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Historical Survey of U.S. Seismograph Stations

GEOLOGICAL SURVEY PROFESSIONAL PAPER 1096

Historical Survey of U.S. Seismograph Stations

By BARBARA B. POPPE

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A listing of seismograph stations, including information on operating organizations, instrumentation, and availability of seismograms

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HISTORICAL SURVEY OF U.S. SEISMOGRAPH STATIONS

By Barbara B. Poppe

ABSTRACT

Although catalogs of seismograph stations have been compiled in the past, there has been no comprehensive modern record of the nearly 1500 stations in the United States. This survey contains the vital information about the stations: who runs them, where they are, what instruments are used, and where the records are kept. For historical interest, information about closed stations that can no longer contribute records to the seismological community is nevertheless included. This survey will be useful for detailed study only in the few years after its release, because the data are constantly in flux. However, significant operators and stations do remain the same, and this information should make station research easier in the next decades.

INTRODUCTION

This publication is a compilation of detailed information about seismograph stations in the United States, the trust territories, Panama, and the Commonwealth of Puerto Rico current to June 1977. Its principal purpose is to provide information on availability of records. Stations no longer offering data are included if specifics about them were available; all information that was available was included, even if incomplete. Not listed are stations about which no information existed beyond a simple reference.

The majority of the information contained in this catalog was obtained from questionnaires sent to each station operator. Much updating and completing of these files was carried on by telephone. The U.S. Geological Survey and Coast and Geodetic Survey (NOAA) files that extend back to the 1930's were helpful in finding information on older stations. References that were of invaluable help are listed at the end of this publication.

The data are presented alphabetically by state and then by the operating institution. In the upper right-hand corner of each page is the State name and the city in which the operating organization is located. Pages are arranged alphabetically, first by in-State addresses and then by out-of-State addresses. Although most networks are confined to one State, those networks that overlap more than one have been split so that the address of the network operator is listed in each State with those stations of the network that are in that State. A listing of the states in which each organization operates stations is included in Appendix 1.

Appendix 2 contains response curves for 11 instrument systems that are broadly used. Each curve is typical of a particular seismometer response, plotted as period vs. relative magnification. Each is normalized to T_o. Appendix 3 is a cross-reference of stations in alphabetic order, and includes station name, state, operating organization, and page reference. The stations coded by NEIS (National Earthquake Information Service) are plotted on region maps in Appendix 4.

A critical point of confusion might arise in the use of station codes. The NEIS maintains a list of internationally recognized codes, which must not be confused with codes that have local validity but conflict with the established, assigned codes. Therefore, all assigned codes are written with no parentheses. Any station that has never contributed data to the NEIS and has consequently never had a code assigned by the NEIS has its local code listed within parentheses. Also in parentheses are codes of stations that have been properly registered and reserved but have not yet submitted data to the NEIS. All codes in parentheses are nonetheless included because they are valuable to anyone wanting to obtain data from a particular station or read published station reports. In some cases both an assigned code and one used by the operating organization exists. When this duplication occurs, both codes are listed, the second being in parentheses.

EXPLANATION OF STATION LISTINGS

General information.--Every effort was made to discern the individual or organization involved with each station. Stations and networks are listed under the operating organization, so that contact can be made directly with that organization for current information and answers to any questions. The records generally are available from the station, except where the data are transferred to a data center. The National Geophysical and Solar-Terrestrial Data Center in Boulder, Colo., is equipped to respond to data requests by supplying copies of the records kept on file; the originals usually reside at the station.

The address and telephone number listed in most cases refer to the operating organization's central location; sometimes this is the address of a station. The different offices of the USGS are treated as separate organizations because the responsibility is distinctly segregated. The Telex number is listed when applicable.

Site information.--"Code" is the three- or four-letter code assigned, either by NEIS or the operator at each location. (The codes does not change in the event of a change in instrumentation or controlling organization; however, a location change of more than 1 km necessitates a new code.) As mentioned above, any code not assigned by NEIS will be in parentheses; if both assigned and local codes exist, they will both be listed. The station name is generally the town closest to the station. Latitude and longitude are listed in degrees and decimal degrees. The four decimal places give the significance of minutes and seconds, but are not always truly significant to that level. Conversion to the four decimals was made from whatever form was supplied by the stations. "Elevation" generally is the elevation of the seismometer. Leaders (---) indicate no data. "Data opened" is the date that the site was occupied and started recording, regardless of which instrument system was involved or which organization was responsible. "Date closed" is the date recording ceased or when the instruments were removed. When no date, not even the year, could be found, the "Date closed" column is merely noted "Closed." Foundation and geologic age are listed whenever this information was available. The information listed under foundation ranges from formation and series names to generic descriptions.

Instrumentation.--Following the code, which is listed again in the instrumentation section, are type (make or design) of seismometer and, if listed, the model number. Most of the types listed are conventional enough to be readily identified. However, some makes may not be familiar; if further information is desired, it should be requested from the operating organization.

"Seismometer component" is most generally listed as Z for vertical, NS for horizontal in a north-south direction, and EW for horizontal in an east-west direction. Conventionally, first motion is N and E on horizontal instruments, and thus, when written as NS and EW, the first letters imply a first-motion direction. When the reverse orientation is known, the component is listed as SN or WE. Unfortunately, the more conventional listing cannot imply absolutely that the convention for first motion is followed. No mention is made of polarity changes that have occurred during a station's operation. Orientations other than these are listed with their compass orientation. If the only information known is that there was a horizontal instrument, it is listed simply as horizontal.

"Seismometer T_o" is the free period of the seismometer, listed in seconds. "Galvo Tg" is the period of the galvanometer. For instrument systems that do not use a galvanometer, the filter characteristics are given, either in seconds or, where noted, in hertz (Hz).

"Type recording" refers to the mode of recording (Helicorder, Develocorder) or the type of records (film, smoked paper).

Magnification of the record is measured at the free period of the seismometer (T_o) unless noted under "Remarks" as measured at another period. Though the magnification can often change, the stated magnifications refer to the most common settings used for a system. High noise level requires lower magnification; low noise level allows higher magnification.

Leaders imply no data available, or in the case of Galvo Tg may indicate that a solid-state amplifier with a filter is used instead of a galvanometer.

Listed under remarks is a variety of data about the particular station's instrumentation. A station recorded off-site is noted as telemetered to another station or location. Newer communications systems, however, now enable various types of transmissions such as microwave, radio, and hard-wire; and these special systems are not delineated from telemetering. Particular standard-instrument networks such as WWSSN (World-Wide Standard Seismograph Network) and SRO (Seismic Research Observatory) are noted.

"Timing system" refers to the clock used and how or if drift is checked. Virtually all currently operating stations now use the National Bureau of Standards broadcast WWV to check times, or WWVB to record directly on the records. In some cases the accuracy may be noted. The NEIS generally requires accuracy to a tenth of a second.

System response curves are presented in Appendix 2. The curves were prepared from those sent by the station. Because the electronics of a system can be easily changed, these curves may not reflect the characteristics of a system at any future time.

Short history.--Information about the station's origin, development, or role in particular research is listed. This history is occasionally quite detailed, but may be only anecdotal. Some information about station reports and records may also be included under history. If no information was available for a history, this heading was omitted.

ACKNOWLEDGMENTS

I am indebted to several individuals for their help during various phases leading to the publication of this volume. Much of the initial data gathering was done by Pamela A. Covington; without her constructive beginnings, I would never have completed this project. Carl W. Stover contributed the computer plots of stations and, along with John S. Derr, provided invaluable support and suggestions. Debbie A. John, Paula K. Smith, Kathleen Gentille, and Jan M. Nevin assisted in the volumes of compilation and cross-checking inherent in this type of work. Helen E. Hodgson maintained unflagging interest in the editorial form of this publication, and I am most appreciative of her efforts.

Additionally, several individual station operators spend generous amounts of time with me clarifying information about their own stations, as well as about other local stations, and this assistance was greatly appreciated.

REFERENCES CITED

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Charlier, Ch. and van Gils, J. M., 1953, Liste des stations seismologiques mondiales: Brussels, Observatoire Royal de Belgique, unpaged.

Covington, P. A., 1974, Seismograph station abbreviations and coordinates: U.S. Geological Survey National Earthquake Information Service, MS 967, Box 25046, Denver Federal Center, Denver, CO 80225, 72 p.

McComb, H. E., and West, C. J., 1931, List of seimological stations of the world, 2d ed.: Nat'l. Research Council Bull., 119 p.

Wood, H. O., 1942, A chronological conspectus of seismologic stations: Seismol. Soc. America Bull., v. 32, no. 2, p. 97-159.

GLOSSARY OF ABBREVIATIONS

AFTAC	Air Force Technical Applications Center.
ARPA	Advance Research Projects Agency.
CIRES	Cooperative Institute for Research in Environmental Science, University of Colorado.
C.I.T.	California Institute of Technology.
Do., do	Ditto.
HGLP	High-Gain Long-Period--standard instruments developed at Lamont-Doherty Geological Observatory and currently maintained by the USGS.
Hz	Hertz (cycles per second).
IGY	International Geophysical Year.
IQSY	International Year of the Quiet Sun.
IRIG-C	A format for time signals, represented in binary-coded decimal (BCD).
K	Thousand. (Magnification of 10 K is the same as 10,000.)
LASA	Large-Aperture Seismic Array.
LRSM	Long-Range Seismic Measurement--an AFTAC project.
M.I.T.	Massachusetts Institute of Technology.
NEIS	National Earthquake Information Service.
NOAA	National Oceanic and Atmospheric Administration.
sec	Second (unit of time).
SRO	Seismic Research Observatory--standard USGS instruments.
USC&GS	U.S. Coast and Geodetic Survey. Many stations and projects run under the USC&GS were eventually transferred within the U.S. Department of Commerce and finally to the U.S. Department of the Interior, as follows:
	USC&GS (U.S. Department of Commerce) to July 1965

USC&GS--Continued

Enviromental Science Services Administration (part of the USC&GS)	July 1965-October 1970
National Ocean Survey (within NOAA)	October 1970-July 1971
Environmental Research Laboratories (within NOAA)	July 1971-September 1973
USGS (U.S. Department of the Interior)	September 1973-present

The NEIS is an example of an office that evolved through this system, previously being called the National Earthquake Information Center in the U.S. Department of Commerce.

USGS	U.S. Geological Survey. Prior to 1973 the USGS was doing seismic research primarily in the National Center for Earthquake Research (NCER) at Menlo Park, Calif. NCER and NEIS, as well as research branches from both Departments, merged to form the Office of Earthquake Studies.
VELA-Uniform	A project funded by ARPA under which several seismic monitoring projects (LRSM, TFO, CPO, etc.) were conducted.
WWSSN	World-Wide Standardized Seismograph Network--standard instruments developed by the USC&GS and currently maintained by the USGS.
WWV and WWVB	Call letters of radio stations of the National Bureau of Standards that continually broadcast time signals. They broadcast at different frequencies and WWVB also includes a time code consistent with Coordinated Universal Time that can be recorded directly on magnetic tape.

Use of brand names in this report is for descriptive purposes only and does not constitute endorsement by the U.S. Geological Survey.

GENERAL INFORMATION

Operated by: Spring Hill College

Address: Seismic Observatory
Spring Hill College
Mobile, AL 36608

Telephone: 205-460-2315

Address to obtain records:

Prior to 1952:

None available.

Pen and ink, since 1952:

Spring Hill College
Mobile, AL 36608

WWSSN records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
SHA	Spring Hill College-----	30.6944	88.1428	61	12/1910	Open--	Unconsolidated clayey sand.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
SHA	Benioff 1051---------	Z	1.0	0.76	Photo paper	6.25 K	WWSSN.
	Benioff 1101---------	NS,EW	1.0	.74	--do-------	6.25 K	Do.
	Sprengnether---------	Z	15.0	100	--do-------	1.5 K	WWSSN. Magnification at 30 sec.
	--do-----------------	NS,EW	15.0	100	--do-------	.75 K	Do.
	Eisele AC transducer-	Z,NS,EW	15.0	---	Pen and ink	5 K	Nonstandard instruments.

Timing system: WWSSN standard used for all instruments at this station.

System response curves: See figure 1, p. 363.

SHORT HISTORY

The Spring Hill College Seismic Observatory began operations in December 1910 with the installation of a Wiechert horizontal instrument. This instrument was operated continuously until 1935, with the exception of 1926. The observatory reopened in 1939 with a Wood-Anderson and, later, acquired a pair of McComb-Rombergs. These latter instruments and the Wiechert were continuously operated from 1941 until 1952, with the exception of the academic year 1947-48. In 1952, with the invention of a novel pick-up and recording system, three new seismometers were constructed--vertical and horizontals. These pen-and-ink units replaced all the previous instruments. After an initial installation in March 1962, WWSSN equipment was relocated in a new thermally insulated structure in June 1963.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(AX-AL)	Alexander City----------	32.8356	86.1764	183	12/03/65	12/13/65	Sand clay.
(AX2AL)	--do----------	32.7772	86.1300	183	3/24/66 1/19/68	1/16/67 1/19/68	---
(BO-AL)	Brewton----------	31.1697	86.8597	76	12/02/65	12/13/65	---
(EU-AL)	Eutaw----------	32.7792	87.8739	43	7/02/63	11/22/64	---
(EU2AL)	--do----------	32.7964	87.8847	43	11/12/66 8/27/69	1/16/67 11/10/69	---

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(AX2AL), (EU-AL), (EU2AL):	Benioff---------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(EU-AL): 70 K	---
	Sprengnether----	Z,NS,EW	20.0	---	--do----------	---	---
(AX-AL), (AX2AL) (2d oper.), (BO-AL), (EU2AL) (2d oper.):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	(AX-AL): 180 K	Portable system.
	Geotech---------	Z,NS,EW	20.0	---	--do---------	---	---

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

GENERAL INFORMATION

Operated by: U.S. Geological Survey and Alabama Geological Survey

Address:

National Center for Earthquake Research
U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025

Alabama Geological Survey
P.O. Drawer "O"
University of Alabama
Tuscaloosa, AL 35486

Telephone: 415-323-8111 ext. 2526 | 205-349-2852

Address to obtain records: As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(DLC)	Deerlick Creek----------	33.2608	87.4448	137	3/10/71	Open--	---
EMA	Elm (South Holt)--------	33.2210	87.4738	92	1/09/71	--do--	---
FLT	Fleetwood---------------	33.2580	87.4095	128	1/09/71	--do--	---
(HLT)	Holt--------------------	33.2223	87.5077	95	1/09/71	--do--	---
LCA (LOG)	Log Cabin (Lake Nichol-- Rd.).	33.3067	87.4683	132	1/09/71	--do--	---
(LDG)	Lodge (Sharpes Rd.)-----	33.2905	87.5350	95	1/09/71	--do--	---
(PEA)	Pea Ridge (Pea Ridge---- Rd.).	33.2553	87.4943	107	1/09/71	--do--	---
PTR (PET)	Peterson----------------	33.2172	87.4333	122	1/09/71	--do--	---
RHA (RHD)	Reichold (East Holt)----	33.2417	87.4660	83	1/09/71	--do--	---
(UOA)	University of Alabama--- (Fox).	33.2110	87.5433	67	1/09/71	--do--	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
All stations	Mark L-4C----------	Z	1.0	---	Develocorder	---	Telemetered to University of Alabama.

Timing system: Not available.

System response curves: See figure 2, p. 363.

SHORT HISTORY

Ten stations were originally set up to monitor seismic activity near a deep disposal well.

Adak, AK

GENERAL INFORMATION

Operated by: National Oceanic and Atmospheric Administration
National Weather Service

Address: Adak Observatory, NOAA
U.S. Naval Station, Box 51
FPO Seattle, WA 97891

Telephone: 907-579-3250 or -3251

Address to obtain records:

Helicorder records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

Develocorder records:

CIRES
University of Colorado
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
ADK	Adak----------	51.8837	176.6844	116	1/66	Open--	Basalt, tuff breccia; Tertiary.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
ADK	Johnson-Matheson----- M/N6480A.	Z	1.25	---	Helicorder	2.5 K	---
	Benioff 1051---------	Z	1.0	---	Helicorder	12.5 K	Magnification also at 1 K, 100, and 10.
					Develocorder	50 K, 1.25 K	---
	Benioff 1101---------	NS,EW	1.0	---	Helicorder	5 K	---
					Develocorder	1 K	---
	Sprengnether---------	Z,NS,EW	20.0	---	Helicorder	500 K	Magnification variable with earthquake.
					Develocorder	50 K	Do.
Remote sites[1]	Benioff 4681---------	Z	1.0	.2	Develocorder	50 K	Located at one of the remote sites.
	Johnson-Matheson----- M/N6480A.	Z	1.25	.2 or filtered	--do--------	50 K	Magnification at 1 sec. Three instruments located at three remote sites.

[1]Four remote sites located 1.609 km north, south, east, and west, respectively, of the main vault.

Timing system: Geotech TG-110 and Geotech 5400.

System response curves: Available from station.

SHORT HISTORY

ADK was started in early 1966 with instrumentation from an LRSM van. The station records data by telemetry from SMY and from the CIRES array.

ALASKA

Anchorage, AK

GENERAL INFORMATION

Operated by: Alaska Methodist University

Address: Alaska Methodist University--Closed
Anchorage, AK
(Obsolete)

Address to obtain records:

National Geophysical and Solsr-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
AMU	Anchorage----------	61.1917	149.8050	53	2/65	12/05/75	Gravels; Quaternary.

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
AMU	Benioff----------	Z,NS,EW	1.0	0.2	Helicorder	20 K	---

Timing system: Sprengnether TS-100.

System response curves: Not available.

SHORT HISTORY

AMU was established at Alaska Methodist University to aid in 1964 aftershock work. It ran intermittently until December 1975. The records that are archived are complete from March 1965 through May 1967. The intermittent recordings are complete through the end of 1971. The rest of the records were kept at the Geology Department of the University and are now lost.

GENERAL INFORMATION

Operated by: Department of the Air Force

Address: 13th Missile Warning Squadron (ADC)
Clear Mews, AK 99704

Telephone: 907-522-3333

Address to obtain records:

Unknown.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CMA	Clear Mews----------	64.2900	149.1800	181	1964	1/74	Unconsolidated, glaciofluvial, sandy gravel; late Pleistocene.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
CMA	Geotech 4681---------	Z	1.0	---	Helicorder	250 K	Two systems: one, part of the warning system; one, a monitor subsystem.

Timing system: Oven-controlled, quartz-crystal frequency standard and Stroboscope, Model 5504.

System response curves: Not available.

SHORT HISTORY

CMA was activated in 1964 in order to give warning of seismic disturbances that might require radar-antenna realinement. Poor location, difficulty in obtaining parts, and excessive maintenance led to deactivation of the station in January 1974.

College, AK

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: College Observatory
Yukon Drive on West Ridge
College, AK 99701

Telephone: 907-479-6146

Address to obtain records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
COL	College Outpost---------	64.9000	147.7933	320	1/64	Open--	Schist; Precambrian.
CMO	College (Fairbanks)-----	64.8600	147.8350	180	1949	1977	Do.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
COL	Benioff 1051---------	Z	1.0	0.75	Photo paper	100 K	WWSSN.
	Benioff 1101- ------	NS,EW	1.0	.75	--do-------	100 K	Do.
	Sprengnether---------	Z,NS,EW	15.0	100.0	--do-------	15 K	Do.
	Benioff MC----------	Z	1.0	.52	--do-------	350 K	Nonstandard instrument.
CMO	Wilson-Lamison-------	Z	1.1	1.1	Pen and ink	---	Not producing quality records.
	Wenner---------------	NS	8.2	11.8	--do-------	---	---

Timing system: WWSSN standard.

System response curves: COL, see figure 1, p. 363.

SHORT HISTORY

The earliest magnetic and seismic monitoring began in 1935 in the Eielson Memorial Building on the campus of the University of Alaska, as a cooperation between the University and the USC&GS. The College Magnetic Observatory was started in 1948 and has been operated by a succession of Government agencies since that time.

CMO has been located on the campus of the University of Alaska since 1949. It housed the Benioff MC, as well as the Wilson-Lamison and Wenner; it also operated several strong-motion instruments from 1965 to 1977. The Wenner was used in the Tsunami Warning System until 1976. CMO records (photo paper) are on file in Boulder, Colo., through 1972.

COL was established as a WWSSN station.

ALASKA

College, AK

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: Barrow Observatory--Closed
c/o College Observatory
College, AK 99701
(Obsolete)

Address to obtain records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BRW	Barrow----------	71.3033	156.7484	-1.5	1/65	6/75	Silt over sand.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
BRW	Wilson-Lamison-------	Z	1.1	0.5	Photo paper	75 K	Magnification varies with background noise level.

Timing system: Sprengnether frequency standard.

System response curves: Not available.

SHORT HISTORY

The seismic program was initiated at the Barrow Observatory by the USC&GS in the fall of 1957, although the records presently available date back only to 1965. The program terminated in April 1975, the instruments finally being shut down in June.

GENERAL INFORMATION

Operated by: University of Alaska

Address: Seismology Laboratory
Geophysical Institute of
the University of Alaska
Fairbanks, AK 99701

Telephone: 907-479-7320

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
AGI	Augustine Island--------	59.3800	153.4200	580	8/71	1/76	---
ANV	Anvil Mountain----------	64.5655	165.3717	330	8/76	Open--	---
(AUF)	Augustine Island--------	59.3878	153.4590	166	9/75	--do--	---
(AUK)	---do-------------------	59.3342	153.4270	259	9/75	--do--	---
(AUM)	---do-------------------	59.3710	153.3528	106	9/75	--do--	---
(AUP)	---do-------------------	59.3622	153.4205	1033	9/75	--do--	---
BDP	Broad Pass--------------	63.2312	149.2593	709	8/71	9/76	---
BI1	Barter Islands----------	70.1318	143.6417	10	9/75	Open--	---
BI2	---do-------------------	69.6235	145.8952	1100	9/75	--do--	---
BI3	---do-------------------	69.5847	144.3707	690	9/75	--do--	---
BI4	---do-------------------	69.5202	142.9800	745	9/75	--do--	---
(BMT)	Blue Mountain-----------	58.0467	158.3367	550	1975	--do--	---
BRH	Birch Hill--------------	64.8648	147.6403	330	7/9/70	8/10/72	---
CCB	Clear Creek Butte-------	64.6480	147.8053	183	2/25/71	1/1/75	---
(CDA)	Cape Douglas------------	58.9553	153.5295	390	1974	Open--	---
(CHI)	Chirikof Island---------	65.8378	155.5797	250	8/75	--do--	---
(CHO)	Chowiet Island----------	56.0333	156.7117	250	1974	--do--	---
CNA	Cantwell----------------	63.3963	148.9450	700	8/71	9/76	---
DDM	Donnelly Dome-----------	63.7872	145.8617	920	9/77	Open--	---
DMA	Devil Mountain----------	66.3130	164.5220	240	8/77	--do--	---
(DMB)	Dead Man Bay------------	57.0872	153.9605	300	10/75	--do--	---
ELV	Elvey-------------------	64.8603	147.8487	180	8/71	8/72	---
ENG	Engineer Hill-----------	64.7352	147.0460	220	9/7/71	6/76	---
(FLP)	Featherly Pass----------	57.7012	156.2650	485	10/75	Open--	---
FYU	Fort Yukon--------------	66.5660	145.2317	137	2/9/72	--do--	---
FY1	---do-------------------	67.2657	148.9755	1040	9/75	--do--	---
FY2	---do-------------------	67.1193	147.1163	670	9/75	--do--	---
FY3	---do-------------------	68.1460	145.6927	1440	9/75	--do--	---

SITE INFORMATION--Continued

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
FY4	Fort Yukon----------	67.4545	146.2117	790	9/75	Open--	---
FY5	---do----------	67.1418	143.2403	560	9/75	--do--	---
GIA	Geophysical Institute---	64.8600	147.8350	158	6/69	1/71	---
GKC	Gold King Creek---------	64.1787	147.9347	490	7/76	Open--	---
GLM	Gilmore Dome----------	64.9873	147.3890	720	8/68	--do--	---
(HDA)	Harding Lake----------	64.4058	146.9538	450	9/77	--do--	---
(HOM)	Homer----------	59.6583	151.6433	198	8/76	--do--	---
HPP	Hepp----------	64.7905	147.9592	170	11/9/71	6/76	---
HUR	Hurricane----------	62.9788	149.6462	510	8/71	6/75	---
KTA	Kotzebue----------	66.8572	162.6112	25	8/76	Open--	---
LVY	Levy----------	64.2167	149.2533	230	7/72	--do--	---
(MAA)	Maars----------	57.8567	153.0803	131	5/20/77	--do--	---
MCB	Moose Creek Bluff-------	64.7283	147.2100	200	9/68	9/71	---
MCK	McKinley----------	63.7323	148.9350	610	12/64	Open--	---
(MCN)	McNeil River----------	59.1010	154.1998	273	1975	--do--	---
MCR	Mercer----------	63.9852	149.0503	456	9/71	7/75	---
MIK	Minitrack----------	64.8723	147.8280	160	5/70	3/75	---
(MMC)	Middle Cape----------	57.3333	154.6350	340	1975	Open--	---
NEA	Nenana----------	64.5892	149.0657	400	8/71	--do--	---
NRA	North River----------	63.8918	160.5143	105	8/76	--do--	---
(OPT)	Oil Point----------	59.6527	153.2297	625	1974	--do--	---
PAX	Paxson----------	62.9708	145.4687	1130	7/69	--do--	---
PJD	Pedro Dome----------	65.0350	147.5083	740	1/67	11/71	---
(PNM)	Pinnacle Mountain-------	56.8050	157.5833	442	1974	Open--	---
(PUB)	Puale Bay----------	57.7733	155.5167	280	1974	--do--	---
(RAI)	Raspberry Island--------	58.0605	153.1592	520	10/75	--do--	---
RDS	Richard D. Siegrest-----	64.8265	148.1447	510	6/77	--do--	---
(RED)	Redoubt Volcano---------	60.4190	152.7720	1067	1974	--do--	---
RON	Remote----------	62.6912	150.2037	470	8/71	10/74	---
(SCF)	Sheep Creek Facility----	61.9947	150.0392	67	8/71	6/75	---
SCM	Sheep Creek Mountain----	61.8333	147.3277	1020	6/66	Open--	---
SCT	Scotty Lake----------	62.3192	150.2972	140	8/71	6/75	---
(SHU)	Shuyak Island----------	58.6280	152.3488	34	1974	Open--	---
(SII)	Sitkinak Island---------	56.5600	154.1820	500	10/75	--do--	---
(SKS)	Sitkalidak Island-------	57.1642	153.0803	135	8/11/77	--do--	---

SITE INFORMATION--Continued

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(SPL)	Spiridon Lake----------	57.7592	153.7713	600	10/75	Open--	---
SSH	Sunshine----------	62.1667	150.0777	100	8/71	9/72	---
TNA	Tin City----------	65.5617	167.4367	50	8/76	Open--	---
TNN	Tanana----------	65.2567	151.9117	504	1/65	--do--	---
(UKL)	Utashik Lake----------	57.4017	156.8550	410	10/75	--do--	---
(YCB)	Yellow Creek Bluff------	56.6483	158.6817	320	1974	--do--	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
AGI, (AUF), (AUK), (AUM), (AUP), (MAA), (MCH), (OPT), RED, (SHU):	Mark L-4C----------	Z	1.0	---	Develocorder	---	Telemetered to HOM.
ANV:	Geotech 18300--------	Z	1.0	---	Develocorder	---	Do.
	Geotech SL-210-------	Z	Long	---	---do-------	---	Do.
BDP, ENG, HPP, HUR, MCR, RON, (SCF), SCT, TNA, TNN:	Geotech S-13---------	Z	1.0	---	---do-------	---	---
BI1, BI2, BI3, BI4, FY1, FY2, FY3, FY4, FY5, FYU:	Geospace HS-1-1-B----	Z	1.0	---	---do-------	---	Telemetered to Fairbanks.
(BMT), (CDA), (CHO), (MMC), (PNM), (PUB), (YCB):	Geotech 18300--------	Z	1.0	---	---do-------	---	Telemetered to HOM.
BRH, ELV:	Geotech S-13---------	Z	1.0	---	---do-------	---	---
CCB, LVY, MCB, PJD:	Geotech 18300--------	Z	1.0	---	---do-------	---	Telemetered to Fairbanks.
(CHI), (DMB), (FLP), (HOM), (RAI), (SII), (SKS), (SPL), (UKL):	Ranger----------	Z	1.0	---	---do-------	---	Telemetered to HOM.
CNA:	Geotech 18300--------	Z	1.0	---	Magnetic tape	---	---
DDM, DMA, GKC, (HDG), KTA, MCK, NEA, NRA, PAX, RDS, SCM:	---do----------	Z	1.0	---	Develocorder	---	Telemetered to Fairbanks.

Fairbanks, AK

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
GIA:	Geotech 18300--------	Z	1.0	---	Helicorder--	---	Telemetered to Fairbanks.
GLM, MCK, MIK, SSH:	UED SD-215----------	Z,NS,EW	1.0	---	Develocorder	---	The six-component system was reduced to only short-period Z and EW. GLM and MCK are telemetered to Fairbanks.
	---do----------	Z,NS,EW	20.0	---	---do-------	---	

Timing system: Tracor Inc. Model 05 crystal clock referenced to WWV.

System response curves: Available from station.

SHORT HISTORY

BLR and SVW were originally owned by the University of Alaska and were transferred to the Alaska Tsunami Warning Center on September 4, 1971, and August 24, 1972, respectively. See ALASKA, Palmer, for the listing of these stations.

BIG was originally owned and operated by the University of Alaska and was transferred to the USGS at Menlo Park, Calif., on July 31, 1972. See ALASKA, Menlo Park, for the listing.

The Institute plans to publish a quarterly bulletin of Alaskan earthquakes starting in November 1977.

GENERAL INFORMATION

Operated by: National Oceanic and Atmospheric Administration
National Weather Service

Address: Alaska Tsunami Warning Center (formerly Plamer Observatory)
P.O. Box Y
Palmer, AK 99645

Telephone: 907-745-4212

Address to obtain records:

Helicorder records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

Develocorder records:

Alaska Tsunami Warning Center
P.O. Box Y
Palmer, AK 99645

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BLR	Black Rapids----------	63.5017	145.8450	809	3/65	Open--	Schist; Devonian.
(CDA)	Cold Bay----------	55.2700	162.8961	---	8/70	11/70	Undifferentiated; Quaternary.
CSA	Cape Sarichef----------	54.5944	164.8750	152	11/28/70	5/18/71	Volcanics; Quaternary.
GIL	Gilmore Creek----------	64.9750	147.4950	350	10/13/67	Open--	Schist; Precambrian.
GMA	Granite Mountain--------	65.4286	161.2319	858	9/17/70	--do--	Granite; Cretaceous.
IMA	Indian Mountain---------	66.0683	153.6786	1380	8/05/71	--do--	Andesitic volcanics; Late Jurassic-Early Cretaceous.
KDC	Kodiak----------	57.7478	152.4917	13	4/02/64	--do--	Surficial gravels; Jurassic and (or) Cretaceous.
MID	Middleton Island--------	59.4278	146.3389	37	4/10/64	--do--	Mudstones, siltstones, and sandstones of Yakataga Formation; Miocene to Holocene.
NIK	Nikolski----------	52.9743	168.8528	207	5/17/71	--do--	Metamorphics and plutonics; Tertiary.
PMA	Port Moller----------	55.9786	160.4972	314	9/06/72	--do--	Volcanics; Pliocene.
PMR	Palmer----------	61.5922	149.1308	100	9/01/67	--do--	Tuff; Mesozoic.
PMS	Palmer South---------- (Arctic Valley).	61.2447	149.5606	716	5/25/67	--do--	Metaclastics and metavolcanics of the McHugh Complex; Late Jurassic and (or) Cretaceous.
PWA	Palmer West---------- (Houston).	61.6508	149.7133	137	5/23/67	--do--	Shallow glacial debris (Holocene), underlain by shales, sandstones, and coal beds (Tertiary).
SMY	Shemya----------	52.7308	174.1031 E.	58	11/17/70	--do--	Basement rocks (siliceous rock, argillite, and conglomerates); Tertiary.
SVW	Sparrevohn----------	61.1081	155.6217	762	8/67	--do--	Shale and sandstones; Cretaceous.
TOA	Tolsona----------	62.1047	146.1722	909	9/15/71	--do--	Sandstone; Tertiary.
TTA	Tatalina----------	62.9300	156.0219	914	8/10/72	--do--	Granitic intrusive; Tertiary.

Palmer, AK

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
BLR	Geotech S-13---------	Z	1.0	---	Helicorder	50 K	Telemetered to PMR.
(CDA)	---	---	---	---	---	---	---
CSA	---	---	---	---	---	---	---
GIL	Geotech S-13---------	Z	1.0	0.2	Develocorder	200 K	Telemetered to PMR.
					Helicorder	100 K	Do.
GMA	--do-----------------	Z	1.0	---	Develocorder	200 K	Do.
					Helicorder	50 K	Do.
IMA	--do-----------------	Z	1.0	.2	Develocorder	200 K	Do.
KDC	Geotech 4681A--------	Z	1.0	.2	Develocorder	50 K	Do.
					Helicorder	12.5 K	Do.
MID	--do-----------------	Z	1.0	.2	Develocorder	6 K	Do.
					Helicorder	1.6 K	Do.
MLP	---	---	---	---	---	---	---
NIK	Geotech S-13---------	Z	1.0	---	Develocorder	12 K	Telemetered to PMR.
					Helicorder	6 K	Do.
PMA	--do-----------------	Z	1.0	---	Develocorder	6 K	Do.
PMR	Geotech 4681---------	Z	1.0	---	Develocorder	10,000 K	---
					Helicorder	.01, .1, 1 K	---
	Geotech 6102---------	SN,WE	1.0	---	Helicorder	1 K	---
	Geotech 7505A--------	Z	20.0	---	--do------	.1, 1 K	---
	Geotech 8700C--------	SN,WE	20.0	---	--do------	.1, 1 K	---
PMS	Geotech S-13---------	Z	1.0	.2	Develocorder	100 K	Telemetered to PMR.
PWA	--do-----------------	Z	1.0	.2	--do--------	100 K	Do.
SMY	--do-----------------	Z	1.0	---	Develocorder	12 K	Do.
					Helicorder	3 K	Do.
	--do-----------------	Z	20.0	---	Helicorder	.01, .1, 1 K	Do.
SVW	--do-----------------	Z	1.0	---	Develocorder	100 K	Do.
TOA	--do-----------------	Z	1.0	---	--do--------	50 K	Do.
TTA	--do-----------------	Z	1.0	---	Develocorder	200 K	Do.
					Helicorder	100 K	Do.

Timing system: Geotech 19000.

System response curves: See figure 4, p. 364.

SHORT HISTORY

PMR records all the stations in the Alaska Tsunami Warning System and is the headquarters for the Alaska Regional Seismological Network.

BLR was previously equipped and operated by the University of Alaska Geophysical Institute and was transferred to Palmer on September 4, 1971.

SVW Sparrevohn was previously operated by the University of Alaska and was transferred on August 24, 1974.

ALASKA

Petersburg, AK

GENERAL INFORMATION

Operated by: Petersburg Public School
Geology students

Address: Petersburg Public School
P.O. Box 289
Petersburg, AK 99833

Telephone: 907-772-4434

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(PSA)	Petersburg----------	56.8083	133.9533	17	12/75	Open--	Slate, phyllite, graywacke; Cretaceous.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(PSA)	Geotech S-13---------	Z	1.0	---	Helicorder	10 K	Magnification estimated.

Timing system: Geotech TG-120.

System response curves: Not available.

SHORT HISTORY

(PSA) was started as a high school project under the direction of Paul Bowen, an instructor at the school.

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
Box 158
Sitka, AK 99835

Telephone: 907-747-3332

Address to obtain records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BIO	Biorka----------	56.8517	135.5583	61	6/08/67	5/70	Hornblende-biotite granodiorite; Cretaceous.
SIT	Sitka----------	57.0569	135.3244	19	1940	Open--	Sitka Graywacke; Late Jurassic and Early Cretaceous.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
BIO	Geotech S-13---------	Z	1.0	0.2	Helicorder	50 K	Telemetered to SIT and PMR.
SIT	Benioff 4681A--------	Z	1.0	.2	Pen and ink	25 K	Telemetered to PMR.
	Wenner----------	NS,EW	7.0	15.0	Photo paper	Uncalibrated	---

Timing system: Sprengnether TS-100 Crystal Chronometer.

System response curves: SIT--see figure 4, p. 364.

SHORT HISTORY

Recording in Sitka began in 1904 at the Astronomical Observatory using a two-component horizontal Bosch-Omori. Wenner horizontal components replaced the Bosch-Omori in 1932; they were refurbished in 1941-42. The instruments were moved to the present SIT location in September 1940. A Wilson-Lamison short-period vertical instrument was added in 1956. The Benioff mentioned above was installed in January 1972 and is recorded concurrently at the Alaska Tsunami Warning Center.

BIO was founded in 1967 to enhance the regional capabilities of Sitka, but it proved to be too noisy.

ALASKA

Boulder, CO

GENERAL INFORMATION

Operated by: University of Colorado

Address: CIRES
University of Colorado
Boulder, CO 80309

Telephone: 303-492-8028

Address to obtain records:

CIRES
University of Colorado
Boulder, CO 80309

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
AD1	Great Sitkin----------	52.0233	176.1517	244	1974	Open--	Basalt; Tertiary.
AD2	Umak----------	51.9033	176.0183	381	1974	--do--	Volcanics; Tertiary.
AD3	Kagalaska----------	51.7428	176.3569	198	1974	--do--	Do.
AD4	Hidden Bay----------	51.6986	176.6325	213	1974	--do--	Do.
AD5	Yakak----------	51.6289	176.9252	152	1974	--do--	Do.
AD6	South Kanaga----------	51.7083	177.2417	137	1974	--do--	Do.
AD7	North Kanaga----------	51.9000	177.0900	244	1974	--do--	Basalt; Tertiary.
AD8	Adagdak----------	51.9806	176.6003	259	1974	--do--	Do.
AK1	West Kanaga----------	51.6650	177.6417	61	1975	--do--	Volcanics; Tertiary.
AK2	South Tanaga----------	51.6633	177.9300	99	1975	--do--	Do.
AK3	North Tanaga----------	51.8067	177.8200	351	1975	--do--	Do.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
All stations	Mark L-4C----------	Z	1.0	---	Develocorder	---	---
	--do----------	EW	1.0	---	--do--------	---	---

Timing system: Geotech Model TG-110 and 5400.

System response curves: See figure 2, p. 363.

SHORT HISTORY

These stations constitute a micro-earthquake network, centered on Adak, installed under a USGS grant to study earthquake prediction in an active subduction zone.

All the AK stations were previously known as AT's and were changed as of October 1976.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:
Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(AA-IS)	Atka----------	52.2117	174.2036	6	7/12/67	9/08/67	---
(AC-IS)	Amchitka----------	51.3894	179.3425 E.	61	7/06/67	9/10/67	---
(AD-IS)	Adak Island----------	51.8750	176.6792	61	7/24/64	3/22/66	Glacial drift.
(BQ-AK)	Bethel----------	60.7789	161.8836	46	7/06/67	9/10/67	---
(FB-AK)	Fairbanks----------	64.9519	148.2842	716	9/03/68	10/10/68	Schist.
(FB2AK)	--do----------	64.9100	147.4464	343	6/09/70	6/14/71	---
(SP-IS)	St. Paul----------	57.1542	170.2181	10	7/02/67	9/10/67	---
(SQ-IS)	Shemya----------	52.7269	174.1092	61	7/14/67	9/10/67	---

INSTRUMENTATION

Code	Seismometer			Galvo	Type	Magnification	Remarks
	Type	Component	T_o (sec)	T_g (sec)	recording	at T_o	
(AA-IS), (BQ-AK), (SP-IS), (SQ-IS):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.
(AC-IS):	Geotech S-13----	Z,NS,EW	1.0	---	--do---------	---	Do.
	Geotech---------	Z,NS,EW	20.0	---	--do---------	---	Do.
(AD-IS), (FB-AK):	Benioff---------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	AD-IS: 40 K	---
	Sprengnether----	Z,NS,EW	20.0	---	--do----------	FB-AK: 250 K	---
(FB2AK):	Sprengnether----	Z,NS,EW	20.0	---	--do----------	---	---

Garland, TX

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
3060 South Highland Dr.
Las Vegas, NV 89109

Telephone: 702-734-3416

Address to obtain records:

As above.

Available only on 16-mm film on a limited basis.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
ACA	Amchitka Central A------	51.4809	179.1193	42	5/08/71	12/11/72	Hardrock.
ACB	Amchitka Central B------	51.4626	179.0909	47	5/08/71	6/31/72	Do.
ACC	Amchitka Central C------	51.4843	179.0431	26	5/08/71	6/31/72	Do.
ACD	Amchitka Central D------	51.4282	179.1366	37	5/08/71	6/31/72	Do.
ACE	Amchitka Central E------	51.4005	179.1728	9	5/08/71	6/31/72	Marsh.
ACF	Amchitka Central F------	51.5258	178.9941	62	5/08/71	6/31/72	Hardrock.
AMA	Amatignak Island--------	51.2884	179.1093	503	10/09/70	4/30/73	Do.
ANA	Amchitka----------	51.6277	178.6564	133	8/25/69	4/30/73	Do.
ANB	Chitka Cove----------	51.6062	178.7917	160	10/14/70	4/30/71	Do.
AND	Amchitka----------	51.5623	178.9534	186	7/18/70	4/30/73	Do.
ASB	--do----------	51.3604	179.2474	34	5/25/69	4/30/73	Marsh.
ASC	--do----------	51.4631	179.1583	40	7/28/69	12/11/72	Hardrock.
ASD	--do----------	51.3907	179.3421	61	5/29/69	4/30/73	Marsh.
LSI	Little Sitkin Island----	51.9197	178.5338	---	10/20/70	6/30/72	Hardrock.
RAT	Rat Island----------	51.7991	178.3301	226	10/14/70	4/30/73	Do.
SSI	Semisopochnoi Island----	51.8924	179.5883	178	10/17/70	4/30/73	Do.

INSTRUMENTATION

Code	Seismometer			Galvo	Type recording	Magnification at T_o	Remarks
	Type	Component	T_o (sec)	T_g (sec)			
ACA	Mark L-4C----------	Z	1.0	DC to 16 Hz	Develocorder	---	---
ACB	--do----------	Z	1.0	DC to 34 Hz	Magnetic tape	---	---
ACC	--do----------	Z	1.0	--do-------	--do---------	---	---

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
ACD	Mark L-4C----------	Z	1.0	DC to 34 Hz	Magnetic tape	---	---
ACE	--do----------	Z	1.0	--do-------	--do---------	---	---
ACF	--do----------	Z	1.0	--do-------	--do---------	---	---
AMA	Geotech S-13---------	Z	1.0	DC to 16 Hz	Helicorder, Develocorder.	---	---
	Hall-Sears HS-10-----	NS,EW	1.0	--do-------	--do--------	---	---
ANA	Geotech S-13---------	Z	1.0	--do-------	--do--------	---	---
ANB	--do----------	Z,NS,EW	1.0	--do-------	Develocorder	---	---
AND	--do----------	Z	1.0	--do-------	Helicorder, Develocorder.	---	---
ASB	NGC-21----------	Z,NS,EW	1.0	--do-------	--do--------	---	---
ASC	Mark L-4C----------	Z	1.0	--do-------	--do--------	---	---
ASD	NGC-21----------	Z	1.0	--do-------	--do--------	---	---
LSI	---	---	---	---	---	---	---
RAT	Geotech S-13---------	Z	1.0	DC to 16 Hz	Helicorder, Develocorder.	---	---
	Hall-Sears-10--------	NS,EW	1.0	--do-------	--do--------	---	---
SSI	Geotech S-13---------	Z	1.0	--do-------	--do--------	---	---
	Hall-Sears-10--------	NS,EW	1.0	--do-------	--do--------	---	---

Timing system: Automatic recording of WWV.

System response curves: See figure 2, p. 363.

SHORT HISTORY

All these stations were established to monitor the seismicity of the area in order to assess what effect, if any, nuclear testing had on the seismicity.

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: Alaska Seismic Project
National Center for Earthquake Research
345 Middlefield Road
Menlo Park, CA 94025

Telephone: 415-323-8111 ext. 2510 or 2579

Address to obtain records:

National Center for Earthquake Research
345 Middlefield Road
Menlo Park, CA 94025

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(BAL)	Baldy----------	61.0362	142.3445	1300	8/24/73	Open--	---
(BCS)	Bancas Point----------	59.9483	139.6167	10	6/25/76	--do--	---
(BGA)	Beluga----------	61.2223	150.9658	20	10/08/75	3/25/76	---
BIG	Big Mountain----------	59.3890	155.2170	567	1966	Open--	---
(BLY)	Burwash Landing--------- (Canada).	61.3725	139.0260	799	7/22/74	--do--	---
CFI	College Fiord----------	61.1827	147.7665	3	7/31/74	--do--	---
(CGB)	Congabuna----------	61.0690	151.4525	160	10/08/75	3/25/76	---
CHX	Chaix Hills----------	60.0667	141.1183	793	9/04/74	Open--	---
CKK	Chekok----------	59.9597	154.2332	732	7/29/72	--do--	---
CVA	Cordova----------	60.5465	145.7493	90	8/31/71	--do--	---
(DSB)	Disenchantment---------	60.0767	139.5450	640	9/08/74	6/08/76	---
DSK	Disk Island----------	60.5020	147.6468	15	7/27/74	10/18/75	---
ERN	Ernestine----------	61.4442	145.1123	570	9/16/71	8/29/73	---
FID	Fidalgo----------	60.7288	146.5965	488	10/07/74	Open--	---
FIS	Fire Island----------	61.1442	150.2185	76	9/24/74	5/04/76	---
(GLB)	Gilahina Butte---------	61.4418	143.8105	845	8/25/73	Open--	---
(GLC)	Glacier Island---------	60.8907	147.0725	3	7/24/72	--do--	---
(GYO)	Guyot Hills----------	60.1463	141.4715	183	6/01/76	--do--	---
HIN	Hinchinbrook----------	60.3968	146.5017	611	10/03/74	--do--	---
HQN	Harlequin Lake---------	59.4517	138.8770	372	10/01/74	--do--	---
ILM	Iliamna----------	60.1820	152.8162	550	8/07/71	--do--	---
KLU	Klutina----------	61.4928	145.9202	1012	7/22/72	--do--	---
(KMP)	Kimball Pass----------	61.5143	145.0298	1103	---	--do--	---

SITE INFORMATION--Continued

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
KNK	Knik	61.4125	148.4557	595	8/11/73	Open--	---
KTM	Katmai	58.3247	155.3765	945	7/27/73	8/24/75	---
KYK	Kayak Island	59.8683	144.5232	375	10/02/74	Open--	---
MLA (MLS)	Malaspina	59.7633	140.1500	46	9/04/74	--do--	---
(MRN)	Martin River	60.5350	144.0083	957	8/22/75	1/15/76	---
MPA (MSP)	Moose Pass	60.4892	149.3607	150	8/05/73	Open--	---
MTG	Montague Island	59.9118	147.4970	31	10/03/74	--do--	---
NGL	North Gasline	60.8208	149.9982	122	9/26/74	3/25/76	---
NIN	Ninilchik One	60.0112	151.5355	110	8/28/71	8/24/72	---
NKA	Nikishka	60.7430	151.2380	100	9/10/71	Open--	---
NNL	Ninilchik	60.0422	151.2963	366	8/24/72	--do--	---
NTK	Nunatak	59.8777	139.0352	1050	10/31/75	--do--	---
(PCL)	Point Campbell	61.1428	150.0155	90	9/04/73	9/15/74	---
PCA (PIN)	Pinnacle	60.0967	140.2567	975	9/05/74	Open--	---
PNL	Peninsula	59.6687	139.3970	579	9/02/74	--do--	---
PTE (PRG)	Portage	60.8645	149.0237	55	8/29/72	--do--	---
(PTR)	Potter	61.0575	149.7292	695	8/12/73	9/15/74	---
PWL	Port Wells	60.8593	148.3348	549	8/03/74	Open--	---
RDT	Redoubt	60.5738	152.4062	930	8/09/71	--do--	---
(RGD)	Ragged Mountain	60.2192	144.5457	610	9/30/74	--do--	---
(RIU)	Riou	59.8783	141.2283	15	8/03/76	--do--	---
SML (SAW)	Sawmill	61.8082	148.3330	740	8/31/73	--do--	---
(SEG)	Seven Egg River	60.9577	150.6773	3	10/08/75	10/23/75	---
(SGA)	Sherman Glacier	60.5012	145.2070	424	8/16/76	Open--	---
SKL	Skilak	60.5143	150.2152	660	9/09/71	--do--	---
SKT (SKN)	Skwentna	61.9803	151.5297	564	8/08/72	--do--	---
SLV	Seldovis	59.4713	151.5805	91	9/30/72	--do--	---
SPU	Spurr	61.1817	152.0543	800	8/10/71	--do--	---

SITE INFORMATION--Continued

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
SUA (SSN)	Susitna----------	61.4638	150.7433	1297	8/15/72	--do--	---
SNH (SSP)	Sunshine Point----------	60.1800	142.8383	732	9/10/74	--do--	---
SST	Susitna One----------	61.4342	150.7803	780	8/24/71	8/15/72	---
SGA (STG)	Stephens Glacier-------	61.4207	146.3948	1326	7/11/74	1/28/76	---
STY	Stony River----------	61.1445	154.2018	1047	7/24/72	1/29/75	---
SUK	Suckling Hills---------	60.0767	143.7833	427	10/02/74	Open--	---
SEW (SWD)	Seward----------	60.1037	149.4493	55	8/22/72	--do--	---
TLK	Talkeetna Mountains----	62.4938	147.8780	1719	7/10/74	11/11/75	---
(TSI)	Tsina----------	61.2262	145.3373	1113	---	Open--	---
VLZ	Valdez----------	61.1315	146.3320	10	9/02/71	--do--	---
VZS	Valdez South----------	61.0442	146.3053	668	7/22/72	3/27/76	---
VZW	Valdez West----------	61.0590	146.5540	796	7/17/72	Open--	---
(WAX)	Waxell Ridge----------	60.4500	142.8517	975	8/22/75	--do--	---
WLM	Willow Mountain--------	61.7736	145.1981	988	2/29/72	6/14/72	---
WRG	White River Glacier----	60.0378	142.0317	550	9/10/74	Open--	---
YAH	Yahtse----------	60.3633	141.7450	2135	9/05/74	--do--	---
YKT	Yakutat----------	59.4517	138.8770	372	10/06/72	9/30/74	---
(YKG)	Yakataga----------	60.0700	142.4222	60	10/08/72	Open--	---
(YTT)	Yakutat Wa----------	59.5793	139.5120	15	9/14/73	9/30/73	---

INSTRUMENTATION

Code	Seismometer			Galvo	Type recording	Magnification at T_o	Remarks
	Type	Component	T_o (sec)	T_g (sec)			
All Stations	Mark L-4C----------	Z	1.0	---	Develocorder, magnetic tape.	---	BLY records on heat-sensitive paper.
GLB, RDT, SKN, and VLZ also have:	Hall-Sears HS-10-----	NS,EW	2.0	---	--do----------	---	NKA, PRG, and SSP also had horizontals at one time.

Timing system: Geotech 19000.
BLY uses an Electronics Research digital chronometer with WWV signals superimposed on the trace at the beginning and end of the record.

System response curves: See figure 2, p. 363.

SHORT HISTORY

BIG was previously operated by the University of Alaska and was transferred on July 31, 1972 to the USGS.
YKT was renamed HQN on October 1, 1974.
YKG was closed from September 11, 1974, to June 2, 1976.

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
Menlo Park, CA

Address to obtain records:

UNA:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
ADA	Adak (Finger Bay)-------	51.8633	176.6550	---	7/49	4/54	---
MFA	Mitchell Field----------	51.9350	176.5917	---	7/49	after 1952	---
SBY	Sand Bay----------	51.9976	176.0920	---	8/48	after 1951	---
UNA	Unalaska----------	53.8733	166.5333	---	4/06/54	9/10/56	---

INSTRUMENTATION

Code	Seismometer			Galvo	Type	Magnification	Remarks
	Type	Component	T_o(sec)	T_g(sec)	recording	at T_o	
ADA	HVO----------	NS,EW	7.5	---	Smoked paper	---	---
MFA	Sprengnether----------	Z,NS,EW	?, 1.2, 0.7	---	---	---	---
SBY	Condenser type-------	Z,NS,EW	---	---	Pen and ink	---	---
UNA	Wilson-Lamison-------	Z	1.0	---	Photo paper	---	---

Timing system: Not available.

System response curves: Not available.

SHORT HISTORY

UNA was installed by the USGS with a seismometer on loan from the USC&GS.

These stations were installed and operated by Austin Jones until his departure from Alaska.

GENERAL INFORMATION

Operated by: Lamont-Doherty Geological Observatory
of Columbia University

Address: Department of Seismology
Lamont-Doherty Geological Observatory
Columbia University
Palisades, NY 10964

Telephone: 914-359-2900

Address to obtain records:

Photo records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

Digital output:

Teledyne-Geotech
Seismic Data Analysis Center
314 Montgomery St.
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
FBK	Fairbanks----------	64.8994	148.0056	330	9/70	4/72	Schist; early Precambrian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
FBK	Geotech-7505A--------	Z	30.0	100.0	Photo paper	50-80 K	---
	Geotech-8700C--------	NS,EW	30.0	100.0	Magnetic tape	---	---

Timing system: Specific Products Model WVTR.

System response curves: Available from station.

SHORT HISTORY

FBK was part of a long-period seismological research program sponsored by ARPA and contrafted to Columbia University.

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
Center of Astrogeology
601 E. Cedar Ave.
Flagstaff, AZ 86001

Telephone: 602-774-5261

Address to obtain records:

July-September 1972:

Department of Geology
Box 6030
Northern Arizona University
Flagstaff, AZ 86001

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
FLG	Flagstaff----------	35.2932	111.7024	2445	11/66	9/72	Volcanic flows and ash beds.

INSTRUMENTATION

Code	Seismometer			Galvo	Type recording	Magnification at T_o	Remarks
	Type	Component	T_o(sec)	T_g(sec)			
FLG	Sprengnether 5007---- PS-100-4S.	Z,NS,EW	20.0	---	Pen and ink	---	---

Timing system: Sprengnether TS-100.

System response curves: Not available.

SHORT HISTORY

The station was originated in an effort to study planetary bodies in conjunction with the lunar seismic system.

ARIZONA

Flagstaff, AZ

GENERAL INFORMATION

Operated by: Sunset Crater National Monument

Address: Supervisory Park Ranger
Sunset Crater National Monument
Tuba Star Route
Flagstaff, AZ 86001

Telephone: 602-526-0586

Address to obtain records:

As above.

Recording erratic; a few tapes are on file for display purposes only.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
SCN	Sunset Crater National Monument.	35.3689	111.5425	2121	7/20/70	Open--	Bonita lava flow.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
SCN	Benioff----------	Z	1.0	---	Magnetic tape	---	---

Timing system: Kinemetrics TS-1.

System response curves: Not available.

SHORT HISTORY

SCN was installed and equipped by Willard L. Groene. It is not manned by a seismologist, has encountered many maintenance difficulties, and is mainly used for display purposes.

GENERAL INFORMATION

Operated by: Air Force Technical Applications Center

Address: Tonto Forest Seismological Observatory--Closed
P.O. Box F
Payson, AZ 85541
(Obsolete)

Address to obtain records:

Teledyne-Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
TFO	Tonto Forest Array------	34.2678	111.2703	1492	1963	3/75	Sandstones and limestones; Cambrian and Devonian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
TFO	Johnson Matheson-----	Z	1.25	0.32	Film, magnetic tape.	1,000 K	Thirty-seven instruments in an array.
	Geotech 7505A--------	Z	20.0	110.0	--do---------	100 K	One component of the three-component system at each of seven stations.
	Geotech 8700C--------	NS,EW	20.0	30.0	--do---------	100 K	Two components of the three-component system at each of seven stations.

Timing system: Hyperian model HI-155.

System response curves: Available with records.

SHORT HISTORY

The Tonto Forest Seismological Observatory, built in 1963, was designed to record seismic events and to be used as a laboratory for seismograph equipment. The instrumentation was assembled, installed, and operated until April 30, 1965, by United Electrodynamics (UED)--later Earth Sciences, Teledyne Company. In March 1964, the LRSM program provided eight mobile seismic-recording vans to extend the existing arrays. On May 1, 1965, Geotech assumed the operation. During 1965, a 37-element short-period array and a 7-element long-period array were designed and installed. Recording of 17 of these instruments (short-period) was discontinued in October 1971.

Scottsdale, AZ

GENERAL INFORMATION

Operated by: Willard L. Groene--Deceased

Address:

Mummy Mountain Observatory--Closed
8102 N. Mummy Mountain Road
Scottsdale, AZ 85251
(Obsolete)

Tonto Hills Observatory--Closed
115 HO-HO-Kam Lane
Tonto Hills
Carefree, AZ 85331
(Obsolete)

Address to obtain records:

Department of Geology
Arizona State University
Tempe, AZ 85281

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
MMA	Mummy Mountain----------	33.5544	111.9579	426	5/17/71	1/18/73	Conglomerate overlying igneous rocks.
THO	Tonto Hills-------------	33.8753	111.8763	1134	2/04/73	7/74	Decomposed granite.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
Both stations	Sprengnether S-7000--	Z	1.0	---	Pen and ink	100 K	---

Timing system: Not available.

System response curves: Not available.

SHORT HISTORY

MMA was started with private monies by Mr. Willard L. Groene. He moved the Mummy Mountain Observatory in 1973 because of noise problems. He established the Tonto Hills Observatory with the equipment from his original site. Upon his death in 1974, his equipment and records were donated to Arizona State University.

ARIZONA

Tempe, AZ

GENERAL INFORMATION

Operated by: Arizona State University

Address: Department of Geology
Arizona State University
Tempe, AZ 85281

Telephone: 602-965-5081

Address to obtain records:

Seismograph Station
Department of Geology
Arizona State University
Tempe, AZ 85281

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
ASU	Arizona State University.	33.4163	111.9347	354	11/71	Open	Alluvium; Quaternary.

INSTRUMENTATION

Code	Seismometer			Galvo	Type recording	Magnification at T_o	Remarks
	Type	Component	T_o(sec)	T_g(sec)			
ASU	Sprengnether	Z	13.0	---	Pen and ink	Uncalibrated	---

Timing system: Sprengnether TS-100 since January 1, 1976.

System response curves: Not available.

SHORT HISTORY

ASU was opened in November 1971 with equipment borrowed from Willard L. Groene (see MMA) in a corner basement office in the Geology Department at the University. It operated continuously to mid-1976. Mrs. Willard Groene donated all of the late Mr. Groene's seismic equipment to the Geology Department in late 1975. His TS-100 timing system was then incorporated in January 1976. The station is expected to be operational in 1978.

ARIZONA

Tsaile, AZ

GENERAL INFORMATION

Operated by: Los Alamos Scientific Laboratory
and Navajo Community College

Address: Navajo Community College
c/o Prof. Ray Barreras
Tsaile, RPO, Chinle, AZ 86503

Telephone: 602-724-3311 ext. 266

Address to obtain records:

Los Alamos Scientific Laboratory
Group G-2
P.O. Box 1663, MS 676
Los Alamos, NM 57454

505-667-7165

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
TSL	Tsaile----------	36.3722	109.2436	2012	5/22/75	Open--	Sandstone.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
TSL	Ranger SS-1----------	Z	1.0	---	Helicorder	580 K	Magnification at 10 Hz.

Timing system: Sprengnether TS-250.

System response curves: Available with records.

SHORT HISTORY

TSL is a cooperative venture between the Los Alamos Scientific Laboratory and the Navajo Community College. The station is located near the Upper Greasewood Trading Post; the data are telemetered to the Navajo Community College campus at Tsaile.

GENERAL INFORMATION

Operated by: Arizona Bureau of Mines for the U.S. Geological Survey

Address: Tucson Observatory
U.S. Geological Survey
7290 E. Tanque Verde Rd.
Tucson, AZ 85715

Telephone: 602-792-6420

Address to obtain records

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
TUC	Tucson----------	32.3097	110.7822	986	12/06/62	Open--	Gneiss; Precambrian.
TUO	Tucson Observatory-----	32.2467	110.8350	770	1909	--do--	Silt, sand, and gravel; Quaternary.
TUT	Tucson Telemeter-------	32.3350	110.7233	1439	1/05/58	1/62	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
TUC	Benioff 1051---------	Z	1.0	0.75	Photo paper	200 K	WWSSN; telemetered to the University of Arizona.
	Benioff 1101---------	NS,EW	1.0	.75	--do-------	200 K	Do.
	Sprengnether---------	Z,NS,EW	15.0	100.0	--do-------	1.5 K	Do.
TUO	Wood-Anderson--------	NS	7.6	---	--do-------	466 K	---
	--do-----------------	EW	7.8	---	--do-------	457 K	---
	Benioff--------------	Z	1.0	.247	--do-------	Uncalibrated	---
				85.	Photo paper, visible.	--do--------	---
TUT	--do-----------------	Z	.98	---	Pen and ink	---	---

Timing system: TUC uses a WWSSN standard system. TUO has a Standard Electric Co. pendulum clock.

System response curves: TUC--see figure 1, p. 363.

SHORT HISTORY

TUO was originally a USC&GS magnetic installation, having been moved to Tucson from Baldwin, Kans., in 1909. Original instrumentation consisted of two Bosch-Omori's (NS and EW). These were discontinued in 1925 when two Wood-Anderson's (NS and EW) were installed. The Benioff was added in the 1940's.

TUC was started with the installation of the WWSSN system. The station is now telemetered to the University of Arizona.

ARIZONA

Tucson, AZ

GENERAL INFORMATION

Operated by: University of Arizona

Address: Department of Geosciences
Laboratory of Geophysics
University of Arizona
Tucson, AZ 85721

Telephone: 602-884-2417

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
UOA	University of Arizona---	32.2331	110.9528	741	4/72	Spring 74	Alluvium.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
UOA	Sprengnether---------	NS,EW	20.0	---	Pen and ink	---	---

Timing system: Not available.

System response curves: Not available.

SHORT HISTORY

UOA was operated sporadically as an instructional station.

GENERAL INFORMATION

Operated by: U.S. Geological Survey for the Bureau of Reclamation

Address:

U.S. Geological Survey
Branch of Global Seismology
Stop 967
Box 25046, Denver Federal Center
Denver, CO 80225

Bureau of Reclamation
Region 3 Office
Boulder City, NY 89005

Telephone: 303-234-3994

Telex: 45-509

Address to obtain records:

U.S. Geological Survey
Branch of Global Seismology
Stop 967
Box 25046, Denver Federal Center
Denver, CO 80225

Prior to 1976:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BDA	Boulder Dam----------	36.0154	114.7366	237	4/41	1961	Volcanic tuff.
GCA	Glen Canyon----------	36.9736	111.5931	1339	8/60	Open	Sandstone.
PFA	Pierce Ferry----------	36.1208	114.0047	417	10/40	6/52	Terrace gravel overlying fine playa silt with gypsum cement.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
BDA	Wood-Anderson--------	EW	---	---	Photo paper	---	---
GCA	Benioff 4681A--------	Z	1.0	---	Develocorder	150 K	Telemetered to GLD.
	Benioff 6102A--------	NS,EW	1.0	---	--do--------	150 K	Do.
PFA	Benioff----------	Z,NS,EW	1.5	---	35-mm film	---	---

Timing system: Time added at GLD (TG-120 precise time). BDA used a Seth Thomas clock.

System response curves: GCA--available with records.

SHORT HISTORY

BDA was located in the Arizona abutment of Boulder Dam (Hoover Dam) in an abandoned grouting gallery approximately 10 km ENE of Boulder City, Nev. The Wood-Anderson instrument originally operated at BCN. BDA was used only as a check for local earthquakes.

GCA was established near the present Glen Canyon Dam in order to monitor seismicity of the area before and particularly after the filling of the reservoir. Telemetering began in 1976. Prior to that, the station recorded on 35-mm film.

PFA was located 5 km west of the lower entrance to the Grand Canyon. The Benioff equipment was installed in 1942, replacing two USGS-type vibration meters.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(FS-AZ)	Flagstaff----------	35.0692	111.3094	1890	10/14/61 2/27/66	5/12/63 3/12/66	Limestone and sandstone; Paleozoic.
(GE-AZ)	Globe----------	33.7756	110.5281	1475	4/09/64	10/04/65	Altered shale.
(HR-AZ)	Heber----------	34.6697	110.7664	1875	7/10/64	10/04/65	Limestone.
(JR-AZ)	Jerome----------	34.8256	111.9903	1311	3/30/64	10/04/65	Do.
(KG-AZ)	Kingman----------	35.6417	113.9078	1067	4/19/63 4/10/68	7/11/63 4/26/68	Granite.
(KH-AZ)	Kohls Ranch----------	34.4833	111.0342	2286	4/02/64	6/18/64	Residual soil.
(LG-AZ)	Long Valley----------	34.4078	111.5458	1768	4/02/64	10/04/65	Tuff and basalt.
(NL-AZ)	Nazlini----------	35.9014	109.5694	1768	3/31/64	1/25/65	Claystone.
(NL2AZ)	--do----------	35.8069	109.6286	1920	2/10/65	10/04/65	Alluvium.
(PY-AZ)	Payson (ARY)----------	34.2542	111.3269	1516	1/26/67	4/06/67	---
(SF-AZ)	Snow Flake----------	34.4386	110.5144	1981	12/03/61	5/03/62	Limestone.
(SG-AZ)	Seligman----------	35.6408	113.2608	1676	4/06/64	10/04/65	Sandy limestone.
(SN-AZ)	Sunflower----------	33.8636	111.6928	884	3/29/64	10/04/65	Granite.
(SV-AZ)	Springerville----------	34.1756	109.1469	2134	11/25/61	5/03/62	Sandstone.
(WM-AZ)	Williams----------	35.4178	112.2150	1920	12/12/61	5/03/62	Limestone.
(WO-AZ)	Winslow----------	34.8814	110.6208	1585	4/01/64	10/04/65	Sandstone.

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(FS-AZ), (GE-AZ), (HR-AZ), (JR-AZ), (KG-AZ), (KH-AZ), (LG-AZ), (NL-AZ), (NL2AZ), (SG-AZ), (SN-AZ), (SV-AZ), (WM-AZ), (WO-AZ):	Benioff---------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(FS-AZ): 180 K (GE-AZ): 350 K (HR-AZ): 400 K (JR-AZ): 250 K (KH-AZ): 100 K (LG-AZ): 250 K (NL-AZ): 260 K (NL2AZ): 350 K (SG-AZ): 440 K (SN-AZ): 200 K (SV-AZ): 145 K (WM-AZ): 360 K (WO-AZ): 310 K	---
	Sprengnether----	Z,NS,EW	20.0	---	--do----------	---	---
(FS-AZ) (2d oper.), (KG-AZ) (2d oper.):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.
	Geotech---------	Z,NS,EW	20.0	---	--do---------	---	Do.
(PY-AZ):	Geotech S-13-----	Z,NS,EW	20.0	---	--do---------	---	Do.
(SF-AZ):	Benioff----------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(SF-AZ): 250 K	---

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

GENERAL INFORMATION

Operated by: U.S. Geological Survey and
California Institute of Technology

Address: U.S. Geological Survey
Seismological Laboratory
California Institute of Technology
Pasadena, CA 91125

Telephone: 213-795-2956

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BPK	Black Peak----------	34.1247	114.2097	504	4/74	11/09/76	Basaltic rocks; Quaternary.
(FTM)	Fortuna Mine----------	32.5548	114.3335	263	7/75	Open--	Gneiss; Mesozoic.
(LGA)	Laguna Mountains--------	32.7597	114.4928	68	7/75	--do--	Nonmarine sediments; Quaternary or Tertiary.
(SLU)	San Luis----------	32.5017	114.7773	41	3/73	--do--	Alluvium; Quaternary.
(YMD)	Yuma Desert----------	32.5547	114.5447	76	7/75	--do--	Nonmarine sediments; Quaternary.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
All stations	Mark L-4C----------	Z	1.0	0.062	Develocorder	BPK: 12,000 K (FTM): 6000 K (LGA): 3000 K (SLU): 24,000 K (YMD): 6000 K	All magnifications at 0.071 sec. Telemetered to Pasadena.

Timing system: WWVB radio signal received and recorded as the top and bottom photographic traces.

System response curves: See figure 2, p. 363.

SHORT HISTORY

BPK was removed because of access-road maintenance costs.
CIT and the USGS publish frequent reports on the data collected through their several networks.

ARKANSAS

Fayetteville, AR

GENERAL INFORMATION

Operated by: University of Arkansas

Address: Department of Geology
University of Arkansas
Fayetteville, AR 72701

Telephone: 501-575-3355

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Lstitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
FAV	Fayetteville----------	36.1214	94.1906	387	7/69	Open--	Boone Limestone; Mississippian.
FAY	--do----------	36.0911	94.1911	404	1/52	7/69	Do.

INSTRUMENTATION

Code	Seismometer			Galvo	Type recording	Magnification at T_o	Remarks
	Type	Component	T_o(sec)	T_g(sec)			
Both stations	Benioff 1051----------	Z	1.0	0.2	Photo paper	100 K	---
	Benioff 1101----------	NS,EW	1.0	.2	--do--------	50 K, 25 K, respectively	---

Timing system: IBM electrically-wound invar-pendulum type. Accuracy limits generally within 0.1 sec.

System response curves: Available from station.

SHORT HISTORY

The station was opened under the code FAY in January 1952. Owing to highway planning, the station was relocated in July 1969, and the code name was changed to FAV.

A seismograph bulletin is published by the University of Arkansss on a biannual basis. Copies of the bulletin for previous years may be obtained from the Department of Geology upon request.

ARKANSAS

Mountain Home, AR

GENERAL INFORMATION

Operated by: Elmer E. Rexin

Address: Elmer E. Rexin
Route 5, Kingswood Estates
P.O. Box 216
Mountain Home, AR 72653

Telephone: 501-425-3057

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(MHA)	Mountain Home----------	36.4056	92.3347	213	1/69	Open--	Cotter Formation; Ordovician.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(MHA)	Sprengnether---------	Z	5.0	---	Pen and ink	---	---

Timing system: Manually checked with WWV.

System response curves: Not available.

SHORT HISTORY

MHA is the avocation of the owner. Time is considered good to 5 sec.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(BK-AR)	Bald Knob	35.3567	91.6450	122	7/06/62 2/12/63	7/11/62 4/10/63	---
(CW-AR)	Conway	35.1356	91.9778	152	11/15/61 5/09/62	12/16/61 6/09/62	---
(IK-AR)	Ink	34.6194	94.1025	305	11/10/62	12/13/62	---
(MP-AR)	Mountain Pine	34.6017	93.1458	183	11/20/61	6/03/63	Sandstone; early Paleozoic.
(MY-AR)	McCrory	35.3511	91.0797	61	7/16/62	8/03/62	---
(MZ-AR)	Mount Ida	34.5586	93.6578	213	12/20/62	1/31/63	---
(PV-AR)	Perryville	34.9294	92.6700	213	6/15/62	6/28/62	---
(WR-AR)	Walnut Ridge	36.0583	91.2219	122	12/05/61	12/16/61	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
(BK-AR), (1st oper.), (CW-AR), (IK-AR), (MY-AR), (PV-AR), (WR-AR):	Benioff	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(BK-AR): 150 K (CW-AR): 170 K (IK-AR): 220 K (MY-AR): 30 K (PV-AR): 210 K (WR-AR): 90 K	---
(MP-AR), (MZ-AR):	Benioff	Z,NS,EW	1.0	---	--do	(MP-AR): 180 K (MZ-AR): 340 K	---
	Sprengnether	Z,NS,EW	20.0	---	--do	---	---

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 ss part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

GENERAL INFORMATION

Operated by: St. Louis University

Address: Department of Earth & Atmospheric Sciences
St. Louis University
P.O. Box 8099, Laclede Station
St. Louis, MO 63156

Telephone: 314-535-3300

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(HCI)	Hatchie Coon Island-----	35.6950	90.3450	67	11/76	Open--	Alluvium (sandy clay).
LRA	Little Rock----------	34.7783	92.3517	150	2/02/31	7/27/67	Sandstone; Ordovician.
PGA	Paragould----------	36.0600	90.6200	152	12/28/74	Open--	Claiborne Group (clay-gravel); Eocene.
POW	Powhatan----------	36.1520	91.1850	156	6/19/74	--do--	Everton Formation (limestone); Ordovician.
WLA	Wittsburg Lake----------	35.1860	90.7200	116	10/73	10/28/75	Jackson Group (cherty clay); Eocene.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(HCI)	Mark L-4C----------	Z	1.0	---	Develocorder, magnetic tape.	182 K	Magnification at 10 Hz; telemetered to Saint Louis.
LRA	1931-1954---------- Wood-Anderson.	NS,EW	2.5	---	Photo paper	2.5 K	---
	1954-1960 Reef-------	NS,EW	1.0	1.0	--do-------	15 K	---
	1960-1967---------- Wilson-Lamison.	Z	1.5	1.0	--do-------	50 K	---
	1960-1967---------- Wood-Anderson.	NS,EW	2.5	---	--do-------	2.5 K	---
PGA	Mark L-4C----------	Z	1.0	---	Develocorder, magnetic tape.	238 K	Magnification at 10 Hz; telemetered to Saint Louis.
POW	--do----------	Z	1.0	---	--do----------	1570 K	Do.
WLA	Geospace HS-10-1-----	Z	1.0	1.0	Photo paper	50 K	---

Timing system: LRA used a Howard-Gaertner pendulum clock. WLA used a Sprengnether TS-100. All other stations have timing added in St. Louis.

System response curves: Available with records.

SHORT HISTORY

LRA was founded as the third station in Saint Louis University's network. It ceased operation when St. John's Seminary was closed.

The other stations are part of the New Madrid network.

The University publishes the "Southeast Missouri Regional Seismic Network Quarterly Bulletin."

CALIFORNIA

Berkeley, CA

GENERAL INFORMATION

Operated by: University of California, Berkeley

Address: University of California
Seismograph Station
475 Earth Sciences Bldg.
Berkeley, CA 94720

Telephone: 415-642-3977

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
ARC	Arcata	40.8767	124.0750	59	2/27/48	Open--	Sandstone; Quaternary.
BKS	Byerly	37.8767	122.2350	276	6/08/62	--do--	Claremont Shale (cherts and shales); Miocene.
BRK	Berkeley	37.8733	122.2600	81	1887	--do--	Franciscan Formation (sandstone); Jurassic to Eocene.
CLS	Calistoga	38.6367	122.5850	457	1961	12/21/64	Alluvium (Quaternary) overlying volcanic flows.
CNC	Concord (Diablo Valley).	37.9667	122.0717	36	9/12/60	12/06/66	Alluvium overlying Franciscan Formation (sandstone).
FHC	Fickle Hill	40.8017	123.9850	610	12/10/68	Open--	Siltstone (Jurassic/Cretaceous) over Franciscan Formation (graywacke); Jurassic to Eocene.
FRE	Fresno	36.7683	119.7697	88	11/28/35	3/02/71	Alluvium; Quaternary.
FRI	Friant	36.9917	119.7083	119	3/09/71	Open--	Alluvium (Quaternary) overlying granite.
GCC	Granite Creek	37.0300	121.9967	122	2/65	--do--	Granite; Jurassic.
HRC	Harris Ranch	36.7650	121.4133	228	3/17/66	7/11/66	Alluvium; Pliocene.
JAS	Jamestown	37.9467	120.4383	457	8/28/64	Open--	Metamorphic rocks; pre-Cretaceous.
LLA	Llanada	36.6167	120.9433	475	9/08/61	--do--	Alluvium (Quaternary) overlying sandstone.
MHC	Mount Hamilton (Lick Observatory).	37.3417	121.6417	1282	4/24/1887	--do--	Franciscan Formation (graywacke and greenstone); Jurassic to Cretaceous.
MIN	Mineral	40.3450	121.6050	1495	1/02/39	--do--	Volcanic debris; Pliocene.
MLC	Manzanita Lake	40.5367	121.5617	1800	6/56	--do--	Volcanic pyroclastic rocks; Quaternary.
PAC	Palo Alto (Branner)	37.4167	122.1817	83	11/21/27	5/31/65	Sandstone; Quaternary.
PCC	Pilarcitos Creek	37.5000	122.3817	91	4/02/65	Open--	Granodiorite; Jurassic.
PRC	Point Reyes	38.0800	122.8667	404	9/09/61	12/21/64	Alluvium underlain by granite.
PRI	Priest	36.1417	120.6650	1187	9/15/61	Open--	Altered serpentine; Jurassic.
PRS	Paraiso	36.3317	121.3700	363	7/07/61	--do--	Granodiorite: Jurassic.

SITE INFORMATION--Continued

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
SAO	San Andreas Geological--Observatory.	36.7650	121.4450	350	7/11/66	Open--	Granite; Jurassic/Cretaceous.
SCC	Santa Cruz----------	37.0067	121.9967	128	6/11/61	2/65	Sandstone; Pleistocene.
SFB	San Francisco----------	37.7667	122.4667	100	4/31	11/35	Franciscan Formation (sandstone); Jurassic to Eocene.
SHS	Shasta (Shasta Dam)-----	40.6950	122.3883	312	1942	5/30/64	Metavolcanics; Devonian.
(USF)	San Francisco----------	37.7667	122.4500	100	11/35	12/17/64	Franciscan Formation (sandstone); Jurassic to Eocene.
VIN	Vineyard----------	36.7500	121.3850	330	2/03/59	3/09/66	Alluvium (Quaternary) overlying weathered granite.
VIT	Vineyard Telemeter------	36.7500	121.3883	360	5/31/61	2/10/65	Dolomite (pre-Cretaceous) intruded by granite (Jurassic/Cretaceous).
WDC	Whiskeytown Dam---------	40.5800	122.5400	300	3/08/73	Open--	Metavolcanics; Devonian.

INSTRUMENTATION

Code	Seismometer			Galvo	Type recording	Magnification at T_o	Remarks
	Type	Component	T_o (sec)	T_g (sec)			
ARC	Wood-Anderson--------	SN,WE	0.8	---	Photo paper	2.8 K	---
BKS	Benioff----------	Z,NS,EW	1.0	0.75	--do-------	25 K	WWSSN.
	Sprengnether---------	Z,NS,EW	15.0	100.0	--do-------	3 K	Do.
	--do----------	N45°E	100.0	300.0	--do-------	230, 640	Two instruments. Ultra-long-period.
BRK	Benioff----------	Z	1.0	.2	Develocorder	25 K	---
	--do----------	Z	1.0	8.0	--do--------	Variable	---
	Press-Ewing----------	Z	15.0	30.0	--do--------	1 K	---
	--do----------	Z,N45°E, N45°W	30.0	---	Magnetic tape	---	Broadband.
CLS	Benioff----------	Z	1.0	.2	Develocorder	60 K	Telemetered to BRK.
CNC	--do----------	Z	1.0	.2	--do--------	58 K	Do.
FHC	--do----------	Z	1.0	.2	--do--------	80 K	Do.
FRE	Sprengnether---------	Z,NS,EW	~2.0	~2.0	Photo paper	Z: 4.5 K NS: 2.9 K EW: 2.3 K	---
	Benioff----------	Z	1.0	.0	--do-------	8 K	---
FRI	--do----------	Z	1.0	.2	Helicorder	64 K	---
GGC	--do----------	Z	1.0	.2	Develocorder	50 K	---
HRC	--do----------	Z	1.0	.2	--do--------	25 K	---
JAS	--do----------	Z	1.0	.2	Develocorder, magnetic tape.	760 K	Telemetered to BRK.
	--do----------	Z,NS,EW	1.0	.75	--do----------	250 K	---
	Willmore----------	N45°E	3.0	.2	Magnetic tape	---	Telemetered to BRK.

Berkeley, CA

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
LLA	Benioff----------	Z	1.0	0.2	Develocorder	75 K	---
MHC	Benioff----------	Z	1.0	.2	Develocorder, magnetic tape.	85 K	Telemetered to BRK.
	Wood-Anderson--------	SN,EW	.8	---	Photo paper	2.8 K	---
	Willmore----------	N45°E	3.0	.2	Magnetic tape	---	---
MIN	Wood-Anderson--------	SN,EW	.8	---	Photo paper	2.8 K	---
	Benioff----------	Z	1.0	.4	Develocorder	60 K	---
MLC	Loucks-Omori---------	NS,EW	6.0	---	Smoked paper	250	---
PAC	Wood-Anderson--------	NS,EW	.8	---	Photo paper	2.8 K	---
	Benioff----------	Z	1.0	.4	--do-------	10 K	---
PCC	Benioff----------	Z	1.0	.2	Develocorder, magnetic tape.	50 K	Telemetered to BRK.
PRC	--do----------	Z	1.0	.2	Develocorder	50 K	Do.
PRI	--do----------	Z	1.0	.2	Develocorder, magnetic tape.	80 K	Do.
PRS	--do----------	Z	1.0	.2	--do----------	75 K	Do.
SAO	Benioff----------	Z	1.0	.2	--do----------	75 K	Do.
	Sprengnether S-7000--	Z	.2	20 Hz	--do----------	800 K	---
	Sprengnether S-5007--	Z,NS,EW	30.0	10 Hz	--do----------	---	---
	Sprengnether S-7000--	Z	.2	20 Hz	magnetic tape	---	A microearthquake array of three instruments.
SCC	Benioff----------	Z	1.0	.2	Develocorder	10 K	---
SFB	Wood-Anderson--------	NS,EW	.8	---	Photo paper	2.8 K	---
	Lehner-Griffith------	Z	1.0	.28	--do--------	10 K	---
SHS	Benioff----------	Z,NS,EW	1.5	.45	35-mm film	50 K	---
USF	Wood-Anderson--------	NS,EW	.8	---	Photo paper	---	---
	Lehner-Griffith------	Z	1.0	.28	--do-------	---	---
VIN	Benioff----------	Z	1.0	.2	Develocorder	---	Telemetered to BRK.
	Wood-Anderson--------	SN,WE	.8	---	--do--------	7.8 K	---
	Sprengnether---------	Z,NS,EW	2.0	.2	Develocorder, magnetic tape.	---	---
VIT	Benioff----------	Z	1.0	.2	Develocorder	36 K	Do.
WDC	Sprengnether---------	Z	40.0	---	Develocorder, magnetic tape.	500 K	Magnification at 1 sec, filtered. Broadband.

Timing system: WWSSN standard checked with WWVB.

System response curves: BKS--see figure 1, p. 363. Others available from station.

SHORT HISTORY

ARC and FHC were established by the University in cooperation with Humboldt State College.
BKS was established as a WWSSN station at its inception in 1962.
BRK and MHC are the oldest seismograph stations in North America.
CNC was established by Diablo Valley College in cooperation with the University. Total operational responsibility for the station was assumed by Diablo Valley College in 1966.

SHORT HISTORY--Continued

FER was established by the University and then transferred to the City of Ferndale in 1962. (See California, City of Ferndale.)

FRE operated until 1971, with a hiatus from December 30, 1966, to March 30, 1967, and then was moved to station FRI.

FRI was established in cooperation with the U.S. Bureau of Reclamation.

GCC was established in cooperation with Richard E. Randolph.

JAS was established and is run in cooperation with the California Department of Water Resources.

MIN, established in 1939 by the University and Lassen Volcanic National Park, is in nearly the same location as the site established in 1926 by the USGS at the Lassen Volcano Observatory. This earlier station used a seismometer made by the Hawaiian Volcano Observatory.

MLC was established in cooperation with the National Park Service. It is in service only during the summer months.

ORV, owned and operated by the California Department of Water Resources, is also recorded at the University.

PAC was established by Stanford University in cooperation with the University of California at the Branner Seismograph Station. The University of California assumed total operation of the station 1947.

PRC and PRI were established in cooperation with the Federal Aviation Agency.

SCC was established in cooperation with the City of Santa Cruz.

SFB was established in cooperation with the California Academy of Sciences. It was later moved to USF.

SHS was established by the U.S. Bureau of Reclamation and transferred to the University in 1952.

VIN and VIT were established in cooperation with W. A. Taylor and Co.

YER was established in cooperation with the City of Yerington.

GENERAL INFORMATION

Operated by: Tera Corporation for
Pacific Gas and Electric

Address: Tera Corporation
2118 Milvia St.
Berkeley, CA 94704

Telephone: 415-845-5200

Address to obtain records:

Stuart W. Smith
Geophysics Program
202 ATG Building, AK-50
University of Washington
Seattle, WA 98195

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(BRY)	Barry Ridge----------	40.7250	123.9739	790	6/18/74	Open--	Franciscan Formation; Jurassic to Eocene.
(BZD)	Buzzard Peak----------	40.5297	124.2189	427	1/15/75	--do--	Eel River sediments; Tertiary.
(DIA)	Diamond Ranch----------	40.4139	123.7575	534	6/18/74	--do--	Franciscan Formation; Jurassic to Eocene.
(EKR)	Elk River----------	40.6953	124.1394	49	6/20/74	--do--	Eel River sediments; Tertiary.
(FKH)	Fickle Hill----------	40.7908	123.9744	633	6/02/74	--do--	Franciscan Formation; Jurassic to Eocene.
(FOX)	Fox Creek----------	40.5211	123.9922	113	6/19/74	--do--	Eel River sediments; Tertiary.
(GWS)	Gas Wells----------	40.6206	124.1314	221	6/02/74	--do--	Do.
(HAH)	Hanson Hill----------	40.5608	123.8139	1092	5/31/74	--do--	Franciscan Formation; Jurassic to Eocene.
(HRS)	Horse Mountain----------	40.8750	123.7322	1510	8/06/74	--do--	Do.
(JBY)	Jacoby Creek----------	40.8167	124.0278	49	8/13/74	--do--	Do.
(LOL)	Loleta----------	40.6689	124.2286	122	6/20/74	--do--	Eel River sediments; Tertiary.
(MMR)	Monument Ridge----------	40.4233	124.0975	967	7/19/74	--do--	Franciscan Formation; Jurassic to Eocene.
(MVR)	Mountain View Ranch-----	40.6764	123.8614	461	6/18/74	--do--	Do.
(PTK)	Port Kenyon----------	40.6044	124.2744	4	6/20/74	--do--	Eel River sediments; Tertiary.
(RYN)	Ryan Slough----------	40.7856	124.1197	6	8/13/74	--do--	Do.
(TIT)	Squaw Tit----------	41.0739	123.9803	642	8/15/74	--do--	Franciscan Formation; Jurassic to Eocene.
WKC	Walker Ridge----------	40.3900	124.2900	976	10/28/74	--do--	Do.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
All stations	Mark L-4C----------	Z	1.0	---	Film	Variable	Telemetered to Eureka, Calif.

Timing system: Time-code generator with WWVB recorded directly.

System response curves: See figure 11, p. 366.

SHORT HISTORY

These stations were established to help determine which faults are active in the area.

CALIFORNIA

Chico, CA

GENERAL INFORMATION

Operated by: California State University, Chico

Address: Department of Geological and Physical Sciences
California State University
Chico, CA 95926

Telephone: 916-895-5262

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CCO	Chico----------	39.0642	121.0094	60	2/23/72	Open--	Alluvium; Quaternary.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
CCO	Geotech SL-220-------	Z	Long	---	Visible	4 K	---

Timing system: Geotech TG-110.

System response curves: Not available.

CALIFORNIA

Ferndale, CA

GENERAL INORMATION

Operated by: City of Ferndale

Address: Ferndale Seismograph Station
c/o Smith and Scalvini
425 Main Street
Ferndale, CA 95536

Telephone: 707-786-4575

Address to obtain records:

Records since 1965:

As above.

Records before 1962:

Seismograph Station
University of California
475 Earth Sciences Bldg.
Berkeley, CA 94720

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
FER	Ferndale----------	40.5767	124.2617	15	1/33	Open--	Sandstone; Quaternary.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
FER	Bosch-Omori----------	NS,EW	10-15	---	Smoked paper	50	---

Timing system: Weight-powered timepiece.

System response curves: Not available.

SHORT HISTORY

FER was established by the University of California, Berkeley, in 1933. It was given to the City of Ferndale in 1962 and is now used as an educational museum piece.

CALIFORNIA

Kentfield, CA

GENERAL INFORMATION

Operated by: College of Marin

Address: Geology Department
College of Marin
Kentfield, CA 94940

Telephone: 415-454-3962 ext. 291

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
KFC	Kentfield----------	37.9550	122.5528	5	1/66	Open--	Franciscan Formation (sandstone); Jurassic to Eocene.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
KFC	UED Ranger SD-214-----	Z	0.981	---	Visible	35 K	Magnification at 0.25 sec.

Timing system: Sprengnether TS-100 synchronized with WWV.

System response curves: Available from station.

SHORT HISTORY

KFC was opened with the above-mentioned equipment.

CALIFORNIA

Livermore, CA

GENERAL INFORMATION

Operated by: Lawrence Livermore Laboratory
of the University of California

Address: Seismic Research Group, L-42
Lawrence Livermore Laboratory
P.O. Box 808
Livermore, CA 94550

Telephone: 415-447-1100 ext. 3475

Telex: 34-6407

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
LAC	Landers----------	34.3898	116.4115	792	8/68	Open--	Gneiss; Precambrian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
LAC	Sprengnether---------	Z	20.0	---	Magnetic tape	Variable	Maximum magnification 100 K. Telemetered to Livermore and Menlo Park.
	--do----------	NS,EW	40.0	---	--do----------	--do----	Do.

Timing system: IRIG time codes B and C synchronized to WWV.

System response curves: See figure 5, p. 364.

SHORT HISTORY

The principal interest of the Laboratory is to monitor nuclear explosions. LAC is located underground in a mine shaft.

GENERAL INFORMATION

Operated by: City of Los Angeles

Address: Griffith Observatory and Planetarium
2800 E. Observatory Road
Los Angeles, CA 90027

Telephone: 213-664-1181

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
GOC	Griffith Observatory----	34.1130	118.3017	348	6/65	Open--	Quartz monzonite; Cretaceous.

INSTRUMENTATION

Code	Seismometer			Galvo	Type	Magnification	Remarks
	Type	Component	T_o(sec)	T_g(sec)	recording	at T_o	
GOC	Benioff 1051---------	Z	1.0	0.2	Visible	300 K	---

Timing system: Crystal-controlled oscillator synchronized with WWVB.

System response curves: Not available.

SHORT HISTORY

GOC is operated as a public demonstration.

GENERAL INFORMATION

Operated by: University of Southern California

Address: Geophysical Laboratory
855 W. 37th Street
University of Southern California
Los Angeles, CA 90007

Telephone: 213-746-6124

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(BHR)	Baldwin Hills---------- Reservoir.	34.0085	118.3620	149	2/71	Open--	Palos Verdes Sand; Pleistocene.
(DHS)	Downhole Seismometer---- Baldwin Hills.	34.0175	118.3855	-1425	3/73	--do--	Pliocene.
(DHT)	Downhole Seismometer---- Terminal Island.	33.7510	118.2208	-856	3/76	--do--	Do.
(DRP)	Drake Park----------	33.7737	118.2167	1	8/72	3/74	Late Pleistocene.
(FMA)	Fort MacArthur----------	33.7075	118.2912	14	5/72	Open--	Monterey Shale; Miocene and Pliocene.
(GFP)	Griffith Park----------	33.0178	118.3098	245	4/75	--do--	Granite.
(HCM)	Holy Cross Mausoleum----	33.9940	118.3830	56	2/71	--do--	Late Pleistocene.
(IPC)	Inglewood Park---------- Cemtery.	33.9707	118.3345	59	3/71	--do--	Early Pleistocene.
(JBF)	Junior Blind---------- Foundation.	33.9930	118.3447	79	2/71	4/75	Late Pleistocene.
(LCL)	Rancho Los Cerritos-----	33.8333	118.2068	8	8/72	Open--	Early Pleistocene.
(LCM)	Los Angeles County------ Museum.	34.0178	118.2870	50	8/71	--do--	Alluvium; Quaternary.
(LNA)	Los Alamitos Naval------ Air Station.	33.7892	118.0545	1	5/72	--do--	Do.
(RCP)	Recreation Park---------	34.7777	118.1333	4	2/71	--do--	Late Pleistocene.
(TPR)	Trippett Ranch----------	34.0889	118.5867	380	7/75	--do--	Miocene.
USC	Los Angeles (University- of Southern Calif.).	34.0178	118.2870	50	2/71	8/71	Alluvium; Quaternary.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
Most stations	Mark L-4C----------	Z	1.0	---	Magnetic tape, strip chart.	10 K	Magnification at 1 sec.
DHS	Geospace----------	Z,NS,EW	6.0	---	--do----------	100 K	---
TPR	Johnson-Matheson-----	Z	1.0	---	--do----------	---	---

Timing system: Eldorado 1710 time-code generator checked with WWV.

System response curves: Available from station.

SHORT HISTORY

The seismotectonic study of the Los Angeles Basin and its offshore area includes seismic-hazard assessment, effect of water-injection into oil fields on earthquake occurrence, and detection of precursory phenomena.

CALIFORNIA

Los Angeles, CA

GENERAL INFORMATION

Operated by: University of California, Los Angeles

Address: Lookout Mountain Observatory
Institute of Geophysics and Planetary Physics
University of California
Los Angeles, CA 90024

Telephone: 213-825-3123

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
LMO	Lookout Mountain-------- Observatory.	34.1086	118.3878	392	2/12/71	6/03/73	---
LMS	--do----------	34.0692	118.4403	131	4/11/74	---	Terrace deposits and Palos Verdes Sand; Pleistocene.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
Both stations	Sprengnether S-5007V--	Z	15.0	100.0	Photo paper	750	---

Timing system: Sprengnether TS-100 crystal chronometer.

System response curves: Not available.

SHORT HISTORY

LMO was the original station; it operated until 1973 when it was moved to the current location, LMS. Two other instruments are operating at LMS: a LaCoste-Romberg earth-tide gravimeter and a Sprengnether horizontal pendulum, both serving as seismic instruments.

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
National Center of Earthquake Research
345 Middlefield Road
Menlo Park, CA 94025

Telephone: 415-323-8111 ext. 2822

Address to obtain records:

As above.

SITE INFORMATION

Code New	Code Alternate	Code Local	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
AARM	---	(AARS)	Airport Road----------	39.2762	121.0255	930	7/20/76	Open---	---
---	---	(ABAB)	Bureau of Reclamation---- Building.	38.8793	121.0675	420	10/29/76	2/14/77	---
ABJM	---	(ABJS)	Bob Jauregui Ranch-------	39.1653	121.1912	457	7/27/76	Open---	---
---	---	(ABP)	Abalone Point------------	37.9392	122.7588	140	11/04/71	10/31/74	---
ABRM	---	(ABRS)	Brophy Road--------------	39.1352	121.4868	24	2/14/77	Open---	---
ADWM	---	(ADWD)	Drytown Water District---	38.4392	120.8482	251	7/21/76	--do---	---
AFDM	ADC	(AFHD)	Forest Hill Divide-------	38.9448	120.9683	524	2/72	--do---	---
AFHM	---	(AFHS)	Forest Hill Site---------	39.0418	120.7913	1064	7/20/76	--do---	---
AFRM	---	(AFID)	Fiddyment Ranch----------	38.7923	121.3485	31	12/02/76	--do---	---
AGIM	---	(AGRI)	Gold Rush Inn------------	38.8447	120.9813	305	1/28/76	--do---	---
AHDM	---	(AHDR)	Hacienda Drive-----------	39.0483	121.0765	483	10/28/76	--do---	---
AHRM	---	(AHFR)	Harold F. Ross-----------	38.8543	121.0705	354	1/29/76	--do---	---
ALNM	---	(ALIN)	Lincoln------------------	38.9297	121.2878	54	12/02/76	--do---	---
AODM	---	(AOTD)	Outingdale---------------	38.6148	120.7285	520	10/19/76	--do---	---
AOHM	---	(AOHO)	Oregon House-------------	39.3753	121.2560	457	2/14/77	--do---	---
APRM	---	(APHR)	Poppy Hill Road----------	38.8770	121.2172	133	7/15/76	--do---	---
ARJM	---	(ARWJ)	Robert W. Jensen---------	38.6865	120.9563	460	12/02/76	--do---	---
ARRM	---	(ARRA)	Rickey Ranch-------------	38.7653	121.1718	127	12/02/76	--do---	---
ARWM	---	(ARPW)	Richard P. Wilkes--------	38.9563	121.1622	320	1/29/76	--do---	---
ASRM	---	(ASHR)	Slough House Road--------	38.4977	121.2048	52	7/21/76	--do---	---
AVRM	---	(AVRS)	Valley Road Site---------	39.0248	121.2680	91	7/15/76	--do---	---
BAVM	---	(ANV)	Antelope Valley----------	37.6458	121.0293	620	7/02/75	--do---	---
BBGM	---	(BGM)	Big Mountain-------------	36.5913	121.0253	1216	3/03/72	--do---	---
BBNM	SBT	(BEN)	San Benito---------------	36.5100	121.0755	448	1/28/71	--do---	---
BCGM	---	(CNR)	Cienega Road-------------	36.7092	121.3433	305	5/29/69	--do---	---
BCHM	---	(BCH)	Black Canyon North-------	36.0543	117.7282	1265	9/26/75	--do---	---

SITE INFORMATION--Continued

Code New	Code Alternate	Code Local	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BEHM	EKH	(ELK)	Elkhorn Ranch----------	36.6647	121.1742	342	2/01/71	Open---	---
BEMM	EMT	(EMM)	Emmet----------	36.6613	121.0960	488	8/14/70	--do---	Franciscan Formation (limestone); Jurassic to Eocene.
---	---	(BGU)	Bear Gulch Road----------	37.3423	122.3385	158	3/01/70	11/02/71	---
BHSM	---	(HST)	Hastings State Park------	36.3558	121.5398	646	9/04/75	Open---	---
BJCM	JHC	(JHC)	Johnson Canyon----------	36.5470	121.3922	207	6/18/69	--do---	Granite; Mesozoic.
BJOM	---	(JON)	Mt. Johnson----------	36.6283	121.3133	---	1/31/74	--do---	---
BLRM	---	(LWR)	Lewis Ranch----------	36.6660	121.2727	232	2/15/73	--do---	---
BMCM	---	(MCP)	McPhails Peak----------	36.6567	121.3652	1022	1/26/75	--do---	---
BMHM	---	(MTH)	Mt. Harlan----------	36.6863	121.4133	811	1/29/75	--do---	---
BMSM	---	(MRS)	Mercey Hot Springs-------	36.6580	120.7937	769	12/06/73	--do---	---
---	---	(BMT)	Black Mountain----------	37.3158	122.1638	170	10/27/66	9/23/68	---
BPCM	PNC	(PNQ)	Pine Canyon----------	36.5650	121.6358	268	2/14/76	Open---	---
BPFM	---	(PFP)	Pfieffer Point----------	36.2300	121.7717	349	12/18/73	--do---	---
BPIM	---	(PIN)	Pinnacles----------	36.4900	121.1685	329	7/03/75	--do---	---
BPPM	---	(PNP)	Pinyon Peak----------	36.1687	121.3780	1591	12/19/73	--do---	---
BRMM	---	(RBM)	Rolling Bench Mark-------	36.8345	120.8237	372	12/03/73	--do---	---
---	---	(BRO)	Mt. Brow----------	38.0080	120.4153	387	4/19/72	7/12/76	---
BRVM	LRV	(LRV)	Little Rabbit Valley-----	36.4243	121.0180	555	11/26/69	Open---	---
BSBM	---	(SWB)	Swanson's Bluff----------	36.7378	121.2868	398	6/25/75	--do---	---
BSCM	---	(STQ)	Stone Canyon----------	36.6330	121.2342	357	10/06/76	--do---	---
BSGM	SHG	(SHG)	Shirt Tail Gulch---------	36.4138	121.2537	192	6/18/69	--do---	Granite; Mesozoic.
BSLM	---	(SLV)	Silva Ranch----------	36.7755	121.3493	155	7/16/75	--do---	Do.
BSRM	---	(SRQ)	Salinas Radio Site-------	36.6675	121.5193	396	3/09/77	--do---	Do.
BVLM	BVL	(BVL)	Bear Valley----------	36.5752	121.1890	510	9/03/70	--do---	Marine sediment; Miocene.
BVYM	---	(VYD)	Vineyard----------	36.7462	121.4182	753	12/11/75	--do---	Do.
CACM	---	(ACH)	Antioch----------	36.9762	121.7603	74	10/26/73	--do---	Do.
CADM	ADR	(AND)	Anderson Dam----------	37.1623	121.6242	244	8/25/67	--do---	Do.
CAIM	AGC	(ANG)	Angel Island----------	37.8613	122.4295	223	8/08/69	--do---	Do.
CALM	CVR	(CAL)	Calaveras----------	37.4512	121.7992	265	10/19/67	--do---	Do.
CAOM	ARN	(ARN)	Arnold Ranch----------	37.3493	121.5327	628	10/19/67	--do---	Do.
CBHM	---	(CBH)	Coso Basin North---------	35.9882	117.7500	890	9/26/75	--do---	Do.
CBRM	BGC	(BOL)	Bollinger Road----------	37.8162	122.0620	610	8/23/69	--do---	Do.

SITE INFORMATION--Continued

Code New	Code Alternate	Code Local	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CBWM	BKC	(BWR)	Brookwood Reservoir------	37.9242	122.1067	221	4/28/71	Open---	Marine sediment; Miocene
CCNM	CYC	(CCQ)	Crow Canyon Road---------	37.7915	121.9482	219	2/05/76	--do---	Do.
CCOM	COE	(COE)	Coe Ranch----------	37.2577	121.6725	366	10/03/67	--do---	Do.
CCYM	---	(CYO)	Coyote Hills----------	38.5517	122.0908	67	5/01/75	--do---	Do.
CDOM	DOO	(DOO)	Doolan Road----------	37.7300	121.8353	198	7/29/70	--do---	Do.
CDSM	---	(DSR)	Don Santos Ranch---------	37.9663	122.2528	109	11/15/73	--do---	Do.
CDUM	DUC	(DUR)	Durate Ranch----------	38.0297	122.0008	168	4/28/71	--do---	Volcanics--rhyolite to andesite, pyroclastics; Pliocene.
CFWM	---	(CFW)	Cactus Flat West---------	36.2083	117.9037	1384	9/26/75	--do---	---
CGSM	---	(CGS)	China Gardens South------	36.1900	117.6237	1689	9/26/75	--do---	---
CLCM	LKC	(LCH)	Lake Chabot----------	37.7380	122.0638	312	11/21/72	--do---	---
---	---	(CLO)	Calero Reservoir---------	37.1908	121.7652	230	11/68	10/16/68	---
CMCM	---	(MIL)	Mills College----------	37.7813	122.1758	90	7/20/71	Open---	---
CMHM	MHR	(MHR)	Mt. Hamilton Road--------	37.3595	121.7563	518	3/04/69	--do---	---
CMJM	MSJ	(MSJ)	Mission San Jose---------	37.5208	121.8705	498	7/01/72	--do---	---
CMOM	MTC	(MOR)	Morgan Territory---------	37.8113	121.8025	792	4/17/69	--do---	---
CMRM	MNR	(MNR)	Mines Road----------	37.5947	121.6370	500	4/17/69	--do---	---
CNCM	---	(NCR)	Norris Canyon Road-------	37.7560	121.9900	306	9/02/76	--do---	---
CPLM	PLC	(PAL)	Palomares----------	37.6313	121.9562	463	6/27/69	--do---	---
CPTM	---	(CPT)	Cactus Peak West---------	36.0710	117.8498	1494	9/26/75	--do---	---
CRAM	---	(SRA)	San Ramon----------	37.7672	121.9375	171	9/02/76	--do---	---
---	CRC	(CRK)	Castle Rock----------	37.2417	122.1303	607	3/01/66	6/01/77	---
CRPM	---	(RUS)	Russellman Park----------	37.9125	121.9055	331	9/18/70	Open---	---
CSCM	SVC	(SVC)	Silver Creek----------	37.2852	121.7725	128	6/10/67	--do---	---
CSHM	CSH	(CSH)	California State--------- College, Hayward.	37.6575	122.0533	170	1972	--do---	---
CSSM	---	(CSS)	Coso Hotspring----------	36.0272	117.7673	1170	9/26/75	--do---	---
---	---	(CCR)	Crow Canyon Road---------	37.7917	121.9500	207	7/29/70	12/31/75	---
---	CYH	(CYH)	Coyote Hills----------	37.5590	122.0937	38	12/15/66	4/29/75	---
---	DIR	(DIR)	Diamond Ranch----------	36.3363	120.3763	496	11/07/73	6/16/75	---
DKNM	---	(DKN)	Devils Kitchen North-----	36.0510	117.8088	1347	9/25/75	Open--	---
DTEM	---	(DTE)	Dunmovintown East--------	36.0975	117.9258	1152	9/26/75	--do---	---
---	EGR	(EGR)	Empire Grade Road--------	37.0352	122.1042	442	3/04/69	4/27/76	---

SITE INFORMATION--Continued

Code New	Code Alternate	Code Local	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
---	---	(FOR)	Forsythe----------	36.7910	121.4547	433	9/25/67	4/27/71	---
---	---	(FWL)	Fowler Lookout----------	38.0195	120.5833	880	4/19/72	7/12/76	---
GAFM	---	(AAF)	Point Arena AFB----------	38.8932	123.5380	710	1/22/75	2/04/75	---
GAXM	---	(ALX)	Alexander Valley---------	38.7108	122.7550	379	9/21/73	Open---	---
GBGM	---	(BGG)	Boggs Mountain----------	38.8140	122.6793	1125	6/26/75	--do---	---
GBOM	---	(BKO)	Black Oak----------	38.8243	122.8428	879	6/20/75	--do---	---
GCMM	---	(CMT)	Cobb Mountain----------	38.8058	122.7552	1286	4/23/75	--do---	---
GCVM	---	(CVD)	Cloverdale----------	38.7690	123.0148	150	5/07/75	--do---	---
GDCM	---	(DRY)	Dry Creek----------	38.7672	123.2395	772	5/07/75	--do---	---
GGLM	---	(GLV)	Glenview----------	38.8967	122.7763	893	4/18/75	--do---	---
GGPM	---	(GYP)	Geyser Peak----------	38.7647	122.8442	1054	4/18/75	--do---	---
GHCM	---	(HOC)	House Creek----------	38.6060	123.1968	518	5/07/75	--do---	---
GHGM	---	(HOG)	Hog Mountain----------	39.1283	122.8245	903	4/18/75	--do---	---
GHLM	---	(HLS)	Highland Springs---------	39.0405	123.0187	956	6/75	--do---	---
GMCM	---	(MCL)	McLaughlin Ranch---------	38.7927	123.1300	439	5/07/75	--do---	---
GMKM	---	(MKI)	Mt. Konoctai----------	38.9695	122.7870	906	4/18/75	--do---	---
GMOM	---	(MOF)	Moffitt Ranch----------	38.7102	123.1432	802	5/07/75	--do---	---
GPMM	---	(PNM)	Pine Mountain----------	38.8475	122.9453	762	9/21/73	--do---	---
GRMM	---	(RDM)	Round Mountain----------	38.0205	122.5843	469	6/26/75	--do---	---
GRTM	---	(RTM)	Round Top Mountain-------	38.9387	122.6697	619	6/26/75	--do---	---
GSGM	---	(SGM)	Seigler Mountain---------	38.8667	122.7100	---	7/02/74	--do---	---
GSMM	---	(SCR)	Socrates Mine----------	38.7692	122.7812	1017	7/18/75	--do---	---
GSNM	---	(SNO)	Snow Mountain----------	38.9405	123.1917	870	6/20/75	--do---	---
GSSM	SKG	(SKG)	Skaggs Springs----------	38.7020	123.0135	282	1/22/75	--do---	---
HAZM	ANZ	(ANZ)	Anzar Road----------	36.8847	121.5909	122	6/29/67	--do---	---
HBTM	---	(BTT)	San Juan Bautista--------	36.8502	121.5507	98	6/05/75	--do---	---
HCAM	CDC	(CAN)	Canada Road----------	37.0253	121.4837	332	10/13/67	--do---	---
HCBM	CBC	(CBC)	Chamberlin Ranch---------	36.9313	121.6605	219	1969	--do---	---
---	HCC	(HCC)	Holy Cross----------	36.9814	121.7225	159	5/02/67	10/12/75	Marine sediment; middle Miocene.
HCCM	---	(CCC)	Corn Cob Canyon----------	36.8865	121.7033	104	11/19/75	Open---	---
HCRM	CSR	(CHR)	Chase Ranch----------	36.9588	121.5847	241	10/05/67	--do---	---
HCZM	---	(CZD)	Cordoza Dairy----------	36.9090	121.8003	30	11/13/75	--do---	---

SITE INFORMATION--Continued

Code New	Code Alternate	Code Local	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
HDLM	DIL	(DIL)	Dillion Ranch----------	36.8353	121.6440	204	8/09/67	Open---	---
HFEM	SFL	(FEL)	San Felipe----------	36.9833	121.4015	323	10/14/71	--do---	---
HFHM	---	(FTH)	Flint Hills----------	36.8882	121.4688	101	12/10/75	--do---	---
HFPM	FRP	(FRP)	Fremont Peak State Park.	36.7537	121.4905	705	9/02/70	--do---	Metamorphic rock; Precambrian.
HGSM	GHS	(GHS)	Gilroy Hot Springs-------	37.0958	121.4472	778	9/03/71	--do---	---
HGWM	---	(GRW)	Gilroy West----------	37.0170	121.6532	131	10/02/75	--do---	---
HJGM	---	(SJG)	San Juan Grade----------	36.7980	121.5738	171	6/21/67	--do---	---
HJSM	---	(JSR)	John Smith Road----------	36.8165	121.2987	215	6/75	--do---	---
HKRM	---	(KNR)	Kincaid Ranch----------	36.9017	121.4260	66	7/03/75	--do---	---
HLTM	LTR	(LTR)	Lone Tree Road----------	36.8845	121.3082	183	8/17/70	--do---	Marine sediment; Late Cretaceous.
HMOM	MTR	(MON)	Monterey----------	36.6117	121.9162	0	11/27/70	--do---	Granite; Mesozoic.
HORM	OCR	(OCR)	O'Connell Ranch----------	36.9172	121.5077	98	6/26/67	--do---	Nonmarine terrace deposits; Quaternary.
HPHM	PKH	(PKH)	Parkhill----------	36.8563	121.4062	122	8/17/70	--do---	---
HPLM	PCL	(PCL)	Pacheco Lake----------	37.0522	121.2900	152	5/10/68	--do---	---
HPRM	PKC	(PMR)	Peckham Road----------	36.9532	121.6950	94	6/23/67	--do---	---
HQRM	QSR	(QSR)	Quien Sabe Road----------	36.8337	117.2127	536	5/29/69	--do---	Volcanic--rhyolite to basalt, pyroclastics; Miocene.
HSFM	---	(STF)	Saint Francis Retreat----	36.8120	121.4995	340	11/13/75	--do---	---
HSLM	---	(SL8)	San Luis Dam----------	37.0802	121.0942	122	3/02/74	--do---	---
HWSM	---	(HWS)	Haiwee Spring South------	36.1050	117.7607	1436	9/26/75	--do---	---
JALM	AMC	(ALM)	Almaden----------	37.1583	121.8470	244	10/16/68	--do---	---
JBCM	---	(BCR)	Bear Creek Road----------	37.1603	122.0262	660	5/21/69	--do---	---
JBGM	BGH	(BGH)	Bear Gulch----------	37.3420	122.3390	158	11/02/71	--do---	---
JBLM	---	(CBL)	Camp Ben Lomond----------	37.1278	122.1663	792	4/27/76	--do---	---
JBMM	---	(BAN)	Black Mountain----------	37.3182	122.1527	820	2/24/75	--do---	---
JBZM	---	(BUZ)	Buzzard Lagoon Road------	37.0178	121.7858	213	10/07/75	--do---	---
JCBM	CBO	(CBO)	Chesbro Reservoir--------	37.1118	121.6888	192	8/24/67	--do---	Franciscan Formation; Jurassic to Eocene.
JECM	EUC	(EUC)	Eureka Canyon----------	37.0507	121.8093	438	5/28/69	--do---	---
JEGM	---	(ELG)	El Granada----------	37.5140	122.4623	202	2/10/75	--do---	---
JHLM	---	(HLN)	Holstrom Ranch----------	37.1093	121.8325	908	10/02/75	--do---	---
JLTM	LTW	(LTW)	Los Trancos Woods--------	37.3537	122.2042	270	12/15/66	--do---	Franciscan Formation; Jurassic to Eocene.

SITE INFORMATION--Continued

Code New	Code Alternate	Code Local	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
JLXM	LXR	(LEX)	Lexington Reservoir------	37.2018	121.9862	244	2/04/75	--do---	---
JMGM	MGA	(MGA)	Miligra Ridge----------	37.6370	122.4738	201	8/31/71	--do---	---
JPLM	PEV	(PLV)	Pleasant Valley----------	36.9770	121.8322	158	7/01/72	--do---	---
JPPM	---	(POR)	Portola State Park-------	37.2645	122.2130	186	12/22/66	--do---	---
JPRM	---	(PRO)	Presidio----------	37.7950	122.4750	107	9/26/68	2/11/69	---
JPSM	PSD	(PES)	Pescadero----------	37.1990	122.3483	84	11/25/70	Open---	---
JRGM	---	(RGR)	Rodeo Gulch Road---------	37.0370	121.9645	213	1/28/76	--do---	---
JRRM	---	(RDR)	Redwood Retreat----------	37.0545	121.7268	408	1/09/76	--do---	---
JRWM	---	(JRW)	Joshua Ridge West--------	35.9943	117.8215	1366	9/25/75	--do---	---
JSAM	SAC	(SAC)	San Andreas Lake---------	37.5825	122.4172	207	10/01/73	--do---	Franciscan Formation; Jurassic to Eocene.
JSCM	SEC	(STV)	Stevens Creek----------	37.2845	122.1237	357	12/23/66	--do---	---
JSFM	SFT	(SFT)	Stanford Telescope-------	37.4052	122.1758	143	12/13/66	--do---	---
JSGM	SGC	(SGC)	Saratoga Golf/Country---- Club.	37.2827	122.0500	198	1/22/75	--do---	---
JSJM	SJH	(STJ)	St. Joseph's Seminary----	37.3338	122.0913	122	12/23/66	--do---	---
JSMM	---	(SAW)	Sawmill Road----------	37.2123	122.1677	262	7/14/71	--do---	---
JSSM	SOS	(SOS)	Soda Springs----------	37.1695	121.9307	946	1/22/75	--do---	---
JSTM	---	(SNT)	Santa Teresa Hills-------	37.2068	121.7973	149	10/02/75	--do---	---
JTGM	---	(TGR)	Trout Gulch Road---------	37.0285	121.8763	253	10/02/75	--do---	---
JUCM	---	(UCS)	Univ. of Calif.,--------- Santa Cruz.	37.0012	122.0485	177	1/29/75	--do---	---
JWSM	WDS	(WDS)	Woodside----------	37.4180	122.2722	280	12/21/66	--do---	---
---	LAS	(LAS)	Mt. Lassen----------	40.4752	121.5082	2650	10/01/73	7/16/73	---
LCFM	---	(CCF)	Crescent Cliffs----------	40.4863	121.5240	840	11/12/76	Open---	---
---	---	(LHD)	La Honda----------	37.3313	122.2803	226	12/18/66	5/01/70	---
LMZM	---	(MZL)	Manzanita Lake----------	40.5443	121.5643	329	11/12/76	Open---	---
LRDM	---	(RED)	Reading Peak----------	40.4642	121.4612	859	11/12/76	--do---	---
LSLM	---	(SLA)	South Lassen----------	40.4337	121.5362	1060	11/12/76	--do---	---
---	---	(LTP)	Las Trampas Ridge--------	37.7943	121.9940	256	9/02/76	6/01/77	---
MBFM	---	(BFS)	Blanchard Fire Station---	37.6785	120.3633	309	11/03/76	Open---	---
MCHM	CRH	(CRH)	Carson Hill----------	38.0187	120.5095	475	4/19/72	--do---	Metavolcanics; pre-Cretaceous.
---	---	(MCM)	McCormick Mine----------	37.8862	120.5067	362	4/19/72	11/03/75	---
MCSM	---	(CNS)	Central Site----------	37.9388	120.5293	373	4/19/72	Open---	---
MCUM	---	(COP)	Copperopolis----------	37.9727	120.6170	336	4/19/72	--do---	--

SITE INFORMATION--Continued

Code New	Code Alternate	Code Local	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
---	MDC	(MDC)	Mt. Diablo----------	37.8817	121.9142	1173	5/27/67	6/01/74	Franciscan Formation; Jurassic to Eocene.
---	---	(MDO)	--do----------	37.8673	121.9282	719	5/27/70	7/29/70	---
MFSM	MFS	(MFS)	McCloud Flat South-------	36.1172	117.8550	1524	9/25/75	Open---	---
MMWM	---	(MWV)	Mi Wuk Village----------	38.0638	120.1815	1411	7/12/76	--do---	---
MNHM	---	(NHR)	New Hogan Reservoir------	38.1458	120.8137	219	3/77	--do---	---
---	MOB	(MOB)	Menlo Park----------	37.4502	122.1833	21	9/22/67	9/11/76	---
MOYM	---	(OBF)	O'Byrne Ferry----------	37.9000	120.5673	176	4/19/72	Open---	---
MRFM	---	(RFR)	Railroad Flat Road-------	38.2453	120.5207	799	7/12/76	--do---	---
MSTM	---	(STN)	Stent----------	37.9045	120.4048	366	4/19/72	--do---	---
---	MTB	(MTB)	Montebello Ridge----------	37.2907	122.0905	347	2/07/75	12/23/76	---
NBPM	---	(BRP)	Berryessa Peak----------	38.6678	122.1933	67	5/10/74	Open---	---
NBRM	BBR	(BBR)	Beebe Ranch----------	38.2608	122.5498	137	8/14/70	--do---	---
NCDM	CRD	(CDR)	Cavedale Road----------	38.3698	122.4617	620	3/08/71	--do---	---
NCFM	---	(CAR)	Canfield Road----------	38.3213	122.7955	98	8/14/70	--do---	---
NFIM	---	(FAR)	Farallones Islands-------	37.6983	123.0000	107	5/05/71	--do---	---
NFRM	FTR	(FTR)	Fort Ross----------	38.5227	123.1610	528	1/22/75	--do---	---
NGVM	GVR	(GVR)	Green Valley Ranch-------	38.2807	122.2148	257	4/30/71	--do---	---
NHBM	---	(HLB)	Heraldsburg----------	38.5893	122.9090	165	2/21/75	--do---	---
NHMM	HMR	(HMR)	Hamilton Ranch----------	38.1547	121.8003	65	4/29/71	--do---	---
NLNM	LOC	(LNS)	Lincoln School----------	38.1525	122.7125	120	8/14/70	--do---	---
NMCM	NMC	(NMC)	Nine Mile Canyon---------	35.8440	117.9073	1080	9/25/75	--do---	---
NMHM/	---	(SHQ)	Mt. Saint Helena---------	38.6695	122.6338	1311	1/20/77	--do---	---
NMTM	---	(MDT)	Middletown----------	38.8057	122.4460	422	6/26/75	--do---	---
NMWM	MAC	(MWS)	Mark West Spring---------	38.5505	122.7228	134	8/14/70	--do---	---
NMXM	MIX	(MIX)	Mix Canyon----------	38.4113	122.0573	177	6/12/71	--do---	---
NOLM	---	(OLQ)	Olema----------	38.0397	122.7925	30	2/23/77	--do---	---
NSHM	---	(SHR)	St. Helena Road----------	38.5200	122.6072	328	8/14/70	--do---	---
NSPM	SNT	(SPT)	Sears Point----------	38.1827	122.4533	88	2/03/71	--do---	---
NTMM	---	(TMN)	Taylor Mountain----------	38.3858	122.6805	105	8/14/70	--do---	---
---	---	(NUT)	Nutting Ranch----------	36.8243	121.4573	128	12/10/75	1977	---
NWRM	---	(WHW)	Wright Ranch----------	38.4570	122.8877	50	8/14/70	Open---	---
---	---	(OAR)	Oak Ridge----------	37.4653	121.7343	964	6/10/70	6/12/70	---

SITE INFORMATION--Continued

Code New	Code Alternate	Code Local	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
OBHM	---	(OBLO)	Bloomer Hill----------	39.6517	121.4617	914	9/06/75	Open---	---
---	---	(OBID)	Bidwell Canyon----------	39.4882	121.4523	305	9/06/75	11/04/75	---
---	---	(OCAM)	Camarillo Hill----------	39.5240	121.6233	122	8/05/75	9/01/76	---
OCHM	---	(OCOR)	Cohasset Ridge----------	39.8758	121.7655	530	12/17/76	Open---	---
---	---	(OCOX)	Cox Road----------	39.3800	121.5435	37	11/04/75	9/01/76	---
---	---	(ODAM)	Oroville Dam----------	39.5310	121.4775	293	9/06/75	11/04/75	---
---	---	(OFIG)	Fine Gold Gulch----------	39.4117	121.4762	152	9/06/75	9/01/76	---
---	---	(OFOR)	Foreman Creek----------	39.5925	121.4492	384	9/06/75	9/01/76	---
OGOM	---	(OGOO)	Van Goodin Ranch---------	39.6537	121.6120	158	12/28/76	Open---	---
OHCM	---	(OHON)	Honcut----------	39.3357	121.4840	79	8/05/75	--do---	---
---	---	(OKAT)	Katskill Hills----------	39.4018	121.4207	250	8/05/75	9/01/76	---
---	OLC	(OLC)	Olema----------	38.0397	122.7925	30	12/22/66	2/23/77	Franciscan Formation; Jurassic to Eocene.
---	---	(OLON)	Lone Tree Road----------	39.4445	121.5712	54	8/05/75	9/01/76	---
---	---	(OLUV)	Olive Highway----------	39.5118	121.5118	168	10/22/75	9/01/76	---
ORAM	---	(ORAT)	Rattlesnake Point--------	39.4687	121.4135	588	8/05/75	Open---	---
---	---	(OSHP)	Shippee----------	39.5562	121.7175	40	9/06/75	10/17/75	---
OSTM	---	(OSTI)	Stimpson Lane----------	39.3688	121.5970	28	8/05/75	Open---	---
OSUM	---	(OSUT)	Sutter Buttes----------	39.2712	121.8523	67	4/01/76	--do---	---
OTBM	---	(OTAB)	Table Mountain----------	39.5457	121.5610	219	9/06/75	11/04/75	---
OWYM	---	(OWYN)	Wyandotte----------	39.4530	121.4868	168	8/05/75	Open---	---
PARM	---	(ATR)	Anticline Ridge----------	36.2492	120.3420	485	9/05/75	--do---	---
PBWM	BTW	(BTW)	Bitterwater----------	36.3150	120.9292	381	1/27/72	--do---	---
PCAM	CTM	(CAS)	Castle Mountain----------	35.9317	120.3370	1189	12/15/70	--do---	---
PCRM	---	(CRY)	Curry Mountain----------	36.0938	120.4347	296	9/04/75	--do---	---
---	---	(PEM)	Permanente Quarry 1------	37.3247	122.1055	466	5/08/70	5/28/70	---
---	---	(PER)	Permanente Quarry 2------	37.3243	122.1102	488	5/24/71	8/28/71	---
PGHM	GHC	(GDH)	Gold Hill----------	35.8310	120.3528	433	3/21/68	Open---	---
PHCM	---	(HEC)	Hearst Castle----------	35.6822	121.1525	514	12/17/73	--do---	---
PHRM	HVC	(HER)	Hernandez----------	36.3730	120.8188	750	11/26/69	--do---	---
PIVM	---	(IND)	Indian Valley----------	35.9065	120.6823	497	9/24/75	--do---	---
PJRM	JOL	(JOL)	Jolon Road----------	36.0837	121.1692	336	6/18/69	--do---	Marine sediment; Miocene.
PLOM	LRC	(LOR)	Lone Oak Road----------	36.2465	121.0425	308	8/14/70	--do---	---
PMPM	MOP	(MOP)	Monarch Peak----------	36.2152	120.7948	784	8/14/70	--do---	---

SITE INFORMATION--Continued

Code New	Code Alternate	Code Local	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
---	PNC	(PNC)	Pine Canyon----------	36.5622	121.6363	305	9/24/67	2/17/67	---
PPFM	PKF	(PKF)	Parkfield----------	35.8818	120.4135	469	1/11/68	Open---	Marine sediment; middle Miocene.
PPTM	PTV	(PTV)	Peach Tree Valley--------	36.1083	120.7212	506	4/16/70	--do---	---
PSMM	---	(SMM)	Smith Mountain----------	36.0697	120.5947	988	9/24/75	--do---	---
PTYM	TRC	(TAY)	Taylor Ranch----------	35.9455	120.4742	552	1/12/67	--do---	---
---	---	(PVR)	Poverty Ridge----------	37.4292	121.7425	975	7/12/68	5/07/70	---
PWKM	WKR	(WKR)	Work Ranch----------	35.8145	120.5112	503	1/11/68	Open---	---
---	---	(QRY)	Permanente Quarry--------	37.3250	122.1047	453	2/07/75	1977	---
RCWM	---	(RCW)	Renegade Canyon West-----	35.9502	117.6473	954	9/26/75	Open---	---
RVCM	---	(RVC)	Rose Valley Central------	36.0080	117.8900	1067	9/26/75	--do---	---
---	---	(SAL)	San Andreas Lake---------	37.5760	122.4233	335	7/13/67	9/27/72	---
---	---	(SCZ)	Santa Cruz----------	37.0140	122.0345	137	1/01/69	3/04/69	---
---	SFR	(SFR)	San Francisco (Rincon)---	37.7880	122.3895	8	---	4/07/76	Franciscan Formation; Jurassic to Eocene.
---	SHC	(SHC)	Mt. Saint Helena---------	38.6703	122.6338	1200	12/07/73	1/20/77	Nonmarine terrace deposits; Quaternary.
---	---	(SL1)	San Luis Reservoir 1-----	37.0812	121.0612	116	2/28/74	1/17/75	---
---	---	(SL2)	San Luis Reservoir 2-----	37.0312	121.0553	293	2/28/74	1/17/75	---
---	---	(SL3)	San Luis Reservoir 3-----	37.1147	121.1382	189	2/28/74	1/17/75	---
---	---	(SL4)	San Luis Reservoir 4-----	37.0043	121.1150	219	2/28/74	1/17/75	---
---	---	(SL5)	San Luis Reservoir 5-----	37.0710	121.1560	180	2/28/74	1/17/75	---
---	---	(SL6)	San Luis Reservoir 6-----	37.0283	121.0920	302	2/28/74	1/17/75	---
---	---	(SL7)	San Luis Reservoir 7-----	37.0297	121.1402	219	2/28/74	1/17/75	---
---	---	(SMR)	Smith Ranch----------	36.3820	120.9695	503	7/26/71	1/18/72	---
SMWM	---	(SMW)	Sugarloaf Mountain West--	36.0193	117.8458	1116	9/25/75	Open---	---
---	SRC	(SRS)	Salinas Radio Site-------	36.6685	121.5188	399	5/09/69	3/04/77	---
---	STC	(STC)	Stone Canyon ---------- Observatory.	36.6350	121.2333	259	1/22/67	10/06/76	---
---	TWN	(TWN)	Twin Peaks----------	36.0527	121.5075	148	12/17/73	9/04/75	---
---	---	(TYL)	Tyler Island----------	38.1470	121.5625	1	7/07/72	10/24/72	---
VPEM	---	(VPE)	Volcano Peak East--------	35.9495	117.8167	1463	9/26/75	Open---	---
---	---	(WAR)	Walter Ranch----------	38.4830	122.7030	115	8/09/70	5/01/71	---

Menlo Park, CA

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
Most stations	Mark L-4C-------	Z	1.0	---	Develocorder	---	A few stations are also recorded on Helicorder.
BJCM, BJOM, BSGM, HDLM, HFPM, HJGM, HQRM, JALM, JPLM, JSFM, JSGM, (OBID), (OCOX), (ODAM), (OFIG), (OLUV), OTBM, SRC, and STC:	Mark L-4C-------	Z,NS	1.0	---	--do--------	---	---
AFDM	Geotech S-13----	Z,NS,EW	1.0	---	--do--------	---	---
BVLM, CRC, (OLON), and OWYM:	Mark L-4C-------	Z,NS,EW	1.0	---	--do--------	---	---
JBMM	Mark L-4C-------	Z	1.0	---	--do--------	---	---
	Wilmore---------	NS	5.0	---	--do--------	---	Operated only April-August 1975.

Timing system: WWVB and IRIG signals recorded directly.

System response curves: See figure 2, p. 363.

SHORT HISTORY

Coding of these stations is somewhat unusual. Local codes had been assigned that often conflicted with other international codes; therefore, when data were contributed to NEIS, alternate three-letter codes were assigned. To identify the networks and to obtain unique station names that would not conflict with existing codes, a system of four-letter codes was designed. These are the codes ending with M, listed in the column headed "New." The "Alternate" codes are those which were assigned by NEIS and are still valid. The "Local" codes are those which had been used by Menlo Park in cataloging data and which may still be useful in locating old records.

The first letter of the four-letter codes signifies the network that contains the station.

Therefore,		
	A--M	belongs to the network Auburn
	B--M	Bear Valley
	C--M	Calaveras
	G--M	Geysers
	H--M	Holister
	J--M	San Jose
	L--M	Lassen
	M--M	Melones
	N--M	Napa
	O--M	Oroville
	P--M	Parkfield

The Coso network does not conform to this system. Its members include BCHM, CBHM, CFWM, CGSM, CPTM, CSSM, DKNM, DTEM, HWSM, JRWM, MFSM, NMCM, RCWM, RVCM, SMWM, VPEM.

Recording of seismicity near Auburn began in February 1972, with the installation of the station ADC; it is owned by the Bureau of Reclamation and operated by the USGS, Albuquerque. A horizontal Wood-Anderson began operating there in April 1973. On January 28, 1976, the operation of the station was turned over to USGS, Menlo Park, which expanded the network to include 20 stations.

HORM was not operated from May 9, 1968, to December 3, 1969.

JPPM was not operated from April 5, 1971, to August 20, 1975.

JBCM, (LHD), (MDO), NFIM, CSHM, (FOR), and HCBM operate intermittently.

The Center publishes a quaterly report entitled, "Catalog of Earthquakes along the San Andreas Fault system in Central California."

CALIFORNIA

Menlo Park, CA

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U. S. Geological Survey
National Center for Earthquake Research
345 Middlefield Road
Menlo Park, CA 94025

Telephone: 415-323-8111 ext. 2321

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(DFCC)	Cottonwood Creek--------	37.4702	117.9365	1682	3/09/70	1/71	---
(DFHR)	Hanging Rock----------	37.2250	117.7313	1268	5/26/70	1/71	---
(DFHT)	Horse Thief----------	37.3777	117.8300	1634	5/06/70	1/71	---
(DFVC)	Victor Con Mine---------	37.2582	117.8963	1079	5/26/70	1/71	---
(NRUB)	Ubehebe Crater----------	36.8913	117.5040	1414	10/24/71	12/73	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
All stations	Mark L4-c----------	Z	1.0	---	Develocorder	---	Telemetered to Menlo Park.

Timing system: WWVB and IRIG-C recorded directly.

System response curves: See figure 2, p. 363.

SHORT HISTORY

(DFCC), (DFHR), (DFHT), and (DFVC) are part of the Death Valley-Furnace Creek network; the other part is in Nevada. (NRUB) is part of the regional network; the other stations of this network are in Nevada.

CALIFORNIA

Pasadena, CA

GENERAL INFORMATION

Operated by: California Institute of Technology

Address: Seismological Laboratory 252-21
California Institute of Technology
Pasadena, CA 91125

Telephone: 213-795-8806

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(ADL)	Adelanto	34.5563	117.4170	900	2/75	Open--	Alluvium; Quaternary.
BAR	Barrett	32.6800	116.6717	510	1/17/52	--do--	Granodiorite; Cretaceous.
BBC	Big Bear	34.2417	116.9083	2060	6/21/51	9/20/57	---
(BLU)	Blue Ridge	34.4053	117.7253	1880	2/75	Open--	Igneous and metamorphic complex (Precambrian), intruded by tonalite (Mesozoic).
(BTL)	Butler Peak	34.2572	117.0033	---	11/75	--do--	Granite; Mesozoic.
(CFT)	Crafton Hills	34.0352	117.1110	671	1/75	--do--	Nonmarine sediments; Pleistocene.
CHP	Chuchupate	34.8083	119.0117	1590	1952	11/52	---
CIS	Catalina Island	33.4067	118.4033	485	7/01/71	Open--	Ultrabasic intrusive; Mesozoic.
(CKC)	Cook Canyon	34.1363	117.1747	550	4/75	--do--	Nonmarine sediments; middle or early Pliocene.
CLC	China Lake	35.8167	117.5967	766	7/08/49	--do--	Quartz diorite; Cretaceous.
(COQ)	Corona Quarry	33.8605	117.5097	1634	1/76	--do--	Metamorphics; Jurassic, Triassic.
(COY)	Coyote Mountain	33.3640	116.3105	---	1/76	--do--	Metamorphics; pre-Cretaceous.
CPE	Camp Elliot	32.8800	117.1000	213	11/72	--do--	Conglomerate; Eocene.
CPT	Camp Pendleton	33.3025	117.3395	61	1/75	--do--	Nonmarine terrace deposits; Quaternary.
(CRE)	Crestline	34.2433	117.2617	1430	5/19/49	8/31/50	---
CWC	Cottonwood	36.4383	118.0783	1620	10/13/65	Open--	Quartz diorite; Cretaceous.
(DB2)	Double Butte	33.7350	117.0620	625	4/75	--do--	Gabbro; Mesozoic.
DHS	Desert Hot Springs	33.9667	116.5000	330	1948	3/49	---
DLT	Dalton	34.1700	117.8100	523	7/20/50	8/29/59	Volcanic; Miocene.
ECA	El Cajon	32.8000	116.9500	135	1949	Closed	---
ECC	El Centro	32.7983	115.5483	-15	11/28/56	9/30/70	Alluvium; Quaternary.
FTC	Fort Tejon	34.8733	118.8933	990	11/21/52	9/30/70	---
GAV	Glen Avon	34.0225	117.5123	289	---	Open--	Metamorphics; pre-Cretaceous.

SITE INFORMATION--Continued

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
GLA	Glamis	33.0525	114.8265	627	12/20/66	Open	Basalt; Tertiary.
GSC	Goldstone	35.3017	116.8046	990	11/07/61	--do--	Granite; Cretaceous.
HAI	Haiwee	36.1367	117.9467	1150	9/11/29	10/27/65	---
HAV	Havilah	35.5100	118.5167	990	7/52	9/04/52	---
HAY	Hayfield	33.7083	115.6383	439	6/20/56	Open	Quartz monzonite; Cretaceous.
(HOT)	Hot Springs	33.3140	116.5815	---	1/76	--do--	Granite; Mesozoic.
IKP	Inkopah	32.6488	116.1080	957	11/72	--do--	Quartz diorite; Cretaceous.
IRC	Iron Canyon	34.3900	118.4000	580	11/01/71	--do--	Shallow alluvium (Quaternary) over gneiss.
ISA	Isabella	35.6633	118.4733	835	1/06/54	--do--	Quartz diorite; Cretaceous.
(KEE)	Keen Camp Maintenance Station.	33.6383	116.6532	1366	2/75	--do--	Tonalite; Mesozoic.
KNO	Knox Ranch	35.4833	118.5283	1090	7/52	11/10/52	---
KRC	King Ranch	35.3267	119.7450	680	10/16/52	12/03/65	---
LGC	Lakewood Golf Course	33.8358	118.1503	17	5/71	3/15/74	Alluvium; Quaternary.
LJC	La Jolla	32.8633	117.2533	8	5/04/27	11/30/75	---
(LRR)	Little Rock Reservoir	34.5260	118.0277	---	5/76	Open	Alluvium.
(MDA)	Mount Davis	33.9130	116.9995	845	1/75	--do--	Nonmarine sedimentary rocks; Pliocene.
(MLL)	Mill Creek	34.0913	116.9363	1513	12/74	--do--	Igneous and metamorphic rock complex; Precambrian.
MWC	Mount Wilson	34.2238	118.0577	1730	4/23/28	--do--	Granodiorite; Cretaceous.
PAS	Pasadena	34.1483	118.1717	295	3/17/27	--do--	Granitic gneiss; pre-Cretaceous.
(PCF)	Pomona	34.0532	117.7907	---	1/76	--do--	Volcanics; Miocene.
(PEM)	Pine Mountain	34.1673	117.8697	---	2/76	--do--	Metamorphics; pre-Cretaceous.
PLM	Palomar	33.3534	116.8617	1692	9/07/39	--do--	Quartz diorite; Cretaceous.
(POB)	Polly Butte	33.6867	116.9233	---	5/76	--do--	Granite; Mesozoic.
POM	Pomona	34.1000	117.7167	350	1949	Closed	---
PRR	Perris	33.7800	117.2333	440	1949	--do---	---
(PSP)	Palm Springs	33.7938	116.5488	195	3/75	Open	Mylonitized metasedimentary rocks; Mesozoic.
PVR	Palos Verdes	33.7583	118.3567	340	3/21/56	Closed	Shale; Miocene.
(RAY)	Raywood Flat	34.0363	116.8112	---	11/75	Open	Gneiss.
(RDM)	Round Mountain	34.4000	117.1850	1426	12/76	--do--	Marine metasediments; Carboniferous.
RVR	Riverside	33.9933	117.3750	260	10/19/26	--do--	Granite; Cretaceous.

Pasadena, CA

SITE INFORMATION--Continued

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
SBB	Saddle Back Butte-------	34.6883	117.8250	832	1/03/74	Open--	Quartz monzonite; Cretaceous.
SBC	Santa Barbara----------	34.4417	119.7133	90	5/10/27	--do--	Alluvium; Quaternary.
SCI	San Clemente Island-----	32.9800	118.5467	219	11/71	--do--	Shallow terrace gravels over basalt; Quaternary.
SCY	Stone Canyon Reservoir--	34.1062	118.4542	287	2/75	--do--	Metavolcanic rocks (Jurassic-Triassic) intruded by quartz monzonite (later Mesozoic).
(SDW)	Sidewinder Mine---------	34.6092	117.0742	1184	2/75	--do--	Granite; Mesozoic.
(SIL)	Silver Peak-------------	34.3478	116.8267	---	11/75	--do--	Marine metasediments; Carboniferous.
SJQ	San Joaquin Reservoir---	33.6200	117.8450	165	7/71	Closed	Sandstone; Tertiary.
(SME)	Santa Rosa Mine---------	33.8227	117.3553	494	2/75	Open--	Tonalite; Mesozoic.
(SMO)	Santa Rosa Mountain-----	33.5358	116.4617	---	6/76	--do--	Granite; Mesozoic.
SNC	San Nicolas Island------	33.2483	119.5233	275	7/24/57	1/24/68	Marine; Eocene.
SNS	San Onofre--------------	33.4322	117.5488	152	1/75	Open--	Marine sandstone; Eocene.
(SSK)	Sunset Peak-------------	34.2162	117.6887	---	1/76	--do--	Metamorphics; pre-Cretaceous.
(SSV)	San Sevaine-------------	34.2170	117.4890	1609	1/76	--do--	Granite; Mesozoic.
SWM	Sawmill-----------------	34.7183	118.5817	1220	3/07/66	12/08/70	Metamorphics; pre-Cretaceous.
SYP	Santa Ynez Peak---------	34.5267	119.9783	1305	6/67	Open--	Sandstone; Eocene.
TCC	Turnbull Canyon---------	33.9945	118.0128	299	11/76	Closed	Siltstone; Miocene.
(THR)	Three Sisters-----------	34.5532	117.7183	---	11/12/75	Open--	Basic intrusive; Mesozoic.
TIN	Tinemaha----------------	37.0550	118.2283	1195	9/04/29	--do--	Basalt; Quaternary.
TPC	Twentynine Palms--------	34.1058	116.0488	720	5/72	--do--	Quartz monzonite; Cretaceous.
(TPO)	Tropico Hill------------	34.8788	118.2277	---	5/76	--do--	Volcanic intrusives; Tertiary.
TWL	Twin Lakes--------------	34.2783	118.5945	390	11/71	--do--	Sandstone; Cretaceous.
(VGR)	Vista Grande------------	33.8375	116.8088	1484	12/75	--do--	Granite; Mesozoic.
VPD	Villa Park Dam----------	33.8160	117.7622	183	7/71	--do--	Terrace gravels; Quaternary.
(VST)	Vista-------------------	33.1567	117.2317	---	1/75	--do--	Granite; Mesozoic.
WDY	Woody-------------------	35.7000	118.8433	500	8/05/52	8/27/70	Granitic rock.
WRC	Williams Ranch----------	35.2983	118.6117	430	1952	1953	---
(WWR)	Whitewater--------------	33.9918	116.6560	702	1/75	Open--	Coachella Fanglomerate (lower member); Miocene(?).

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(ADL)	Mark L-4C----------	Z	1.0	0.062	Develocorder	6000 K	Magnification at 14 Hz on Geotech viewer.
BAR	Benioff----------	Z,NS,EW	1.0	90.0	Photo paper	3 K	Also has a torsion meter.
	--do----------	Z	1.0	.2	--do-------	300 K	---
BBC	--do----------	Z	1.0	.2	--do-------	---	---
(BLU)	Mark L-4C----------	Z	1.0	.062	Develocorder	1200 K	Magnification at 14 Hz on viewer screen.
(BTL)	--do----------	Z	1.0	.062	--do--------	3000 K	Magnification at 14 Hz on viewer screen.
(CFT)	--do----------	Z	1.0	.062	--do--------	1500 K	Do.
CHP	---	Z	1.0	---	---	---	---
CIS	Mark L-4C----------	Z	1.0	.033-10	Photo paper, pen and ink	430 K	Telemetered to Pasadena.
(CKC)	--do----------	Z	1.0	.062	Develocorder	1500 K	Magnification at 14 Hz on viewer screen.
CLC	Benioff----------	Z	1.0	.2	Photo paper	500 K	Telemetered to Pasadena.
(COQ)	Mark L-4C----------	Z	1.0	.062	Develocorder	1200 K	---
(COY)	--do----------	Z	1.0	.062	--do--------	1200 K	---
CPE	Johnson-Matheson-----	Z	1.2	.2	Photo paper, pen and ink	87 K	Telemetered to Pasadena and the University of California, San Diego.
CPT	Benioff-MC----------	Z	1.0	.2	Pen and ink	80 K	---
(CRE)	Benioff----------	Z	1.0	.2	---	---	---
CWC	--do----------	Z	1.0	.2	Photo paper	400 K	Also has torsion meters and strong-motion instruments.
(DB2)	Mark L-4C----------	Z	1.0	.062	Develocorder	6000 K	---
DHS	---	Z	1.0	---	---	---	---
DLT	Benioff----------	Z	1.0	.2	---	---	---
ECA	---	Z	1.0	---	---	---	---
ECC	Strong-motion--------- instruments only.	---	---	---	---	---	---
FTC	Benioff----------	Z	1.0	.2	---	---	---
GAV	Mark L-4C----------	Z	1.0	.062	Develocorder	1200 K	---
GLA	Benioff----------	Z	1.0	.2	Photo paper, pen and ink	360 K	Also has a torsion meter. Telemetered to Pasadena.
GSC	Benioff----------	Z	1.0	.2	--do--------	480 K	Telemetered to Pasadena.
	--do----------	Z,NS,EW	1.0	.75	Photo paper	---	WWSSN station.
	Sprengnether---------	Z,NS,EW	15.0	100.0	--do-------	1.5 K	Do.

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
HAI	Benioff	Z,NS,EW	1.0	0.2	---	---	---
	Wood-Anderson	Z,NS,EW	.8	---	---	---	---
HAV	Benioff	Z	1.0	---	---	---	---
HAY	--do	Z	1.0	.2, 90	Photo paper	400 K, 3 K	Signal filtered two ways.
(HOT)	Mark L-4C	Z	1.0	.062	Develocorder	1200 K	---
IKP	Electrotech	Z	1.0	.2	Photo paper, pen and ink	166 K	Telemetered to Pasadena.
IRC	--do	Z	1.0	.2	Photo paper	234 K	Do.
ISA	Benioff	Z	1.0	.2	Photo paper, pen and ink	240 K	Also has torsion and strain meters.
(KEE)	Mark L-4C	Z	1.0	.062	Develocorder	6000 K	Magnification at 14 Hz on viewer screen.
KNO	Benioff	Z	1.0	---	---	---	---
KRC	--do	Z	1.0	0.2	---	---	---
LGC	Mark L-4C	Z	1.0	.033-10	Photo paper	30 K	Telemetered to Pasadena.
LJC	Benioff	Z	1.0	.2	---	---	---
(LRR)	Mark L-4C	Z	1.0	.062	Develocorder	1200 K	---
(MDA)	--do	Z	1.0	.062	--do	3000 K	Magnification at 14 Hz on Geotech viewer.
(MLL)	--do	Z	1.0	.062	--do	1500 K	Do.
MWC	Benioff	Z	1.0	.2	Photo paper, pen and ink	237 K	Telemetered to Pasadena.
PAS	Benioff	Z,NS,EW	1.0	.2	Photo paper	---	Z telemetered to Pasadena.
	--do	Z,NS,EW	1.0	90.0	--do	3 K	---
	Wood-Anderson	NS,EW	.8	---	--do	---	---
	Lehner-Griffith	Z,NS,EW	.8	---	--do	4, 100	---
	Press-Ewing	Z,NS,EW	30.0	90.0	Photo paper, pen and ink	2000, 25	---
	--do	Z,NS,EW	---	Ultra-long			---
(PCF)	Mark L-4C	Z	1.0	.062	Develocorder	1200 K	---
(PEM)	--do	Z	1.0	.062	--do	1200 K	---
PLM	Benioff	Z	1.0	.2	Photo paper, pen and ink	480 K	Also has torsion and strong-motion meters.
(POB)	Mark L-4C	Z	1.0	.062	Develocorder	1200 K	---
POM	---	Z	1.0	---	---	---	---
PPR	---	Z	1.0	---	---	---	---
(PSP)	Mark L-4C	Z	1.0	.062	Develocorder	6000 K	Magnification at 14 Hz on Geotech viewer.
PVR	Benioff	Z	1.0	.2	---	---	---
(RAY)	Mark L-4C	Z	1.0	.062	Develocorder	1200 K	---

Pasadena, CA

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
(RDM)	Mark L-4C----------	Z	1.0	0.062	Develocorder	1200 K	---
RVR	Benioff----------	Z	1.0	.2	Photo paper	240 K	---
	--do----------	Z,NS,EW	1.0	90.0	Pen and ink	3 K	---
	Wood-Anderson--------	NS,EW	.8	---	Photo paper	2.8 K	---
	Lehner-Griffith------	Z,NS,EW	.8	---	--do-------	100	NS component also recorded at magnification 4.
SBB	Ranger----------	Z	1.0	.2	Photo paper, pen and ink	800 K	---
	Geotech S-13---------	Z,NS,EW	1.0	90.0	Photo paper	3 K	---
SBC	Benioff----------	Z	1.0	.2	Photo paper	20 K	---
	Wood-Anderson--------	NS,EW	.8	---	--do-------	2.8 K	---
	Lehner-Griffith------	Z,NS,EW	.8	---	--do-------	100	NS component also recorded at magnification 4.
SCI	Benioff----------	Z	1.0	.2	Photo paper	90 K	---
SCY	--do----------	Z	1.0	.2	---	---	---
(SDW)	Mark L-4C----------	Z	1.0	.062	Develocorder	---	---
(SIL)	--do----------	Z	1.0	.062	--do--------	1200 K	---
SJQ	--do----------	Z	1.0	.033-10	Photo paper	110 K	---
(SME)	--do----------	Z	1.0	.062	Develocorder	6000 K	Magnification at 14 Hz on Geotech viewer.
(SMO)	Mark L-4C----------	Z	1.0	.062	Develocorder	1200 K	---
SNC	Benioff----------	Z	1.0	.2	---	---	---
	--do----------	Z	1.0	90.0	---	---	---
	Wood-Anderson--------	EW	.8	---	---	---	---
SNS	Benioff----------	Z	1.0	.2	Develocorder	---	---
(SSK)	Mark L-4C----------	Z	1.0	.062	--do--------	1200 K	---
(SSV)	--do----------	Z	1.0	.062	--do--------	1200 K	---
SWM	Benioff----------	Z	1.0	.2	---	---	---
SYP	--do----------	Z	1.0	.2	Photo paper, pen and ink	90 K	---
TCC	Mark L-4C----------	Z	1.0	.033-10	Photo paper	110 K	---
(THR)	--do----------	Z	1.0	.062	Develocorder	1200 K	---
TIN	Benioff----------	Z	1.0	.2	Photo paper	60 K	---
	--do----------	Z,NS,EW	1.0	90.0	--do-------	3 K	---
	Wood-Anderson--------	NS,EW	.8	---	--do-------	2.8 K	---
TPC	Electrotech----------	Z	1.0	.2	Photo paper, pen and ink	376 K	---
(TPO)	Mark L-4C----------	Z	1.0	.062	Develocorder	1200 K	---
TWL	Electrotech----------	Z	1.0	.2	Photo paper	117 K	---
	Geotech S-13---------	Z,NS,EW	1.0	90.0	Pen and ink	3 K	---
(VGR)	Mark L-4C----------	Z	1.0	.062	Develocorder	1200 K	---
VPD	Mark L-4C----------	Z	1.0	.2	Photo paper	220 K	---
	Geotech S-13---------	Z,NS,EW	1.0	90.0	Pen and ink	3 K	---
(VST)	Ranger----------	Z	1.0	.2	Develocorder	---	---

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
WDY	Benioff----------	Z	1.0	.2	---	---	---
	Wood-Anderson--------	EW	.8	---	---	---	---
WRC	---	Z	1.0	---	---	---	---
(WWR)	Mark L-4C----------	Z	1.0	.062	Develocorder	3000 K	Magnification at 14 Hz on Geotech viewer.

Timing system: Custom crystal clock and WWVB radio signal.

System response curves: GSC--see figure 1, p. 363. Others available from station.

SHORT HISTORY

Along with the extensive network noted above, C.I.T. shares responsibility with the USGS for nearly 100 other stations in southern California region. C.I.T and USGS efforts are closely coordinated; and, occasionally, funding and operational responsibilities for various stations are exchanged.

Most of the stations currently operating belong to one of three networks: L. A. Basin, C.I.T. Telemetered, and San Bernardino.

L. A. Basin network comprises: CIS, IRC, MWC, PAS, SCY, SJQ, SNS, SWM, TCC, TWL, and VPD.

C.I.T. Telemetered network is composed of: CLC, CPE, GLA, GSC, IKP, ISA, PLM, RVR, SBB, SCI, SYP, TPC and (VST).

San Bernardino network comprises: (ADL), (BLU), (BTL), (CFT), (CKC), (COQ), (COY), (DB2), (DVL), GAV, (HOT), (KEE), (LRR), (MDA), (MLL), (PCF), (PEM), (POB), (PSP), (RAY), (RDM), (SDW), (SIL), (SME), (SMO), (SSK), (SSV), (TPO), (VGR), and (WWR).

BAR replaced LJC, part of the original C.I.T. network.

CLC was installed as a temporary station but later was made permanent.

CPE was installed by the University of California, San Diego. Telemetering was added by C.I.T.; the station is now shared by both institutions.

(CRE) was destroyed by fire and was subsequently replaced by BBC.

CHP, DHS, ECA, HAV, KNO, POM, PRR and WRC were all temporary stations.

CWC replaced HAI, which was razed to enlarge the Haiwee Dam.

ECC established instruments in the same room with USC&GS strong-motion instruments in order to compare the magnitude determination of the instruments.

GLA was one of the original telemetered stations.

GSC was started as a temporary station; it was then equipped with the permanent WWSSN equipment that was moved from Palomar.

HAY was originally installed in a building constructed for the purpose of housing the instrument, but was later moved to a cave-vault 330 m from the building.

IKP is located in Inkopah Park, San Diego County.

IRC started as a temporary installation after the San Fernando earthquake in 1971. The instruments later were transferred to a permanent, insulated steel vault.

ISA was installed following the 1952 Tehachapi earthquake. It moved to a more permanent location at Isabella Dam and later to a tunnel at Frenchman's Gulch.

PAS was established by Carnegie Institution of Washington, D. C. In 1937, its operation was assumed by C.I.T. and it has since become the headquarters for the C.I.T. network. Several instrument changes have been made since 1937.

PLM originally had a Benioff seismometer (t_o =1.5 sec) and a 35-mm film recorder, which were replaced after World War II with a variety of instruments installed for a microseism study. The WWSSN equipment, now at GSC, was originally installed here.

RVR recorded on-site for many years; the torsion meters still do record on-site. The three-component Benioff system was added when telemetering began.

SBB and TPC are powered by solar panels.

SBC was recorded for years on paper drums, with the exception of a period when recording was done on 35-mm film for economic reasons. The Lehner-Griffith instruments were added in the 1950's. The station was maintained by the Santa Barbara Museum of Natural History.

SCI was installed with the help of the U.S. Navy, although the installation was not completed at the time and was "reestablished" 2 years later.

SNC was established in cooperation with the U.S. Navy; it was later replaced by SCI.

TCC was operated in cooperation with the USGS.

TIN operated with the above-stated instruments from its inception. Except for the three-component Benioff's, which were added in the late 1940's. Telemetering was used for only a short period, and currently the station records on-site and is maintained by the Department of Water and Power for the City of Los Angeles.

TWL was installed after the 1971 San Fernando earthquake with a Benioff seismometer, which was later replaced with an Electrotech. The three-component instruments have been recently installed and are telemetered to PAS.

VPD was originally part of the C.I.T.-USGS L. A. Basin network; it is now operated by C.I.T., which has added the three-component instruments.

GENERAL INFORMATION

Operated by: U.S. Geological Survey and California Institute of Technology

Address: U.S. Geological Survey
Seismological Laboratory
California Institute of Technology
Pasadena, CA 91125

Telephone: 213-795-8806

Address to obtain records:

As above.

SITE INFORMATION

Code		Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(ABL)		Mount Abel---------	34.8508	119.2208	1981	6/76	Open--	Undivided metamorphic rocks, gneiss; Precambrian.
AIC	(SBAI)	Anacapa Island-----	34.0133	119.4372	113	2/23/73	--do--	Volcanic basalt; Miocene.
AMS		Amos---------------	33.1413	115.2542	140	3/73	--do--	Igneous and metamorphic rock complex; Precambrian.
(BC2)		Big Chuckwalla----- Mountains, No. 2.	33.6570	115.4612	1185	11/74	--do--	Granitic gneiss; Precambrian.
BCC	(SBCC)	Colson Canyon------	34.9413	120.1720	610	11/24/69	--do--	Marine sediments; middle Miocene.
BCD	(SBCD)	Casitas Dam--------	34.3687	119.3438	213	11/71	--do--	Nonmarine sediments; Oligocene.
(BCH)		Branch Mountain----	35.1850	120.0842	1140	6/76	--do--	Marine sediments; Late Cretaceous.
BCL	(SBCL)	Casitas Lake-------	34.4125	119.3612	111	11/24/69	8/05/71	Nonmarine sedimentary rock; Oligocene.
(BCM)		Big Chuckwalla----- Mountains.	33.6553	115.4480	1135	4/74	11/74	Granitic gneiss; Precambrian.
BFC		Brooks Farm--------	32.7248	115.0440	43	3/73	Open--	Dune sand over alluvium; Quaternary.
(BHM)		Bighorn Mountains--	34.2788	116.6152	1850	4/74	11/74	Quartz monzonite or related rock; Mesozoic(?).
BLG	(SBLG)	Laguna Peak--------	34.1145	119.0642	415	11/69	Open--	Marine sediments; middle Miocene.
BLP	(SBLP)	Lompoc-------------	34.5603	120.4005	134	11/69	--do--	Marine sediments; Late Cretaceous.
BMM		Big Maria Mountains	33.7567	114.5857	564	4/74	10/76	Granitic rock; Precambrian.
(BMT)		Bear Mountain------	35.1358	118.5968	1237	8/76	Open--	Granite, tonalite, and diorite; Mesozoic.
(BON)		Bonds Corner-------	32.6945	115.2685	14	3/73	--do--	Alluvium or lake deposits; Quaternary.
BSC	(SBSC)	Santa Cruz Island--	33.9947	119.6332	457	11/69	--do--	Marine sediments; middle Miocene.
BSM	(SBSM)	San Miguel Island--	34.0375	120.3498	172	11/69	--do--	Do.
BSN	(SBSN)	San Nicolas Island-	33.2450	119.5067	259	3/70	--do--	Marine sediments; Pleistocene.
(CAM)		Camarillo Hills----	34.2545	119.0333	268	6/15/73	--do--	Nonmarine sediments; Pliocene-Pleistocene.
(CEM)		Cemetery-----------	32.7160	115.5012	-1	1/74	1/75	Lake deposits; Quaternary.

SITE INFORMATION--Continued

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(CJP)	Conejo----------	34.1820	118.9865	314	6/18/73	10/75	---
(CLI)	Calipatria---------	33.1408	115.5273	-59	11/76	Open--	Lake deposits; Quaternary.
(CLP)	Clark's Peak-------	34.0888	118.9642	545	6/18/73	10/75	Volcanic basalt; Miocene.
CMH	Chemehuevi--------- Mountains.	34.5530	114.5720	940	2/75	Open--	Granitic rock; Precambrian.
CO2	Coxcomb Mountains-- No. 2.	33.8472	115.3447	276	11/74	--do--	Metasedimentary rock; Mesozoic.
COA	Coachella----------	32.8635	115.1227	34	3/73	--do--	Alluvium; Quaternary.
(COK)	Cook Ranch---------	32.8492	115.7268	-15	4/73	--do--	Lake deposits; Quaternary.
COT	Chocolate Mountain-	33.3048	115.3533	293	3/73	--do--	Granitic rocks; Quaternary.
(COX)	Coxcomb Mountains--	33.8725	115.3280	884	4/74	11/74	Metasedimentary rocks; Mesozoic.
(CPM)	Copper Mountain----	34.1540	116.1967	937	6/74	Open--	Quartzite aplite(?); Paleozoic/ Mesozoic(?).
(CRG)	Crocker Grade------	35.2422	119.7233	1204	6/76	--do--	Marine sediments; middle Miocene.
CRR	Carrizo------------	32.8863	115.9683	98	3/73	--do--	Terrace deposit (Quaternary) over nonmarine sedimentary rocks (Pliocene).
(DAH)	Dahlia Canal-------	32.7345	115.5578	-6	1/74	5/76	Lake deposits; Quaternary.
(DBB)	Double Butte-------	33.7350	117.0620	625	4/75	Open--	Basic intrusive; Mesozoic.
(DVL)	Devil Canyon-------	34.1998	117.3282	598	12/74	11/76	Metamorphic rocks; pre-Cretaceous.
EAG	Eagle Mountain-----	33.8490	115.4732	366	11/74	Open--	Alluvium; Quaternary.
(ECF)	Echo Falls---------	34.4580	119.0907	1000	11/75	--do--	Marine sediments; Eocene.
(EGG)	Egg Ranch----------	34.1325	119.1470	---	6/16/73	7/04/73	Alluvium; Holocene.
(ELR)	Elmore Ranch-------	33.1473	115.8325	-63	11/76	Open--	Sedimentary lake deposits; Quaternary.
(FNK)	Frink--------------	33.3830	115.6377	12	11/76	--do--	Do.
FTC	Fort Tejon---------	34.8733	118.8933	924	8/76	--do--	Alluvium; Holocene.
(GRP)	Granite Pass-------	34.8043	115.6045	1238	4/74	--do--	Granitic rock; Mesozoic.
(HDG)	Hidalgo Mountain---	34.4288	116.3050	1347	4/74	--do--	Quartz monzonite or related rock; Mesozoic.
(HSP)	Imperial Valley---- Hospital.	32.7468	115.5618	-6	1/74	5/76	Lake deposits; Quaternary.
ING	Ingram Ranch-------	32.9883	115.3102	2	3/73	Open--	Do.
(INS)	Inspiration--------	33.9356	116.1943	1700	4/74	--do--	Undivided granitic rock (Mesozoic) and gneiss (Precambrian).
(IRN)	Iron Mountains-----	34.1600	115.1840	980	9/74	--do--	Metasedimentary rock; Mesozoic.
(KBY)	Kobayashi Ranch----	33.0402	115.7010	-51	2/75	5/76	Lake deposits; Quaternary.
(KUB)	Kubber Ranch-------	32.6868	115.5810	-2	1/74	1/75	Do.

SITE INFORMATION--Continued

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(KYP)	Key Point----------	34.1018	118.8795	700	6/73	Open--	Volcanic basalt; Miocene.
(LED)	Lead Mountain------	34.4677	115.9365	853	4/74	--do--	Andesitic rock; Miocene.
(LHU)	Lake Hughes--------	34.6710	118.4113	1036	6/76	--do--	Granite and adamellite; Mesozoic.
LPC (SBLC)	La Cumbre Peak-----	34.4965	119.7135	1190	11/69	--do--	Marine rocks; Eocene.
(LTC)	Little Chuckwalla-- Mountains.	33.4890	115.0700	458	4/74	--do--	Granitic rock; Precambrian.
LTM	Little Maria------- Mountains.	33.9150	114.9183	744	4/74	--do--	Metasedimentary rock; Mesozoic.
(MDA)	Mount Davis--------	33.9130	116.9995	845	1/75	--do--	Nonmarine sedimentary rocks; Pliocene.
(NWR)	New River----------	33.1017	115.6835	-69	11/76	--do--	Sedimentary lake deposits; Quaternary.
OBB	Obsidian Butte-----	33.1673	115.6367	-59	4/73	--do--	Rhyolite; Holocene.
OCB	Ocean Bottom-------	34.0367	119.1835	-75	6/73	10/75	Sea-floor mud.
(PIC)	Picacho Peak-------	32.9142	114.6432	263	7/75	Open--	Nonmarine sediments; Pleistocene.
(PIU)	Piute Mountains----	34.7403	115.0940	1209	4/74	10/76	Gneiss and granitic rock; Precambrian.
(PKM)	Peak Mountain------	34.8958	119.8188	1704	8/76	Open--	Marine sediments; Eocene.
PLT	Pilot Knob---------	32.7312	114.7293	61	3/73	--do--	Granitic and metamorphic rocks; pre-Cenozoic.
(PNM)	Pinto Mountains----	33.9773	115.8008	1148	4/74	--do--	Metasedimentary rock; Mesozoic.
(PTD)	Point Dume---------	34.0042	118.8063	40	6/73	--do--	Marine sediments; late Miocene.
(RMR)	Rimrock------------	34.2128	116.5753	1702	11/74	--do--	Quartz monzonite or related rock; Mesozoic.
(ROD)	Rodman Mountain----	34.6297	116.6048	1292	5/76	--do--	Nonmarine sediments; Pleistocene.
(RSE)	Rose Pump----------	32.9255	115.4992	-41	2/75	--do--	Lake deposits; pre-Cenozoic.
RUN	Ruthven------------	32.9722	114.9772	151	3/73	--do--	Nonmarine sediments; Pleistocene.
(RVM)	Rio Vista Mine-----	34.1802	114.2003	243	5/77	--do--	Basaltic rocks; Quaternary.
RVS	Riverside Mountains	34.0347	114.5180	677	4/74	--do--	Igneous and metamorphic rock complex; Precambrian.
(RYS)	Reyes Peak---------	34.6433	119.3513	1841	6/76	--do--	Marine sediments; Eocene.
(SAD)	Saddle Peak--------	34.0810	118.6650	732	8/73	--do--	Intrusive basalt; Tertiary.
SGL	Mount Signal-------	32.6492	115.7253	110	3/73	--do--	Nonmarine sediments; Pliocene.
(SHH)	Sheep Hole--------- Mountains.	34.1877	115.6545	1122	4/74	--do--	Metamorphic rock; pre-Cretaceous.
(SIP)	Simi Peak----------	34.2040	118.7990	700	6/73	--do--	Marine rocks; Late Cretaceous.
SNR	Schaffner Ranch----	32.8618	115.4368	-30	3/73	--do--	Lake deposits; Quaternary.
SPH	San Pedro Hill-----	33.7467	118.3347	445	7/71	3/74	Marine sediments; middle Miocene.

SITE INFORMATION--Continued

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
SPM	Ship Mountains-----	34.4720	115.4027	915	4/74	Open--	Granitic rocks; Mesozoic.
STP	Stepladder---------- Mountains.	34.5712	114.8480	628	4/74	10/76	Igneous and metamorphic rock complex; Precambrian.
(SUF)	Sulfur Ridge-------	34.4097	119.2025	---	7/13/73	8/24/73	Marine sediments; middle Miocene.
(SUP)	Superstition------- Mountain.	32.9552	115.8238	220	3/73	Open--	Granitic rocks; Mesozoic.
(TMB)	Temblor Range SE---	35.0873	119.5347	1021	6/76	--do--	Marine sedimentary rock; middle Miocene.
TTM	Turtle Mountains---	34.3353	114.8275	1098	4/74	--do--	Basaltic rock; Tertiary.
(WEL)	Well---------------	32.7160	115.5578	-4	1/74	10/75	Lake deposits; Quaternary.
WH2	Whipple Mountains-- No. 2.	34.3145	114.4092	1245	10/74	Open--	Gneiss; Precambrian.
(WHP)	Whipple Mountains--	34.3070	114.4958	606	4/74	10/74	Gneiss (Precambrian) intruded by andesite dikes (Tertiary).
(WIS)	Wister-------------	33.2760	115.5930	-68	11/76	Open--	Lake deposits; Quaternary.
WLK	Wiest Lake---------	33.0513	115.4907	-52	3/73	--do--	Do.
(WML)	Westmorland--------	33.0152	115.6225	-44	11/76	--do--	Do.
(YEG)	Yeguas Mountain----	35.4363	119.9593	939	8/76	--do--	Alluvium; Holocene.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
All stations	Mark L-4C----------	Z	1.0	0.062	Develocorder	Variable	Telemetered to Pasadena.

Timing system: WWVB recorded directly on Develocorder.

System response curves: See figure 2, p. 363.

SHORT HISTORY

The USGS and C.I.T. cooperate in funding and operation of the above-mentioned stations. C.I.T. also maintains another large network in this area. The responsibility for the different networks occasionally shifts between C.I.T. and C.I.T.-USGS.

These stations are grouped into five networks; Mojave, Imperial Valley, Carrizo Plain-Palmdale, Dos Cuadros, and Santa Barbara-Pt. Mugu.

Mojave network comprises (BC2), CMH, CO2, (CPM), EAG, (GRP), (HDG), (INS), (IRN), (LED), (LTC), LTM, (PNM), (RMR), (ROD), (RVM), RVS, (SHH), SPM, TTM, and WH2.

Imperial Valley network is composed of AMS, (BON), (CLI), COA, (COK), COT, CRR, (ELR), (FNK), ING, (NWR), OBB, PLT, RUN, SGL, SNR, (SUP), (WIS), WLK, (WML), and (FTM) Arizona, (LGA) Arizona, (SLU) Arizona, and (YMD) Arizona.

Carrizo Plain-Palmdale network consists of (ABL), (BCH), (BMT), (CRG), FTC, (LHU), (PKM), (RYS), (TMB), and (YEG).

Santa Barbara-Pt. Mugu network comprises AIC, BCC, BCD, BLG, BLP, BSC, BSM, BSN, (CAM), (ECF), (KYP), LPC, (PTD), (SAD), and (SIP).

FTC began operation in November 1952. This station ran until it was closed in the 1960's. The present location is nearly identical to that of the old station.

C.I.T. and the USGS publish frequent reports on the data collected through their several networks.

GENERAL INFORMATION

Operated by: Theosophical University

Address: Theosophical University--Closed
Point Loma, CA
(Obsolete)

Address to obtain records:

Unknown.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
	Point Loma----------	32.7167	117.2500	91	1906	Closed	Eolian hard pan on sandstone.

INSTRUMENTATION

Code	Seismometer			Galvo	Type recording	Magnification at T_o	Remarks
	Type	Component	T_o(sec)	T_g(sec)			
	West astatic pendulum	NS,EW	---	---	---	---	---
	Custom instrument----	Z	---	---	---	---	---

Timing system: Unknown.

System response curves: Not available.

CALIFORNIA

Sacramento, CA

GENERAL INFORMATION

Operated by: California Department of Water Resources

Address: California Department of Water Resources
Earthquake Engineering Office, Rm 216-4
1416 9th Street
Sacramento, CA 95814

Telephone: 916-445-8064

Address to obtain records:

As above.

SLD records for 1965-70 also available from:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CED	Cedar Springs----------	34.2772	117.3342	1067	3/65	7/67	---
(CSL)	Crestline----------	34.2497	117.2783	1490	4/71	Open--	Granitic rock; Mesozoic.
CSP	Cedar Springs----------	34.2980	117.3574	1268	7/69	--do--	Do.
FEA	Feather Falls----------	39.6191	121.2457	1227	6/66	1/69	Metavolcanics; Triassic.
KRK	Kanaka Peak----------	39.5833	121.3053	889	1/69	Open--	Granitic rock; Mesozoic.
MGL	Magalia----------	39.8117	121.5575	1010	6/66	--do--	Ultrabasic intrusive rock; Mesozoic.
(MRD)	Mojave River Dam--------	34.6757	117.2408	969	1/72	--do--	Granitic rock; Mesozoic.
ORV	Oroville----------	39.5556	121.2167	362	8/63	--do--	Metavolcanics; Mesozoic.
PAM	Palermo----------	39.4488	121.5197	130	1/76	--do--	---
PEC	Perris----------	33.8919	117.1607	616	1/70	--do--	Granitic rock; Mesozoic.
PYR	Pyramid----------	34.5680	118.7411	1247	7/69	--do--	Granitic rock, tonalite, diorite; Mesozoic.
SLD	San Luis Dam----------	37.0747	121.2206	443	11/65	--do--	Franciscan Formation; Jurassic to Eocene.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
CED	Benioff----------	Z	1.0	---	Photo paper	---	---
(CSL), KPK, MGL, (MRD):	Teledyne SD-210------	Z	1.0	---	Develocorder	---	Telemetered to Sacramento.
CSP	Sprengnether S-7000--	Z	1.0	---	--do--------	---	Do.
FEA	Ranger----------	Z	1.0	---	Photo paper	---	---

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
ORV	Benioff 1051, 1101---	Z,NS,EW	1.0	---	Develocorder	---	Telemetered to Sacramento.
	Geotech 7505, 8700A--	Z,NS,EW	20.0	---	--do--------	---	Do.
PAM	Ranger----------	Z	1.0	---	--do--------	---	Do.
PEC, PYR:	Sprengnether S-7000--	Z,NS,EW	1.0	---	--do--------	---	Do.
SLD	Benioff 4681A--------	Z	1.0	.2	--do--------	100 K, 3 K	Telemetered to Sacramento. Two instruments run at different magnifications.
	Benioff 6102A--------	NS,EW	1.0	.2	--do--------	100 K	Telemetered to Sacramento.

Timing system: All telemetered stations use an Astrodata 6190 time-code generator and WWVB, recorded directly.

System response curves: Available from station.

SHORT HISTORY

FEA, MGL, ORV, and SLD were initiated by the U.S. Bureau of Reclamation in conjunction with dam-building at each of the sites. The UGC&GS installed the equipment under a special arrangement with the Bureau. The USC&GS continued to run the stations until the Bureau no longer required the stations, at which time the stations were given to the California Department of Water Resources in 1968. Telemetering of these stations began at that time.

JAS is funded by the Department of Water Resources and is run jointly with the University of California, Berkeley.

GENERAL INFORMATION

Operated by: San Bernardino Valley College

Address: Department of Geology
San Bernardino Valley College
701 South Mt. Vernon Ave.
San Bernardino, CA 92403

Telephone: 714-885-0231

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(SBVC)	San Bernardino----------	34.0881	117.3105	319	1/72	Open--	Alluvium; Quaternary.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(SBVC)	Geotech 4681, 6102---	Z,NS,EW	1.0	---	Pen and ink	3.5 K	---

Timing system: Sprengnether TS-100 checked with WWVB.

System response curves: Not available.

SHORT HISTORY

Interest in seismology at the College was sparked by the proximity of the campus to the San Jacinto and San Andreas faults.

CALIFORNIA

San Diego, CA

GENERAL INFORMATION

Operated by: San Diego State University

Address: Department of Geological Sciences
5300 Campanile Drive
San Diego State University
San Diego, CA 92182

Telephone: 714-286-5586

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
SND	San Diego----------	32.7772	117.0681	125	8/64	Open	Poway Group (conglomerate); Tertiary.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
SND	Benioff----------	Z	1.0	90	Helicorder	230 K	Magnification at 40 sec.
	--do----------	Z	1.0	.2	--do------	7.5 K	Magnification at 1 sec.

Timing system: Custom quartz crystal clock with WWV recorded on the records.

System response curves: Not available.

SHORT HISTORY

SND was established as a teaching station as well as a serious scientific tool.

CALIFORNIA

San Diego, CA

GENERAL INFORMATION

Operated by: University of California, San Diego

Address: Institute of Geophysics and Planetary Physics
University of California, San Diego
San Diego, CA 92110

Telephone: 714-452-2890

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(LJC)	La Jolla----------	32.8633	117.2533	8	1927	Open--	Consolidated alluvium; Eocene.
(PFO)	Pinyon Flat Observatory-	33.6092	116.4553	1280	3/71	--do--	Granite; Mesozoic.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
LJC	Press-Ewing----------	Z,NS,EW	10.0	---	Pen and ink--	---	Station run mainly for demonstration.
PFO	--do----------	Z,NS,EW	10.0	---	Magnetic tape	---	---

Timing system: Custom clock checked with WWV.

System response curves: Not available.

SHORT HISTORY

LJC was established by Carnegie Institution of Washington and Scripps Institute of Oceanography with two horizontal Wood-Anderson's. The station ran under the auspices of C.I.T. until May 1952. It was reinstated at a slightly different location and is currently run by the University of California, San Diego.

PFO also operates a three-component laser strainmeter, modified LaCoste-Romberg gravimeter, superconducting gravimeter, and several tiltmeters.

CALIFORNIA

San Francisco, CA

GENERAL INFORMATION

Operated by: Golden Gate Park

Address: Natural Science Curator
Josephine D. Randall Junior Museum
199 Museum Way
San Francisco, CA 94114

Telephone: 415-863-1399

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
SFM	San Francisco----------	37.7644	122.4369	103	1969	Open--	Franciscan Formation (chert); Jurassic to Eocene.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
SFM	Bosch-Omori----------	Z	---	---	Smoked paper	---	Telemetered to San Francisco State University and recorded on Helicorder.
	Wilson-Lamison-------	NS	---	---	Pen and ink	---	Do.

Timing system: Chronometer checked with WWV.

System response curves: Not available.

SHORT HISTORY

The instruments are used principally for display.

GENERAL INFORMATION

Operated by: University of Santa Clara

Address: Ricard Memorial Observatory--Currently closed
University of Santa Clara
Santa Clara, CA 95053

Telephone: 408-984-4533

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
SCL	Santa Clara (Ricard)----	37.3500	121.9500	28	1909	mid-1950's	Sand and gravel.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
SCL	Weichert----------	Z,NS,EW	---	---	Photo paper	---	---
	Galitzin-Wilip-------	Z,NS,EW	---	---	--do-------	---	---
	Wood-Anderson--------	NS,EW	1.0	---	--do-------	---	---

Timing system: Weichert clock.

System response curves: Not available.

SHORT HISTORY

The station had only the Weichert instruments when it began under the direction of Jerome S. Ricard. Data were contributed to the Jesuit Seismological Association Bulletin. The station is currently inoperative, although it still has the instruments. Scientific research is no longer conducted in the building where the instruments are kept.

CALIFORNIA

Ukiah, CA

GENERAL INFORMATION

Operated by: National Oceanic and Atmospheric Administration
for the U.S. Geological Survey

Address: Latitude Observatory
432 Observatory Avenue
Ukiah, CA 95428

Telephone: 707-462-2208

Address to obtain records:

Records through 1974:

National Geophysical and Solar-Terrestrial
Data Center
NOAA/EDS, D62
Boulder, CO 80302

Records since 1974:

National Earthquake Information Service
Stop 967, Box 25046, Denver Federal Center
Denver, CO 80225

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
UKI	Ukiah	39.1372	123.2106	199	9/31	Open	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
UKI	McComb-Romberg	NS,EW	11	1.652	Photo paper	---	---
	Wilson-Lamison	Z	---	---	--do--	---	---

Timing system: Quartz crystal chronometer checked with WWV daily.

System response curves: Not available.

SHORT HISTORY

Latitude Observatory was originally equipped with Bosch-Omori instruments installed by the USC&GS. In 1953, the McComb-Romberg instruments were installed; they were followed by installation of the Wilson-Lamison in 1956. The University of California at Berkeley assisted in these installations and, in 1965, installed a Benioff vertical instrument; it was removed in 1973.

CALIFORNIA

Albuquerque, NM

GENERAL INFORMATION

Operated by: Sandia Laboratories

Address: Sandia Laboratories
Albuquerque, NM 87115

Telephone: 505-264-1468

Address to obtain records:

Not generally available.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
DAC	Darwin----------	36.2770	117.5937	1433	6/60	Open--	Keeler Canyon Formation (limestone); Pennsylvanian and Permian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
DAC	Benioff 1051---------	Z	1.0	0.2	Magnetic tape	Variable	---
	Benioff 1101---------	54°,144°	1.0	.2	--do---------	--do----	---
	NGC-23H----------	53.5°,143.5°	.8	---	--do---------	--do----	---
	NGC-23V----------	Z	.8	---	--do---------	--do----	---

Timing system: IRIG recorded directly at central recording site.

System response curves: Not available.

SHORT HISTORY

This station is part of a network surrounding the Nevada Test Site. It is used for recording scheduled explosions and does not operate all the time. It is controlled remotely from the test site and is sometimes recorded by the USGS in Las Vegas. Data are not available to the public.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(BF-CL)	Bakersfield----------	35.6481	118.8575	567	10/28/61	11/06/61	Granite.
					1/08/62	4/23/62	
					4/19/63	7/09/63	
					4/15/68	4/26/68	
(BP-CL)	Bishop----------	37.3600	118.6903	2317	4/16/63	7/18/63	Metamorphics.
					8/27/66	9/09/66	
					4/13/68	4/26/68	
					8/29/69	10/10/69	
					5/08/73	5/22/73	
(CP-CL)	Campo----------	32.7289	116.3711	1189	10/10/61	3/01/64	Granitic batholith; Mesozoic.
					10/26/65	11/13/65	
					2/26/66	3/12/66	
					8/01/67	8/06/67	
					4/18/68	4/26/68	
(DV-CL)	Death Valley----------	35.8333	116.1017	792	12/29/61	1/20/62	Metamorphics.
(KM-CL)	Kramer----------	34.8811	117.2567	853	4/29/63	7/10/63	Dolomite.
					1/14/64	3/21/64	
					2/25/66	3/12/66	
					4/15/68	4/26/68	
(ML1CL)	Mono Lake----------	37.8806	118.8494	2512	8/22/66	8/26/66	---
(ML2CL)	--do----------	38.0806	119.2442	2987	8/24/66	9/09/66	Shale.
(ML3CL)	--do----------	37.5494	118.8153	2512	8/25/66	9/09/66	Sandstone.
(ML4CL)	--do----------	38.3058	119.5536	2195	8/23/66	9/09/66	Granodiorite.
(MV-CL)	Marysville----------	39.2131	121.2931	183	10/18/61	3/10/64	Volcanics.
					3/01/66	3/12/66	
(ND-CL)	Needles----------	34.5992	115.5514	366	4/17/63	6/07/63	Metamorphics.
					4/11/68	4/26/68	
(TF-CL)	Taft----------	35.1636	119.9675	793	5/23/62	5/12/63	Folded sandstone; Cretaceous.
					10/24/65	11/13/65	
(TN-CL)	Twentynine Palms--------	34.1983	115.9500	533	2/01/62	5/03/62	Limestone.
(YR-CL)	Yreka----------	41.6353	122.7539	914	10/25/65	11/13/65	---
					8/01/67	10/06/67	
					8/30/68	9/09/68	

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(BF-CL), (BP-CL), (CP-CL) (1st, 2d, and 4th oper.), (KM-CL), (MV-CL), (ND-CL), (TF-CL), (YR-CL):	Benioff---------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(BF-CL): 450 K (BP-CL): 120 K (CP-CL): 215 K (KM-CL): 500 K (MV-CL): 225 K (ND-CL): 150 K (TF-CL) (2d oper.): 120 K (YR-CL): 246 K	---
	Sprengnether----	Z,NS,EW	20.0	---	--do---------	---	---
(BF-CL) (2d oper.), (DV-CL), (TN-CL):	Benioff---------	Z,NS,EW	1.0	---	--do---------	(DV-CL): 440 K (TN-CL): 250 K	---
(BF-CL) (4th oper.), (BP-CL) (last 3 oper.), (CP-CL) (3d and 5th oper.), (KM-CL) (last 2 oper.), (MV-CL) (2d oper.), (ND-CL) (2d oper.), (YR-CL) (3d oper.):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	(BF-CL): 450 K (CP-CL): 215 K (KM-CL): 500 K (MV-CL): 225 K (ND-CL): 150 K	Portable system.
	Geotech---------	Z,NS,EW	20.0	---	--do---------	---	Do.
(BP-CL) (2d oper.), (ML1CL), (ML2CL), (ML3CL), (ML4CL):	Geotech---------	Z,NS,EW	1.0	---	--do---------	(ML2CL): 280 K (ML3CL): 300 K (ML4CL): 250 K	Do.

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

GENERAL INFORMATION

Operated by: Lamont-Doherty Geological Observatory of Columbia University

Address: Department of Seismology
Lamont-Doherty Geological Observatory
Columbia University
Palisades, NY 10964

Telephone: 914-359-2900

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
OBS	Ocean Bottom Seismometer.	38.1533	124.9067	-3840	1966	1972	---

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
OBS	---	Z,NS,EW	1.0	---	---	---	Recorded on shore.
	---	Z,NS,EW	15.0	---	---	---	Do.

Timing system: Not available.

System response curves: Not available.

SHORT HISTORY

This experimental ocean-bottom system was operated remotely from shore.

GENERAL INFORMATION

Operated by: University of Nevada

Address: Seismology Laboratory
Mackay School of Mines
University of Nevada
Reno, NV 89507

Telephone: 702-784-4975

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(AVC)	Adobe Valley----------	37.9160	118.7325	2225	7/75	Open--	Granite.
HBM	Hobart Mills----------	39.4017	120.1533	1804	---	4/73	Volcanics.
HBT	--do----------	39.4267	120.1633	1804	4/73	Open--	Do.
KBF	Kyburz Flat----------	39.5068	120.2118	2079	4/73	--do--	Do.
MPK	Martis Peak----------	39.2957	120.0302	2484	4/73	--do--	Granite.
TNK	Tinkers Knob----------	39.2675	120.2358	2438	4/73	--do--	Do.
VPK	Verdi Peak----------	39.4747	120.0373	2469	4/73	--do--	Volcanics.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
All stations	Mark L-4C----------	Z	1.0	---	Magnetic tape	Variable	Telemetered to Reno.

Timing system: Sprengnether TS-210 digital chronometer.

System response curves: See figure 2, p. 363.

SHORT HISTORY

These stations are used for local seismicity studies.

GENERAL INFORMATION

Operated by: U.S. Coast and Geodetic Survey for the U.S. Bureau of Reclamation

Address: U.S. Coast and Geodetic Survey
Washington, DC
(Obsolete)

Address to obtain records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
SHS	Shasta Dam----------	40.6950	122.3883	312	7/42	1953	Copley Greenstone (meta-andesite); Devonian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
SHS	Benioff----------	Z,NS,EW	1.5	---	35-mm film	---	---

Timing system: Chronometer with WWV, automatically checked several times a day.

System response curves: Not available.

SHORT HISTORY

SHS was part of the U.S. Bureau of Reclamation's "Central Valley" project. It is just below the confluence of the Sacramento and Pit Rivers near Reading, Calif.

COLORADO

Boulder, CO

GENERAL INFORMATION

Operated by: National Oceanic and Atmospheric Administration

Address: NOAA/EDS, D62
Boulder, CO 80302

Telephone: 303-499-1000

Address to obtain records:

U.S. Geological Survey
Branch of Global Seismology
Stop 968, Box 25046, Denver Federal Center
Denver, CO 80225

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(ALC)	Alamosa----------	37.4800	105.8500	---	1970	11/72	---
CGC	Craig----------	40.5233	107.5500	1925	1970	11/72	---
DGC	Durango----------	37.2500	107.8833	2340	1970	11/72	---
EGC	Eagle----------	39.6525	106.8281	2010	1970	11/72	---
MRC	Montrose----------	38.4701	107.8600	1790	1970	11/72	---
TDC	Trinidad----------	37.2536	104.3347	1750	1970	11/72	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
All stations	Sprengnether or------ Johnson-Matheson.	Z	1.0	---	Pen and ink	---	Three stations telemetered to Boulder.

Timing system: Sprengnether TS-110.

System response curves: Uncalibrated.

SHORT HISTORY

This array was used to study the crustal and upper mantle structure of Colorado.

COLORADO

Boulder, CO

GENERAL INFORMATION

Operated by: University of Colorado

Address: Department of Geology
University of Colorado
Boulder, CO 80302

Telephone: 303-492-8141

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BOU	Boulder----------	40.0083	105.2708	1654	12/53 10/65	1959 1968	Pierre Shale; Cretaceous.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
BOU	Benioff MC----------	Z,NS,EW	1.0	---	35--mm film	30 K	When station reactivated, used photo paper.
	UED----------	Z,NS,EW	1.5	---	Pen and ink	---	Operated only for a short time.

Timing system: Sprengnether TS-100.

System response curves: Available with records.

SHORT HISTORY

BOU operated from 1954 to 1959; it was then reactivated in 1965 to monitor the Derby earthquakes. The Benioff seismometer is not the standard variable-reluctance type, but is a moving coil version developed by Benioff before he developed the instrument commonly called the "Benioff" seismometer.

The NEIC also ran a station across the street from BOU from mid-1972 to August 1974.

COLORADO

Denver, CO

GENERAL INFORMATION

Operated by: Regis College

Address: Regis College
50th and Lowell
Eenver, CO 80221

Telephone: 303-433-8471

Address to obtain records:

As above.

~~Until 1964, only records with earthquakes on them were preserved.~~

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
DEN	Denver----------	39.7917	105.0333	1655	8/1909	Open--	Partially consolidated shale (Denver Formation).

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
DEN	Sprengnether----------	Z,NS,EW	1.0	1.0	Photo paper	40 K	Also recorded on Helicorder (magnification 80 K).
	--do----------	Z,NS,EW	25.0	30.0	--do-------	4 K	Do.

Timing system: Sprengnether TS-100 Chronometer timed with WWVB.

System response curves: Not available.

SHORT HISTORY

The Jesuit Seismological Association started DEN in 1909 with a Wiechert. Long-period Sprengnethers were installed in 1946 (20-sec NS,EW). Newer models (long- and short-period) were installed in 1963. The station contributes data to the Jesuit Seismological Association Report.

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address:

U.S. Geological Survey
National Earthquake Information Service
Stop 967, Box 25046
Denver Federal Center
Denver, CO 80225

U.S. Geological Survey
Engineering Geology Branch
Stop 903, Box 25046
Denver Federal Center
Denver, CO 80225

Telephone: 303-234-3994 303-234-3721

Address to obtain records:

GLD records kept at:

National Earthquake Information Service
Stop 967, Box 25046
Denver Federal Center
Denver, CO 80225

SIG records kept at:

Colorado School of Mines
Green Center
Golden, CO 80401

RBC records kept at:

Environmental Research Laboratories
3060 South Highland Drive
Las Vegas, NV 89109

SMC records kept at:

U.S. Geological Survey
Engineering Geology Branch
Stop 903, Box 25046
Denver Federal Center
Denver, CO 80225

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
GLD	Golden----------	39.7506	105.2214	1762	1974	Open--	Denver and Arapahoe Formations; Cretaceous and Tertiary.
RBC	Rio Blanco----------	39.8425	108.3922	1996	1/73	12/73	---
SIG	South Ingalls----------	39.6878	105.0647	---	---	8/65	---
SMC	Somerset----------	38.9333	107.4578	1905	7/69	Open--	Mesaverde Formation (sandstone); Late Cretaceous.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
GLD	Wilson-Lamison-------	Z	1.2	---	Helicorder	25 K	---
	EV-300----------	Z	15.0	---	--do-------	540	---
RBC	---	---	---	---	---	---	Temporary stations set up in an array.
SIG	---	---	---	---	Pen and ink	---	---
SMC	Mark L-4----------	Z	1.5	---	Magnetic tape	---	---

Timing system: GLD uses a Teledyne-Geotech TG-120 digital timing system. SMC uses an electronic chronometer synchronized with WWV.

System response curves: GLD--available from station.

SHORT HISTORY

NEIS moved from Boulder to Golden, Colo., in August 1974 and established the GLD site using instruments from the Boulder site. (See Colorado, Boulder, CO Short History).

Colorado School of Mines also runs instruments at GLD; they are used chiefly for display.

RBC was instituted as an array to monitor an atomic explosion designed to release natural gas.

SIG was operated informally by Jerry Eaton, a USGS employee, in his back yard.

NEIS telemeters data from selected stations run by the following organizations:

California Department of Water Resources
California Institute of Technology
Delaware Geological Survey
Ford Aerospace and Communications Corporation
Lamont-Doherty Geological Observatory
Lawrence Livermore Laboratory
St. Louis University
University of California, Berkeley
University of Connecticut
University of Nevada
University of Utah
University of Washington
U.S. Air Force, Patrick AFB
USGS in Arizona, California, New Mexico, South Carolina, Texas, Utah, and Washington
Weston Observatory

COLORADO

Golden, CO

GENERAL INFORMATION

Operated by: Colorado School of Mines

Address: Geophysics Department
Colorado School of Mines
Golden, CO 80401

Telephone: 303-279-0300 ext. 262

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
GOL	Golden (Bergen Park).	39.7003	105.3711	2359	12/21/61	Open	Schists and gneiss, Idaho Springs Formation; Precambrian.
HDQ	Headquarters	39.5583	105.0792	1683	1/73	11/30/76	Alluvium; Quaternary.
HLR	Highlands Ranch	39.5372	104.9744	1782	1/73	11/30/76	Denver and Arapahoe Formations; Cretaceous and Tertiary.
(TLD)	Tule Lake Drive	39.6139	105.0497	1663	1/73	11/30/76	Do.
WTC (MMV)	Waterton (Martin Marietta Vault).	39.5143	105.1375	1987	1/73	11/30/76	Schist and gneiss, Idaho Springs Formation; Precambrian.
(WTN)	Waterton	39.4994	105.0875	1668	1/73	11/30/76	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
GOL	Benioff 1051	Z	1.0	0.75	Photo paper	200 K	WWSSN. Magnification increases to 400 K during the summer.
	Benioff 1101	NS,EW	1.0	.75	--do	200 K	Do.
	Sprengnether	Z,NS,EW	30.0	100.0	--do	1.5 K	WWSSN. Magnification at 15 sec.
	Wood-Anderson	NS,EW	.8	---	--do	2.8 K	Nonstandard instrument.
HDQ	Geotech 18300	Z	1.0	.0625	Microfilm	500 K	Telemetered to GLD. Magnification at 0.1 sec.
HLR	--do	Z	1.0	.0625	--do	1500 K	Do.
TLD	--do	Z	1.0	.0625	--do	1500 K	Do.
WTC	--do	Z	1.0	.0625	--do	2500 K	Do.
WTN	--do	Z	1.0	.0625	--do	250 K	Do.

Timing system: GOL uses a WWSSN standard. All other stations used a General Radio Corporation type 1103B Synchronometer in conjunction with a modified Sprengnether TS-100 clock.

System response curves: GOL--see figure 1, p.363. (Note: Long-period WWSSN instrument not standardized to 15.0-sec period.) Others available from station.

SHORT HISTORY

GOL was started with the establishment of the WWSSN System. The station possesses the most inclusive library available for the earthquakes in the vicinity of the Rocky Mountain Arsenal Disposal Well in northeast Denver (Derby).

HDQ, HLR, TLD, WTC, and WTN were all part of the Chatfield Network, which was constructed under contract with the U.S. Army Corps of Engineers beginning in September 1972.

COLORADO

Rangely, CO

GENERAL INFORMATION

Operated by: Chevron Oil Company

Address: Chevron Oil Company
Rangely Oil Field
Rangely, CO 81648

Telephone: 303-675-2244

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
RGC	Rangely----------	40.1042	108.9270	1610	2/1/75	Open--	Mancos Shale; Cretaceous.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
RGC	Mark L-4----------	Z	1.0	---	Pen and ink	---	An array of three instruments within a radius of 5 km.

Timing system: Clock set daily by WWV.

System response curves: Not available.

SHORT HISTORY

Field seismometers were installed in Rangely by the USGS for experiments. When the tests were completed, Chevron installed the present recording equipment.

COLORADO

Trinidad, CO

GENERAL INFORMATION

Operated by: Trinidad State Junior College

Address: Department of Science and Mathematics
Trinidad State Junior College
Trinidad, CO 81082

Telephone: 303-846-5516

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
TJC	Trinidad State Junior College.	37.2169	104.6912	2103	10/65	Open--	Poison Canyon Formation (lower beds); Paleocene.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
TJC	Benioff 6102A	Z	1.0	5.0	35-mm film	100 K	---
	Benioff 4681A	NS,EW	1.0	5.0	--do--	---	---
	Sprengnether	Z,NS,EW	20.0	30.0	--do--	---	---

Timing system: Geotech model 5400A.

System response curves: Available from station.

SHORT HISTORY

TJC opened in Boncarbo, Colo., under supervision of the USGS Seismology Branch, headquartered in Denver. Operating and maintenance personnel were then and are still supplied by Trinidad State Junior College, located in Trinidad. Funding for the project was supplied by Colorado School of Mines, located at Golden, for the first 2 years. Present funding is received from the State of Colorado.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(DR-CO)	Durango----------	37.4647	107.7833	2225	10/01/61	12/30/64	Granitic basement; Precambrian.
(FK-CO)	Franktown----------	39.5867	104.4617	1803	11/17/66	6/26/67	---

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(DR-CO), (FK-CO):	Benioff---------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	DR-CO: 350 K	---
	Sprengnether----	Z,NS,EW	20.0	---	--do----------	---	---

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
National Center for Earthquake Research
345 Middlefield Road
Menlo Park, CA 94025

Telephone: 415-323-8111 ext. 2632

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(COB)	Coal Oil Basin----------	40.0987	108.8995	1643	11/69	11/73	---
(DDG)	Dead Dog----------	40.1445	108.8215	1831	10/69	3/74	---
(DHV)	Downhole----------	40.0975	108.8735	---	5/70	12/72	---
(DHS)	--do----------	40.0935	108.9037	1661	5/71	11/73	---
(DPN)	Douglas Pass North------	40.0612	108.7837	1795	9/69	3/74	---
(DPS)	Douglas Pass South------	40.0117	108.7787	1725	9/69	11/73	---
(HDW)	Hardaway----------	40.0737	108.9567	1868	10/69	3/74	---
(LGD)	Little Gillan Draw------	40.0903	108.7278	1679	6/69	3/74	---
(MEL)	Melon Hill----------	40.1552	108.9395	1722	5/70	11/73	---
(ONE)	One----------	40.0845	108.8962	1652	9/69	3/74	---
(RAD)	Radio----------	40.1270	108.9492	1856	9/69	3/74	---
(RDG)	Ridge----------	40.1042	108.9270	1768	9/69	3/74	---
(RVR)	Raven Ridge----------	40.0813	108.9222	1649	9/69	3/74	---
(SEC)	Section----------	40.0983	108.9143	1687	9/69	12/72	---
(SHV)	Shavetail----------	40.0160	108.8975	1916	10/69	3/74	---
(SIX)	Six----------	40.0878	108.8775	1616	9/69	3/74	---
(SWC)	Stinking Water----------	40.0975	108.8735	1617	5/70	11/73	---
(TXC)	Texas Camp----------	40.0962	108.8825	1632	9/69	12/72	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
All stations	Mark L-4C----------	Z	1.0	---	Develocorder, magnetic tape.	---	---

Timing system: Custom clock with WWVB also recorded.

System response curves: See figure 2, p. 363.

SHORT HISTORY

This network was established to monitor the effect of fluid injection on the Rangely Oil Field. A small part of the network was turned over to Chevron Oil Company when the study was complete.

(DHV) also had a horizontal seismometer which was recorded under the code DHH.

(MEL) and (RDG) were also recorded at low gain and these records were designated by MHL and RDL, respectively.

CONNECTICUT

Hartford, CT

GENERAL INFORMATION

Operated by: Trinity College

Address: Science Department
Trinity College
Hartford, CT

Telephone: 203-527-3151

Address to obtain records:

Unknown

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
HAR	Hartford----------	41.7500	72.6833	---	1947	1954	---

INSTRUMENTATION

Code	Seismometer			Galvo	Type	Magnification	Remarks
	Type	Component	T_o (sec)	T_g (sec)	recording	at T_o	
HAR	Linehan-Arringdale---	Z,NS,EW	---	---	---	---	---

Timing system: Not available.

System response curves: Not available.

New Haven, CT

GENERAL INFORMATION

Operated by: Yale University

Address: Seismograph Station--Closed
Peabody Museum
Yale University
New Haven, CT
(Obsolete)

Address to obtain records:

No longer exist.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
NHC	New Haven----------	41.3167	72.9000	11	1925	Closed	Sandstone.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
NHC	Bosch-Omori----------	NS,EW	---	---	---	---	---

Timing system: Not available.

System response curves: Not avsilable.

CONNECTICUT

Weston, MA

GENERAL INFORMATION

Operated by: Weston Observatory, Boston College

Address: Weston Observatory
Concord Road
Weston, MA 02193

Telephone: 617-899-0950

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
APT	Avery Point----------	41.3160	72.0639	3	1/07/72	6/10/77	Stonington Gneiss of Martin (1925)[1]; Paleozoic.
BCT	Brookfield----------	41.4933	73.3839	69	6/10/75	Open--	Brookfield Diorite Gneiss of Gregory (1906)[2]; early Paleozoic.
BPT	Bridgeport----------	41.2221	73.2422	83	1/07/72	6/10/77	Straits Schist; Paleozoic.
CPL	Chaplin----------	41.7890	72.1073	161	1/19/72	7/23/74	Eastford Gneiss; Devonian or Silurian.
ECT	Ellsworth----------	41.8346	73.4113	342	1/28/76	Open--	Granite schist; Paleozoic.
HDM	Haddam----------	41.4858	72.5232	24	12/23/74	--do--	Haddam Granite Gneiss; Paleozoic.
NSC	North Stonington--------	41.4807	71.8516	110	6/27/77	--do--	Metavolcanics and gneiss; Ordovician.
TMT	Talcott Mountain--------	41.8114	72.7989	290	1/07/72	6/10/77	Holyoke Basalt; Triassic.
UCT	University of---------- Connecticut (Storrs).	41.8317	72.2506	149	11/05/74	Open--	Brimfield Schist; Ordovician or older.

[1]Martin, L. H. 1925, Geology of the Stonington region, Connecticut: Connecticut Geol. and Nat. History Survey Bull. 33, 70 p.

[2]Gregory, H. E., 1906, The Crystalline rocks of Connecticut: Connecticut Geol. and Nat. History Survey Bull. 6, p. 39-156.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
APT	Benioff----------	Z	1.0	---	Develocorder	1.68 K	---
	Geotech S-13----------	Z	1.0	---	--do--------	100 K	---
BCT	Geotech S-13----------	Z	1.0	---	--do--------	100 K	Telemetered to WES.
BPT	--do----------	Z	1.0	---	--do--------	75 K	Do.
CPL	--do----------	Z	1.0	---	--do--------	130 K	Do.
ECT	--do----------	Z	1.0	---	--do--------	150 K	Do.

Weston, MA

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
HDM	Geotech S-13---------	Z	1.0	---	Develocorder	100 K	Telemetered to WES.
NSC	Hall-Sears 10--------	Z	1.0	---	--do--------	100 K	Do.
TMT	Geotech S-13---------	Z	1.0	---	--do--------	100 K	Do.
UCT	--do-----------------	Z	1.0	---	--do--------	100 K	Do.

Timing system: WWSSN standard added at WES.

System response curves: Available from station.

SHORT HISTORY

This network was owned and operated by the University of Connecticut and was temporarily based at Avery Point between January 1977 and June 1977. The ownership and operation of the network were assumed by Weston Observatory in June 1977.
APT had minor instrument changes throughout its operation.
BPT was moved less than 30 m in June 1975 to reduce the higher frequency background noise.
CPL was moved slightly in January 1973 and burned down on July 23, 1974.
TMT is located at Talcott Mountain Science Center.
The Observatory contributes data to the Northeastern United States Seismic Network bulletin.

DELAWARE

Newark, DE

GENERAL INFORMATION

Operated by: Delaware Geological Survey

Address: Delaware Geological Survey
101 Penny Hall
University of Delaware
Newark, DE 19711

Telephone: 302-738-2833

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(BBD)	Blackbird State Forest.	39.3461	75.6767	18	1/01/77	Open--	Columbia Group; Pleistocene.
GTD	Georgetown----------	38.7414	75.4144	15	1/01/77	--do--	Do.
NED	Newark----------	39.7042	75.7082	47	11/19/70	--do--	Weathered gneiss; early Paleozoic.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(BBD)	Hall-Sears----------	Z	1.0	---	Pen and ink	Uncalibrated	---
GTD	--do----------	Z	1.0	---	--do-------	--do--------	---
NED	Geotech 18300--------	Z	1.0	---	Helicorder	15 K	---

Timing system: Teledyne Geotech 110, transistorized, quartz-crystal controlled. Operates from a 12-V DC battery maintained by a trickle charger.

System response curves: NED--available from station.

SHORT HISTORY

NED began with a vertical-component instrument in November 1970 at 101 Penny Hall. About a year later, the sensor was moved approximately 3 km away and telemetered to the University. Telemetry equipment was converted to solar power and batteries in November 1974. The station was out of operation for several weeks in late summer-early fall 1974 due to lightening damage.

DISTRICT OF COLUMBIA

Washington, DC

GENERAL INFORMATION

Operated by: Georgetown University

Address: Physics Department
Room 506, Reiss Science
Georgetown University
37th & O Streets, N.W.
Washington, DC 20057

Telephone: 202-625-4144

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
GEO	Georgetown----------	38.9000	77.0667	29	1911	Open--	Diorite; Precambrian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
GEO	Benioff 1051---------	Z	1.0	0.75	Photo paper	25 K	WWSSN.
	Benioff 1101---------	NS,EW	1.0	.75	--do-------	25 K	Do.
	Sprengnether---------	Z,NS,EW	15.0	100.0	--do-------	750	Do.

Timing system: WWSSN standard.

System response curves: See figure 1, p. 363.

SHORT HISTORY

The founder and first director was Rev. Francis A. Tondorf, S.J., who initiated the station's operation in 1911. GEO joined WWSSN in 1961.

DISTRICT OF COLUMBIA

Washington, DC

GENERAL INFORMATION

Operated by: Carnegie Institution of Washington

Address: Carnegie Institution of Washington
5241 Broadbranch Road, N.W.
Washington, DC 20015

Telephone: 202-966-0863

Address to obtain records:

Unknown.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BED	Bald Eagle----------	38.8200	77.0089	---	---	Closed	---
DTM	Carnegie Institute------	38.9567	77.0644	67	---	--do--	---

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
Both stations	---	---	---	---	---	---	---

Timing system: Not available.

System response curves: Not available.

DISTRICT OF COLUMBIA

Rockville, MD

GENERAL INFORMATION

Operated by: National Earthquake Information Center (NEIC)

Address: National Earthquake Information Center--Closed
Washington Science Center
Rockville, MD
(Obsolete)

Telephone: None

Address to obtain records:

NRL records not available.

WAS records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
NRL	Naval Research Laboratory.	38.8333	77.0833	0	1953	1972	---
WAS	Washington	38.8925	77.0331	1	1909	1969	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
Both stations	Johnson-Matheson	Z	1.0	---	Helicorder	Uncalibrated	NRL telemetered to WSC.

Timing system: Sprengnether clock checked with WWV.

System response curves: Not available.

SHORT HISTORY

NRL was owned and operated by the U.S. Bureau of Standards. In 1967, NEIC began telemetering this station and recorded it on Helicorder. The U.S. Bureau of Standards recorded their stations on Develocorder film, but this set of records was subsequently discarded.

WAS was located in the Commerce Building, 14th and Constitution, and was on display in the lobby. It closed when the USC&GS moved its headquarters to the Washington Science Center. (See WSC).

FLORIDA

Garland, TX

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(BE-FL)	Belleview----------	28.9053	82.0644	21	10/07/65	1/16/67	Limestone.
					1/17/68	1/19/68	
					8/21/69	10/10/69	
					9/23/71	11/09/71	
					5/07/73	5/22/73	
(OR-FL)	Orlando----------	28.4669	81.2214	20	5/14/63	9/15/63	Unconsolidated sand.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(BE-FL), (OR-FL):	Benioff----------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(BE-FL): 25 K	---
	Sprengnether----	Z,NS,EW	20.0	---	--do----------	---	---
(BE-FL) (last 4 oper.):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.
	Geotech---------	Z,NS,EW	20.0	---	--do---------	---	Do.
(OR-FL):	Benioff----------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(OR-FL): 40 K	---

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3. p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

GENERAL INFORMATION

Operated by: U.S. Department of the Navy

Address: Office of Naval Research
U.S. Department of the Navy
Washington, DC 20375

Address to obtain records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
JAC	Jacksonville----------	30.4167	81.6500	9	1950	1956	---
MIA	Miami----------	25.9167	80.3000	---	1945	1956	---
WFF	Whiting Field----------	30.7083	87.0167	---	1949	1956	---

INSTRUMENTATION

Code	Seismometer			Galvo	Type	Magnification	Remarks
	Type	Component	T_o(sec)	T_g(sec)	recording	at T_o	
All stations	Sprengnether---------	Z	1.0-2.0	---	Photo paper	---	---
	--do----------	Horizontal	6.0-10.0	---	--do-------	---	---

Timing system: Unknown.

System response curves: Not available.

SHORT HISTORY

The Navy was interested in trying to track hurricanes by monitoring microseisms. Data from this network through 1956 are on file as stated above; MIA records only date back to 1949, however, even though the station began operating in 1945.

GEORGIA

Americus, GA

GENERAL INFORMATION

Operated by: Georgia Southwestern College

Address: Physical Science Department
Georgia Southwestern College
Americus, GA 31709

Telephone: 912-928-1245

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
AMG	Americus----------	32.0594	84.2177	106	9/01/73	Open--	Unconsolidated clayey sand; late Eocene.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
AMG	Benioff 1051---------	Z	1.25	0.75	Heat-sensitive	20 K	---
	Geotech SL-210-------	Z	15.0	---	--do----------	---	---
	Geotech SL-220-------	NS,EW	15.0	---	--do----------	2 K	---

Timing system: Geotech TG-110.

System response curves: Available from station.

SHORT HISTORY

AMG started with the vertical short-period seismometer, and the NS and EW long-period instruments were added in September 1974. The vertical long-period seismograph became operational in September 1975.

GENERAL INFORMATION

Operated by: Georgia Institute of Technology

Address: School of Geophysical Sciences
Georgia Institute of Technology
Atlanta, GA 30332

Telephone: 404-894-2860

Address to obtain records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
ATL	Atlanta	33.4333	84.3375	273	6/21/63	Open	Unseamed granite gneiss; Precambrian.
CDG	Carters Dam	34.6108	84.6713	351	1/01/75	--do--	Metamorphic rock: Paleozoic.
CH5	Clark Hill Reservoir---- No. 5.	33.7333	82.3250	132	12/75	--do--	Mafic metavolcanics.
CH6	Clark Hill Reservoir---- No. 6.	33.8792	82.5194	146	12/75	--do--	Granite.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
ATL	Benioff 1051	Z	1.0	0.75	Photo paper	50 K	WWSSN.
	Benioff 1101	NS,EW	1.0	.75	--do--	50 K	Do.
	Sprengnether	Z	15.0	100.0	--do--	3 K	Do.
	--do--	NS,EW	15.0	100.0	--do--	3 K	Do.
CDG	Geospace	Z	1.0	---	Pen and ink	84 K	Magnification at 15.0 sec.
CH5	Mark L-4C	Z	1.0	---	--do--	25-200 K	---
CH6	--do--	Z	1.0	---	--do--	25-200 K	---

Timing system: WWSSN standard is used at ATL, Sprengnether TS-300 is used at CDG, and the TS-250 is used for the Clark Hill Reservoir network.

System response curves: ATL--see figure 1, p. 363. Others available from stations.

SHORT HISTORY

ATL was constructed and maintained by the Engineering Experiment Station at Georgia Institute of Technology until June 1973 when it was transferred to the School of Geophysical Sciences.

GEORGIA

Garland, TX

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:
Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(LA-GA)	Lafayette----------	34.8572	85.4500	610	12/03/65	12/13/65	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(LA-GA):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.
	Geotech---------	Z,NS,EW	20.0	---	--do---------	---	Do.

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

GENERAL INFORMATION

Operated by: National Oceanic and Atmospheric Administration
National Weather Service

Address: Pacific Tsunami Warning Center
NOAA/National Weather Service
91-270 Fort Weaver Road
Ewa Beach, HI 96706

Telephone: 808-689-8207

Address to obtain records:

As above for most records.

HGLP records:

Albuquerque Seismological Laboratory
USGS, Bldg. 10002, Kirtland AFB
Albuquerque, NM 87115

WWSSN records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BAH (BAR)	Barrette----------	21.3397	158.0772	---	---	1970	Basalt.
HKL	Haleakala----------	20.7283	156.2550	3037	1975	Open--	Kula Formation; Quaternary.
HON	Honolulu----------	21.3217	158.0083	2	1902	--do--	Coral; Holocene.
KIP	Kipapa----------	21.4233	158.0150	70	11/62	--do--	Koolau Volcanic Series; Pliocene(?) and Pleistocene.
KKH	Kailua Kona----------	19.6642	156.0089	55	1975	--do--	Basaltic lava flows; Holocene.
KPH	Kaena Point----------	21.5761	158.2754	110	4/65	1976	Waianae Volcanics; Pliocene and Pleistocene(?).
MKH	Mauna Kea----------	19.8267	155.4725	4180	1975	Open--	Laupahoehoe Volcanics; Quaternary.
MOK	Mokapu----------	21.4565	157.7365	90	4/65	--do--	Koolau Volcanic Series; Pliocene(?) and Pleistocene.
OPA	Opana----------	21.6906	158.0119	150	4/65	--do--	Do.
PUP	Pupukea----------	21.6472	158.0278	---	1960	1965	---

INSTRUMENTATION

Code	Seismometer			Galvo	Type recording	Magnification at T_o	Remarks
	Type	Component	T_o (sec)	T_g (sec)			
BAH	---	---	---	---	---	---	---
HKL	Johnson-Matheson-----	Z	1.0	---	Helicorder	1 K	---

Ewa Beach, HI

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
HON	Geotech 18300--------	NS,EW	1.0	---	Helicorder	1 K, 10	---
	Johnson-Matheson-----	Z	1.0	---	--do------	1 K, 10	---
	--do-----------------	Z	1.0	.2	--do------	12.5 K	---
	Sprengnether---------	Z,NS,EW	15.0	30.0	--do------	1 K, 100 K	---
KIP	Benioff--------------	Z	1.0	.75	Photo paper	12.5 K	WWSSN.
	Benioff--------------	NS,EW	1.0	.75	--do-------	12.5 K	Do.
	Sprengnether---------	Z,NS,EW	15.0	100.0	--do-------	750	Do.
	Geotech 1200---------	Z	30.0	100.0	Photo paper, Magnetic tape	45.9 K, 665	HGLP.
	Geotech 1300---------	NS	30.0	100.0	--do---------	37.8 K, 761	Do.
	--do-----------------	EW	30.0	100.0	--do---------	33.5 K, 611	Do.
KKH	Johnson-Matheson-----	Z	1.0	---	Helicorder	1 K	---
KPH	Benioff 4681---------	Z	1.0	.3	Helicorder, 16-mm film.	11 K	---
MKH	Johnson-Matheson-----	Z	1.0	--	Helicorder	1 K	---
MOK	Benioff 4681---------	Z	1.0	.3	--do------	11 K	---
OPA	--do-----------------	Z	1.0	.3	--do-------	6.2 K	---
PUP	--do-----------------	Z	1.0	.3	--do-------	12.5 K	---

Timing system: WWSSN standard.

System response curves: KIP--see figure 3, p. 364, and figure 6, p. 365. Others available from stations.

SHORT HISTORY

The Tsunami Warning System detects and locates major earthquakes in the Pacific region, determines whether they have generated tsunamis, and provides timely and effective tsunami information and warnings to the countries that might be affected. New instrumental techniques were developed to permit visible recording of earthquakes and triggering of alarms for events above a certain magnitude. The first of these instruments were installed at USC&GS observatories in 1947 and 1948, and the alarms were added in 1950. The initial participating seismic observatories were College and Sitka, Alaska; Tucson, Ariz.; and Honolulu, Hawaii. In addition to the four original stations, the system now includes Adak and Palmer, Alaska; Berkeley and Pasadena, Calif.; Newport, Wash., and numerous stations throughout the Pacific region.

HON, established in 1902, has been in three locations in the southwest Oahu area: 1902-47--southwest 3 km of Ewa, 1947-60--at Barbers Point, 1960-present--Ewa Beach.

KIP was started when the WWSSN system was installed.

PUP's instrumentation was moved to OPA when PUP closed in 1965.

Hawaii National Park, HI

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
Hawaii Volcano Observatory
Hawaii National Park, HI 96718

Telephone: 808-967-7328

Address to obtain records:

As above.

Archives are complete from 1958 to the present. Records before that were kept sporadically.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
AHA (AHU)	Ahua----------	19.3733	155.2650	1070	1958	Open--	Basalt; Quaternary or Tertiary.
AIN	Ainahou----------	19.3750	155.4603	1524	4/26/73	--do--	Do.
(ALO)	Aloi----------	19.3667	155.2133	963	5/69	4/15/70	Do.
CPH (CAC)	Captain Cook----------	19.4882	155.9182	323	9/20/73	Open--	Do.
CPK	Cone Peak----------	19.2950	155.3283	1038	11/67	--do--	Do.
(DAN)	Dandelion----------	19.3570	155.6673	3003	4/29/76	--do--	Do.
DES	Desert----------	19.3367	155.3883	815	7/58	--do--	Do.
(EKO)	East Koae----------	19.3695	155.2498	1009	5/69	9/24/71	Do.
ESR	Escape Road----------	19.4113	155.2388	1177	9/71	Open--	Do.
(GLN)	Glenwood----------	19.4950	155.1650	732	4/68	4/30/70	Ash (firm soil); Quaternary or Tertiary.
HIL	Hilo----------	19.7200	155.0883	20	1922	Open--	Basalt; Quaternary or Tertiary.
HLK (HAL)	Haleakala----------	20.7667	156.2500	2090	9/58	--do--	Do.
HLP	Hilina Pali----------	19.2993	155.3105	707	9/70	--do--	Do.
HPU	Hale Pohaku----------	19.7808	155.4583	3396	8/18/69	--do--	Volcanic ash.
(HSS)	Humuula----------	19.6052	155.4855	2445	7/07/75	--do--	Basalt; Quaternary or Tertiary.
HUH (HUA)	Hualalai----------	19.6875	155.8387	2189	5/6/71	--do--	Do.
HVO	Hawaiian Volcano------	19.4233	155.2933	1240	1912	--do--	Do.
KAE	Kaena----------	19.2892	155.1325	37	5/8/73	--do--	Pahoehoe basalt; Quaternary or Tertiary.
KEA (KMO)	Kealakomo----------	19.3083	155.1600	201	9/27/66	1969	Do.
KHU	Kahuku----------	19.2483	155.6183	1939	8/26/69	Open--	Basalt; Quaternary or Tertiary.
(KII)	Kaneikii----------	19.5093	155.7650	1841	7/06/75	--do--	Do.
KKU	Keanakolu----------	19.8898	155.3430	1863	3/23/71	--do--	Do.
KLH (KPR)	Kapapala Ranch--------	19.2733	155.4450	610	10/2/69	--do--	Do.
KLK	Kealakekua----------	19.5220	155.9203	305	4/65	1/74	Do.
KML	Kamuela----------	20.0317	155.7000	740	1962	10/30/71	Volcanic ash; Quaternary or Tertiary.
KNH (KPN)	Kipuka Nene----------	19.3350	155.2900	924	9/21/67	Open--	Pahoehoe basalt; Quaternary or Tertiary.

SITE INFORMATION--Continued

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
KNW	Konawaena----------	19.5133	155.9183	495	1922	12/60	Basalt; Quaternary or Tertiary.
KOH	Kohala----------	20.1282	155.7795	1166	5/25/71	Open--	Ash (firm soil); Quaternary or Tertiary.
KUH (KAA)	Kaapuna----------	19.2663	155.8713	524	1/04/72	--do--	Basalt; Quaternary or Tertiary.
(LUA)	Kalalua----------	19.4092	155.0708	622	12/09/75	--do--	Do.
M12	M12----------	19.3948	155.3075	1116	12/72	6/73	Pahoehoe basalt; Quaternary or Tertiary.
MKA (MPR)	Makaopuhi----------	19.3678	155.1642	881	3/64	Open--	Basalt; Quaternary or Tertiary.
MLH (MLO)	Mauna Loa----------	19.4967	155.3883	2010	7/58	--do--	Do.
MLX	Mauna Loa (2)---------	19.4600	155.3450	1475	9/21/66	--do--	Basalt; Quaternary or Tertiary.
MVH (MTV)	Mountain View---------	19.5042	155.0625	409	3/71	--do--	Do.
MWH (MOK)	Mokuaweoweo----------	19.4880	155.5997	4104	5/22/71	--do--	Pahoehoe basalt; Quaternary or Tertiary.
NAA (NAL)	Naalehu----------	19.0633	155.5867	205	1958	1/01/69	Volcanic ash; Quaternary or Tertiary.
NBH (NGY)	North Bay----------	19.4950	155.5800	4005	3/64	7/05/68	Basalt; Quaternary or Tertiary.
NGH (NAC)	National Guard--------	19.7020	155.0287	18	6/14/73	Open--	Pahoehoe basalt; Quaternary or Tertiary.
NPH (NPT)	North Pit----------	19.4150	155.2833	1115	7/58	--do--	Basalt; Quaternary or Tertiary.
OUT (OTL)	Outlet----------	19.3897	155.2823	1038	7/58	--do--	Do.
PAH (PHA)	Pahoa----------	19.4950	155.9467	205	1958	1/01/69	Do.
(PAX)	Pahoa X----------	19.4850	155.9300	213	4/24/70	4/15/70	Do.
PHH	Puu Huluhulu----------	19.3750	155.2083	1021	7/69	11/73	Do.
PHO	Puu Honuaula----------	19.4817	154.8900	215	4/70	Open--	Do.
PPL	Puu Pili----------	19.1583	155.4645	35	2/71	--do--	Do.
PUH (PAU)	Pauahi----------	19.3770	155.2183	994	3/74	--do--	Pahoehoe basalt; Quaternary or Tertiary.
PWH (POL)	Poliokeawe Pali--------	19.2837	155.2245	169	5/23/73	--do--	Do.
RIM	Rim----------	19.3983	155.2767	1128	5/73	--do--	Volcanic ash; Quaternary or Tertiary.
(SCA)	Summit Cabin----------	19.4700	155.5847	4048	8/74	--do--	Basalt; Quaternary or Tertiary.
SPT	South Point----------	18.9818	155.6653	244	3/10/71	--do--	Volcanit ash; Quaternary or Tertiary.
(SWR)	Southwest Rift--------	19.4543	155.6050	4046	8/74	--do--	Basalt; Quaternary or Tertiary.
(TAN)	Tangerine----------	19.4632	154.9752	351	Open--	--do--	Do.
UWE	Uwekahuna----------	19.4233	155.2933	1240	1930	--do--	Do.
WHA	Wahaula----------	19.3317	155.0487	29	3/02/71	--do--	Pahoehoe basalt; Quaternary or Tertiary.
(WHA)	Waiohinu----------	19.0600	155.6100	274	5/01/68	9/01/70	Basalt; Quaternary or Tertiary.
WHI	Whitney----------	19.4317	155.2617	1210	1961	1961	Do.
WLG	Waldron Ledge---------	19.4248	155.2615	1067	9/71	Open--	Pahoehoe basalt; Quaternary or Tertiary.
WPH (WPT)	West Pit----------	19.4117	155.2917	1115	10/31/62	9/24/71	Do.

Hawaii National Park, HI

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
AHA, (ALO), CPH, DES, (EKO), ESR, (GLN), HLP, HPU, HUH, HVO, KAE, KEA, KHU, KKU, KLH, KLK, KNH, KNW, KOH, KUH, M12, MVH, MWH, NAA, NBH, NGH, (PAX), PAH, PHH, PHO, PPL, PWH, RIM, SPT, (TAN), WHA, (WHA), WHI, WLG, WPH:	Electrotech EV-17	Z	1.0	15.0	Filmstrip--	---	---
AIN, CPK, (HSS), (KII), MLX, PUH:	Mark L-4---------	Z,NS,EW	1.0	---	---do------	---	---
(DAN), (LUA), MKA, NPH, (SCA), (SWR):	Mark L-4---------	Z	1.0	---	---do------	---	---
HIL, HLK:	Electrotech EV-17	Z	1.0	15.0	---do------	---	---
	Wood-Anderson----	NS,EW	1.0	---	---do------	---	---
KML:	HVO-1----------	Z	1.0	2.0	---do------	---	---
MLH:	Electrotech EV-17	Z,NS,EW	1.0	15.0	---do------	---	---
OUT:	Electrotech EV-17	Z	1.0	15.0	---do------	---	---
	---do----------	horizontal	1.0	---	---do------	---	---
UWE:	Sprengnether-----	Z,EW	1.0	1.5	Photo paper	---	---
	Electrotech EV-17	Z	1.0	15.0	---do------	---	---
	HVO-1----------	Z	.8	1.5	Filmstrip--	---	---
	Press-Ewing------	Z,NS,EW	15.0	90.0	Photo paper	---	---

Timing system: Most stations use a USGS-built solid-state crystal-controlled clock. HIL and KML use a Sprengnether TS-100.

System response curves: Available from station.

SHORT HISTORY

In 1912, Omori seismographs were installed in Whitney Vault at the summit of Kilauea Volcano by Thomas A. Jagger, founder of the Hawaiian Volcano Observatory. Seismic signals were recorded on rotating drums with smoked paper. Later in 1912, the "Hawaiian type" short-period seismograph developed by T. A. Jagger and A. Romberg was installed at Hilo and tested in other parts of the island. Various types of low-magnification instruments were operated during the first half of the century.

From about 1955, sensitive electromagnetic seismographs with peak magnifications of 20 to 40 K at about a 0.2-second period were used to replace the less sensitive mechanical instruments. By 1958, highly amplified signals from four stations around the summit of Kilauea were telemetered to the Observatory. About that time, standard Wood-Anderson seismometers at Haleakala and Hilo and a three-component long-period Press-Ewing system at Uwekahuna were put in operation.

From 1966, single-station drum recordings were supplemented with 16-mm filmstrip records. Cable and FM radio carriers were used to expand the telemetry network. Currently a 40-station islandwide telemetry system is maintained by the Hawaiian Volcano Observatory. Seismic signals are recorded on smoked and photographic paper, 16-mm filmstrip, and 1-in. magnetic tape.

During the long history of the Observatory, several changes have occurred in the instrumentation and location of the stations. Many of the details of these changes can be obtained from the Observatory.

HIL was originally located at St. Mary's School in the summer of 1927. In July 1949 the station was moved to its present location at the Catholic school on Ululani Street.

MKA was twice moved from its original location of 19.3667° N., 155.1783° W. (elevation 885 m). In October 1965 it was located at 19.3633° N., 155.1675° W. (elevation 866 m). In July 1969 it moved to its current location, listed above.

NBH is telemetered to Mauna Loa Observatory for recording. Many periods of interruption in recording occurred owing to lightning damage. No records exist from mid-April to mid-June 1968.

PHH was located at 19.3742° N., 155.2110° W. (elevation 988 m) from June 1971 until November 1973 when the station was destroyed by lava flow.

OLT and WPH were destroyed by an eruption on September 24, 1971. OLT was later reinstalled.

GENERAL INFORMATION

Operated by: University of Hawaii

Address: Hawaii Institute of Geophysics
University of Hawaii
Honolulu, HI 96822

Telephone: 808-948-7864

Address to obtain records:

As above (on a limited basis).

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
HIG	Hawaii Institute of Geophysics	21.2847	157.8194.	18	5/64	Open	Nepheline basalt; Holocene.
HNL	Honolulu (Manoa Valley)	21.3583	157.8097	243	5/64	1974	Tholeiitic basalt; Pliocene-Pleistocene.
MDY	Midway Island	28.2067	177.3333	3	1966	1970	Coral atoll.
(PON)	Ponape Island	6.9500	158.2000 E.	85	4/72	9/73	Basalt.
WKE	Wake Island	19.3150	166.6267 E.	5	1956	1969	Coral atoll.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
HIG	Sprengnether	Z,NS,EW	23.0	---	Pen and ink	750	---
HNG	Benioff	Z,NS,EW	1.0	---	Photo paper	---	Operated intermittently.
	Sprengnether	Z,NS,EW	15.0	---	---do	---	Do.
MDY	Sprengnether	---	15.0	---	Magnetic tape	---	Research station.
(PON)	HS 10-1	Z,NS,EW	1.0	---	Hot stylus	12 K	---
	---do	Z,NS,EW	.1	---	---do	100 K	---
WKE	HS 10-1	Z	1.0	---	---do	1 K	---
	Sprengnether	Z	15.0	---	---do	10	---

Timing system: Sprengnether TS-2000 crystal chronometer synchronized with WWVB.

System response curves: Available from station.

SHORT HISTORY

The University of Hawaii has operated a number of stations in the Pacific, as evidenced by stations MDY, WKE, and (PON). In addition to these stations, it also operates stations on Marcus Island, a Japanese territory, and on Easter Island, run in conjunction with the University of Chile.

(PON) was an unusual station in that it was situated on a high volcanic island with numerous basaltic outcrops. The magnification of the system was higher than that of any of the coral atolls, and its operation was considered very useful.

WKE was installed by the U.S. Navy, equipped with a Wilson-Lamison and a short-period Benioff, and transferred to the University on October 14, 1965.

Agana, Guam

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
Guam Observatory
Box 8001 M.O.U. #3
Agana, Guam 96910

Address to obtain records:

National Geophysical and Solar-Terrestrial
Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg E.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
GUA	Guam----------	13.5383	144.9117	230	4/63	Open--	Volcanic tuff; Holocene.
GUMO	--do----------	13.5878	144.8663	14	8/75	--do--	Limestone.
KOR	Koror Island---------- Caroline Islands.	7.3350	134.4850	30	1/50	12/58	---
PJG	Potts Junction----------	13.5878	144.8663	14	5/57	Open--	Limestone.
TRU	Truk Island----------	7.4458	151.8556	107	3/49	--do--	Basalt.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
GUA	Benioff----------	Z,NS,EW	1.0	0.75	Photo photo---	6.25 K	WWSSN.
	Sprengnether----------	Z,NS,EW	15.0	100.0	---do----------	750	Do.
GUMO	Geotech 36000--------	Z,NS,EW	1.0	---	Helicorder,--- magnetic tape.	20 K	SRO. Magnification at 25 sec. A recorded at 6.25 K at 1 sec. Digital data of 120-dB dynamic range available on tape.
KOR	Sprengnether----------	NS,EW	7.0	7.0	Film, paper---	---	---
	Wilson-Lamison-------	Z	.95	1.5	---do----------	---	---
	HTL------------------	---	.5	.5	---do----------	---	---
PJG	Sprengnether----------	NS	7.0	7.0	Pen and ink---	85	Part of the Tsunami Warning System.
	Johnson-Matheson-----	Z	1.25	.2	Helicorder----	6.25 K	---
TRU	Benioff----------	Z	1.0	.2	Film, paper---	---	---
	Sprengnether----------	NS,EW	7.0	7.0	---do----------	---	---
	HTL------------------	---	.5	.5	---do----------	---	---

Timing system: WWSSN standard for GUA. KOR and TRU used a chronometer checked daily with WWV.

System response curves: GUA--see figure 1, p. 363. GUMO--see figure 7, p. 365. Others available from station.

Agana, Guam

SHORT HISTORY

The earliest station on Guam was sponsored by the Manila Observatory; recording of a two-component Wiechert began in 1914.

GUA was established in 1947 as part of the Guam Microseismic Project, along with NAH, Naha in the Ryukyu Islands, and SBP, Subic Bay in the Philippines. It was run by the Fleet Weather Central Research Laboratory and was located approximately 20 km west-southwest of its present location. The project ended on the outlying islands by early 1950 and was terminated on Guam in 1955. The WWSSN station, GUA, was opened in April 1963.

GUMO is an SRO station located on the main Observatory grounds at Potts Junction and has been in operation since August 1975.

PJG was activated in May 1957 as a Geomagnetic Seismological Station for use in the IGY Pacific Project, along with KOR and TRU. In 1965, PJG became an integral part of the Pacific Tsunami Warning System.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 314-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(EW-IS)	Eniwetok----------	11.3972	162.3753 E	411	6/28/63	9/31/62	Unconsolidated sand and coral pebbles.
(HW-IS)	Hawaii Island Array-----	19.9803	155.7056	705	7/24/63	10/22/64	Unconsolidated lava and ash.
(JN-IS)	Johnston Island---------	16.7339	169.5281	3	3/21/62	9/02/62	---
(OA-IS)	Oahu Island------------	21.4575	157.9964	183	3/30/64 9/29/62	9/03/62 11/05/62	Do.
(PR-IS)	Palmyra Island----------	5.8881	162.0942	3	4/06/62 9/30/62	8/03/62 11/04/62	Do.
(TG-IS)	Tonagareva Island-------	9.0600	158.0356	3	4/30/62 9/30/62	8/04/62 11/04/62	Do.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
(EW-IS), (HW-IS):	Benioff---------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(EW-IS): 15 K	---
	Sprengnether----	Z,NS,EW	20.0	---	---do---------	---	---
(JN-IS), (OA-IS), (PR-IS), (TG-IS):	Benioff---------	Z,NS,EW	1.0	---	---do---------	---	---

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 2, p. 363.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

IDAHO

Boise, ID

GENERAL INFORMATION

Operated by: Boise State University

Address: Department of Geology
Boise State University
Boise, ID 83725

Telephone: 208-385-3629

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BSE	Boise----------	43.6500	116.0917	---	5/75	Open--	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
BSE	Sprengnether---------	Z	1.0	---	Pen and ink	---	---

Timing system: Sprengnether, calibrated with WWV.

System response curves: Not available.

IDAHO

Rexburg, ID

GENERAL INFORMATION

Operated by: Ricks College

Address: Department of Geology
Ricks College
Rexburg, ID 83440

Telephone: 208-356-2011

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
REX	Rexburg----------	43.8125	111.7833	1532	4/20/72	Open--	Basalt; Pleistocene.

INSTRUMENTATION

Code	Seismometer			Galvo	Type	Magnification	Remarks
	Type	Component	T_o(sec)	T_g(sec)	recording	at T_o	
REX	Benioff 1051---------	Z	1.0	---	Helicorder	50-100 K	---

Timing system: Geotech TG-110.

System response curve: Not available.

SHORT HISTORY

The station operated until September 1976 when it was hit by lightning and damaged. It was repaired and again operational by May 1977.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(CL-ID)	Challis	44.4911	114.3417	2256	5/23/66	5/24/66	---
(HL-ID)	Hailey	43.6472	114.2506	1890	10/14/61	3/07/64	Limestone; Paleozoic.
(HL2ID)	--do	43.5611	114.4189	1829	3/29/64 10/07/65 8/09/67 8/27/68	7/23/65 11/15/65 12/10/67 9/09/68	Basalt and limestone.
(MO-ID)	Mountain Home	43.0719	116.2656	792	11/17/66	6/26/67	---
(PO-ID)	Preston	42.2281	111.7158	1554	11/07/67	12/10/67	Sand, silt, and gravel.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(HL-ID), (HL2ID) (first 3 oper.), (MO-ID):	Benioff	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(HL-ID): 340 K (HL2ID) (2d oper.): 400 K	---
	Sprengnether	Z,NS,EW	20.0	---	---do---	---	---
(CL-ID):	Geotech S-13	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.
(HL2ID) (4th oper.), (PQ-ID):	Geotech S-13	Z,NS,EW	1.0	---	---	(PQ-ID): 320 K	Do.
	Geotech	Z,NS,EW	20.0	---	---do---	---	Do.

Timing system: Geotech crystal clock checked with WWV (50 msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

GENERAL INFORMATION

Operated by: U.S. Geological Survey for the U.S. Bureau of Reclamation and the U.S. Department of Energy

Address: U.S. Geological Survey
3060 South Highland Drive
Las Vegas, NV 89109

Telephone: 702-734-3416

Address to obtain records:

As above.

On a limited basis.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BBI	Big Bend----------	44.1762	111.4288	1950	6/74	Open--	Hard rock.
DCI	Dry Creek----------	43.9548	111.0958	2020	6/74	--do--	Do.
GMI	Garnes Mountain---------	43.7065	111.3425	2630	6/74	--do--	Do.
HID	Hamer Butte----------	43.9627	112.1576	1504	8/73	--do--	Do.
HPI	Howe Peak----------	43.7133	113.0992	2621	10/72	--do--	Do.
LRI	Big Lost River----------	43.5283	112.9483	1509	12/71	See below	Alluvium.
MBI	Menan Buttes----------	43.7864	111.9706	1707	9/73	7/74	Hard rock.
TMI	Taylor Mountain---------	43.3064	111.9203	2255	10/72	Open--	Do.

INSTRUMENTATION

Code	Seismometer			Galvo	Type recording	Magnification at T_o	Remarks
	Type	Component	T_o (sec)	T_g (sec)			
All stations	Mark L-4C----------	Z	1.0	---	Helicorder	---	BBI, DCI, GMI telemetered to Ricks College, ID. HID, HPI, DCI, TMI telemetered to the Idaho National Engineering Laboratory.

Time system: Geotech TG-110.

System response curves: See figure 2, p. 363.

SHORT HISTORY

BBI, DCI, and GMI are owned by the U.S. Bureau of Reclamation and run for that agency by the USGS. They constitute the Teton network.

HID, HPI, LRIm and TMI are owned by the Idaho National Engineering Laboratory, Health Services Laboratory, U.S. Department of Energy (ERDA) Idaho Operations Office, 550 Second Street, Idaho Falls, ID 83401.

LRI is not routinely recorded, although it is used as a backup system whenever another station is down.

MBI was chosen as an alternative site to HID when initial problems were encountered. Subsequently, the instrument problems were eliminated and the instruments moved back to HID. Records for HID begin when MBI was closed in July 1974.

IDAHO

Missoula, MT

GENERAL INFORMATION

Operated by: University of Montana

Address: Earthquake Research Laboratory
Geology Department
University of Montana
Missoula, MT 59812

Telephone: 406-243-6422 or 243-2341

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BHI	Bertha Hill----------	46.7640	115.7920	1652	10/71	1/14/76	Belt Supergroup (argillite, quartzite, and limestone); Precambrian.
DEI	Dent----------	46.6400	116.1992	960	10/71	7/25/74	Basalt; Tertiary.
ERI	Eureka Ridge----------	46.5347	116.2748	862	10/71	7/26/74	Do.
GHI	Gilbert Hill----------	46.4702	116.3190	920	10/71	1/14/76	Do.
HHI	Harmony Heights----------	46.4757	116.1465	636	10/71	7/25/74	Do.
LGM	Little Green Mountain---	46.7330	116.0930	1455	10/71	7/25/74	Do.
MAS	Mason Butte----------	46.6327	116.3578	1141	10/71	1/14/76	Belt Supergroup (argillite, quartzite, and limestone); Precambrian.
WBI	Whiskey Butte----------	46.5826	115.9788	1341	10/71	1/14/76	Do.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
All stations	Mark L-4C----------	Z	1.0	0.06	Develocorder	100 K	Magnification at 10 Hz.

Timing system: Direct recording of WWVB.

System response curves: See figure 2, p. 363.

SHORT HISTORY

All these stations belong to the Dworshak Dam Array.

IDAHO

Menlo Park, CA

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
National Center for Earthquake Research
345 Middlefield Road
Menlo Park, CA 94025

Telephone: 415-323-8111 ext. 2571

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(YPMF)	Mesa Falls---------	44.1432	111.2882	1786	10/74	10/76	---
(YPTS)	Trude Siding-------	44.4623	111.3525	1926	10/74	10/76	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
Both stations	Mark L4-C----------	Z	1.0	---	Develocorder	---	Telemetered to MHS.

Timing system: WWVB recorded with custom-chronometer backup.

System response curves: See figure 2, p. 363.

SHORT HISTORY

These stations have also been recorded on magnetic tape at various times, and these records are also available. Both stations are part of the Yellowstone network.

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Department of the Interior
Geological Survey
Newport Geophysical Observatory
Rt. 4, Box 56A
Newport, WA 99156

Telephone: 509-447-3195

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
NTI	Nordman----------	48.6300	116.9633	823	8/27/67	12/08/75	Miocene slates with other Tertiary strata.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
NTI	Geotech 18300--------	Z	1.0	0.2	Visible	100 K	---

Timing system: WWSSN standard.

System response curves: Available from station.

SHORT HISTORY

NTI was established in August 1967 as a telemetry station for the Newport Geophysical Observatory, Wash.

IDAHO

Salt Lake City, UT

GENERAL INFORMATION

Operated by: University of Utah

Address: Department of Geology and Geophysics
College of Mines and Mineral Industries
University of Utah
717 Mineral Science Building
Salt Lake City, UT 84112

Telephone: 801-581-6201

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BEI	Bear River Range--------	42.1167	111.7823	1859	10/74	Open--	---
MLI	Malad Range-------------	42.0268	112.1256	1896	10/74	--do--	---
NPI	North Pocatello Valley--	42.1473	112.5183	1640	4/75	--do--	---
STI	Star Valley-------------	42.8023	111.0508	2149	12/76	--do--	---

INSTRUMENTATION

Code	Seismometer			Galvo	Type	Magnification	Remarks
	Type	Component	T_o(sec)	T_g(sec)	recording	at T_o	
BEI	Mark L-4C----------	Z	1.0	---	Develocorder	200-800 K	Telemetered to the University.
MLI	---do----------	Z	1.0	---	---do-------	200-800 K	Do.
NPI	---do----------	Z	1.0	---	---do-------	200-800 K	Do.
STI	---do----------	Z	1.0	---	---do-------	200-800 K	Do.

Timing system: WWVB recorded directly at the University.

System response curves: See figure 2, p. 363.

SHORT HISTORY

These stations are an extension of the University's network in Utah.

IDAHO

Spokane, WA

GENERAL INFORMATION

Operated by: U.S. Bureau of Mines

Address: Spokane Mining Research Center
East 315 Montgomery Avenue
Spokane, WA 99207

Telephone: 509-484-1610 ext. 325

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(BUI)	Burke----------	47.4650	115.7817	590	4/75	Open--	Belt Supergroup (argillite, quartzite, and limestone); Precambrian.
KGI	Kellogg----------	47.4883	116.0817	1400	1970	--do--	Do.
MUL	Mullan----------	47.4617	115.7817	1300	1968	--do--	Do.
WAL	Wallace----------	47.4600	115.9650	1200	1965	--do--	Do.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
BUI:	Sprengnether S-6000--	Z,NS,EW	0.5	---	Visual	100 K	Magnification at 1 sec.
KGI:	---do----------	Z,NS,EW	.5	---	--do--	---	---
MUL,WAL:	Sprengnether S-6000--	Z,NS,EW	.5	---	--do--	100 K	Magnification reduced to 50 K when necessary for mining background.
	Geotech S-13---------	Z,NS,EW	1.0	---	--do--	100 K	Do.

Timing system: Sprengnether TS-200 with a radio tie to WWV.

System response curves: Available from station.

SHORT HISTORY

All four stations primarily monitor rock bursts. Rock-burst reports are furnished to the mining companies and are available.

BUI is located in the Star mine at Burke, 700 m below ground surface.

KGI was closed in 1975 for approximately 6 months and its equipment moved to an adjacent mine within the Sunshine mine.

MUL is at the Lucky Friday mine and originally had a Johnson-Matheson S-10 seismometer on loan from the USGS. It was converted to the present equipment in 1971.

WAL is at the Galena mine and originally had a Johnson-Matheson S-10 seismometer on loan from the USGS. It was converted to the present equipment in 1970.

ILLINOIS

Chicago, IL

GENERAL INFORMATION

Operated by: Loyola University

Address: Loyola University
6525 Sheridan Road
Chicago, IL 60626

Telephone: 312-274-3000 ext. 255 or 389

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CHI	Chicago-Loyola----------	41.9000	87.6333	183	9/1912	Open--	Hard packed sand.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
CHI	Sprengnether DH------	Z	1.0	1.0	Photo paper	Uncalibrated	---
	Sprengnether H-------	NS,EW	7.0	7.0	---do------	---do-------	---
	Sprengnether VR-40-0-	NS	7.0	7.0	Visible----	---do-------	---

Timing system: Sprengnether TS-100 crystal clock.

System response curve: Not available.

SHORT HISTORY

An 80-kg Wiechert horizontal seismometer was set up in September 1912. The first quake was recorded on September 29, 1912, and reported on the first page of the Chicago Tribune.

GENERAL INFORMATION

Operated by: U.S. Weather Bureau and
the University of Chicago

Address: University of Chicago
Chicago, IL 60637

Address to obtain records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CHK	Chicago----------	41.7889	87.5992	180	1918	1967	Niagara Limestone; Middle Silurian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
CHK	McComb-Romberg-------	NS,EW	10.0	---	Photo paper	330	---

Timing system: Seth Thomas clock.

System response curves: Not available.

SHORT HISTORY

CHK was established by the U.S. Weather Bureau and the University of Chicago in cooperation with the USC&GS. The original equipment consisted of a two-component Milne-Shaw seismometer and was located in the basement of Rosenwald Hall of the University. The above-mentioned equipment was installed in 1939.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(PW-IL)	Pontiac----------	40.9161	88.5853	210	6/29/66	6/30/66	---
(WQ-IL)	Watseka----------	40.8656	87.5864	198	8/23/69 5/07/73	10/10/69 5/22/73	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(PW-IL)	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.
(WQ-IL)	Geotech S-13----	Z,NS,EW	1.0	---	---do---------	---	Do.
	Geotech---------	Z,NS,EW	20.0	---	---do---------	---	Do.

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

GENERAL INFORMATION

Operated by: Saint Louis University

Address: Department of Earth and Atmospheric Sciences
Saint Louis University
P.O. Box 8099, Laclede Station
Saint Louis, MO 63156

Telephone: 314-535-3300

Address to obtain records:

As above.

Address requests to: Director of the Geophysical Observatory.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
ELC	Elco----------	37.2850	89.2270	153	7/19/74	Open--	St. Louis Limestone (sandstone); Late Mississippian.
SMV	Samsville----------	38.4390	88.0820	134	4/74	--do--	Conemaugh Formation (clay over sandstone); Late Pennsylvanian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
ELC	Mark L-4----------	Z	1.0	16 Hz	Develocorder, magnetic tape.	1262 K	Magnification at 10 Hz. Telemetered to SLM.
SMV	Geospace HS 10-1-----	Z	1.0	.5	Photo paper--	100 K	Autocorder.

Timing system: ELC timing added at SLM. SMV has a Sprengnether TS-100.

System response curve: Available from station.

SHORT HISTORY

ELC is part of the New Madrid Network. Its instrumentation is a modification of USGS microearthquake equipment.
SMV was installed near the epicenter of an m_b 4.7 earthquake. It operated unattended for 1 month at a time from April 1974 until December 1976. A telemetry station is planned for that site starting in the fall of 1977.
Saint Louis University publishes a quarterly bulletin of the Southeast Missouri Regional Seismic Network.

INDIANA

Bloomington, IN

GENERAL INFORMATION

Operated by: University of Indiana

Address: Department of Geology
University of Indiana
1005 E. 10th Street
Bloomington, IN 47401

Telephone: 812-337-1008

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BLO	Bloomington----------	39.1719	86.5222	230	12/61	Open--	Salem Limestone; Late Mississippian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
BLO	Sprengnether---------	Z,NS,EW	15.0	---	Photo paper	1200	---
	Benioff----------	Z,NS,EW	1.0	---	---do------	60 K	---

Timing system: Oven-controlled tuning fork and digital clock made in the laboratory.

System response curves: Not available.

SHORT HISTORY

BLO was originally run by Saint Louis University under a U.S. Air Force contract. It was taken over by the University of Indiana in 1967.

GENERAL INFORMATION

Operated by: Gerald J. Shea

Address: 1105 Springhill Road
Terre Haute, IN 47802

Telephone: 812-232-6311 ext. 2435

Address to obtain records:

1950-1967:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

1968-present:

Records available only on a limited basis, and records are not retained on a routine basis.

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(THI)	Terre Haute----------	39.3556	87.3667	160	1/01/49	9/21/62	Sedimentary fill; Holocene.
THI	--do----------	39.4069	87.3600	150	9/21/62	Open--	Do.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
THI	Electronic Research--	NS	7.0	12.0	Pen and ink-	1000	---
	Custom----------	EW	10.0	10.0	---do-------	1000	---
	Experimental---------	Z	3.0	5.0	Smoked paper	1000	---

Timing system: Electronic home-crafted crystal clock, manually timed with WWV.

System response curve: Not available.

SHORT HISTORY

(THI) was started in 1949 to participate in the IGY. The station, moved to THI in 1962, was funded through the USC&GS until 1967. During that period, the instruments used were a Milne-Shaw modified, t_o=12 sec, and a Bosch-Omori, t_o=14 sec. Since 1955 the station has also maintained two strong-motion instruments, t_o=1 sec. Experimental research-type instruments have been in use since 1967.

IOWA

Des Moines, IA

GENERAL INFORMATION

Operated by: Mrs. M. M. Seeburger

Address: Mrs. M. M. Seeburger
1224 44th Street
Des Moines, IA

Address to obtain records:

Unknown.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
DMI	Des Moines----------	41.6000	93.6833	296	12/20/34	6/37	Kansan till; Pleistocene.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
DMI	Modified Bosch-Omori	NS,EW	9.0	---	Smoked paper	15	EW component installed 3/35.

Timing system: Gilbert Regulator clock checked daily with WWV.

System response curves: Not available.

SHORT HISTORY

DMI was the avocation of the owner.

IOWA

Dubuque, IA

GENERAL INFORMATION

Operated by: Loras College

Address: Department of Physics
Loras College
Dubuque, IA 52003

Telephone: 319-588-7154

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
DBQ	Dubuque----------	42.5067	90.6833	244	1962	Open--	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
DBQ	Wood-Anderson--------	---	---	---	Photo paper	---	---
	Benioff----------	Z	1.0	---	---do------	---	---

Timing system: Westrex chronometer.

System response curves: Not calibrated.

SHORT HISTORY

DBQ was started as a VELA-Uniform station. It was operated by St. Louis University until 1967.

IOWA

Garland, TX

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(BY-IO)	Bloomfield----------	40.7692	92.4525	259	8/26/69	10/10/69	---
(VO-IO)	Vinton----------	42.2250	92.1269	274	9/1/64	3/22/65	Limestone.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(BY-IO)	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape-	70 K	Portable system.
	Geotech----------	Z,NS,EW	20.0	---	---do----------	---	Do.
(VO-IO)	Benioff----------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	---	---
	Sprengnether----	Z,NS,EW	20.0	---	---do----------	---	---

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

KANSAS

Lawrence, KS

GENERAL INFORMATION

Operated by: University of Kansas

Address: Seismograph Station
Department of Geology
University of Kansas
Lawrence, KS 66044

Telephone: 913-864-3242

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
LAW	Lawrence----------	38.9594	95.2500	260	1909	Open--	Shale.

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
LAW	Sprengnether---------	Z,NS,EW	1.0	1.0	Photo paper	20 K, 10 K, 10 K	Magnification approximate.

Timing system: Pendulum clock.

System response curve: Not available.

SHORT HISTORY

LAW was started in 1909 and run by the Physics Department until about 1930 at which time the Department of Geography took it over. The station operated intermittently until about 1933 when it was shut down entirely. Records from this early period are lost. New equipment was installed in 1952, and records are virtually complete from then to the present.

KANSAS

Manhattan, KS

GENERAL INFORMATION

Operated by: Kansas State University

Address: Department of Geology
Thompson Hall
Kansas State University
Manhattan, KS 66056

Telephone: 913-532-6724

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
MHK	Manhattan----------	39.1874	96.5792	318	11/19/74	Open--	Americus Limestone Member of Foraker Limestone; Early Permian.
MHT	--do----------	39.1997	96.5806	339	9/61	6/71	Burr Limestone Member of Grenola Limestone; Early Permian.
(MHT)	--do----------	39.1866	96.5790	314	11/12/73	11/74	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
MHK:	Sprengnether S-5007--	Z,NS,EW	20.0	---	Visible----	---	---
MHT, (MHT):	Benioff 4681A--------	Z	1.0	.75	Photo paper	27 K	---
	Benioff 6102A--------	NS,EW	1.0	.75	---do------	27 K	---
	Sprengnether S-5007--	Z,NS,EW	15.0	90	---do------	1.4 K	---

Timing system: Times chronometer TS-3.

System response curves: Available from station.

SHORT HISTORY

MHT was constructed and initially funded by Saint Louis University as part of a project under VELA-Uniform. It closed in 1971 for lack of operating funds.
(MHT) was opened as a temporary station while the construction of the site of MHK was being completed.
MHK is a successor to MHT; it is a joint project of Kansas State University and St. Louis University.

KANSAS

Garland, TX

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(EM-KA)	Emporia----------	38.5247	96.4728	2012	9/14/65	9/16/65	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
(EM-KA)	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

KENTUCKY

Lexington, KY

GENERAL INFORMATION

Operated by: University of Kentucky

Address: Department of Geology
Seismograph Station
University of Kentucky
Lexington, KY 40503

Telephone: 606-257-3758

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(LEX)	Lexington----------	38.0361	84.5050	299	10/01/74	5/76	Lexington Limestone; Middle and Late Ordovician.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(LEX)	Sprengnether S-7000--	Z	1.0	---	Visible	80 K	Magnification at 5 Hz.

Timing system: Sprengnether TS-300 Chronometer, solid state.

System response curve: Available from station.

KENTUCKY

Garland, TX

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(RS-KY)	Russell Springs---------	37.1986	84.8683	274	12/03/65	12/12/65	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(RS-KY)	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.
	Geotech---------	Z,NS,EW	20.0	---	---do--------	---	Do.

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

KENTUCKY

Huntington, WV

GENERAL INFORMATION

Operated by: Department of the Army

Address: Huntington District, Corps of Engineers
P.O. Box 2127
Huntington, WV 25721

Telephone: 304-529-2281

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(PIV1)	Paintsville Project-----	37.7983	82.8492	---	5/75	3/76	---
(PIV2)	---do----------	37.8998	82.8733	---	5/75	3/76	---
(PIV3)	---do----------	37.8250	82.9557	---	5/75	3/76	---

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
All stations	Geotech----------	Z	1.0	---	Helicorder	---	Telemetered to Huntington office.

Timing system: Geotech TG-100.

System response curves: Not calibrated.

SHORT HISTORY

This network was located in the vicinity of a projected dam and also near a local fault. It was designed to monitor the seismicity of the area prior to construction.

KENTUCKY

Saint Louis, MO

GENERAL INFORMATION

Operated by: Saint Louis University

Address: Department of Earth and Atmospheric Sciences
Saint Louis University
P.O. Box 8099, Laclede Station
St. Louis, MO 63156

Telephone: 314-535-3300

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CRU	Crutchfield----------	36.5950	89.0200	127	7/12/74	Open--	Loess (Pleistocene) of the Wilcox Formation (Paleocene and Eocene).
WCK	Wilson Creek----------	36.9340	88.8740	137	7/19/74	--do--	Loess (Pleistocene) over siltstone of the Wilcox Formation (Paleocene and Eocene).

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
CRU	Mark L-4C----------	Z	1.0	16 Hz	Develocorder, magnetic tape.	310 K	Magnification at 10 Hz. Telemetered to SLM through Sikeston, Mo.
WCK	---do----------	Z	1.0	16 Hz	---do---------	695 K	Magnification at 10 Hz. Telemetered to SLM and GLD.

Timing system: Timing added at SLM.

System response curves: Available from station.

SHORT HISTORY

Both stations are part of the New Madrid Network, and the equipment is modified USGS microearthquake equipment. Saint Louis University publishes a quarterly bulletin of the Southeast Missouri Regional Seismic Network.

GENERAL INFORMATION

Operated by: Loyola University

Address: Nicholas D. Burke Seismic Observatory
Loyola University
New Orleans, LA 70118

Telephone: 504-865-3647

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
NOL	New Orleans----------	29.9483	90.1200	2	1910	Open--	Thick alluvium (60 m and deeper).

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
NOL	Sprengnether---------	NS,EW	18.0	20.0	Photo paper	20 K	---
	---do----------	Z	2.0	2.0	---do------	2 K	Magnification at 20 sec.

Timing system: Standard Electric Time Clock, Invar Pendulum, checked by WWV signal.

System response curves: Not available.

SHORT HISTORY

NOL was started in 1910 with three Wiechert instruments: 80-kg inverted-pendulum N and E components and a horizontal-pendulum Z component. In February 1946, these instruments were replaced by the present Sprengnether instruments.

LOUISIANA

Garland, TX

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(JE-LA)	Jena----------	31.7847	92.0153	46	2/06/64 11/16/66	11/23/64 1/16/67	Sandstone.
(LV-LA)	Liddieville----------	32.1361	91.8750	15	6/28/63	1/30/64	Alluvium.

INSTRUMENTATION

Code	Seismometer			Galvo	Type recording	Magnification at T_o	Remarks
	Type	Component	T_o(sec)	T_g(sec)			
(JE-LA), (LV-LA):	Benioff---------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(JE-LA): 30 K (LV-LA): 40 K	---
	Sprengnether----	Z,NS,EW	20.0	---	---do---------	---	---

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

MAINE

Waterville, ME

GENERAL INFORMATION

Operated by: Colby College

Address: Department of Geology
Colby College
Waterville, ME 20230

Telephone: 207-873-1131 ext. 241

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
WTR	Waterville----------	44.6483	69.6556	79	10/51	Open--	Metamorphics of the Mayflower Hill Formation; Early Silurian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
WTR	Wilson-Lamison-------	Z	1.0	1.5	Photo paper	---	---

Timing system: Sprengnether clock.

System response curve: Not calibrated.

SHORT HISTORY

WTR originally operated with a Sprengnether torsion seismometer, mainly used for teaching purposes. In 1961 the USC&GS provided the Wilson-Lamison currently in use. The station was inoperative early in 1977 while the system was changed to include a visual recording system and an electronic Sprengnether clock.

MAINE

Cambridge, MA

GENERAL INFORMATION

Operated by: Massachusetts Institute of Technology

Address: Department of Civil and Sanitary Engineering
Massachusetts Institute of Technology
Cambridge, MA 02138

Telephone: 617-253-7796

Address to obtain records:

Unknown.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(EMM)	East Machias---------- (Camp Technology).	44.7833	67.3533	33	7/32	Closed after 1940	Granite.

INSTRUMENTATION

Code	Seismometer			Galvo	Type	Magnification	Remarks
	Type	Component	T_o(sec)	T_g(sec)	recording	at T_o	
(EMM)	Wenner----------	NS,EW	7.0	---	Photo paper	---	---

Timing system: Seth Thomas checked with WWV.

System response curves: Not available.

SHORT HISTORY

The station at East Machias was located on the property of Camp Technology, owned and operated by M.I.T.. The USC&GS installed the system and help to advise the operators in the initial phases of operation.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(BG-ME)	Bangor----------	44.6344	69.2214	183	11/04/61	8/01/62	Fine-grained phyllite.
(HN-ME)	Houlton----------	46.1619	67.9858	213	8/22/62	9/06/66	Paleozoic slate over Precambrian basement.
					10/21/66	2/04/71	
					9/27/71	11/10/71	
					5/10/73	5/22/73	
					2/20/75	12/11/75	
					12/11/75	Open---	

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(BG-ME), (HN-ME):	Benioff---------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(BG-ME): 45 K (HN-ME): 130 K	---
	Sprengnether----	Z,NS,EW	20.0	---	---do---------	---	---
(HN-ME) (last 4 oper.):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.
	Geotech---------	Z,NS,EW	20.0	---	---do--------	---	Do.

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

MAINE

Weston, MA

GENERAL INFORMATION

Operated by: Weston Observatory, Boston College

Address: Weston Observatory
Concord Road
Weston, MA 02193

Telephone: 617-899-0950

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
AGM	Allagash----------	47.0817	69.0233	238	11/75	Open--	Indurated till; Pleistocene.
CBM	Caribou----------	46.9325	68.1208	250	10/62	--do--	Vertically bedded schist; Silurian.
(D1A)	Dickey----------	47.0586	69.0989	305	10/76	--do--	Metasandstone; Devonian.
(D2A)	---do----------	47.1304	69.1502	402	10/76	--do--	Do.
(D3A)	---do----------	47.0876	69.1669	259	10/76	--do--	Do.
EMM	East Machias----------	44.7392	67.4894	20	---	--do--	Volcanics and minor granitic intrusives; Silurian.
MIN	Milo----------	45.2436	69.0403	140	7/75	--do--	Silurian metaquartzite and Devonian graywacke.
TRM	Turner----------	44.2597	70.2551	113	1977	--do--	Metashale, siltstone, and sandstone; Silurian.

INSTRUMENTATION

Code	Seismometer			Galvo	Type	Magnification	Remarks
	Type	Component	T_o (sec)	T_g (sec)	recording	at T_o	
All stations	Hall-Sears 10--------	Z	1.0	---	Develocorder	75 K-200 K	Telemetered to WES.

Timing system: WWSSN standard added at WES.

System response curves: Available from station.

SHORT HISTORY

AGM, (D1A), (D2A), and (D3A) constitute a subnetwork of the New England Seismic Network, run by the Observatory. The Observatory contributes to the Northeastern United States Seismic Network bulletin.

Operation of CBM, EMM, and MIM was interrupted between September 1967 and May 1975, although CBM was reactivated for a 7-month period in 1968.

GENERAL INFORMATION

Operated by: U.S. Coast and Geodetic Survey

Address: Cheltenham Magnetic Observatory--Closed
Cheltenham, MD
(Obsolete)

Address to obtain records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CLH	Cheltenham----------	38.7347	76.8458	72	11/1904	12/1928	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
CLH	Bosch-Omori----------	---	---	---	---	---	---

Timing system: Not available.

System response curves: Not available.

SHORT HISTORY

Cheltenham Magnetic Observatory was principally involved in magnetic observations and incidentally ran a seismograph station. The instruments were dismantled in 1928 and only operated for a few months in 1929. The observatory closed in 1956 and the staff moved to Corbin, Va.

MARYLAND

Rockville, MD

GENERAL INFORMATION

Operated by: National Earthquake Information Center

Address: National Earthquake Information Center--Closed
Washington Science Center
Rockville, MD
(Obsolete)

Telephone: None.

Address to obtain records:

WSC records: All others not available.

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
NHB	National Naval Medical Center.	39.0016	77.0837	91	1962	1972	---
NLM	Naval Ordinance Lab	39.0324	76.9805	114	1962	1972	---
VIL	Villa Mercy	39.0209	77.1887	0	1962	1972	---
WSC	Washington Science Center	39.0505	77.1237	120	1965	1972	Pelitic schist.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
All stations	Johnson-Matheson	Z	1.0	---	Helicorder	---	Telemetered to WSC.

Timing system: Sprengnether clock checked by hand with WWV.

System response curves: Not available.

SHORT HISTORY

NBH, NLM, and VIL were owned and operated by the U.S. Bureau of Standards. In 1967, NEIC began telemetering these stations and recorded them on Helicorders. The U.S. Bureau of Standards recorded their stations on Develocorder film, but this set of records was subsequently discarded.

WSC was started when the Seismology Division of the USC&GS (later, NEIC) first located in the Washington Science Center in mid-1965.

GENERAL INFORMATION

Operated by: Massachusetts Institute of Technology and Harvard University

Address: Department of Earth and Planetary Sciences
Building 54, Room 527
Massachusetts Institute of Technology
Cambridge, MA 02138

Telephone: 617-253-7796

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CAM	Cambridge----------	42.3833	71.1167	5	1908	1930's	---
(DUX)	Duxbury----------	42.0686	70.7678	27	10/76	Open--	Gneiss; Devonian.
GLO	Gloucester----------	42.6403	70.7272	15	8/75	--do--	Granite; Devonian.
HRV	Harvard (Oak Ridge)-----	42.5064	71.5583	180	1933	--do--	Gneiss; Devonian.
WFM	Westford----------	42.6106	71.4906	88	5/76	--do--	Granite; Devonian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
CAM	---	---	---	---	---	---	---
(DUX)	Mark L-4C----------	Z	1.0	---	Develocorder	---	Telemetered to M.I.T..
GLO	---do----------	Z	1.0	---	---do-------	---	Do.
HRV	Geotech S-13----------	Z,NS,EW	1.0	---	---do-------	---	---
	Geotech 7505A----------	Z	23.0	---	---do-------	---	---
WFM	Mark L-4C----------	Z,NS,EW	1.0	---	---do-------	---	---

Timing system: Sprengnether TS-250 digital timing system; Kinemetrics model WVTR mark IV with time-code stripper.

System response curves: Not available.

SHORT HISTORY

CAM was owned and operated by Harvard University. It was located in the Geology Museum, Oxford Street, Cambridge. When the Observatory was moved from Cambridge to Harvard, Mass., HRV was established. It is still owned by Harvard University but is operated by M.I.T. under an arrangement made in 1970.

DUX and GLO are temporary stations established for use in the Northeast Seismic Network.

WFM (Wallace Observatory), located in Westford, Mass., is owned and operated by M.I.T. Underground vault construction was completed in April 1975, and the station opened May 20, 1975. Data are telemetered to M.I.T. and recorded at the Seismology Lab in Cambridge. WFM is also equipped with an earth-tide gravimeter and NS, EW tiltmeters.

MASSACHUSETTS

Weston, MA

GENERAL INFORMATION

Operated by: Weston Observatory, Boston College

Address: Weston Observatory
Concord Road
Weston, MA 02193

Telephone: 617-899-0950

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
FLR	Fall River----------	41.7167	71.1215	52	3/24/75	Open--	Glacial deposits; Pleistocene.
QUA	Quabbin----------	42.4566	71.3738	201	5/07/77	--do--	Fine-grained schist; Ordovician.
WES	Weston----------	42.3847	71.3221	60	12/1930	--do--	Metavolcanics; Precambrian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
FLR	Hall-Sears 10--------	Z	1.0	---	Develocorder	50 K	Telemetered to WES.
QUA	--do----------	Z	1.0	---	---do--------	150 K	Do.
WES	Benioff 1051---------	Z	1.0	.75	Photo paper-	50 K	WWSSN.
	Benioff 1101---------	NS,EW	1.0	.75	---do--------	50 K	Do.
	Sprengnether---------	Z,NS,EW	15.0	100.0	---do--------	3 K	Do.

Timing system: WWSSN standard added at WES.

System response curves: WES--see figure 1, p. 363. Others available from station.

SHORT HISTORY

Weston College Seismic Station began operating in 1930 with a Bosch-Omori recorded on smoked paper. The instrumentation was changed to a Weichert and then, in 1936, to a three-component Benioff system. In 1949 the station was moved 300 m to the newly established Weston Observatory site. The WWSSN equipment was installed in December 1961, and several months later the New England Seismic Network was initiated. The Observatory now runs stations in Connecticut, Maine, Massachusetts, and New Hampshire. Part of this work is supported by USGS grants.

The Observatory contributes to the Northeastern United States Seismic Network bulletin.

GENERAL INFORMATION

Operated by: University of Michigan

Address: Seismological Observatory
Department of Geology and Mineralogy
University of Michigan
Ann Arbor, MI 48104

Telephone: 313-763-4069

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
AAM	Ann Arbor----------	42.2997	83.6561	249	1940	Open--	Gravel.
SUG	Sugar Island----------	46.5214	84.1383	190	9/26/69	5/30/70	Jacobsville Sandstone; Precambrian.
WPM	White Pine----------	46.7515	89.5549	193	1973	Open--	Copper Harbor Conglomerate; Precambrian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
AAM	Benioff 1051---------	Z	1.0	0.75	Photo paper	12.5 K, 6.25 K	WWSSN.
	Benioff 1101---------	NS,EW	1.0	.75	---do------	12.5 K, 6.25 K	Do.
	Sprengnether---------	Z,NS,EW	15.0	100.0	---do------	1.5 K	Do.
SUG	Geotech 7505A--------	Z	30.0	100.0	Strip chart	55 K	HGLP.
	Geotech 8700C--------	NS,EW	30.0	100.0	---do------	55 K	Do.
WPM	Benioff----------	Z	1.0	---	Helicorder	15 K	---
	Geotech 7505A, 8700C-	Z,NS,EW	30.0	---	Helicorder, magnetic tape.	Z: 17.5 K NS: 16.5 K EW: 16.5 K	HGLP.

Timing system: AAM uses WWSSN standard. SUG used a Sprengnether TG-110 quartz-crystal chronometer. WPM uses a Geotech TG120.

System response curves: AAM--see figure 3, p. 364. WPM--see figure 6, p. 365.

SHORT HISTORY

The Seismological Observatory at Ann Arbor was established in 1909 and used a Bosch-Omori and a Weichert. It was located at a slightly different location than the present one. AAM was established in 1940 under the direction of Dr. James T. Wilson. WWSSN equipment began operating at this station on October 22, 1962.

SUG began operation as the first surface-installation HGLP prototype station, funded by ARPA. The station was dismantled following two severe floods.

WPM was established in the White Pine Copper Company mine (89 m deep) during 1973 and 1974 with funds provided by ARPA. First installed as an experimental station, it was raised to the status of the eleventh HGLP observatory in 1974.

MICHIGAN

Garland, TX

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(ED-MI)	Edgewood----------	43.2556	84.4114	213	12/02/65	12/13/65	---
(PF-MI)	Pickford----------	46.0878	84.4608	259	1/03/63	6/17/63	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(ED-MI):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.
	Geotech---------	Z,NS,EW	20.0	---	---do----------	---	Do.
(PF-MI):	Benioff---------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	80 K	---

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

MINNESOTA

Minneapolis, MN

GENERAL INFORMATION

Operated by: University of Minnesota

Address: Department of Geology and Geophysics
University of Minnesota
Minneapolis, MN 55455

Telephone: 612-373-3137

Address to obtain records:

As above.

WWSSN records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(CM1)	Central Minn. 1--------	45.9339	93.3546	324	1/01/77	Open--	Hinckley and Fond du Lac Formations; Precambrian.
(CM2)	Central Minn. 2--------	45.9791	93.1696	323	1/01/77	--do--	Do.
(CM3)	Central Minn. 3--------	43.8801	93.0162	294	1/01/77	--do--	Do.
(CM4)	Central Minn. 4--------	45.7500	93.1033	298	1/01/77	--do--	Do.
(CM5)	Central Minn. 5--------	45.7939	93.3279	298	1/01/77	--do--	Do.
(CM6)	Central Minn. 6--------	45.8665	93.2073	310	1/01/77	--do--	Do.
DUL	Duluth-----------------	46.8200	92.0833	340	1952	1961	Duluth Complex; Precambrian.
MFM	Ford Plant, St. Paul---	44.9141	93.1936	226	6/76	Open--	St. Peter Sandstone; Middle Ordovician.
MNM	Minneapolis------------	44.9740	93.2381	204	12/74	1976	Do.
MNN	Minneapolis------------	44.9144	93.1900	217	1964	1967	Do.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(CM1-6)	Geotech S-13---------	Z	1.0	---	Magnetic tape	---	Telemetered to MNM.
DUL	Wilson-Lamison-------	Z	1.1	0.58	Pen and ink	---	---
	Modified Sprengnether	NS,EW	6.0	6.5	---do------	---	---
MFM	Geotech S-13---------	Z	1.0	---	---do------	5 K	---
MNM	---do-----------------	Z	1.0	---	Magnetic tape	---	---
MNN	Benioff 1051, 1101---	Z,NS,EW	1.0	0.75	Photo paper	---	WWSSN.
	Sprengnether---------	Z,NS,EW	15.0	100.0	---do------	---	Do.

Timing system: WWVB directly recorded on tape. MNN uses Accutron one-minute marks with WWVB superimposed once a day.

System response curves: Available from station.

Minneapolis, MN

SHORT HISTORY

(CM1-6) is an array funded by the U.S. Department of Energy in the vicinity of the Lake Superior Geologic Province. It is of interest because of its proximity to the mid-continent gravity high and to a major fault, and because it is within 150 km of the epicenter of the 1975 earthquake.

DUL was run by the University of Minnesota, Duluth. It operated intermittently before 1954 and then operated continuously between 1955 and 1956 using one short-period vertical Benioff. In 1956 the USC&GS installed two short-period horizontals. Some records were sent to the USC&GS and a few were saved for display. The rest were discarded.

MNM is located on the campus of the University.

MNN was started in 1964 as a WWSSN station and ran until 1967. It was abandoned because of flooding problems.

MINNESOTA

Garland, TX

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(GP-MN)	Grand Rapids----------	47.6644	93.4894	427	9/02/64	12/01/64	Glacial drift.
(GY-MN)	Gaylord----------	44.5047	94.0547	305	7/05/62	7/11/62	---
(HT-MN)	Hastings----------	44.8528	92.8778	274	8/02/62	10/05/62	---
(JO-MN)	Jordan----------	44.7069	93.5083	290	7/13/62	7/30/62	---
(SE-MN)	Sleepy Eye----------	44.4142	94.6653	244	1/24/62	6/19/63	Granitic basement; Precambrian.
(WF-MN)	Wykoff----------	43.8014	92.3731	381	8/30/64	11/24/64	Dolomitic limestone.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(GP-MN), (WF-MN):	Benioff---------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(GP-MN): 140 K (WF-MN): 120 K	---
	Sprengnether----	Z,NS,EW	20.0	---	---do---------	---	---
(GY-MN), (HT-MN), (JO-MN), (SE-MN):	Benioff---------	Z,NS,EW	1.0	---	---do--------	(GY-MN): 50 K (HT-MN): 50 K (JO-MN): 40 K (SE-MN): 225 K	---

Timing system: Geotech crystal clock checked with WWV (50 msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing th seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

University, MS

GENERAL INFORMATION

Operated by: University of Mississippi

Address: Seismological Observatory--Closed
University of Mississippi
University, MS 38677

Address to obtain records:

WWSSN records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
OXF	Oxford----------	34.5118	89.4092	101	8/63	5/76	Clay; Tertiary.
(OXR)	--do----------	34.3000	89.6000	157	8/67	5/76	Do.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
OXF	Benioff 1051, 1101---	Z,NS,EW	1.0	0.75	Photo paper	50 K	WWSSN.
	Sprengnether----------	Z,NS,EW	15.0	100.0	---do------	3 K	Do.
(OXR)	Sprengnether----------	Z	30.0	1.5	Pen and ink	1 K	Located on campus; run infrequently.

Timing system: WWSSN standard.

Response curves: OXF--see figure 1, p. 363.

SHORT HISTORY

OXF was established as a WWSSN station in 1963 and operated as the only permanent station in Mississippi until funding was stopped in 1976. Original records are archived at St. Louis University.

MISSISSIPPI

Garland, TX

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(GS-MS)	Greenville----------	33.3292	91.0353	30	8/22/69	10/10/69	---
(LD-MS)	Lucedale----------	30.9500	88.8833	70	11/13/66 1/19/69 4/11/70	12/03/66 2/02/69 4/22/70	---
(LD2MS)	--do----------	30.8528	88.5406	79	1/18/69 4/14/70	2/02/69 4/22/70	---
(LD3MS)	--do----------	30.6661	89.0436	46	1/18/69 4/09/70	2/02/69 4/22/70	---
(LL-MS)	Laurel----------	31.7214	89.3558	91	11/14/66 1/19/69 4/09/70	12/03/66 2/02/69 4/22/70	---
(LU-MS)	Lumberton----------	31.0389	89.2389	91	1/16/69 4/07/70	2/02/69 4/22/70	---
(MB-MS)	McComb----------	31.3428	90.2864	122	11/15/66 1/15/69 4/09/70	12/06/66 2/02/69 4/22/70	Sand, clay, and gravel.
(PC-MS)	Picayune----------	30.5558	89.7825	12	11/12/66 1/15/69 4/10/70	12/06/66 2/02/69 4/22/70	---
(PU-MS)	Purvis----------	31.1519	89.5489	91	2/26/65	4/03/65	---
(RI-MS)	Richton----------	31.1978	88.8508	37	1/14/69 4/16/70	2/02/69 4/22/70	---

Garland, TX

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(GH-MS), (LD-MS), (LD2MS), (LD3MS), (LL-MS), (LU-MS), (MB-MS), (PC-MS), (PU-MS), (RI-MS):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	(MB-MS): 40 K	Portable system.
	Geotech---------	Z,NS,EW	20.0	---	---do--------	---	Do.

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

MISSOURI

Rolla, MO

GENERAL INFORMATION

Operated by: University of Missouri

Address: Department of Geology and Geophysics
University of Missouri
Rolla, MO 65401

Telephone: 314-341-4364

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
ROL	Rolla----------	37.9178	91.8689	200	1965	Open--	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
ROL	Benioff----------	Z,NS,EW	1.0	0.75	Photo paper	50 K	Recorded at the main campus and telemetered to SLM.
	Sprengnether---------	Z,NS,EW	15.0	90.0	---do------	1500	Do.

Timing system: Not available.

System response curves: Not available.

SHORT HISTORY

ROL is owned and operated by the University of Missouri, Rolla, and receives considerable support from St. Louis University, which records this station, along with its own network, in St. Louis.

GENERAL INFORMATION

Operated by: Saint Louis University

Address: Department of Earth and Atmospheric Sciences
Saint Louis University
P.O. Box 8099, Laclede Station
St. Louis, MO 63156

Telephone: 314-535-3300

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BRM	Bernie----------	36.6333	90.0597	109	1969	1973	Clay over gravel; Eocene.
BRR	Berryman----------	37.9533	91.1750	250	1960	1962	Gasconade Dolomite; Ordovician.
CGM	Cape Girardeau----------	37.3167	89.5333	134	1938	Open--	Fernvale Limestone; Late Ordovician.
DON	Dongola----------	37.1760	89.9330	165	7/10/74	--do--	Smithville Formation (cherty dolomite); Early Ordovician.
DWM	Dogwood----------	36.8050	89.4900	92	11/20/74	--do--	Gumbo, sandy clay alluvium; Pleistocene.
ECD	Elk Chute Ditch---------	36.0600	89.9400	79	9/25/75	--do--	Sandy clay alluvium; Quaternary.
FLO	Florissant----------	38.8017	90.3700	160	1928	8/31/71	Shale; Pennsylvanian.
FRM	Flat River----------	37.8358	90.4864	161	1969	12/72	Bonneterre Dolomite (Cambrian) overlying porphyry (Precambrian).
FVM	French Village----------	37.9840	90.4260	310	9/01/72	Open--	Bonneterre Dolomite; Late Cambrian.
GRV	Greenville----------	37.0533	90.3950	168	1964	1974	Roubidoux Dolomite; Early Ordovician.
LST	Lone Star----------	36.5230	89.7310	83	7/18/74	Open--	Gumbo sandy clay; Quaternary.
MLD	Malden----------	36.5587	89.9698	80	11/67	11/69	Sandy clay; Quaternary.
(MMM)	Pea Ridge Mine----------	38.1300	91.0400	-244	12/75	Open--	Granite porphyry; Precambrian.
NMM	New Madrid----------	36.5910	89.5282	92	11/67	11/69	Sandy clay; Quaternary.
PTG	Portageville----------	36.4277	89.7037	85	11/67	11/69	Sandy clay; Quaternary.
RMB	Rombauer----------	36.8860	90.2780	147	6/27/74	Open--	Roubidoux Dolomite (chert); Early Ordovician.
SLM	St. Louis----------	38.6361	90.2361	161	10/09/09	--do--	St. Louis Limestone; Late Mississippian.
TYS	Tyson Valley----------	38.5150	90.5680	195	2/19/74	--do--	Joachim Dolomite; Middle Ordovician.

St. Louis, MO

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
BRM	Sprengnether---------	Z	0.5	0.5	Photo paper	30 K	Magnification at 0.3 sec. Recorded on autocorder.
BRR	Reeff----------	Z,NS,EW	1.0	1.0	---do------	100 K	---
CGM	Benioff----------	NS,EW	1.0	.75	---do------	15 K	---
DON	Mark L-4C----------	Z	1.0	16 Hz	Develocorder	1200 K	Magnification at 10 Hz. Telemetered to SLM.
DWM	---do----------	Z	1.0	16 Hz	---do-------	95 K	Do.
ECD	---do----------	Z	1.0	16 Hz	---do-------	206 K	Do.
FLO	Galitzin-Wilip-------	Z,NS,EW	12.0	12.0	Photo paper	1 K	Original instrumentation.
	Benioff----------	Z,NS,EW	1.0	.75	---do------	50 K	WWSSN.
	Sprengnether---------	Z,NS,EW	15.0	100.0	---do------	1500	Do.
FRM	Sprengnether---------	Z,NS,EW	30.0	None	Visible,---- magnetic tape.	1500	Strainmeters also recorded. Telemetered to SLM. Magnification 25 K at 1 sec.
FVM	Benioff 4861---------	Z	1.0	.75	Photo paper, magnetic tape.	100 K	WWSSN. Filtered and recorded visibly and on magnetic tape. Telemetered to GLD.
	Benioff 6102---------	NS,EW	1.0	.75	---do-------	100 K	WWSSN.
	Sprengnether---------	Z,NS,EW	15.0	100.0	---do-------	1500	WWSSN. Z filtered and recorded visibly; telemetered to GLD.
GRV	Sprengnether---------	Z	.5	.5	Photo paper	100 K	Magnification at 0.3 sec. Autocorder.
LST	Mark L-4C----------	Z	1.0	16 Hz	Develocorder	167 K	Magnification at 10 Hz. Telemetered to SLM.
MLD	Hall-Sears 10--------	Z	Short	---	Magnetic tape	50 K	Magnification at 10 Hz. Telemetered to PTG.
(MMM)	Geospace----------	Z	.22	---	Visible----	50 K	Magnification at 10 Hz. Located in a deep iron mine.
NMM	Hall-Sears 10--------	Z	Short	---	Magnetic tape	50 K	Magnification at 10 Hz. Telemetered to PTG.
PTG	Hall-Sears----------	Z	Short	---	---do--------	50 K	Magnification at 10 Hz.
RMB	Mark L-4C----------	Z	1.0	16 Hz	Develocorder	1390 K	Magnification at 10 Hz. Telemetered to SLM.
SLM	Benioff----------	Z	1.0	.75	Photo paper	25 K	---
	---do----------	NS,EW	1.0	.75	---do------	7.5 K	---
	Sprengnether---------	Z,NS,EW	15.0	90.0	---do------	750	Z also recorded with pen and ink and displayed in the lobby.
TYS	Mark L-4C----------	Z	1.0	16 Hz	Develocorder, magnetic tape.	720 K	Magnification at 10 sec. Telemetered to SLM.
	Sprengnether S-7000 or Geospace HS-10-1---	Z	1.0	16 Hz	---do---------	---	---

Timing system: WWSSN standard TS-100, Astrodata TCG.

System response curves: FLO--see figure 1, p. 363. FVM--see figure 1, p. 363, and figure 6, p. 365. Others available from station.

SHORT HISTORY

BRM had many instrument problems and, consequently, only intermittent records exist.

BRR was used as an experimental station for testing different kinds of instruments.

CGM was founded in cooperation with Southeast Missouri State Teachers College in 1938. For some periods of a year or more, the station has not been in operation.

DON, DWM, LST, and RMB are stations in the SIK array. Their instrumentation is modified USGS microearthquake equipment.

EDD is a station in the PGA array. It uses modified USGS microearthquake equipment.

FLO began operation in 1928 with a Wood-Anderson NS and EW system and a Galitzin-Wilip three-component system. The WWSSN equipment was installed on December 1, 1961 and operated until August 1971 when the equipment was moved to FVM.

FRM was closed in 1972 because of the closing of the lead mine in which it was located.

FVM is a remote site buried in a vault near the Missouri Conservation Department firetower site. A temporary system (Mark L-4C, helicorder) operated intermittently for 2 years before the WWSSN equipment was installed on October 5, 1974. The portable Benioff's were used instead of the larger units because of the difficult access to the vault.

GRV was a temporary station, operating intermittently from its start in 1964 until 1969. It ran continuously from 1969 to 1974, with one intermittent period from 1972 to 1973.

LST is located in a region of sand blows from the 1811-12 earthquakes.

MLD, NMM, and PTG were part of an early tripartite network, later moved to Tennessee.

SLM was founded in 1909 and has been in continuous operation since that time, having been relocated once in 1926 less than 1 km from its original site. Unfortunately, some of the older Wiechert records have been lost, over the years, and so continuous records do not exist before about 1927. Between 1925 and 1960, the station operated as Central Station of the Jesuit Seismological Association. Presently, it serves as headquarters for the Saint Louis University network of some 25 stations in an area of 80,000 km^2.

TYS is located 30 km southwest of St. Louis at the Washington University biological preserve. It is used for testing other seismograph systems, and the instruments at TYS are used to test other locations.

Sixteen of the stations in the University's multi-state network are supported by USGS grants.

The University publishes a quarterly bulletin of the Southeast Missouri Regional Seismic Network.

MISSOURI

Garland, TX

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(EN-MO)	Ellsinore----------	36.8828	90.5956	152	9/15/65 10/25/65	9/16/65 2/25/66	---
(KC-MO)	Kansas City----------	39.3558	94.6714	274	10/17/65	1/16/67	Limestone and shale.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(EN-MO) (2d oper.) (KC-MO):	Benioff---------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(KC-MO): 50 K	---
	Sprengnether----	Z,NS,EW	20.0	---	---do-------	---	---
(EN-MO) (1st oper.):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

MONTANA

Billings, MT

GENERAL INFORMATION

Operated by: Ford Aerospace and Communications Corporation

Address: 214 North 30th Street
Billings, MT 59101

Telephone: 406-245-6332

Address to obtain records:

VELA Seismological Center
312 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
LA0	LASA Array----------	46.6886	106.2222	744	1/66	Open--	Fort Union Formation; Paleocene.
LB1	LASA B Ring----------	46.7522	106.0917	754	1/66	--do--	Do.
LB2	LASA B Ring----------	46.6350	106.1628	694	1/66	--do--	Do.
LB3	LASA B Ring----------	46.6592	106.3169	723	1/66	--do--	Do.
LB4	LASA B Ring----------	46.7681	106.2431	717	1/66	--do--	Do.
LC1	LASA C Ring----------	46.8394	106.1275	719	1/66	--do--	Do.
LC2	LASA C Ring----------	46.6694	106.0125	779	1/66	--do--	Do.
LC3	LASA C Ring----------	46.5742	106.2497	682	1/66	--do--	Do.
LC4	LASA C Ring----------	46.7353	106.3739	764	1/66	--do--	Do.
LD1	LASA D Ring----------	46.8397	105.8894	759	1/66	--do--	Do.
LD2	LASA D Ring----------	46.5031	106.0108	661	1/66	--do--	Do.
LD3	LASA D Ring----------	46.5497	106.4803	800	1/66	--do--	Do.
LD4	LASA D Ring----------	46.9419	106.3833	713	1/66	--do--	Do.
(LE1)	LASA E Ring----------	47.1628	106.0561	685	1/66	1/74	Do.
(LE2)	LASA E Ring----------	46.5128	105.3647	610	1/66	1/74	Do.
(LE3)	LASA E Ring----------	46.1494	106.3342	761	1/66	1/74	Do.
(LE4)	LASA E Ring----------	46.7608	106.9167	803	1/66	1/74	Do.
(LF1)	LASA F Ring----------	47.3708	105.1875	740	1/66	1/74	Do.
(LF2)	LASA F Ring----------	45.9097	105.4856	754	1/66	1/74	Do.
(LF3)	LASA F Ring----------	45.9728	107.0817	837	1/66	1/74	Do.
(LF4)	LASA F Ring----------	47.4111	106.9436	707	1/66	1/74	Do.

Billings, MT

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
LA0, LC1-4, LD1-4, LF1-4, LF1-4:	Hall-Sears 10-1A-----	Z	1.0	---	Develocorder, digital.	---	Each station has 15 additional stations in an array within 3.5 km of the central station. Their instrumentation is the same as that of the LB stations. LC1 has only 14 additional stations.
	Geotech 7505A---------	Z,NS,EW	20.0	---	Digital------	---	Do.
LB1-4	Hall-Sears 10-1A-----	Z	1.0	---	Digital------	---	Do.

Timing system: A WWV synchronized time-of-day Hyperion Industries, Model HI-140, time-code generator and Motorola SLN-6039D Master Oscillator.

System response curves: See figure 8, p. 365.

SHORT HISTORY

LASA was established to explore the possibility of using large arrays for seismic discrimination, specifically discriminating between earthquakes and blasts. Experimental work on the dynamics of large arrays continues. The Corporation puts out daily teleseismic event reports, weekly near-regional reports, and biweekly strip-mine blast reports.

The central site, LA0, is sometimes coded LAØ.

GENERAL INFORMATION

Operated by: Montana State University

Address: Earth Sciences Department
Montana State University
Bozeman, MT

Telephone: 406-994-0211

Address to obtain records:

WWSSN records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

BZE records:

Sporadic records from operation during winter months. Contact the Earth Sciences Department.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BOZ	Bozeman----------	45.6000	111.6333	1575	3/63	3/68	Granite gneiss.
BZE	Bozeman----------	45.8060	110.9327	244	1974	5/77	---
BZM	Bozeman----------	45.6669	111.0453	1490	5/31	3/68	Alluvium.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
BOZ	Benioff 1051, 1101---	Z,NS,EW	1.0	0.75	Photo Paper	60 K	WWSSN.
	Sprengnether---------	Z,NS,EW	15.0	100.0	---do------	---	Do.
BZE	J302----------	Z	.25	---	Helicorder	---	Recorded sporadically.
BZM	Wilson-Lamison-------	Z	1.5	1.5	Photo paper	12 K	---
	Sprengnether---------	NS,EW	11.0	8	---do------	8 K	Magnification at 8 sec.

Timing system: BZM used a Seth-Thomas pendulum clock. BOZ employed the standard WWSSN clock.

System response curves: BOZ--see figure 1, p. 363. Others available from station.

SHORT HISTORY

BOZ was established as a WWSSN station and operated efficiently until it encountered funding problems. It ceased operating at the end of 1966; its equipment was finally removed in 1968 and sent to Missoula, Mont., a currently operating WWSSN station.

BZE was established in the mountains near the University to monitor avalanche activity.

BZM was located on the campus of the University and its operation contracted to the Physics Department by the USC&GS.

GENERAL INFORMATION

Operated by: Montana College of Mineral Science and Technology
for the U.S. Geological Survey

Address: Montana College of Mineral Science and Technology
West Park Street
Butte, MT 59701

Telephone: 406-792-8321

Address to obtain records:

U.S. Geological Survey
Branch of Global Seismology
Stop 967
Box 25046, Denver Federal Center
Denver, CO 80225

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BUT	Butte----------	46.0133	112.5633	1758	10/36	Open--	Rhyolite; Tertiary.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
BUT	Benioff MC----------	Z	1.3	1.0	Photo paper	50 K	---
	Wood-Anderson (Henson)	NS	8.0	---	---do------	316	---
	Wilson-Lamison-------	NS,EW	8.0	3.8	---do------	12 K	---

Timing system: Simplex Time Recorder type 93-2.

System response curves: Available from station.

SHORT HISTORY

Operation was started with the Wood-Anderson and an accelerograph. The Benioff was added and operational May 20, 1951. Both Wilson-Lamison's were added in June 1954. The original pendulum-type timer was replaced in May-June 1971 by the present clock. The station has been run for the USGS (and for its predecessors in the U.S. Department of Commerce) by the Montana College (formerly the Montana School of Mines) since 1944.

MONTANA

Columbia Falls, MT

GENERAL INFORMATION

Operated by: Roy E. Wendt for the U.S. Geological Survey

Address: Roy E. Wendt
Rte. 1A
Columbia Falls, MT 59912

Telephone: 406-892-3715

Address to obtain records:

U.S. Geological Survey
Branch of Global Seismology
Stop 967
Box 25046, Denver Federal Center
Denver, CO 80225

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
HHM	Hungry Horse----------	48.3494	114.0275	1100	11/10/47	Open--	Belt Supergroup (argillaceous limestone); Precambrian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
HHM	Benioff----------	Z	1.05	0.50	Photo paper	188 K	---
	Wilson-Lamison-------	NS,EW	3.5	4.0	---do------	10 K	Magnification at 4 sec.

Timing system: IBM clock, HRO-60 National receiver.

System response curves: Available from station.

SHORT HISTORY

HHM was established before the Dam was erected to monitor seismic activity of the area. Originally maintained by the U.S. Bureau of Reclamation, the NEIS took over the operation in about 1960.

MONTANA

Libby, MT

GENERAL INFORMATION

Operated by: Department of the Army

Address: Libby Dam Resident Office
Resident Engineer
Star Route 2
Libby, MT 59923

Telephone: In Seattle: 206-764-3711

Address to obtain records:

Seattle District, Corps of Engineers
Department of the Army
P.O. Box C-3755
Seattle, WA 98124

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
LDM	Libby Dam----------	48.45	115.32	838	2/22/70	Open--	Calcareous argillite; Precambrian.
RXF	Rexford----------	48.86	115.12	1231	10/01/76	--do--	Do.
YKM	Yaak----------	48.86	115.71	1509	10/01/76	--do--	Do.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
LDM:	Benioff 4681A--------	Z	1.0	---	Helicorder	---	Telemetered to the powerhouse at Libby Dam.
RXF, YKM:	Ranger SS-1----------	Z	1.0	---	---do-----	---	Do.

Timing system: Kinemetrics DTS-1 digital timing system.

System response curves: Uncalibrated.

SHORT HISTORY

LDM was established to monitor the local seismicity around the Libby Dam before, during, and after the filling of the reservoir. Having supported several other stations run by the University of Montana, the U.S. Army Corps of Engineers decided in 1976 to operate its own additional stations and thus opened RXF and YKM.

MONTANTA

Missoula, MT

GENERAL INFORMATION

Operated by: University of Montana

Address: Earthquake Research Laboratory
Geology Department
University of Montana
Missoula, MT 59182

Telephone: 406-243-6422 or 243-2341

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BBM	Big Bend----------	48.3764	115.3275	719	2/71	7/09/74	Alluvium; Quaternary.
BCB	Big Creek Baldy---------	48.6351	115.5454	1756	7/07/72	10/04/76	Quartzitic argillite; Precambrian.
BLK	Black Butte----------	48.8547	115.1177	969	2/07/71	10/04/76	Do.
CFM	Cliffside----------	48.2081	115.4583	898	2/71	7/09/74	Do.
CKM	Coopers Lake----------	47.0666	112.9099	1353	8/02/74	10/04/76	Do.
GBM	Granite Butte----------	46.8593	112.4559	2237	10/09/74	10/04/76	Diorite and gabbro; Cretaceous.
HLM	Helmville----------	46.8894	112.9331	1365	9/03/74	10/04/76	Alluvium; Quaternary.
LBM	Little Butte----------	46.5149	111.8537	1524	10/09/74	10/04/76	Diorite; Tertiary.
LFM	Lubrecht Forest---------	46.8898	113.4527	1256	8/02/74	10/04/76	Unconsolidated gravel, silt, and clay; Tertiary.
LHM	Lake Helena----------	46.6756	111.9434	1117	10/09/74	10/04/76	Alluvium; Quaternary.
MSO	Missoula----------	46.8292	113.9406	1264	11/73	Open--	Quartzite; Precambrian.
PNK	Pinkham Creek----------	48.7677	115.0880	1150	2/71	7/10/74	Quartzitic argillite; Precambrian.
SWP	Swamp Creek----------	48.6068	114.9850	1157	2/71	10/04/76	Silty glacial lake deposits; Quaternary.
TEE	Teeples Ranch----------	48.3795	115.5881	805	2/71	10/04/76	Glacial outwash; Quaternary.
WCM	Warland Creek----------	48.4583	115.1028	1704	2/71	7/11/74	Argillite; Precambrian.
WHM	Wild Horse Parks--------	46.7621	113.1812	1792	9/06/74	10/04/76	Volcanic rocks; Tertiary.
YCM	YMCA Camp----------	46.5256	112.3942	1597	8/06/74	10/04/76	Alluvium; Quaternary.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
All stations	Mark L-4C----------	Z	1.0	0.06	Develocorder	1000 K	Magnification at 10 Hz (approximated).
MSO	Benioff 1051---------	Z	1.0	.75	Photo paper	100 K	WWSSN.
	Benioff 1101---------	NS,EW	1.0	.75	---do------	100 K	Do.
	Sprengnether---------	Z,NS,EW	15.0	100.0	---do------	1.5 K	WWSSN. Magnification of Z is 3 K.

Timing system: Direct recording of WWVB. MSO uses WWSSN Model 8684 (Geotech) transistorized 60-Hz current source controlled by a quartz crystal.

System response curves: MSO--see figure 1, p. 363. Others--see figure 2, p. 363.

SHORT HISTORY

BBM, BCB, BLK, CFM, PNK, SWP, TEE and WCM belonged to the Libby Dam array. They were originally funded by the USGS and later by the U.S. Army Corps of Engineers. The Corps now maintains its own small array in the area.

CKM, GBM, HLM, LBM, LFM, LHM, WAM, and YCM belonged to the Helena-Ovando array.

MSO is equipped with instruments from the old WWSSN station at Bozeman (BOZ) and is funded by the USGS.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(AN-MA)	Angela	46.7522	106.0917	907	11/16/64	6/11/65	Sandstone and shale.
(BS-MA)	Billings	45.7322	108.8922	1219	11/28/67	12/10/67	---
(DI-MA)	Dillon	45.1736	112.4478	1859	5/23/66	5/24/66	---
(FR-MA)	Forsyth	46.1000	106.4403	823	7/07/63	8/05/64	Sandstone.
(GI-MA)	Glendive	47.1928	104.2194	732	7/17/63	8/05/64	Siltstone.
(HV-MA)	Havre	48.4222	109.8222	884	10/25/65 8/03/67 8/30/68	12/31/65 12/10/67 9/09/68	---
(HY-MA)	Hysham	45.9728	107.0817	975	11/30/64	9/19/65	Loose sand.
(LN-MA)	Lewistown	47.2119	109.1489	1448	11/07/67	12/10/67	
(SW-MA)	Sweetgrass	48.9689	111.9628	1113	10/16/65	9/13/66	Sandstone.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(AN-MA), (BS-MA), (FR-MA), (GI-MA), (HV-MA), (HY-MA), (SW-MA):	Benioff	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(AN-MA): 210 K (FR-MA): 50 K (GI-MA): 110 K (HY-MA): 180 K (SW-MA): 70 K	---
	Sprengrether	Z,NS,EW	20.0	---	---do---	---	---
(DI-MA):	Geotech S-13	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.
(HV-MA) (3d oper.), (LN-MA):	Geotech S-13	Z,NS,EW	1.0	---	Magnetic tape	---	Do.
	Geotech	Z,NS,EW	20.0	---	---do---	---	Do.

Garland, TX

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
National Center for Earthquake Research
345 Middlefield Road
Menlo Park, CA 94025

Telephone: 323-8111 ext. 2571

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
GCR (YPGC)	Grayling Creek	44.7962	111.1065	2075	1/73	Open--	---
(HL)	Hebgen Lake	44.8718	111.3382	2050	1964	1972	---
(NE)	North East Entrance	45.0053	110.0102	2257	1964	1972	---
(YPBB)	Black Butte	45.0288	111.1168	2085	1/73	Open--	---
(YPDC)	Denny Creek	44.7095	111.2397	2025	1/73	--do--	---
(YPHB)	Horse Butte	44.7510	111.1953	2157	10/74	10/76	---
(YPHR)	Hebgen Ridge	44.8523	111.3160	2060	1/73	Open--	---
(YPRL)	Red Lodge	45.1617	109.3017	1951	10/74	10/76	---
(YPWY)	West Yellowstone	44.6058	111.0968	2292	10/74	Open--	---

INSTRUMENTATION

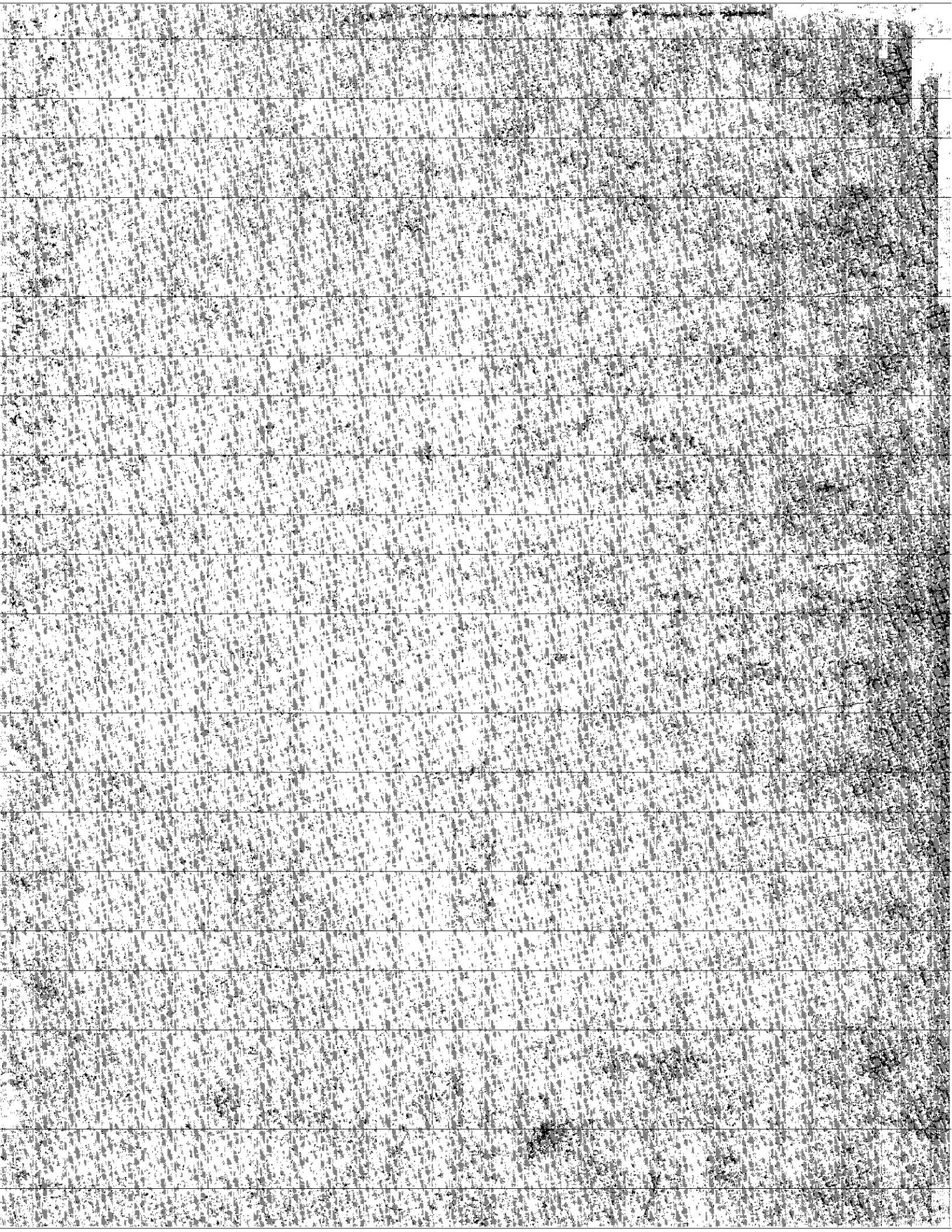
Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(NE), (HL):	EV-17	Z	1.0	---	Photo paper	---	---
GCR	Mark L-4C	Z	1.0	---	Develocorder	---	Telemetered to MHS.
	---do---	NS	1.0	---	---do---	---	---
All other stations	---do---	Z	1.0	---	---do---	---	Do.

Timing system: WWVB recorded directly with a custom-chronometer backup.

System response curves: See figure 2, p. 363.

SHORT HISTORY

These stations are part of the Yellowstone network.
Many of these stations have also been recorded on magnetic tape at various times, and these records are also available. Older data (before 1972) may not be complete in the archives.



SITE INFORMATION--continued

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
STX	Station 2----------	37.1940	116.1613	1632	1964	1970	Hard rock
TMN	Timber Mountain---------	37.0837	116.4438	2190	10/75	Open--	Do.
TPV	Tonopah----------	38.0658	117.2280	1890	1965	1970	Do.
TSV	Twin Springs----------	38.2017	116.1750	1585	1965	1972	Alluvium.
WSN	Warm Springs----------	38.3833	116.1917	1768	1965	1970	Do.
WSR	Warm Springs Repeater---	38.1914	116.3989	1890	1965	1970	Hard rock.
ZOX	Ground Zero----------	37.2360	116.5160	---	1970	1973	Do.

INSTRUMENTATION

Code	Seismometer			Galvo	Type	Magnification	Remarks
	Type	Component	T_o(sec)	T_g(sec)	recording	at T_o	
All stations	Mark L-4C, NGC-21,--- or Geotech S-13.	Z	1.0	---	Develocorder	50-200 K	---

Timing system: WWVB and IRIG signals recorded directly.

System response curves: See figure 2, p. 363.

SHORT HISTORY

This laboratory originally was part of the USC&GS, then run as NOAA's Earth Sciences Laboratory. In May 1973 it became part of the USGS.

GENERAL INFORMATION

Operated by: University of Nevada

Address: Seismology Lab
Mackay School of Mines
University of Nevada
Reno, NV 89507

Telephone: 702-784-4975

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(ANC)	Anchorite----------	38.1732	118.7537	2249	5/76	Open--	---
BGN	Big Creek----------	41.6761	118.5969	1527	3/74	8/75	---
(BLM)	Bell Mountain----------	39.1540	118.0910	1951	---	7/75	---
BMN	Battle Mountain---------	40.4315	117.2218	1500	---	Open--	---
(BOD)	Bodie----------	38.1628	118.9702	2195	5/76	--do--	---
(BON)	Boundary Peak----------	37.9552	118.3017	1582	---	--do--	---
(CAN)	Candelaria----------	38.1097	118.1932	2015	2/75	1976	---
CMN	Crown Mine----------	40.8160	117.5278	1792	1964	Open--	---
CND	Currant----------	38.8287	115.2872	2243	11/75	--do--	---
(COL)	Columbus----------	38.1447	118.0542	1835	11/74	1976	---
(COR)	Corey Peak----------	38.4482	118.7808	3170	---	2/76	---
(COT)	Cottonwood----------	38.6417	118.7718	1890	8/74	8/75	---
(DOG)	Douglas----------	38.3425	118.2178	1914	---	3/76	---
EKO	Elko----------	40.8122	115.7762	1615	---	Closed	---
(EST)	Eastside----------	38.0913	118.3267	1780	12/74	4/76	---
(EXC)	Excelsior----------	38.3385	118.3242	1823	---	Open--	---
(FER)	Ferguson----------	38.5928	118.1750	1646	3/76	--do--	---
FPN	Fairview Park----------	39.2028	118.1550	2255	---	7/75	---
(GAR)	Garfield----------	38.4662	118.4743	1585	---	1976	---
(GBT)	Gilbert----------	38.1630	117,6843	2137	7/76	6/77	---
(GIL)	Gillis----------	38.7313	118.5347	1676	7/74	7/75	---
(HSP)	Huntoon Springs---------	38.0882	118.5810	1810	---	4/76	---
(HVL)	Huntoon Valley----------	38.1832	118.5390	1856	---	4/76	---
KVN	Kaiserville----------	39.0510	118.1000	1829	---	Open--	---
(LBP)	Lucky Boy Pass----------	38.4320	118.7390	2280	3/76	--do--	---
LDV	Leadville----------	41.0975	119.3906	1798	3/74	5/76	---
LUN	Luning----------	38.6150	118.2097	---	---	Closed	---

SITE INFORMATION--Continued

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
LVK	Lovelock----------	40.1870	118.5245	1225	1970	11/75	---
(MAB)	Mable Mountain----------	38.4292	118.3027	2039	---	2/76	---
(MAM)	Mammoth Rock----------	37.6060	118.9892	2896	---	1974	---
(MAR)	Marietta----------	38.2223	118.2648	1844	---	2/76	---
(MCR)	Mono Crater----------	37.8872	118.9937	2267	5/76	Open--	---
(MIL)	Miller Mountain---------	38.0248	118.1858	2030	---	3/76	---
MNA (MIN)	Mina----------	38.4328	118.1567	1525	---	Open--	---
(MON)	Mono Valley----------	38.0608	118.7758	2179	---	--do--	---
NRR	North Reno----------	39.5720	119.8490	1634	1964	--do--	---
(PAR)	Paradise----------	38.7707	117.8965	1774	6/76	--do--	---
PNR	Penrod----------	38.8213	118.7938	---	---	Closed	---
(PPK)	Pilot Peak----------	38.3370	118.0272	2255	---	7/76	---
(PZC)	Pizona Creek----------	37.9652	118.5683	2103	7/75	Open--	---
QRV	Quinn River Valley------	41.6972	117.9550	1433	3/74	8/75	---
(QUA)	Quailey Mine----------	38.3145	118.5000	1951	---	2/76	---
REN	Reno----------	39.5400	119.8131	1383	1911	2/75	---
(RYN)	Ryan----------	38.6282	118.5230	1585	---	Open--	---
(SIM)	Simon----------	38.4750	117.7675	1899	7/76	--do--	---
(SOD)	Soda Spring----------	38.5648	118.2925	1463	---	2/76	---
STM	Slate Mountain----------	39.1140	118.2000	2020	1972	7/75	---
(SWN)	Stillwater----------	39.8830	118.0623	2298	10/74	7/75	---
(TEE)	Teel's Marsh----------	38.2063	118.4285	2140	---	2/76	---
TNP	Tonopah----------	38.0820	117.2180	1932	8/31/64	Open--	---
UVN	Unionville----------	40.4423	118.1583	1926	9/13/64	12/69	---
WCN	Washoe City----------	39.3106	119.7563	1709	1972	Open--	---
(WLD)	Wildhorse----------	38.8235	118.5747	1798	8/74	7/75	---
WMN	Winnemucca----------	40.9800	117.9200	1524	3/74	7/75	---

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
Most stations	Mark L-4C or Ranger	Z	1.0	---	Magnetic tape	---	Telemetered to Reno.

Reno, NV

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
BMN	Benioff----------	Z,NS,EW	1.0	---	Magnetic tape	1,000 K	Telemetered to Reno.
KVN	--do----------	Z,NS,EW	1.0	---	--do---------	---	Do.
MNA	--do----------	Z,NS,EW	1.0	---	--do---------	---	Do.
TNP	--do----------	Z,NS,EW	1.0	---	--do---------	---	Do.
WCN	--do----------	Z,NS,EW	1.0	---	--do---------	---	Do.

Timing system: Sprengnether TS-210 digital chronometer.

System response curves: Stations with Mark L-4C or Ranger seismometers--see figure 2, p.363. Others available from station.

SHORT HISTORY

REN started in 1911 with a Wiechert and a Ewing duplex and operated through the 1930's. The station was opened again by the University of California, Berkeley, in 1948 in cooperation with the University of Nevada. This cooperative station became the University of Nevada's responsibility in 1963.

The stations in the Mina area are supported by USGS grants.

NEVADA

Albuquerque, NM

GENERAL INFORMATION

Operated by: Sandia Laboratories

Address: Sandia Laboratories
Albuquerque, NM 87115

Telephone: 505-264-1468

Address to obtain records:

As above. Not generally made available.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(BMN)	Battle Mountain---------	40.4315	117.2218	1500	12/67	Open--	---
ELY	Ely----------	39.1313	114.8920	2011	---	Closed	---
NEL	Nelson----------	35.7122	114.8436	1061	10/63	Open--	---
TPH	Tonopah----------	38.0747	117.2225	1890	9/61	--do--	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
(BMN)	Geotech 18300--------	Z	1.33	---	Magnetic tape	Variable	---
	NGC-23H----------	166°, 76°	.8	---	--do----------	--do----	---
	NGC-23V----------	Z	.8	---	--do----------	--do----	---
ELY	Geotech 18300--------	Z	1.33	---	--do----------	--do----	---
	NGC-23H----------	Horizontal	.8	---	--do----------	--do----	---
	NGC-23V----------	Z	.8	---	--do----------	--do----	---
NEL	Benioff 1051---------	Z	1.0	.2	--do----------	--do----	---
	Benioff 1101---------	144.8°, 54.8°	1.0	.2	--do----------	--do----	---
	Geotech 18300--------	Z	1.33	---	--do----------	--do----	---
	NGC-23H----------	142°, 52°	.8	---	--do----------	--do----	---
	NGC-23V----------	Z	.8	---	--do----------	--do----	---
TPH	Benioff 1051---------	Z	1.0	.2	--do----------	--do----	---
	Benioff 1101---------	136.2°, 46.2°	1.0	.2	--do----------	--do----	---
	NGC-23H----------	140°, 50°	.8	---	--do----------	--do----	---
	NGC-23V----------	Z	.8	---	--do----------	--do----	---

Timing system: IRIG time code imposed at central recording site at the Nevada Test Site.

System response curves: Not available.

SHORT HISTORY

These stations are part of a net surrounding the NTS (Nevada Test Site). They are used for recording scheduled explosions and do not operate all the time. Stations are remotely controlled from NTS. Data are not available to the public. At times data are recorded on a 24-hour basis by the USGS in Las Vegas. The USGS records the short-period vertical channels at high gains using their own timing and recording systems.

GENERAL INFORMATION

Operated by: University of California, Berkeley

Address: Seismograph Station
University of California
475 Earth Sciences Building
Berkeley, CA 94720

Telephone: 415-642-3977

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(FAL)	Fallon----------	36.4733	118.7767	1207	7/02/56	6/57	Alluvium; Quaternary.
(YER)	Yerington----------	38.9883	119.1600	1335	7/03/56	6/57	Do.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(FAL)	Sprengnether---------	Z,NS,EW	2.0	2.0	Photo paper	---	---
(YER)	--do----------	Z,EW	2.0	2.0	--do-------	---	---

Timing system: Spring-wound chronometer.

System response curves: Not available.

SHORT HISTORY

(FAL) was established in the City Hall of Fallon, Nev.
(YER) was established with the cooperation of the City of Yerington, Nev.
REN was also established by the University of California, Berkeley, in 1948, in cooperation with the University of Nevada. This station was given to the University of Nevada in 1963. (See NEVADA, University of Nevada.) The early records reside at Berkeley.

NEVADA

Garland, TX

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(AT-NV)	Austin----------	39.4814	117.0739	1981	1/15/62 4/23/63 4/13/68	5/14/62 7/12/63 4/26/68	Metamorphics.
(CQ-NV)	Caliente----------	37.9042	114.4708	1804	11/01/67	12/10/67	Limestone.
(CU-NV)	Currant----------	38.6772	115.4550	1646	9/09/63	3/09/64	Limestone.
(EK-NV)	Eureka----------	39.2089	115.7103	1951	11/11/63	11/02/64	Sandstone.
(EY-NV)	Ely----------	39.4100	115.3128	2012	4/21/63 4/19/68	6/10/63 4/26/68	---
(EY2NV)	--do----------	39.4314	115.3178	2012	3/01/66	3/12/66	---
(FA-NV)	Faultless----------	38.6406	116.2230	1920	6/03/77	Open---	---
(GF-NV)	Goldfield----------	37.9175	117.2017	1707	2/08/63	3/29/63	---
(LM-NV)	Lake Mead----------	36.5825	114.5353	536	11/25/61 5/09/62	12/20/61 5/14/62	---
(LO-NV)	Lovelock----------	39.9353	118.8394	1280	2/23/63	3/29/63	---
(MN-NV)	Mina----------	38.4361	118.1481	1524	9/19/61	1/15/69	Limestone and shale; Mesozoic.
(NT-NV)	Nevada Test Site-------	37.2758	116.4183	1987	8/26/76	4/01/77	---
(NT2NV)	--do----------	37.2533	116.2853	2185	9/10/76	4/01/77	---
(OB2NV)	Oak Springs Butte------	37.2253	116.0578	1542	8/16/76	Open---	---
(OB3NV)	--do----------	37.2325	116.0542	1609	4/20/77	Open---	---
(RH-NV)	Rawhide Mountain-------	38.2267	116.3814	1768	4/21/71	8/02/71	---
(ST-NV)	Stillwater----------	39.4381	118.5800	1219	1/30/63	3/29/63	---
(SZ-NV)	Shoal----------	39.2036	118.3800	1606	1/05/63	2/08/63	---
(TP-NV)	Tippipah----------	37.2003	116.2261	2256	12/06/61	12/16/61	---
(WI-NV)	Winnemucca----------	41.3506	117.4583	1524	12/10/61	3/03/64	Limestone; Mesozoic.
(WZ-NV)	Warm Springa----------	38.0628	116.4397	2073	11/07/67	12/10/67	Porphyritic granodiorite.

Garland, TX

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(AT-NV), (EY-NV), (GF-NV), (LM-NV), (SZ-NV), (TP-NV):	Benioff---------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(AT-NV): 600 K (EK-NV): 640 K (SZ-NV): 250 K (TP-NV): 140 K	---
(AT-NV) (2d oper.), (CU-NV, (EK-NV), (LM-NV) (2d oper.), (LO-NV), (MN-NV), (RH-NV), (ST-NV), (WI-NV):	Benioff---------	Z,NS,EW	1.0	---	--do----------	(CU-NV): 140 K (EY-NV): 600 K (MN-NV): 600 K (WI-NV): 460 K	
	Sprengnether----	Z,NS,EW	20.0	---	--do----------	---	---
(AT-NV) (3d oper.), (CQ-NV), (EY-NV) (2d oper.), (WZ-NV):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	(AT-NV): 600 K (CQ-NV): 60 K (EY-NV): 600 K	Portable system.
	Geotech---------	Z,NS,EW	20.0	---	--do----------	---	Do.
(EY2NV), (FA-NV), (NT-NV), (NT2NV), (OB2NV):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	(NT-NV): 250 K (NT2NV): 200 K (OB2NV): 600 K	Do.
(OB3NV):	Geotech 18300---	Z	1.0	---	--do----------	---	Outrigger site.

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

Five additional sites in Nevada ran strainmeters only, and four sites ran accelerometers only. Information on these nine sites are not included in this publication but can be obtained from Teledyne Geotech, Garland, Tex.

NEVADA

Livermore, CA

GENERAL INFORMATION

Operated by: Lawrence Livermore Laboratory
of the University of California

Address: Seismic Research Group, L-42
Lawrence Livermore Laboratory
P.O. Box 808
Livermore, CA 94550

Telephone: 415-447-1100 ext. 3475

Telex: 34-6407

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
ELK	Elko----------	40.7448	115.2388	2210	11/68	Open--	Granite.
MNV	Mina----------	38.4322	118.1544	1507	4/68	--do--	Limestone; Mesozoic.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
ELK	Sprengnether----------	Z,NS,EW	20.0	---	Magnetic tape	100 K	Broadband system. Magnification at 1 Hz. Telemetered to Livermore, Menlo Park, and GLD.
MNV	Benioff----------	Z,NS,EW	1.0	---	Magnetic tape	Variable	Telemetered to Livermore, Menlo Park, and GLD. Broadband system.

Timing system: IRIG time codes B and C synchronized to WWV.

System response curves: See figure 5, p. 364.

SHORT HISTORY

MNV was originally an AFTAC station. A vertical-component broadband system was installed just prior to AFTAC's departure.

ELK and MNV acquired their three-component systems in 1977. These stations are intended to monitor underground test explosions and are also used in research.

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
National Center for Earthquake Research
345 Middlefield Road
Menlo Park, CA 94025

Telephone: 415-232-8111 ext. 2321

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(CNBC)	Base Camp----------	38.3113	116.2773	1591	9/26/69	10/01/70	---
(CNEC)	Easy Chair----------	38.4688	115.9983	1682	9/26/69	10/01/70	---
(CNHC)	Hobble Canyon----------	38.5907	116.2455	1811	9/26/69	10/01/70	---
(CNHM)	Halligan Mesa----------	38.5047	116.1465	2210	9/26/69	10/01/70	---
(CNHR)	Hot Creek Ranch---------	38.5232	116.3730	1786	9/26/69	10/01/70	---
(CNPS)	Pritchards Station------	38.7660	116.2037	1942	9/26/69	10/01/70	---
(CNSB)	Slanted Butte----------	38.6280	116.1480	1960	9/26/69	10/01/70	---
(DFLM)	Lost Mine----------	37.5928	117.9268	1661	5/26/70	1/71	---
(DFMM)	Magruder Mountain-------	37.4193	117.5935	2170	3/06/70	1/71	---
(DFOD)	Oasis Divide----------	37.5530	117.7527	2173	5/26/70	12/73	---
(NRCE)	Cedar Pass----------	37.7280	116.3107	2170	7/03/71	12/73	---
(NRCP)	Cactus Peak----------	37.7498	116.8675	2085	7/11/71	12/73	---
(NRGF)	Goldfield----------	37.6810	117.2458	1920	10/18/71	12/73	---
(NRGM)	Groom Range----------	37.5267	115.8017	1942	11/16/71	12/73	---
(NRSL)	Slate Ridge----------	37.3083	117.4147	1963	7/14/71	12/73	---
(NRWP)	Worthington Mountain----	37.9458	115.6292	1890	6/19/71	12/73	---
(NT11)	First Aid Station-------	37.2783	116.4367	1999	12/17/68	2/73	---
(NT12)	Pahute Southeast--------	37.2297	116.4468	1990	6/08/69	2/73	---
(NT13)	Thirsty----------	37.1570	116.6673	1628	7/12/69	2/73	---
(NT14)	Stockage Wash----------	37.1443	116.2632	1737	12/17/68	2/73	---
(NT15)	Pahute Southwest--------	37.2263	116.5067	1891	6/08/69	2/73	---
(NT16)	Airstrip----------	37.0925	116.3160	1667	12/17/68	2/73	---
(NT17)	Buckboard Mesa----------	37.1428	116.3857	1524	12/17/68	4/01/71	---
(NT18)	Grass Spring----------	37.4293	116.3920	1649	6/08/69	2/73	---
(N119)	Dead Horse Flat---------	37.2833	116.3050	2135	6/22/69	2/73	---
(NT20)	Gold Flat Peak----------	37.4228	116.5647	1603	6/08/69	2/73	---

SITE INFORMATION--Continued

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(NT21)	Silent Butte----------	37.3752	116.4342	1637	6/08/69	2/73	---
(N222)	Echo----------	37.2135	116.3157	2198	2/12/70	2/73	---
(NT23)	Black Mountain---------	37.3013	116.6162	1838	6/14/69	2/73	---
(N124)	Trail Ridge----------	37.2863	116.5145	1936	9/05/69	2/73	---
NYC (NYCH)	Charlie----------	37.1550	116.1553	1695	1/71	1/73	---
NYS (NYSR)	Syncline Ridge---------	37.0325	116.1688	1509	1/71	1/73	---
NYJ (NYJT)	Joshua Tree----------	37.0080	115.9747	1286	1/71	1/73	---
NYM (NYMC)	Climax Mine----------	37.2313	116.0523	1603	1/71	1/73	---
NYV (NYVN)	Vern----------	37.1128	115.9900	1442	1/71	1/73	---
NYR (NYRS)	Receiver Site----------	37.0553	116.0917	1279	1/71	1/73	---
(NYND)	Down-Hole----------	37.1327	116.0980	1094	8/17/71	1/73	---
(NYNC)	North-Central----------	37.1417	116.0878	1329	4/21/71	8/16/71	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(NT14), (N222), (N124):	EV-17----------	Z	1.0	---	Develocorder		Telemetered to Menlo Park.
All other stations:	Mark L-4C----------	Z	1.0	---	--do--------		Do.

Timing system: WWVB recorded directly as well as IRIG-C.

System response curves: See figure 2, p. 363.

SHORT HISTORY

The (CN--) stations constitute the Central Nevada Test Site network.

The (DF--) stations listed above make up part of the Death Valley-Furnace Creek network; four other stations in this network are in California.

The (NR--) stations constitute the Regional network, one of the stations being in California.

The (NT--) stations make up the Pahute Mesa network. The numbering sequence on these stations reflects the fact that when a station was moved, the new location was given a code which reflected this change: (NT19) became (N119); (NT22) was moved twice, the final location being (N222); and (NT24) became (N124). This network also has alias code names for each station which can be obtained from the station operator.

The (NY--) stations constitute the Yucca Flat network.

GENERAL INFORMATION

Operated by: California Institute of Technology

Address: Seismological Laboratory 252-21
California Institute of Technology
Pasadena, CA 91125

Telephone: 213-795-8806

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
RUT	Ruth----------	39.2333	114.9833	2270	1/60	4/64	Ely Limestone; Late Mississippian to Permian.

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
RUT	Press-Ewing----------	Z,NS,EW	30.0	90.0	Photo paper	---	---

Timing system: Crystal-controlled clock.

System response curves: Not available.

SHORT HISTORY

RUT was established by C.I.T. in cooperation with University of California, Berkeley, and Kennecott Copper Corp. The station is sometimes referred to as Ely.

NEW HAMPSHIRE

Twin Mountain, NH

GENERAL INFORMATION

Operated by: New Hampshire Highway Department
for the U.S. Geological Survey

Address: New Hampshire Highway Department
Box 82
Twin Mountain, NH

Address to obtain records:

Unknown.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
FNN	Franconia Notch---------	44.1600	71.6817	1060	1967	1975	Granite.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
FNN	Texas Instruments----	Z	1.0	---	35-mm film	---	Four instruments in an array.

Timing system: Sprengnether TS-100.

System response curve: Uncalibrated.

SHORT HISTORY

The small array was set up to monitor the activity around the Great Stone Face, so that the State Highway Department could evaluate the threat to this natural landmark created by a nearby highway.

GENERAL INFORMATION

Operated by: Massachusetts Institute of Technology

Address: Department of Earth and Planetary Sciences
Building 54, Room 527
Massachusetts Institute of Technology
Cambridge, MA 02138

Telephone: 617-253-7796

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(DNH)	Durham----------	43.1225	70.8947	24	1/76	Open--	Granodiorite; Late Devonian.
(ONH)	Oakhill, Concord--------	43.2792	71.5056	280	12/75	--do--	Schist; Early Devonian.
PNH	Pitcher Mt.----------	43.0942	72.1358	659	1/76	--do--	Gneiss; Early Devonian.
(WNH)	Whiteface----------	43.8683	71.3997	220	1/76	--do--	Schist; Early Devonian.

INSTRUMENTATION

Code	Seismometer			Galvo	Type	Magnification	Remarks
	Type	Component	T_o(sec)	T_g(sec)	recording	at T_o	
All stations	Mark L-4C----------	Z	1.0	---	Develocorder	---	Telemetered to M.I.T.

Timing system: Sprengnether TS-250 digital timing system. Kinemetrics model WVTR Mark IV with time-code stripper.

System response curves: Not available.

SHORT HISTORY

(DNH), (ONH), PNH, and (WNH) are temporary stations established for use in the Northeast seismic network. All stations operste remotely and are telemetered to the Seismology Laborstory in Cambridge, Mass.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(LB-NH)	Lebanon----------	43.6208	72.2756	274	6/14/62	6/28/62	---
(LS-NH)	Lisbon----------	44.2383	71.9225	287	9/27/63 12/17/66 1/19/68	3/22/65 12/20/66 1/19/68	Metamorphics.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(LB-NH):	Benioff----------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(LS-NH): 100 K	---
(LS-NH):	Benioff----------	Z,NS,EW	1.0	---	---do----------	---	---
	Sprengnether----	Z,NS,EW	20.0	---	---do----------	---	---
(LS-NH) (2d and 3d oper.):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.
	Geotech----------	Z,NS,EW	20.0	---	---do--------	---	Do.

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

GENERAL INFORMATION

Operated by: Weston Observatory, Boston College

Address: Weston Observatory
Concord Road
Weston, MA 02193

Telephone: 617-899-0950

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BNH	Berlin----------	44.5906	71.2564	472	1/63	Open--	Granite; Devonian.
HNH	Hanover----------	43.7053	72.2856	180	6/15/75	--do--	Metavolcanics; Ordovician.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
BNH	Benioff 4681A--------	Z	1.0	---	Develocorder	---	Telemetered to WES.
HNH	Mark L-4C----------	Z	1.0	---	---do-------	---	Do.

Timing system: WWSSN standard added at WES.

System response curves: Available from station.

SHORT HISTORY

BNH has run continuously since its installation with the exception of September-December 1967 and March 1974-February 1975, when the station was closed.
HNH is at the same location as a station run intermittently by Dartmouth College.
The Observatory contributes to the Northeastern United States Seismic Network bulletin.

NEW JERSEY

Paterson, NJ

GENERAL INFORMATION

Operated by: Philip J. Del Vecchio

Address: Philip J. Del Vecchio
Station PNJ, P.O. Box 266
971 East 22nd Street
Paterson, NJ 07513

Telephone: 201-684-4345

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
PNJ	Paterson----------	40.9071	74.1548	31	3/72	Open--	Soft red shale and sandstone; Triassic.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
PNJ	Benioff----------	Z	1.0	0.6	Visible	140 K	---
	Reed (rebuilt)-------	EW	1.5	.6	--do---	2.5 K	Operates intermittently owing to a shortage of paper.
	Milne-Shaw type------	NS	20.0	50-75	--do---	.5-2 K	Do.

Timing system: Chronometer checked against WWV or CHU several times daily.

System response curves: Not available.

SHORT HISTORY

PNJ is equipped with instruments originally used in IGY and IQSY operations; it is supported by loans and donations from various organizations.

GENERAL INFORMATION

Operated by: Lamont-Doherty Geological Observatory of Columbia University

Address: Department of Seismology
Lamont-Doherty Geological Observatory
Columbia University
Palisades, NY 10964

Telephone: 914-359-2900

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CNJ	Catfish Pond----------	41.0358	75.0042	351	2/73	7/74	Shale; Ordovician.
GPD	Greenpond----------	41.0177	74.4608	360	8/76	Open--	Green Pond Conglomerate; Silurian.
OGD	Ogdensburg----------	41.0875	74.5958	-367	1960	--do--	Franklin Limestone; Precambrian.
PQN	Pahaquarry----------	41.0073	75.0858	229	2/73	--do--	High Falls Formation; Silurian.
(PRIN)	Princeton----------	40.3669	74.7179	110	3/77	--do--	Brunswick Formation; Late Triassic.
PVN	Peters Valley----------	41.1957	74.8697	175	2/73	7/74	High Falls Formation; Silurian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
CNJ	Geospace HS 10-2B----	Z	0.5	0.02	Develocorder	---	---
GPD	---do----------	Z	.5	.02	---do-------	3200 K	Magnification at 20 Hz.[1]
OGD	Benioff----------	Z,NS,EW	1.0	.75	Photo paper	50 K	WWSSN.
	Sprengnether----------	Z,NS,EW	15.0	100.0	---do------	50 K	Do.
	Geotech 7505A, 8700C-	Z,NS,EW	30.0	---	Photo paper, magnetic tape.	57.9 K, 49.8 K 61.3 K	HGLP.
PQN	Geospace HS 10-2B----	Z	.5	.02	Develocorder	6400 K	Magnification at 20 Hz.[1]
(PRIN)	---	---	---	---	---	---	---
PVN	Geospace HS 10-2B----	Z	.5	.02	Develocorder	---	---

[1] To obtain magnification at 1 Hz, multiply by 7.9×10^{-3}.

Timing system: Sprengnether TS-200.

System response curves: See figure 9, p. 366.

SHORT HISTORY

Lamont-Doherty publishes a bimonthly bulletin and a yearly bulletin, available from the Observatory.

NEW MEXICO

Albuquerque, NM

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
Albuquerque Seismological Laboratory
Bldg. 10002
Kirtland AFB-East
Albuquerque, NM 87115

Telephone: 505-264-4637

Telex: 66-0351

Address to obtain records:

As above.

WWSSN records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
ABQ	Albuquerque----------	34.9425	106.4575	1849	1/01/74	Open--	Gneiss. Precambrian.
ALQ	---do----------	34.9425	106.4575	1849	11/28/61	--do--	Do.
AMMO	---do----------	34.9469	106.4569	1737	8/74	--do--	Do.
CCN	Cachucha Ranch----------	36.8333	106.8333	---	---	Closed	---
CDN	Cerro Del Durzno--------	35.4546	107.3485	2591	1/76	Open--	Basalt; Quaternary.
CNM	Chama----------	36.9167	106.5689	---	---	Closed	---
COH	Cochiti----------	35.5802	106.3048	1646	1/76	Open--	Basalt; Quaternary.
DNM	Dulce----------	36.9333	1069958	---	---	Closed	---
EST	Estancia----------	34.8645	105.7228	2055	6/76	Open--	Limestone; Pennsylvanian.
GNM	Golden----------	35.2496	106.1926	2417	1/76	--do--	Do.
LAD	Ladron Mountain----------	34.4583	107.0375	1768	1/76	--do--	Gneiss; Precambrian.
LPM	Los Pinos Mountain------	34.3076	106.6336	1737	1/76	--do--	Granite.
MLM	Mesa Lucera----------	34.8144	107.1450	2088	1/76	--do--	Basalt; Quaternary.
(VOL)	Volcano----------	35.1250	106.7675	1782	5/77	--do--	Do.
WMA	West Mesa----------	35.0722	106.8563	1804	---	12/75	---
(WTX)	Socorro----------	34.0722	106.9458	1555	6/77	Open--	Granite; Precambrian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
ABQ	Johnson-Matheson------	Z	1.0	---	Develocorder	500 K	Array of eight elements, aperture of 2 km. One instrument recorded on Helicorder.

Albuquerque, NM

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
ALQ	Benioff 1051, 1101---	Z,NS,EW	1.0	0.75	Photo paper----	200 K	WWSSN.
	Sprengnether---------	Z,NS,EW	15.0	100.0	---do----------	3 K	Do.
	Geotech 7505A, 8700--	Z,NS,EW	30.0	---	Photo paper,--- magnetic tape.	106 K, 52 K, 50 K	HGLP. Z telemetered to GLD also.
ANMO	Geotech 36000--------	Z,NS,EW	1.0	---	Helicorder,---- magnetic tape.	40 K	SRO. Magnification at 25 sec. Z also recorded at 200 K at 1 sec. Digital data of 120-dB dynamic range available on tape.
All others	Johnson-Matheson-----	Z	1.0	---	Helicorder,---- Develocorder.	200 K	Magnification approximate. All stations telemetered to ALQ.

Timing system: WWSSN standard used for all stations except ANMO, which uses a Systron-Donner clock.

System response curves: ALQ--see figure 3, p. 364, and figure 6, p. 365. ANMO--see figure 7, p. 365. Others available from station.

SHORT HISTORY

In 1961 the USC&GS established its seismic instrumentation laboratory in Albuquerque after evaluating several sites for seismic noise, access to other government facilities, and proximity to a large city. The Laboratory has been engaged in instrument development and deployment of the WWSSN, HGLP, SRO, and ASRO networks and the Tsunami Warning System; it continues in a supporting role for these networks.

WXT is operated in conjunction with the New Mexico Institute of Mining and Technology.

NEW MEXICO

Albuquerque, NM

GENERAL INFORMATION

Operated by: Sandia Laboratories

Address: Sandia Laboratories
Albuquerque, NM 87115

Telephone: 505-264-1468

Address to obtain records:

As above.

Not generally available.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(ALB)	Albuquerque----------	34.9750	106.4386	1935	12/59	Open--	Granite; Precambrian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(ALB)	Benioff 1051, 1101---	Z,NS,EW	1.0	0.2	Magnetic tape	15.6 K	Z also records visibly.
	NGC-23----------	Z, 108.3°	.8	---	---do--------	1 K	---
	Press-Ewing----------	Z,NS,EW	20.0	---	---do--------	5 K	Z also records visibly. EW recorded as a broadband.

Timing system: IRIG time code synchronized to WWV.

System response curves: Not available.

SHORT HISTORY

The station operates only during the workweek. The magnification of all the instruments is variable.

GENERAL INFORMATION

Operated by: Los Alamos Scientific Laboratory

Address: Group J-13
University of California
Los Alamos Scientific Laboratory
P.O. Box 1663
Los Alamos, NM 87554

Telephone: 505-667-7165

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BRC	Barley Canyon----------	35.8903	106.7114	2261	6/76	Open--	Cased well below water table; Permian.
CLP	Clara Peak----------	36.0358	106.2403	2591	9/73	--do--	Basalt; Pliocene.
(CZL)	Cerro Azul----------	36.2833	105.9103	2128	9/29/76	--do--	Quartzite; Precambrian.
(DMPK)	Dead Man Peak----------	36.4264	106.7757	2664	11/22/76	--do--	Sandstone; Triassic.
EUM	Eureka Mesa----------	36.0131	106.8439	2914	1/13/76	--do--	Sandstone; Permian.
FCN	Frijoles Canyon---------	35.7719	106.2503	1945	5/07/73	7/73	Tuff; Pleistocene.
LCV	La Cueva----------	35.8828	106.6742	2652	9/73	Open--	Tuff; Pleistocene.
LFC	Lake Fork Canyon--------	35.8769	106.6647	2451	11/04/75	--do--	Cased well near water table; Permian.
LOA	Los Alamos----------	35.8247	106.2944	2144	1/12/72	--do--	Tuff; Pleistocene.
MSA	Mount San Antonia-------	36.8592	106.0178	3322	10/09/75	--do--	Basalt; Pliocene.
MTL	Mount Taylor----------	35.2519	107.5964	3335	10/15/75	--do--	Rhyolite; Miocene.
(OTZ)	Ortiz Mountain----------	35.7603	106.1728	2091	9/17/76	--do--	Basalt; Pleistocene.
RIO	Rio Grant---------- (Caja Del Rio)	35.7547	106.1756	2073	2/21/75	9/17/76	Do.
SPD	St. Peter's Dome Lookout	35.7578	106.3694	2566	9/73	Open--	Rhyolite; Pliocene.
TSP	Tesuque Peak----------	35.7853	105.7814	3664	10/14/73	--do--	Granite; Precambrian.
TTP	Tetilla Peak----------	35.6094	106.2064	2103	10/73	--do--	Basalt; Pleistocene.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
BRC	Mark L4-C----------	Z	1.0	---	Helicorder, Develocorder, magnetic tape.	42 K	---
CLP	Kinemetrics SS-1-----	Z	1.0	---	---do---------	40 K	---
(CZL)	Geotech S-13---------	Z	1.0	---	---do---------	42 K	---

Los Alamos, NM

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(DMPK)	Geotech S-13---------	Z	1.0	---	Helicorder, Develocorder, magnetic tape.	37 K	---
EUM	Mark L4-3D----------	Z,NS,EW	1.0	---	---do---------	58 K	---
FCN	---do----------	Z,NS,EW	1.0	---	---do---------	---	---
LCV	---do----------	Z,NS,EW	1.0	---	---do---------	43 K	---
LFC	Mark L4-C----------	Z	1.0	---	---do---------	42 K	---
LOA	Mark L4-3D----------	Z,NS,EW	1.0	---	---do---------	21 K	---
MSA	---do----------	Z,NS,EW	1.0	---	---do---------	32 K	---
MTL	---do----------	Z,NS,EW	1.0	---	---do---------	34 K	---
(OTZ)	Mark L4-C----------	Z	1.0	---	---do---------	43 K	---
RIO	---do----------	Z	1.0	---	---do---------	42 K	---
SPD	Kinemetrics SS-1-----	Z	1.0	---	---do---------	43 K	---
TSP	Mark L4-3D----------	Z,NS,EW	1.0	---	---do---------	40 K	---
TTP	Mark L4-C----------	Z	1.0	---	---do---------	42 K	---

Timing system: Geotech TG-110.

System response curves: Available from station.

GENERAL INFORMATION

Operated by: New Mexico Institute of Mining and Technology

Address: Campus Station
New Mexico Institute of Mining and Technology
Socorro, NM 87801

Telephone: 505-835-5212 or 835-5426

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BBN	Black Butte----------	34.4078	106.7456	1524	2/15/70	12/18/71	Alluvium; Tertiary.
CLN	Carlsbad----------	32.4027	103.7318	1094	4/05/74	Open--	Caliche; Tertiary.
SNM	Socorro----------	34.0702	106.9435	1511	7/62	--do--	Welded tuff; Tertiary.
SRF	Snake Ranch Flats-------	34.2033	107.0900	1768	1/69	6/69	Alluvium; Tertiary.
SRM	Socorro (La Joya)-------	34.3419	106.8986	1522	6/25/69	6/30/70	Do.

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
BBN:	ASC-1----------	Z,NS,EW	1.0	---	Magnetic tape	28 K	Peak magnification of 324 K at 10 Hz.
CLN, SRF, SRM:	Custom-designed------	Z	1.0	---	70-mm film	---	Peak magnification of 400 K at 20 Hz.
SNM:	Benioff----------	Z,NS,EW	1.0	---	Film-------	30 K	LRSM system. Peak magnification of 128 K at 5 Hz.
	Press-Ewing----------	Z	18.0	---	Film-------	1300	---
	Wood Anderson--------	Horizontal	---	---	Photo paper	2800	---

Timing system: CLN uses a quartz clock checked with WWVB every 2 hours. SNM uses a Geotech digital clock checked with WWVB, which is also recorded directly.

System response curves: Not available.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(GB-NM)	Gasbuggy----------	36.6869	107.2261	2164	5/29/77	Open---	---
(GN-NM)	Gnome (Carlsbad)--------	32.2625	103.8569	1036	1/08/62	2/15/62	Limestone.
(LC-NM)	Las Cruces----------	32.4022	106.5994	1585	9/20/61 9/28/65 8/02/67 9/01/69 9/26/69 3/13/70 3/16/70 9/27/71 5/08/73	7/23/65 11/15/65 7/16/69 9/16/69 10/10/69 3/26/70 3/26/70 11/10/71 5/22/73	Limestone; Paleozoic.
(ML-NM)	Mogollon----------	33.4147	108.8364	1646	12/15/61	2/16/62	Metamorphics.
(RT-NM)	Raton----------	36.7294	104.3603	1951	12/04/61 8/14/63	2/15/62 3/22/65	Limestone.
(TC-NM)	Truth or Consequences---	33.1842	107.4617	1524	12/20/61	5/03/62	Granite.
(TD-NM)	Tres Piedras----------	36.6556	106.1717	2926	8/22/63	11/26/63	Metamorphics.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(GN-NM), (ML-NM), (RT-NM):	Benioff---------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(GN-NM): 115 K (ML-NM): 270 K (RT-NM): 250 K	---
(LC-NM), (RT-NM) (2d oper.) (TC-NM), (TD-NM):	Benioff---------	Z,NS,EW	1.0	---	---do---------	(LC-NM): 370 K (TC-NM): 280 K (TD-NM): 450 K	---
	Sprengnether----	Z,NS,EW	20.0	---	---do---------	---	---
(GB-NM), (LC-NM) (last 3 oper.):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.
	Geotech---------	Z,NS,EW	20.0	---	---do---------	---	Do.

Garland, TX

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

NEW YORK

Binghamton, NY

GENERAL INFORMATION

Operated by: State University of New York at Binghamton

Address: Department of Geological Sciences
State University of New York
Binghamton, NY 13901

Telephone: 607-798-2512

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BNY	Binghamton----------	42.0896	75.9708	291	8/70	Open--	Pleistocene glacial till overlying Devonian sandstone and shale.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
BNY	Benioff----------	Z	1.0	---	Visible	75 K	---
	Sprengnether---------	Z,NS,EW	30.0	---	--do---	3 K	---

Timing system: Sprengnether TS-200.

System response curves: Calibration changes to suit particular needs.

SHORT HISTORY

BNY started in 1970 as a research station.
From 1955 to 1967 a station operated at nearly the same location; it was run by a private individual named Charles Elleiott, 577 State Street.

NEW YORK

Buffalo, NY

GENERAL INFORMATION

Operated by: Canisius College

Address: Seismic Observatory
Department of Physics
Canisius College
Buffalo, NY 14208

Telephone: 716-883-7000

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BUF	Buffalo----------	42.9333	78.8500	195	1912	Open--	Cherty limestone.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
BUF	Wiechert----------	NS,EW	1.0	---	Smoked paper	---	---
	Gallitzin-Wilip------	Z	1.0	---	Photo paper	---	---
	Sprengnether---------	Z	1.0	---	---do------	---	---
	Sprengnether---------	NS,EW	20.0	---	---do------	---	---

Timing system: Power-line frequency clock.

System response curves: Not available.

SHORT HISTORY

BUF was inaugurated in 1910 as an early Jesuit Seismological Station; it moved to a new location in 1912. Its original instruments were the Weichert's and the Galitzin-Wilip described above. In 1930 a new Galitzin-Wilip was added. The Sprengnether's were added in 1946. The station is not currently operating but will be refurbished in the academic year 1977-78.

NEW YORK

Buffalo, NY

GENERAL INFORMATION

Operated by: Harry H. Larkin, Jr.

Address: Mr. Harry H. Larkin, Jr.
189 Van Rensselaer Street
Buffalo, NY 14210

Address to obtain records:

Unknown.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BBF	Buffalo-Larkin----------	42.8475	78.6442	230	3/51	Closed	---

INSTRUMENTATION

Code	Seismometer			Galvo	Type	Magnification	Remarks
	Type	Component	T_o (sec)	T_g (sec)	recording	at T_o	
BFF	Sprengnether---------	NS	---	---	---	---	---

Timing system: Not available.

System response curve: Not available.

SHORT HISTORY

BFF was privately operated; some of its equipment was loaned by the USC&GS.

NEW YORK

Glen Cove, NY

GENERAL INFORMATION

Operated by: Victor S. Aiello

Address: Victor S. Aiello
3 Central Avenue
Glen Cove, NY 11542

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
GCY	Glen Cove----------	40.8583	73.6300	43	2/65	Open--	Alluvium.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
GCY	Sprengnether---------	Z	3.4	17.6	Photo paper	4.4 K	Magnification at 15 sec.

Timing system: Pendulum clock with invar pendulum, corrected daily with CHU or WWV.

System response curves: Available from station.

SHORT HISTORY

The station is the avocation of the owner.

GENERAL INFORMATION

Operated by: Cornell University

Address: Department of Geological Sciences
Cornell University
Ithaca, NY 14850

Telephone: 607-256-5267

Address to obtain records:

As above for INY records. ITH records not available.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
INY	Ithaca----------	42.4438	76.4836	238	8/05/72	Open--	Ithaca Member of Genesee Formation; Late Devonian.
ITH	Ithaca----------	42.4500	76.4833	243	1909	1940's	Ithaca Member of Genesee Formation; Late Devonian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
INY	Sprengnether S-5007--	Z,NS,EW	25.0	0.1	Visible	Z: 11.7 K NS: 14 K EW: 11.9 K	Magnification at 1 sec. Do. Do.
	U.E.D. Lehner-Griffith	Z	1.5	.025	Visible	85 K	Do.
ITH	Bosch-Omori----------	NS,EW	---	---	---	---	---

Timing system: Sprengnether TS-250 used at INY.

System response curves: Available from station.

SHORT HISTORY

Two of the Sprengnether's and the Lehner-Griffith instrument began operation when INY opened; the Sprengnether EW was added October 15, 1972.

ITH was located in McGraw Hall on the campus of Cornell University in 1909.

The University published monthly bulletins during the time ITH was operating.

GENERAL INFORMATION

Operated by: City College of New York

Address: Babor Seismograph and Weather Station
City College of New York
139th Street and Convent Avenue
New York, NY 10031

Telephone: 212-690-8203

Address to obtain records:

Lamont-Doherty Geological Observatory
Columbia University
Palisades, NY 10964

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CNY	City College	40.8217	73.9533	---	5/48	Open	---

INSTRUMENTATION

Code	Seismometer			Galvo	Type recording	Magnification at T_o	Remarks
	Type	Component	T_o (sec)	T_g (sec)			
CNY	Sprengnether	Z,NS,EW	2.0, 6.0, 6.0	2.2, 6.8, 7.2	Photo paper	---	---

Timing system: WWV recorded with an IBM pendulum-clock backup.

System response curves: Not available.

SHORT HISTORY

The station was run for over 20 years under the supervision of Daniel T. O'Connell and Arthur T. Pitschi. It became inoperative in 1970. The instruments are expected to again be operational in 1978.

GENERAL INFORMATION

Operated by: Fordham University

Address: Seismic Station
Department of Physics
Fordham University
New York, NY 10058

Telephone: 212-933-2233

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
FOR	Fordham----------	40.8631	73.8856	24	1910	8/76	Fordham Gneiss; Precambrian.

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
FOR	Gallitzin-Wilip------	Z,NS,EW	1.0	---	Photo paper	---	---
	Wood-Anderson--------	NS,EW	1.0	---	---do------	---	---
	Milne-Shaw-----------	NS,EW	1.0	---	---do------	---	---
	Wiechert-------------	NS,EW	---	---	---do------	---	---
	Benioff--------------	Z	1.0	---	---do------	---	---
	Benioff--------------	Z	20.0	---	---do------	---	---
	Sprengnether---------	Z,NS,EW	1.0	---	---do------	---	---

Timing system: Standard Electric Time, Invar Pendulum.

System response curves: Not available.

SHORT HISTORY

FOR was inaugurated in 1910 but moved in 1921, 1926, and 1934. It was part of the Jesuit Seismological Association.

GENERAL INFORMATION

Operated by: Lamont-Doherty Geological Observatory of Columbia University

Address: Department of Seismology
Lamont-Doherty Geological Observatory
Columbia University
Palisades, NY 10964

Telephone: 914-359-2900

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
ADN	Adams----------	43.8333	76.1197	137	11/24/74	Open--	Limestone, Trenton Group; Middle Ordovician.
ALF	Alfred----------	42.2253	77.7972	671	1/71	--do--	Java and West Falls Formations; Late Devonian.
ALX	Alexander Bay----------	44.3225	75.9279	122	8/76	--do--	Gneiss; Precambrian.
APH	Airport Hangar----------	43.8413	74.4970	564	7/74	--do--	Do.
ATT	Attica----------	42.8358	78.1942	470	7/71	1/16/76	Java and West Falls Formations; Late Devonian.
(BGR)	Bangor----------	44.8271	74.3788	329	11/76	3/14/77	Potsdam Sandstone; Late Cambrian.
(BKH)	Bank Hill----------	42.8594	78.1522	366	1/16/76	6/76	Java and West Falls Formations; Late Devonian.
BML	Blue Mountain Lake------	43.8680	74.4020	305	9/71	10/73	Gneiss; Precambrian.
CLY	Crystal Lake----------	43.8513	74.4490	579	9/71	Open--	Gneiss; Precambrian.
CTR	Castle Rock----------	43.8742	74.4600	585	9/71	--do--	Do.
(DHN)	Doyle Hill----------	42.8256	78.1931	491	1/16/76	7/28/76	Java and West Falls Formations; Late Devonian.
DNY	Dersam----------	42.8363	78.1688	381	7/71	Open--	Do.
DSN	Dusing----------	42.8443	78.1803	412	7/71	1/16/76	Do.
EGN	Eagle's Nest----------	43.8595	74.4818	549	9/71	Open--	Gneiss; Precambrian.
ELM	Elma----------	42.8502	78.6433	216	7/71	7/28/76	Java and West Falls Formations; Late Devonian.
GFN	Grafton----------	42.7928	78.4153	518	10/71	7/28/76	Cossayuna Group of Fisher[1], 1962; Early Cambrian.
HMB	Hamburg----------	42.6545	78.8525	290	9/71	7/28/76	Java and West Falls Formations; Late Devonian.
HNY	Hamilton----------	42.8318	75.5148	500	7/74	Open--	Marcellus and Skaneateles Shales; Middle Devonian.
(MRH)	Merchants Hill----------	42.8392	78.2400	448	1/16/76	4/77	Java and West Falls Formations; Late Devonian.
(MSNY)	Massena----------	44.9983	74.8621	55	2/77	4/77	---

[1]Fisher, D. W., 1962, Correlation of the Cambrian rocks in New York State: New York Geol. Survey Map and Chart Ser. 2.

SITE INFORMATION--Continued

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
OAK	Oakfield----------	43.0570	78.3372	259	9/71	11/74	Lockport Dolomite; Middle Silurian.
OCN	Over Castle Rock--------	43.8848	74.5293	701	7/74	Open--	Gneiss; Precambrian.
PAL	Palisades----------	41.0042	73.9092	91	1949	--do--	Palisade Diabase; Late Triassic.
PNY	Plattsburgh----------	44.8342	73.5550	177	8/71	--do--	Potsdam Sandstone; Late Cambrian.
PTN	Potsdam----------	44.5725	74.9828	238	10/71	--do--	Gneiss; Precambrian.
SFO	Sterling Forest---------	41.1962	74.2600	300	1962	Closed	Gneiss; Precambrian.
SKN	Skaneateles----------	42.9915	76.4672	226	11/74	Open--	Oriskany Sandstone; Early Devonian.
TBR	Tablerock----------	41.1417	74.2222	261	7/75	--do--	Gneiss; Precambrian.
TUS	Tuscarora----------	43.1800	78.9592	165	6/71	3/74	Clinton Group; Middle Silurian.
UWL	Utowana Lake----------	43.8378	74.5433	561	7/74	Open--	Gneiss; Precambrian.
(WLI)	Wellesley Island--------	44.3090	76.0098	90	8/74	8/16/76	Gneiss; Precambrian.
WND	Windham----------	42.3373	74.1525	602	10/08/76	Open--	Kiskatom Formation; Middle Devonian.
WNY	Wilmington----------	44.3910	73.8595	598	10/71	--do--	Anorthosite in Adirondack Mountains; Precambrian.
WPR	Ward Pound Ridge--------	44.2547	73.5857	152	3/71	--do--	Gneiss; early Paleozoic or Precambrian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
ADN	Geospace HS 10-2B----	Z	0.5	0.02	Develocorder	6300 K	Magnification at 20 Hz[1]. Most stations also have a Helicorder with a 0.04 galvo.
ALF	---do----------	Z	.5	.02	---do-------	---	Do.
ALX	---do----------	Z	.5	.02	---do-------	3200 K	Do.
APH	---do----------	Z	.5	.02	---do-------	6400 K	Do.
ATT	---do----------	Z	.5	.02	---do-------	3160 K	Do.
(BGR)	---do----------	Z	.5	.02	---do-------	6400 K	Do.
(BKH)	---do----------	Z	.5	.02	---do-------	2300 K	Do.
BML	---do----------	Z	.5	.02	---do-------	---	Do.
CLY	---do----------	Z	.5	.02	---do-------	14700 K	Do.
CTR	---do----------	NS	.5	.02	---do-------	8000 K	Do.
(DHN)	---do----------	EW	.5	.02	---do-------	1200 K	Do.
DNY	---do----------	Z	.5	.02	---do-------	1160 K	Do.

[1]To obtain magnification at 1 Hz, multiply by 7.9×10^{-3}.

Palisades, NY

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
DSN	Geospace HS-10-2B----	Z	0.5	0.02	Develocorder	3160 K	Magnification at 20 Hz[1]. Most stations also have a Helicorder with a 0.04 galvo.
EGN	---do----------	Z	.5	.02	---do-------	4000 K	Do.
ELM	---do----------	Z	.5	.02	---do-------	9300 K	Do.
GFN	---do----------	Z	.5	.02	---do-------	9300 K	Do.
HMB	---do----------	Z	.5	.02	---do-------	2310 K	Do.
HNY	---do----------	Z	.5	.02	---do-------	5900 K	Do.
(MRH)	---do----------	Z	.5	.02	---do-------	2300 K	Do.
(MSNY)	---do----------	Z	.5	.02	---do-------	---	Do.
OAK	---do----------	Z	.5	.02	---do-------	---	Do.
OCN	---do----------	Z	.5	.02	---do-------	12800 K	Do.
PAL	Sprengnether----------	Z,NS,EW	30.0	100.0	Photo paper	250	Magnification at 25 sec.
	Wood-Anderson--------	NS,EW	.8	---	---do------	2800	---
	Sprengnether---------	Z	15.0	75.0	Pen and ink	3 K	---
	Press-Ewing----------	NS,EW	---	---	---do------	---	---
PNY	Geospace HS-10-2B----	Z	.5	.02	Develocorder	1600 K	Magnification at 20 Hz[1]. Most stations also have a Helicorder with a 0.04 galvo.
PTN	---do----------	Z	.5	.02	---do-------	11800 K	Do.
SFO	---do----------	Z	.5	.02	---do-------	6300 K	Do.
SKN	---do----------	Z	.5	.02	---do-------	5900 K	Do.
TBR	---do----------	Z	.5	.02	---do-------	21400 K	Do.
TUS	---do----------	Z	.5	.02	---do-------	---	Do.
UWL	---do----------	Z	.5	.02	---do-------	12800 K	Do.
VCS	---do----------	Z	.5	.02	---do-------	2300 K	Do.
(WLI)	---do----------	Z	.5	.02	---do-------	21400 K	Do.
WND	---do----------	Z	.5	.02	---do-------	6400 K	Do.
WNY	---do----------	Z	.5	.02	---do-------	2000 K	Do.
WPR	---do----------	Z	.5	.02	---do-------	21400 K	Do.

[1]To obtain magnification at 1 Hz multiply by 7.9×10^{-3}.

Timing system: PAL uses a Sprengnether TS-100. All other stations use a Sprengnether TS-200 digital timing system.

System response curves: See figure 9, p. 366.

SHORT HISTORY

ALF is operated jointly with Alfred University.
CLY, CTR, and EGN are part of the Blue Mountain Lake array. BLM was a forerunner of this array.
PNY is operated jointly with the State University of New York at Plattsburgh, Department of Earth Sciences.
Telemetry for the New York stations is funded by the USGS.
Lamont-Doherty publishes a bimonthly bulletin and a yearly bulletin, available from the Observatory.

GENERAL INFORMATION

Operated by: George E. Mercier

Address: Rochester-Mercier Observatory--Closed
100 Sandringham Dr.
Rochester, NY 14610
(Obsolete)

Address to obtain records:

No longer available.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
RMO	Rochester-Mercier Observatory	43.1317	77.5386	141	3/22/68	9/71	Limestone and granite.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
RMO	Willmore	Z	1.0	0.5	Photo paper	100 K	---
	Sprengnether	NS,EW	60.0	45-60	--do--	---	---

Timing system: Springer pendulum clock timed with WWV daily.

System response curves: Not available.

SHORT HISTORY

RMO was started as a high school project. Reports were sent to the USC&GS.

NEW YORK

Rochester, NY

GENERAL INFORMATION

Operated by: McQuaid Jesuit High School

Address: Odenbach Seismic Observatory
McQuaid Jesuit High School
1800 Clinton Avenue, South
Rochester, NY 14618

Telephone: 716-473-1130

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
ROC	Rochester----------	43.1245	77.5923	155	2/13/59	Open--	Lockport Dolomite; Middle Silurian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
ROC	Wilmore (Hilger------ & Watts 98093).	Z	0.75	0.75	Photo paper	---	---
	Benioff----------	NS	1.0	1.5	--do-------	---	---
	--do----------	EW	1.0	6.3	--do-------	---	---

Timing system: 60-Hz line clock.

~~System response curves: Uncalibrated.~~

SHORT HISTORY

ROC was begun in 1959 on the initiative of several students and some faculty. It used two long-period Sprengnether seismometers until 1964 when the Benioff's, previously used by Harvard University, were loaned to the school.

The Observatory puts out periodic reports of observed disturbances and special reports of local disturbances, which contain observational data and an intensity map if possible.

NEW YORK

Troy, NY

GENERAL INFORMATION

Operated by: Rensselaer Polytechnic Institute

Address: Department of Geology
Rensselaer Polytechnic Institute
Troy, NY 12181

Telephone: 518-270-6476

Address to obtain records:

As above.

Records for six components (three 0.5-sec instruments and three 22.0-sec instruments) are available on photographic paper through 1966.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
TRY	Troy----------	42.7311	73.6669	118	1960	Open--	Troy Shale of Ruedemann[1] (1944); Cambrian.

[1]Ruedemann, Rudolf, and Cushing, H. D., 1914, Geology of Saratoga Springs and vicinity: N.Y. State Mus. Bull. 169, 177 p.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
TRY	Press-Ewing----------	Z	22.0	---	Helicorder	3 K	Recorded on two recorders with different response curves.

Timing system: Tuning-fork clock timed with WWV hourly.

System response curves: Available from station.

SHORT HISTORY

TRY records on two recorders with two response curves, one with a lowered response at 7 sec to cut down on microseisms caused by storms in the Atlantic.

NEW YORK

Clifton, NJ

GENERAL INFORMATION

Operated by: Woodward-Clyde Consultants
for Consolidated Edison

Address: Woodward-Clyde Consultants
1425 Broad Street
Clifton, NJ 07012

Telephone: 201-471-2000

Telex: 13-3541

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(BLMY)	Blum----------	41.3297	73.9552	134	6/16/75	Open--	Gneiss; Precambrian.
(CHRY)	Calls Hollow Road-------	41.2082	74.0543	183	6/17/75	--do--	Do.
(DBMY)	Dunderburg Mountain-----	41.2947	73.9750	27	6/17/75	--do--	Do.
(DPLY)	Delli Paoli----------	41.2528	73.9108	67	8/18/75	--do--	Norite; Ordovician.
(GOBY)	Gobbelet----------	41.3295	73.9218	150	10/01/75	--do--	Gneiss; Precambrian.
(GSCY)	Girl Scout Camp---------	41.2663	74.0040	110	6/17/75	--do--	Do.
(OSBY)	Osborn----------	41.3603	73.9240	212	6/18/75	--do--	Do.
(SNPY)	Stoney Point----------	41.2408	73.9713	30	6/17/75	--do--	Diorite; Ordovician.
(SPSY)	St. Peter's School------	41.3020	73.8907	168	5/30/75	--do--	Gneiss; Precambrian.
(SRMY)	Scherman----------	41.2283	74.0137	165	6/17/75	--do--	Do.
(STLY)	Stiles----------	41.1887	74.0037	125	6/04/75	--do--	Diabase; Triassic.
(WGLY)	Wegel----------	41.3588	73.8993	152	9/16/75	--do--	Limestone; Devonian.

INSTRUMENTATION

Code	Seismometer			Galvo	Type recording	Magnification at T_o	Remarks
	Type	Component	T_o(sec)	T_g(sec)			
All stations	Geospace HS-10-------	Z	0.5	---	Magnetic tape	---	Telemetered to Clifton. Three stations are also recorded visibly on drum recorders.

Timing system: Sprengnether TS-250 chronometer used for visible recorders. IRIC-C used with tape recorders. WWV checked daily.

System response curves: See figure 9, p. 366.

SHORT HISTORY

All stations are part of the Indian Point Seismic Monitoring Network and were installed to determine seismic activity near a powerplant site. Operation of the Network was assumed by Woodward Clyde in early 1977 for Consolidated Edison.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(DH-NY)	Delhi----------	42.2442	74.8883	652	10/28/61 5/31/66	11/15/65 6/03/66	Sandstone; Paleozoic.
(DP-NY)	Deposit----------	42.0883	75.4522	579	7/07/62	7/17/62	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(DH-NY):	Benioff----------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(DH-NY): 60 K	---
	Sprengnether----	Z,NS,EW	20.0	---	--do----------	---	---
(DH-NY) (2d oper.):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.
	Geotech----------	Z,NS,EW	20.0	---	--do----------	---	Do.
(DP-NY):	Benioff----------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(DP-NY): 90 K	---

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

NORTH CAROLINA

Chapel Hill, NC

GENERAL INFORMATION

Operated by: University of North Carolina

Address: MacCarthy Geophysics Laboratory
Department of Geology
University of North Carolina
Chapel Hill, NC 27514

Telephone: 919-933-1212

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CEH	Chapel Hill----------	35.8908	79.0928	152	8/75	Open--	Bouldery saprolite; late Precambrian.
CHC	Chapel Hill----------	35.9028	79.0506	149	1953	12/70	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
CEH	Geotech 18300--------	Z,NS,EW	1.0	---	Helicorder	15 K	Telemetered to the University.
CHC	Benioff 1051,1101----	Z,NS,EW	1.0	---	Photographic	25 K	---

Timing system: Geotech TG-110.

System response curves: Available from station.

SHORT HISTORY

CHC operated on campus from 1953 to 1970. The station was inoperative from 1971 to August 1975 when it was reestablished as CEH at a new site 5 km from campus. Signals are telemetered via phone lines to the department for visual display.

A compilation of recorded events is available from the Division of Mineral Resources, P.O. Box 27687, Raleigh, NC 27611. Request: "A Catalogue of Seismic Events Recorded at Seismograph Station CHC, Chapel Hill, NC, January 1, 1955 to December 31, 1970," North Carolina Geol. and Mineral Resources Section Spec. Publ. 6, 72 p.

GENERAL INFORMATION

Operated by: Carolina Power and Light Company

Address: Carolina Power and Light Company
First Union National Bank Building, Rm. 411
Wilmington, NC 28401

Telephone: 919-836-6146

Address to obtain records:

Charles K. Ross
c/o Carolina Power and Light Company
P.O. Box 1551
Raleigh, NC 27602

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
WNC	Wilmington----------	34.0581	78.2461	20	5/03/76	Open--	Sandstone; post-Miocene.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
WNC	Geotech RF-400-------	Z	1.0	16 Hz	Develocorder	100 K	---

Timing system: Geotech TG-210.

System response curve: Available from station.

SHORT HISTORY

WNC is one of seven stations located in a circular array having a diameter of 72 km. WNC is the only one that reports data for teleseisms.

NORTH CAROLINA

Garland, TX

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(AE-NC)	Albemarle----------	35.4336	80.0597	183	12/16/66 1/19/68	12/20/66 1/19/68	---

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
(AE-NC)	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.
	Geotech---------	Z,NS,EW	20.0	---	--do---------	---	Do.

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

GENERAL INFORMATION

Operated by: U.S. Department of the Navy

Address: Office of Naval Research
U.S. Department of the Navy
Washington, DC 20375

Address to obtain records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CPC	Cherry Point----------	34.9000	76.8833	---	1/50	12/56	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
CPC	Sprengnether---------	Z	1.0-2.0	---	Photo paper	---	---
	--do----------	Horizontal	6.0-10.0	---	--do-------	---	---

Timing system: Not available.

System response curves: Not available.

SHORT HISTORY

This station was part of a network of stations, which were mostly in Florida, run by the U.S. Navy to track hurricanes by monitoring microseisms.

NORTH DAKOTA

Garland, TX

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(HH-ND)	Hannah----------	48.9481	98.6925	488	7/22/63	8/05/64	Shale.
(HH2ND)	--do----------	48.9442	98.6822	488	5/23/66	6/03/66	---
(RY-ND)	Ryder----------	48.0972	101.4944	640	7/22/63 5/23/66	3/22/65 6/03/66	Glacial drift.
(TS-ND)	Trotters----------	47.1069	103.6731	816	10/02/64	5/14/65	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(HH-ND), (RY-ND):	Benioff----------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(HH-ND): 60 K (RY-ND): 60 K	---
	Sprengnether----	Z,NS,EW	20.0	---	--do----------	---	---
(HH2ND), (RY-ND) (2d oper.):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.
	Geotech----------	Z,NS,EW	20.0	---	--do----------	---	Do.
(TS-ND):	Benioff----------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	---	---

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

OHIO

Bowling Green, OH

GENERAL INFORMATION

Operated by: Bowling Green State University

Address: Seismological Observatory
Department of Geology
Bowling Green State University
Bowling Green, OH 43403

Telephone: 419-372-2531

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BGO	Bowling Green----------	41.3781	83.6592	212	9/63	Open--	Dolostone; Silurian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
BGO	Geotech S-13---------	Z,NS,EW	1.0	0.75	Photo paper	30 K	---

Timing system: Sprengnether TS-100.

System response curves: Not available.

SHORT HISTORY

BGO started with the installation of one short-period seismometer in 1963.

OHIO

Cincinnati, OH

GENERAL INFORMATION

Operated by: Xavier University

Address: Seismological Observatory
Xavier University
Victory Parkway
Cincinnati, OH 45207

Telephone: 513-731-2341

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CNN	Cincinnati----------	39.1450	84.4967	203	1927	1963	Limestone.
MLF	Milford----------	39.1374	84.2774	238	1963	Open--	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
CNN	Wood-Anderson--------	NS,EW	Short	---	Photo paper	---	---
	--do----------	NS,EW	Long	---	--do-------	---	---
MLF	Benioff----------	Z,NS,EW	1.0	---	Pen and ink	---	---

Timing system: Sprengnether crystal clock checked daily with WWV.

System response curves: Uncalibrated.

SHORT HISTORY

CNN was established by St. Xavier College (now Xavier University) in 1927.

OHIO

Cleveland, OH

GENERAL INFORMATION

Operated by: John Carroll University

Address: Seismological Observatory
John Carroll University
Cleveland, OH 44118

Telephone: 216-491-4361

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CLE	Cleveland----------	41.4888	81.5321	328	1904	Open--	Pleistocene clay on Paleozoic shale.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
CLE	Benioff----------	Z	1.0	6.0	Photo paper	9.6 K	---
	Sprengnether---------	Z	1.4	1.3	--do-------	1250	Magnification at 1.3 sec.
	--do----------	NS,EW	1.5	1.5	--do-------	1800	Magnification at 1.0 sec.
	--do----------	NS,EW	18.0	18.0	--do-------	2.2 K	Magnification at 12 sec.

Timing system: Sprengnether TS 250 digital timing system.

System response curves: Available from station.

SHORT HISTORY

CLE was formally inaugurated in 1904 after several years of informal experimentation that began in 1900. In 1908, the Jesuit Seismological Service was organized and 16 stations began operating in the United States. Several instruments, in addition to those mentioned above, are run experimentally at this site. The station publishes an annual station bulletin.

OHIO

Ann Arbor, MI

GENERAL INFORMATION

Operated by: University of Michigan

Address: Seismological Observatory
Department of Geology and Mineralogy
University of Michigan
Ann Arbor, MI 48104

Telephone: 313-763-3438

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
AN1	Anna----------	40.4314	84.1236	323	1/15/76	Open--	Glacial till; Quaternary.
(AN2)	Anna----------	40.8556	83.7311	277	8/01/76	--do--	Do.
(AN3)	Anna----------	40.5486	83.8122	326	9/01/76	--do--	Do.
(AN4)	Anna----------	40.2219	83.8978	346	9/01/76	--do--	Do.
(AN5)	Anna----------	40.1061	84.1531	331	8/01/76	--do--	Do.
(AN6)	Anna----------	40.6369	84.4322	254	9/01/76	--do--	Do.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
All stations	Mark L-4C----------	Z	1.0	---	Pen and ink	---	---

Timing system: Geotech TG-120.

System response curves: See figure 2, p. 363.

SHORT HISTORY

These stations make up the Anna, Ohio, array. The array was established in order to monitor the seismicity in the vicinity of this relatively active area. Funding has been provided, in part, by the Nuclear Regulatory Commission.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(GZ-OH)	Galion----------	40.6600	82.7833	372	8/23/69	10/10/69	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(GZ-OH):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.
	Geotech---------	Z,NS,EW	20.0	---	--do---------	--	Do.

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

GENERAL INFORMATION

Operated by: Air Force Technical Application Center

Address: Wichita Mountains Seismological Observatory--Closed
McAlester, OK
(Obsolete)

Address to obtain records:

Teledyne-Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
WMO	Wichita Mountain--------	34.7181	98.5891	505	---	Closed	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
WMO	Johnson-Matheson-----	Z	1.25	---	Develocorder, magnetic tape.	---	Thirteen instruments in an array.

Timing system: Geotech TG-110.

System response curve: Available with records.

SHORT HISTORY

WMO was set up by AFTAC as one of five special-purpose arrays. The others were BMO, CPO, TFO, and UBO.

GENERAL INFORMATION

Operated by: University of Oklahoma

Address: Earth Sciences Observatory
University of Oklahoma
P.O. Box 5
Leonard, OK 74043

Telephone: 918-366-4152

Address to obtain records:

As above.

TUL records since January 1971:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CRO	Carnasaw Mountain------- Lookout Tower.	34.1499	94.5556	302	5/17/77	Open--	Bigfork Chert; Middle Ordovician.
MZO	Mazie Landing----------	36.1316	95.3001	182	9/16/76	--do--	Weathered limestone, Boone Formation; Mississippian.
NMO	Norman-----------------	35.2056	97.4440	354	mid 75	mid 76	---
OLO	Oologah----------------	36.4573	95.7108	196	11/28/76	Open--	Oologah Limestone; Middle Pennsylvanian.
RLO	Rose Lookout Tower------	36.1672	95.0261	384	5/77	--do--	Boone Foundation; Mississippian.
TUL	Tulsa-------------------	35.9106	95.7925	261	7/61	--do--	Sandstone; Pennsylvanian.
WLO	Wilson-----------------	34.0648	97.3697	284	4/25/77	--do--	Alluvium; Quaternary.

INSTRUMENTATION

Code	Seismometer			Galvo	Type recording	Magnification at T_o	Remarks
	Type	Component	T_o(sec)	T_g(sec)			
CRO	Geotech S-13---------	Z	1.3	---	Pen and ink	32 K	Magnification at 1 sec. High-pass. Magnification 280 K at 10 Hz.
MZO	Geotech S-13---------	Z	1.3	---	--do-------	16 K	Magnification at 1 sec. High-pass. Magnification 140 K at 10 Hz.
NMO	Modified Johnson-Matheson----------	Z	2.5	---	Helicorder	---	---
OLO	Geotech S-13---------	Z	1.3	---	Pen and ink	16 K	Magnification at 1 sec. High-pass. Magnification 140 K at 10 Hz.
RLO	--do-----------------	Z	1.3	---	--do-------	---	---

Norman, OK

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
TUL	Benioff----------	Z,NS,EW	1.0	0.75	Photo paper	100 K	---
	--do----------	Z	1.0	High-pass	Visible, 16-mm film	35.6 K, 100 K, 10 K	Three instruments.
	--do----------	Z	1.0	1-Hz bandpass.	Helicorder, 16-mm film.	200 K	
	--do----------	Z	1.0	16-Hz bandpass.	Helicorder	2000 K	Magnification at 16 Hz.
	Press-Ewing----------	Z,NS,EW	20.0	100.0	Photo paper	5 K	
	--do----------	Z,NS,EW	20.0	---	16-mm film	200, 20, 2	Ten instruments.
	--do----------	Z	20.0	Low-pass	Helicorder, 16-mm film.	34 K, 53.6 K, 5.36 K, 536	High-gain.
WLO	Geotech S-13---------	Z	1.3	---	Pen and ink	16 K	Magnification at 1 sec. High-pass. Magnification 140 K at 10 Hz.

Timing system: Most stations use a Sprengnether MEQ-800B crystal clock with WWV recorded at the beginning of each record. NMO used the 60-Hz powerline corrected by WWV (not to within 1 sec). TUL has a digital system using a quartz crystal contained in a proportional oven.

System response curves: Available from station.

SHORT HISTORY

TUL was established in 1961 by Jersey Production Research Company as a broadly based geophysical observatory. In April 1965, the complete facility and its record archives were was given to the University of Oklahoma by Humble Oil Company. Since December 1961, three short-period and three long-period photo-paper seismograms have been recorded. From 1970 to the present, the seismometers have been modified and 17 other seismic recording systems have been added.

NMO was located on the campus in Norman. The timing system was imprecise and the records are currently misplaced. A new array of 11 short-period vertical seismographs is being installed throughout the State. RLO and two new stations will be telemetered to TUL. MZO, OLO, WLO, CRO, and four new stations will be operated by volunteers who will mail all records to TUL.

The new array, of which all the stations listed above except TUL are a part, will eventually contain 11 short-period vertical instruments.

GENERAL INFORMATION

Operated by: Senturion Sciences, Inc.

Address: Senturion Sciences, Inc.
P.O. Box 15447
Tulsa, OK 74115

Telephone: Not available.

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
TSO	Tulsa----------	36.1482	95.8979	210	2/73	4/29/74	Alluvium overlying terrace deposits; Quaternary.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
TSO	Hall-Scars----------	Z	0.5	---	Helicorder	---	Intermittent operation.

Timing system: 60 Hz measured from power signal, with WWV superimposed at beginning and end of record. Timing considered imprecise.

System response curve: Not available.

SHORT HISTORY

TSO was located in downtown Tulsa outside the offices of Senturion Sciences. The site was noisy and only a few large teleseisms were recorded.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(AK-OK)	Atoka----------	34.3683	96.0572	183	6/17/62	6/28/62	---
(AL-OK)	Antlers----------	34.3581	95.6125	213	7/04/62	7/11/62	---
(AM-OK)	Ardmore----------	34.0478	97.4114	274	12/08/61	12/20/61	---
(AP-OK)	Apache----------	34.8331	98.4358	427	9/25/63 5/05/65 12/09/65	12/31/63 9/19/65 1/13/66	Alluvium and limestone.
(CT-OK)	Clayton----------	34.4881	95.1272	305	7/14/62	10/05/62	Do.
(DU-OK)	Durant----------	34.0364	96.2178	198	8/14/63	3/09/64	Clay.
(HB-OK)	Hobart----------	35.1764	98.9103	491	11/09/61	4/10/63	Clay and limestone; Paleozoic.
(TO-OK)	Tishomingo----------	34.3564	96.5681	259	11/20/61 5/09/62	12/18/61 6/09/62	---
(WA-OK)	Watson----------	34.4417	94.4911	305	10/17/62	10/27/62	Do.

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(AK-OK), (AL-OK), (AP-OK) (2d and 3d oper.), (CT-OK), (HB-OK), (TO-OK), (WA-OK):	Benioff----------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(AK-OK): 150 K (AL-OK): 290 K (CT-OK): 200 K (HB-OK): 85 K (TO-OK): 290 K	---

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
(AM-OK), (AP-OK) (1st oper.), (DU-OK):	Benioff---------	Z,NS,EW	1.0	---	--do--------	(AM-OK): 100 K (AP-OK): 350 K (DU-OK): 160 K	---
	Sprengnether----	Z,NS,EW	20.0	---	--do--------	---	---

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 363.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

OREGON

Ashland, OR

GENERAL INFORMATION

Operated by: Southern Oregon State College

Address: Geology Department
Southern Oregon State College
1250 Siskiyou Blvd.
Ashland, OR 97520

Telephone: 503-482-6477

Address to obtain records:

As above.

None usable as yet.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(ALO)	Ashland----------	42.2	122.7	720	3/22/73	Open--	Granodiorite; Late Jurassic.

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
(ALO)	---	Z	1.0	---	Helicorder	10-20 K	---

Timing system: Sprengnether TS-100 clock checked with WWV.

System response curve: Not available.

SHORT HISTORY

ALO was started by the late Dean Carder upon retirement from Government service in the field of seismology. Dr. Carder died before the station was operational, and the lack of expertise has delayed completion of the station. It is hoped it will be a contributing station by the end of 1977; the station is currently acquiring data which is troubled by noise that has not yet been correlated with any known disturbance.

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: Baker Observatory--Closed
U.S. Geological Survey
Baker, OR 97814
(Obsolete)

Address to obtain records:

1962-1966:

Teledyne-Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

1966-1975:

U.S. Geological Survey
Branch of Global Seismology
Stop 967
Box 25046, Denver Federal Center
Denver, CO 80225

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BMO	Blue Mountain----------	44.8489	117.3056	1189	1962	5/12/75	Granite; Early Triassic.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
BMO	Johnson-Matheson-----	Z	1.25	0.33	Helicorder	700 K	Sixteen instruments in an array. Magnification at 1 sec.
	Benioff 1051---------	Z	1.0	.065	Develocorder	25 K	Located at the tank farm.
	Johnson-Matheson 7515	NS,EW	1.25	.33	--do--------	360 K	Do.
	Geotech 7505A, 8700A-	Z,NS,EW	20.0	110.0	--do--------	8.5 K, 3.2 K, 4 K	Do.
	Geotech 8700B--------	NS,EW	2.5	.64	--do--------	---	Do.
	Melton 10012---------	Z	2.42	.64	--do--------	---	Do.

Timing system: Geotech 11880.

System response curves: Available with records.

SHORT HISTORY

BMO was an array, originally of 10 stations all situated within a 2.5-km radius, set up by AFTAC. The station was turned over to the USGS in 1966. Originally, the "tank farm" location had a total of nine instruments run at different gains and having different periods.

OREGON

Corvallis, OR

GENERAL INFORMATION

Operated by: Oregon State University

Address: Seismic Station
School of Oceanography
Oregon State University
Corvallis, OR 97331

Telephone: 503-754-2912

Address to obtain records:

As above.

COR records until 1962:

Seismograph Station
University of California
Berkeley, CA 94720

WWSSN records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
COR	Corvallis----------	44.5857	123.3032	121	12/50	Open--	Basaltic deposits; Quaternary.
KFO	Klamath Falls----------	42.2667	121.7450	1439	1962	--do--	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
COR	Benioff 1051, 1101---	Z,NS,EW	1.0	0.75	Photo paper	25 K	WWSSN. Magnification 12.5 K in winter.
	Sprengnether----------	Z,NS,EW	15.0	100.0	--do-------	1.5 K	WWSSN. Magnification 750 in winter.
KFO	Benioff----------	Z	1.0	---	Helicorder	15 K	---

Timing system: WWSSN Model 8684 Geotech.

System response curves: COR--see figure 1, p. 363. KFO available from station.

SHORT HISTORY

The first seismometer operating at the University was installed in 1944. It was a custom-made instrument located in the Physics Building. In 1950 the site was moved to its present location and was equipped with a three-component Schlicter, 1.0-sec system and a Wilson-Lamison 1.0-sec vertical seismometer. In August 1962 the WWSSN equipment was installed.

OREGON

Eugene, OR

GENERAL INFORMATION

Operated by: University of Oregon

Address: Seismic Station
Department of Geology
University of Oregon
Eugene, OR 97403

Telephone: 503-686-4573

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
PMT	Pine Mountain----------	43.7909	120.9449	1924	9/22/69	Open--	Volcanic rock; Tertiary.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
PMT	Geotech S-13---------	Z,NS,EW	1.0	---	Helicorder	60 K	---

Timing system: Geotech TG-110 (will be replaced owing to malfunction).

System response curve: Available from station.

SHORT HISTORY

PMT operated for about a year with six components, then another year with only the vertical component of the short-period instrument. From 1972 to late 1976, the station was inactive. The station is again functioning, currently with only the short-period vertical component.

OREGON

Portland, OR

GENERAL INFORMATION

Operated by: Oregon Museum of Science and Industry

Address: Oregon Museum of Science and Industry
4015 S.W. Canyon Road
Portland, OR 97221

Telephone: 503-248-5900

Address to obtain records:

Oregon State University
Seismic Station
School of Oceanography
Corvallis, OR 97331

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
PTD	Portland----------	45.5083	122.7164	208	5/64	Open--	Columbia River Group (basalt); Miocene.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
PTD	Wilson-Lamison-------	Z	1.0	1.5	Visible	8 K	---

Timing system: Pendulum clock, checked each day against WWV.

System response curve: Not available.

SHORT HISTORY

PTD is chiefly run for display purposes. The equipment is on loan from the USGS, Albuquerque.

OREGON

Portland, OR

GENERAL INFORMATION

Operated by: Harold Mason

Address: Harold Mason
c/o Portland State University
Earth Science Department
Box 751
Portland, OR 97207

Telephone: 503-299-3022

Address to obtain records:

Earth Science Department
Portland State University
Box 751
Portland, OR 97207

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
HMO	H. Mason----------	45.5381	122.5719	64	1975	Open--	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
HMO	Custom----------	Z	1.0	---	Pen and ink	---	---

Timing system: 60-Hz line timer checked with WWV twice daily.

System response curves: Not available.

SHORT HISTORY

HMO was established as an avocation of the owner and operator, Mr. Harold Mason.

OREGON

Berkeley, CA

GENERAL INFORMATION

Operated by: Tera Corporation for
Portland General Electric Company

Address: Tera Corporation
2118 Milvia Street
Berkeley, CA 94704

Telephone: 415-845-5200

Address to obtain records:

Stuart W. Smith
Geophysics Program
202 ATG Building, AK-50
University of Washington
Seattle, WA 98195

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
FMC	Four Mile Canyon--------	45.6244	120.0283	305	11/75	Open--	Loess; Pleistocene.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
FMC	Mark L-4C----------	Z	1.0	---	Helicorder	Variable	Gain adjusted seasonally. Telemetered to Arlington, OR.

Timing system: Sprengnether clock checked with WWVB daily.

System response curve: Curve is slightly different from standard Mark L-4C microseismic system (fig. 2); peaks at 5 Hz.

SHORT HISTORY

This station is part of a three-station array in this area, where there are no other instruments and the seismicity is low. Portland General is interested in being able to precisely locate occasional earthquakes when they do occur.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(PK-OR)	Pilot Rock----------	45.3175	118.9092	1036	6/06/62	6/28/62	---
(PT-OR)	Pendleton----------	45.6111	118.8839	411	1/26/62	7/29/63	Basalt.
(SR-OR)	Sparta----------	44.9403	117.4278	1341	3/19/63	6/03/63	Basalt and granite.
(UK-OR)	Ukiah----------	45.0931	118.8986	1311	2/08/63	3/01/63	---
(VT-OR)	Venator----------	43.1136	118.4147	1341	1/16/62	5/21/62	Granite.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(PK-OR), (SR-OR), (UK-OR), (VT-OR):	Benioff----------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(PK-OR): 190 K (SR-OR): 180 K (VT-OR): 330 K	---
(PT-OR):	Benioff----------	Z,NS,EW	1.0	---	---do----------	(PT-OR): 200 K	---
	Sprengnether----	Z,NS,EW	20.0	---	---do----------	---	---

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

GENERAL INFORMATION

Operated by: University of Washington

Address: Geophysics Program
202 ATG Building, AK-50
University of Washington
Seattle, WA 98195

Telephone: 206-543-7010

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
HRO	Hermiston----------	45.8357	119.3808	172	6/75	Open--	Volcanics; Miocene.
MFW	Milton-Freewater---------	45.9030	118.4058	384	10/71	--do--	Alluvium; Quaternary.
PNO	Pendleton----------	45.6120	118.7629	402	6/75	--do--	Volcanics; Miocene.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
All stations	Mark L-4C----------	Z	1.0	16 Hz	16-mm film	100-200 K	Telemetered to the University.

Timing system: Astrodata Time Code Generator and WWVB.

System response curves: See figure 11, p. 366.

SHORT HISTORY

MFW used to belong to the Hanford array run by the USGS. The University took over its operation in June 1975. The University publishes a bimonthly hypocenter-location bulletin.

PANAMA CANAL ZONE

Balboa Heights, CZ

GENERAL INFORMATION

Operated by: Panama Canal Company

Address: Panama Canal Company
280 Administration Building
Balboa Heights, CZ

Address to obtain records:

Before 1962:	WWSSN records (since 1962):
As above.	National Geophysical and Solar-Terrestrial Data Center NOAA/EDS, D62 Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BHP	Balboa Heights----------	8.9608	79.5581	36	1914	3/77	Volcanics; Tertiary.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
BHP	Benioff----------	Z,NS,EW	1.0	0.75	Photo paper	12.4 K	WWSSN.
	Sprengnether---------	Z,NS,EW	15.0	100.0	---do------	740	Do.

Timing system: WWSSN standard.

System response curves: See figure 1, p. 363.

SHORT HISTORY

BHP's original equipment consisted of two Bosch-Omori's; these were replaced in 1931 with two Wood-Anderson instruments. In January 1962 the WWSSN system was installed.

PENNSYLVANIA

Kutztown, PA

GENERAL INFORMATION

Operated by: Kutztown State College

Address: Physical Science Department
Kutztown State College
Kutztown, PA 19530

Telephone: 215-683-3511 ext. 368

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
KTZ	Kutztown----------	40.5117	75.7800	148	10/67	Open--	Shaly limestone; Ordovician.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
KTZ	Geotech----------	Z,NS,EW	1.0	---	Helicorder	4 K	---
	Geotech----------	Z,NS,EW	20.0	---	---do-----	2 K	---

Timing system: WWV recorded directly on records.

System response curves: Not available.

PENNSYLVANIA

Millersville, PA

GENERAL INFORMATION

Operated by: Millersville State College

Address: Department of Earth Sciences
Roddy Science Center
Millersville State College
Millersville, PA 17551

Telephone: 717-872-5411 ext. 726

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(MVL)	Millersville----------	39.9917	76.3667	91	10/23/74	Open--	Phyllitic marble; Ordovician.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(MVL)	Mark L4-C----------	Z	1.0	---	Smoked paper	---	---

Timing system: Sprengnether TS-300 digital clock checked daily with WWV.

System response curve: Uncalibrated.

SHORT HISTORY

(MVL) operated in a temporary location in the basement of the building until March 1975. It then was located at a permanent site on bedrock. The station is intended to be part of a Pennsylvania-New Jersey-Maryland-Delaware network under the supervision of Pennsylvania State University.

PENNSYLVANIA

New Kensington, PA

GENERAL INFORMATION

Operated by: Fred A. Keller

Address: Fred Keller
508 Pershing Drive
New Kensington, PA 15068
(Obsolete)

Address to obtain records:

Unknown.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
NKP	New Kensington----------	40.5597	79.7542	251	1939	1959	Red shale; Pennsylvanian.

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
NKP	Custom----------	N 15° W	10.0	12.0	Smoked paper	500	---

Timing system: Seth Thomas pendulum clock checked with WWV.

System response curve: Not available.

SHORT HISTORY

NKP was the avocation of the owner and operator. He developed his own seismograph system which he described in various papers, one of which was in the "Seismological Observatory Bulletin" of the University of Pittsburgh, 1942.

PENNSYLVANIA

Philadelphia, PA

GENERAL INFORMATION

Operated by: The Franklin Institute

Address: The Fels Planetarium
The Franklin Institute
Philadelphia, PA 19103

Telephone: 215-448-1000

Address to obtain records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
PHI	Philadelphia----------	39.9589	75.1750	5	7/34	8/28/71	Solid rock.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
PHI	Wenner----------	NS,EW	9.0	4.9	Photo paper, pen and ink.	1400	---

Timing system: Pendulum clock checked daily with Dominion Observatory.

System response curve: Not available.

SHORT HISTORY

The station was established for the dual purpose of being a display item as well as a scientifically useful installation. At one point it housed a McComb-Romberg two-component horizontal system in addition to the Wenner.

PENNSYLVANIA

Pittsburgh, PA

GENERAL INFORMATION

Operated by: University of Pittsburgh

Address: Department of Earth and Planetary Sciences
University of Pittsburgh
Pittsburgh, PA 15260

Telephone: 412-624-4700

Address to obtain records:

Unknown.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
PIT	Pittsburgh----------	40.4450	79.9533	273	1929	1/62	Birmingham Shale Member of Conemaugh Formation; Late Pennsylvanian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
PIT	Wenner----------	N30°W,N60°E	12.3	15	Photo paper	200	---
	Benioff----------	Z	Long	---	---do------	24 K	---
	Pittsburgh-type------	NS,EW	---	---	---do------	---	---

Timing system: Astronomical clock.

System response curve: Not available.

SHORT HISTORY

PIT was considered an excellent station, although it experienced interference from street cars. The station published annual reports of seismic activity recorded at the station.

PENNSYLVANIA

University Park, PA

GENERAL INFORMATION

Operated by: Pennsylvania State University

Address: Geophysical Laboratory
Pennsylvania State University
204 Mineral Science Building
University Park, PA 16802

Telephone: 814-865-2622

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(ABG)	Abington	40.1167	75.1333	---	1975	Open	---
(BVR)	Beaver	40.7000	80.3333	---	1975	--do--	---
(ERP)	Erie	42.1333	79.9833	---	1975	--do--	---
SCP	State College	40.7950	77.8650	---	1935	--do--	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(ABG), (BVR), (ERP):	Hall-Sears 10	Z	1.0	---	Pen and ink	---	---
SCP:	Benioff	Z,NS,EW	1.0	.75	Photo paper	---	WWSSN.
	Sprengnether	Z,NS,EW	15.0	100.0	---do---	---	Do.

Timing system: SCP uses the standard WWSSN system.

System response curves: Not available.

SHORT HISTORY

SCP operated from 1935 to 1945 using horizontal Bosch-Omori instruments (T_o = 6 sec). From 1945 to 1951 the station employed horizontal Galitzin-type instruments with a period of 10 sec. A shorter period vertical instrument began operating in 1948. In 1952 the station had three components operating fairly consistently; the horizontal instruments had periods of about 17 sec and a vertical instrument had a period of about 3 sec. In January 1962 the WWSSN equipment was installed. The records before the WWSSN installation were on photo paper and are archived at the University.

(ABG), (BVR), and (ERP) are located on the outlying campuses of the University. They will eventually be telemetered to SCP and recorded on Develocorder film.

PENNSYLVANIA

Waynesburg, PA

GENERAL INFORMATION

Operated by: Waynesburg College for Lamont-Doherty Geological Observatory, Columbia University

Address: Department of Geology
Waynesburg College
Waynesburg, PA 15370

Address to obtain records:

Department of Seismology
Lamont-Doherty Geological Observatory
Palisades, NY 10964

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
WAY	Waynesburg----------	39.9017	80.1850	329	6/56	1964	Shaly sandstone, thin limestone and bituminous coal; Early Permian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
WAY	Custom, Lamont-type--	NS,EW	15.0	75.0	Photo paper	---	---
	Sprengnether---------	Z	15.0	75.0	--do-------	---	---

Timing system: Pendulum clock checked with WWV daily.

System response curve: Not available.

SHORT HISTORY

This station was installed as part of a study of long-period waves undertaken by Columbia University.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(AS-PA)	Altoona	40.7331	78.5239	469	8/26/69	10/10/69	---
(BB-PA)	Bloomsburg	41.1822	76.5519	305	8/16/62	10/05/62	---
(BD-PA)	Bedford	40.1333	78.5078	366	12/22/62	3/21/63	---
(BR-PA)	Berlin	39.9242	78.8447	665	12/30/62	7/23/65	Sandstone and shale.
(BV-PA)	Belleview	40.6844	77.6233	244	11/08/62	3/21/63	---
(GT-PA)	Galeton	41.6317	77.8111	610	5/31/62	6/28/62	---
(HD-PA)	Howard	40.9956	77.5956	369	9/25/64	1/25/65	Sandy clay.
(LT-PA)	Lewistown	40.3392	78.0667	396	11/08/62	12/12/62	---
(MR-PA)	Middleburg	40.8147	77.1756	213	10/11/62	10/27/62	---
(MS-PA)	Montrose	41.7611	75.7975	457	7/24/62	7/27/62	---
(PJ-PA)	Pottstown	40.2828	75.5836	91	8/29/69	10/10/69	---
(SH-PA)	Shamokin	41.0136	76.9136	183	10/11/62	10/27/62	---
(TU-PA)	Tunkhannock	41.5714	76.1367	366	8/02/62	10/05/62	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
(AS-PA), (PJ-PA):	Geotech S-13	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.
	Geotech	Z,NS,EW	20.0	---	--do---	---	Do.
(BR-PA), (HD-PA):	Benioff	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(BR-PA): 90 K (HD-PA): 100 K	---
	Sprengnether	Z,NS,EW	20.0	---	--do---	---	---

Garland, TX

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(BB-PA), (BD-PA), (BV-PA), (GT-PA), (LT-PA), (MR-PA), (MS-PA), (SH-PA), (TU-PA):	Benioff---------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(BB-PA): 140 K (BD-PA): 160 K (BV-PA): 140 K (GT-PA): 140 K (LT-PA): 130 K (MR-PA): 110 K (MS-PA): 80 K (SH-PA): 110 K (TU-PA): 110 K	---

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

GENERAL INFORMATION

Operated by: Lamont-Doherty Geological Observatory
of Columbia University

Address: Department of Seismology
Lamont-Doherty Geological Observatory
Columbia University
Palisades, NY 10964

Telephone: 914-359-2900

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
HKP	Hidden Lake----------	41.0382	75.0617	337	2/73	7/74	Shale; Silurian.
SSL	Sunset Lake----------	41.1612	74.9160	259	2/13/73	5/76	Shale; Devonian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
HKP	Geospace HS 10-2B-----	Z	0.5	0.02	Develocorder	---	---
SSL	--do----------	Z	.5	.02	--do--------	3700 K	Magnification at 20 Hz[1].

[1]To obtain magnification at 1 Hz multiply by 7.9 x 10-3.

Timing system: Sprengnether TS-200.

System response curves: See figure 9, p. 366.

SHORT HISTORY

Lamont-Doherty publishes a bimonthly bulletin and a yearly bulletin, available from the Observatory.

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
San Juan Geophysical Observatory
P.O. Box 936
Cayey, PR 00633

Telephone: 809-738-2281

Address to obtain records:

U.S. Geological Survey
Branch of Earthquake Tectonics and Risk
Stop 966
Box 25046, Denver Federal Center
Denver, CO 80225

SJG, SJP, and VQS records:

National Geophysical and Solar-Terrestrial
Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
APR	Arecibo	18.4577	66.7295	53	11/14/75	Open--	Alluvial deposits; Pleistocene to Holocene.
CAG	Caguas	18.2395	66.0353	350	8/16/74	7/17/75	Do.
CCA	Cerro Cariblanco (Coamo).	18.0697	66.3263	269	2/15/77	Open--	Plutonic/volcanic rock; Late Cretaceous.
CDP	Cerro de Punta	18.1752	66.5913	1300	7/30/75	--do--	Do.
CPD	Cerro la Pandura (Yabucoa).	18.0388	65.9155	370	7/30/75	--do--	Plutonic rocks; Late Cretaceous to Paleocene.
CSB	Colonia Sabana	18.2892	66.1560	480	7/30/75	--do--	Plutonic/volcanic rock; Late Cretaceous.
DOS	Dos Bocas	18.3295	66.6788	400	8/16/74	7/17/75	Plutonic/volcanic rocks; Early Cretaceous.
EYP	El Yunque (Luquillo)	18.3127	65.7912	1060	7/30/75	8/09/76	Plutonic/volcanic rocks; Late Cretaceous.
IDE	Isla Desecheo	18.3865	67.4795	218	2/15/77	Open--	Plutonic/volcanic rocks; Late Cretaceous to Paleocene.
IMO	Isla Mona	18.1115	67.9085	84	2/15/77	--do--	Limestone; Miocene.
IMR	Isla Mona	18.0883	67.8472	55	11/14/75	1/10/77	Do.
LPR	La Peregrina	18.3088	65.8697	580	8/10/76	Open--	Plutonic/volcanic rocks; Late Cretaceous.
LRS	Lares	18.2933	66.8450	440	2/15/77	--do--	Plutonic rocks; Late Cretaceous to Paleocene.
LSP	Las Mesas	18.1777	67.0862	390	11/14/75	--do--	Sandstone/plutonic rocks; Paleocene to Eocene.
MCP	Moca	18.4190	67.1107	250	11/14/75	--do--	Limestone; Miocene.
MGP	Lajas (Maguayo)	18.0077	67.0892	60	11/14/75	--do--	Plutonic/volcanic rocks; Cretaceous.
MOV	Morovis	18.2820	66.3667	485	2/15/77	--do--	Plutonic/volcanic rocks; Late Cretaceous.

Cayey, PR

SITE INFORMATION--Continued

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
PNP	Ponce (Penuelas)--------	18.0583	66.6837	200	7/30/75	Open--	Plutonic/volcanic rocks; Late Cretaceous.
PON	Ponce--------------------	18.0033	66.6138	50	8/16/74	7/17/75	Alluvial deposits; Pleistocene to Holocene.
SJG	Cayey--------------------	18.1117	66.1500	457	9/23/64	Open--	Plutonic/volcanic rocks; Early Cretaceous.
SJGC	Cayey--------------------	18.1117	66.1500	457	2/22/76	--do--	Do.
SJP	San Juan-----------------	18.3817	66.1183	80	12/1925	12/1965	---
VQS	Vieques------------------	18.1500	65.4500	20	9/1903	12/1924	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
CCA, CPD, CSB, IDE, IMO, LPR, LRS, MGP, MOV, PNP:	Geotech S-13---------	Z	1.0	---	Develocorder	550 K	Magnification at 10 Hz. Telemetered to the Observatory.
APR, LSP, MCP:	Geotech S-13---------	Z	1.0	---	--do--------	225 K	Do.
CAG, DOS, PON:	Geotech S-13---------	Z	1.0	---	--do--------	100 K	Telemetered to the Observatory.
CDP:	--do----------	Z,NS,EW	1.0	---	--do--------	225 K, 112.5 K	Magnification at 10 Hz; horizontals run at half magnification of vertical. Telemetered to Observatory.
EYP:	--do----------	Z	1.0	---	--do--------	80 K	Magnification at 5 Hz. Telemetered to Observatory.
IMR:	--do----------	Z,NS,EW	1.0	---	--do--------	160 K, 35.2 K	Magnification at 5 Hz; horizontals run at half magnification of vertical. Telemetered to Observatory.
SJG:	Benioff----------	Z,NS,EW	1.0	.75	Photo paper	---	WWSSN.
	Sprengnether------	Z,NS,EW	15.0	100.0	--do-------	---	Do.
SJGC:	Geotech S-13---------	Z	1.0	---	Develocorder	550 K	Magnification at 10 Hz. Telemetered to the Observatory.

Cayey, PR

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
SJP:	Wenner	NS,EW	12.0	---	Photo Paper	---	---
	Benioff	Z	1.04	.5	--do--	---	---
VQS:	Bosch-Omori	NS,EW	25.0	---	---	---	---

Timing system: WWVB and IRIG-E signals recorded directly with a Geotech TG-110 used as a backup.

System response curves: SJG--see figure 1, p. 363. All Geotech S-13 systems--see figure 10, p. 366.

SHORT HISTORY

This network is used principally to determine the regional and local seismicity of Puerto Rico and to assess the seismic hazard.

The San Juan Magnetic Observatory was established by the USC&GS in 1903, first at VQS and then at SJP.

VQS was established in September 1903 at Fort Isabel Segunda, Vieques Island, Puerto Rico (18°08.9' N., 65°26.4' W. elevation, 40 m). In March 1907 it was moved to 18°08.8' N., 65°26.9' W., (elevation 20 m). This station was discontinued on December 1, 1924, and the instruments were moved to SJP.

SJP was equipped with two Bosch-Omori seismographs, 8-sec periods, which began operating in January 1926. A destructive hurricane in September 1928 rendered the station inoperative; it resumed operation in November 1930 with two horizontal Wenner instruments. In November 1950 the vertical Benioff was added.

PUERTO RICO

Mayaguez, PR

GENERAL INFORMATION

Operated by: University of Puerto Rico

Address: Department of Geology
University of Puerto Rico
Mayaguez, PR 00708

Telephone: 809-832-4040 ext. 3575

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
MPR	Mayaguez----------	18.2128	67.1393	---	1973	Open--	---

INSTRUMENTATION

Code	Seismometer			Galvo	Type	Magnification	Remarks
	Type	Component	T_o(sec)	T_g(sec)	recording	at T_o	
MPR	Ranger SS-1----------	Z	1.0	---	Pen and ink	---	---

Timing system: Sprengnether TS-300.

System response curve: Not available.

GENERAL INFORMATION

Operated by: Lamont-Doherty Geological Observatory of Columbia University

Address: Department of Seismology
Lamont-Doherty Geological Observatory
Palisades, NY 10964

Telephone: 914-359-2900

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CSJ	Cape San Juan---------- Lighthouse.	18.3830	65.6181	66	3/75	Open--	Breccia and tuff flows; Cretaceous.
CUP	Culebra----------	18.335	65.309	120	6/75	--do--	Sedimentary rock; Tertiary and Cretaceous.
MTP	Mount Pirata, Vieques---	18.0940	65.5352	175	3/75	--do--	Weathered plutonic rock of varied composition; Tertiary and Cretaceous.
PWP	Barrio Florida,--------- Vieques.	18.135	65.445	10	3/75	--do--	Tholeiitic basalt, basaltic-andesite, and associated sedimentary rock; Tertiary and Cretaceous.
RRD	Roosevelt Roads--------- Naval Base.	18.2361	65.618	40	3/75	--do--	Breccia, tuff, partly of marine deposition; Early Cretaceous.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
All stations	Hall-Sears 10--------	Z	0.5	16 Hz	Develocorder	250-750 K	Magnification variable.

Timing system: Sprengnether TS 100.

System response curves: Available from station.

SHORT HISTORY

These stations were installed and are being maintained as part of the USGS Earthquake Hazards Reduction Program.

RHODE ISLAND

Groton, CT

GENERAL INFORMATION

Operated by: University of Connecticut

Address: Marine Sciences Institute
Avery Point
Groton, CT 06340

Telephone: 203-446-1020

Address to obtain records:

Weston Observatory
Boston College
Weston, MA 02193

617-899-0950

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
LAF	Lafayette----------	41.5508	71.5067	40	3/25/76	6/10/77	Rhode Island Formation (shale and sandstone); Pennsylvanian.

INSTRUMENTATION

Code	Seismometer			Galvo	Type recording	Magnification at T_o	Remarks
	Type	Component	T_o(sec)	T_g(sec)			
LAF	Geotech S-13---------	Z	1.0	---	Develocorder	50 K	Telemetered to APT.

Timing system: Geotech 11395 programmer driven by a Geotech Model 5479 crystal oscillator.

System response curves: Available from station.

SHORT HISTORY

LAF was part of the University of Connecticut's network, which was based at Avery Point, Conn. The stations that remained active after July 1977 were transferred to Weston Observatory, Mass.

LAF contributed data to the Northeastern United States Seismic Network bulletin.

SOUTH CAROLINA

Aiken, SC

GENERAL INFORMATION

Operated by: E. I. du Pont de Nemours and Company, Inc., for the U.S. Department of Energy

Address: Savannah River Laboratory
E. I. du Pont de Nemours and Company, Inc.
Aiken, SC 29801

Telephone: 803-824-6331 ext. 2095, 3469, 2114

TWX: 810-771-2670

Address to obtain records:

C.W. Krapp or I.W. Marine
Environmental Transport Division
E. I. du Pont
SRL-773-16A
Aiken, SC 29801

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(SRPD)	Savannah River Plant---- D-Area.	33.1550	81.7125	31	8/06/76	Open--	Terrace deposits; Quaternary.
(SRPN)	Savannah River Plant---- Navy.	33.3290	81.5888	95	8/06/76	--do--	Unconsolidated coastal-plain sediments; Tertiary.
(SRPW)	Savannah River Plant---- Well DRB-20.	33.2023	81.5782	77	8/06/76	--do--	Do.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(SRPD)	Mark L-4C----------	Z	1.0	---	Helicorder	9.8 K	Magnification is medium gain at 5 Hz.
(SRPN)	--do----------	Z	1.0	---	--do------	9.8 K	Magnification is medium gain at 5 Hz; high gain is 51 K at 5 Hz.
(SRPW)	--do----------	Z	1.0	---	--do------	25.8 K	Magnification is medium gain at 5 Hz.

Timing system: Geotech TG-120 with error comparator with WWV.

System response curves: See figure 2, p. 363.

SHORT HISTORY

The purpose of the network is twofold: first, to provide a continuous monitor of the seismic activity on and near the plant site and thus determine location and magnitude of local earthquakes; second, to determine whether there is a significant difference in the ground motion of the two geologically different materials that occur at the surface of the plant and whether the response varies over different thicknesses of coastal-plain sediments.

SOUTH CAROLINA

Columbia, SC

GENERAL INFORMATION

Operated by: University of South Carolina

Address: Seismograph Station, Geology Department
University of South Carolina
Columbia, SC 29208

Telephone: 803-777-6449

Address to obtain records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CSC	Columbia	34.0000	81.0333	94	1/01/31	9/73	Granite; Paleozoic(?).

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
CSC	Wilson-Lamison	Z	1.1	1.6	Photo paper	24 K	---
	--do	NS,EW	8.0	4.1	--do	13 K	---

Timing system: Pendulum clock.

System response curves: Not available.

SHORT HISTORY

This station was a cooperative effort of the USC&GS and the University. It was closed because the site became too noisy.

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
Branch of Earthquake Tectonics and Risk
Stop 968
Box 25046, Denver Federal Center
Denver, CO 80225

Telephone: 303-234-4041

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(BCS)	Baptist College at Charleston.	22.9812	80.0717	12	3/31/76	Open--	Alluvium.
(CAF)	Charleston AFB	32.9150	80.0638	10	2/27/73	9/28/73	Do.
(CCS)	Cawcaw Swamp	32.8162	80.2553	9	3/31/76	Open--	Do.
(CHF)	Calhoun Falls	34.0247	82.5867	152	2/14/77	--do--	Do.
FMF	Francis Marion National Forest.	32.9540	79.8410	0	2/28/73	10/02/73	Do.
(GVF)	Givhans Ferry State Park.	32.0167	80.3667	15	2/28/73	3/04/73	Do.
GVS	Graniteville	33.5970	81.8528	100	5/20/74	8/09/76	Granite.
HBF	Harts Bluff	32.9330	80.3780	10	3/23/73	Open--	Alluvium.
JSC	Jenkinsville	34.2790	81.2580	120	5/20/74	--do--	Granite.
LHS	Liberty Hill	34.4790	80.8080	120	5/20/74	--do--	Alluvium and granite.
(MGS)	Middleton Gardens	32.8970	80.1408	9	3/31/76	--do--	Alluvium.
MKC	Moncks Corner	33.1900	80.0400	25	3/13/73	10/01/73	Do.
(MTT)	Monetta	33.7513	81.6362	182	8/09/76	Open--	Do.
NHS	North Hampden	33.0720	79.7560	10	5/20/74	--do--	Do.
OSB	Orangeburg	33.5472	80.8444	91	4/02/77	--do--	Do.
OSC	Orangeburg	33.5400	80.8250	60	5/20/74	3/77	Do.
PBS	Pigeon Bay	33.2790	80.2640	25	5/20/74	Open--	Do.
(PPS)	Pierpont	32.8237	80.0400	4	3/31/76	--do--	Do.
PRM	Parsons Mountain	34.0833	82.3633	254	7/04/75	--do--	Hard rock.
SGS	St. George	33.1930	80.5120	25	3/08/73	--do--	Do.
SMA	Summerton	33.6280	80.3180	30	5/20/74	7/01/75	Do.
(SVS)	Slandsville	32.9688	80.2487	3	3/31/76	Open--	Do.
VSC	Varneville	32.8790	81.0500	30	5/20/74	--do--	Do.
(WAC)	Walterboro County Airport.	32.9330	80.6330	25	3/02/73	3/23/73	Do.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
(BCS)	Mark L-4C----------	Z	1.0	---	Helicorder, magnetic tape.	26 K	Magnification at 2 Hz.
(CAF)	Geotech S-13---------	Z,NS,EW	1.0	---	Develocorder	52.8 K	Magnification at 2 Hz. Telemetered to the University of South Carolina.
(CCS)	Mark L-4C----------	Z	1.0	---	Helicorder, magnetic tape.	54 K	Magnification at 2 Hz. Telemetered to BCS.
(CHF)	--do----------	Z,NS	1.0	---	Develocorder	26 K	Magnification at 2 Hz. Telemetered to the University.
FMF	--do----------	Z	1.0	---	--do--------	211.2 K	Do.
(GVF)	Hall Sears 10--------	Z	1.0	---	Smoked paper	100 K	Magnification at 2 Hz.
GVS	Geotech S-13---------	Z	1.0	---	Develocorder	35 K	Do.
HBF	--do----------	Z	1.0	---	--do--------	124 K	Magnification at 2 Hz. Telemetered to the University.
JSC	--do----------	Z	1.0	---	--do--------	240 K	Do.
LHS	--do----------	Z	1.0	---	--do--------	124 K	Do.
(MGS)	Mark L-4C----------	Z	1.0	---	Helicorder, magnetic tape.	13.8 K	Magnification at 2 Hz. Telemetered to BCS.
	Mark L-7----------	Z,NS,EW	1.0	---	--do--------	2.8 K	Magnification at 10 Hz.
MKC	Mark L-4C----------	Z	1.0	---	Develocorder	105.6 K	Magnification at 2 Hz. Telemetered to the University.
	Geotech S-13---------	NS,EW	1.0	---	--do--------	105.6 K	Do.
(MTT)	Geotech S-13---------	Z	1.0	---	--do--------	62 K	Do.
NHS	--do----------	Z	1.0	---	--do--------	62 K	Do.
OSB	--do----------	Z	1.0	---	--do--------	---	Do.
OSC	--do----------	Z	1.0	---	--do--------	31 K	Do.
PBS	--do----------	Z	1.0	---	--do--------	31 K	Do.
(PPS)	Mark L-4C----------	Z	1.0	---	Helicorder, magnetic tape.	13.8 K	Magnification at 2 Hz. Telemetered to BCS.
PRM	Geotech S-13---------	Z	1.0	---	Develocorder	240 K	Magnification at 2 Hz. Telemetered to the University.
SGS	--do----------	Z	1.0	---	--do--------	124 K	Do.
SMA	--do----------	Z	1.0	---	--do--------	31 K	Telemetered to the University.
(SVS)	Mark L-4C----------	Z	1.0	---	Helicorder, magnetic tape.	54 K	Magnification at 2 Hz. Telemetered to BCS.

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
VSC	Geotech S-13---------	Z	1.0	---	Develocorder	31 K	Magnification at 2 Hz. Telemetered to the University.
(WAC)	Mark L-4C----------	Z	1.0	---	--do--------	105.6 K	Do.

Timing system: Geotech TG-120. The mini-net uses a Geotech TG-110.

System response curves: See figure 10, p. 366 for the main network. See figure 2, p.363 for the mini-net.

SHORT HISTORY

(BCS) is the central station of the mini-net comprising (BCS), (CCS), (MGS), (PPS), and (SVS). The main network consists of all the other operating stations.

SOUTH DAKOTA

Eagle Butte, SD

GENERAL INFORMATION

Operated by: Jerome E. Payne

Address: Jerome E. Payne
Eagle Butte, SD 57625

Telephone: 605-964-3591

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
EBS	Eagle Butte----------	44.9998	101.2322	735	5/72	Open--	Clay.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
EBS	Custom----------	Z	1.0	---	Pen and ink	150 K	---

Timing system: Westclox quartzmatic time adjusted to WWV twice daily.

System response curve: Not available.

SHORT HISTORY

EBS is the avocation of the owner and operator of the station.

GENERAL INFORMATION

Operated by: South Dakota School of Mines

Address: Department of Geological Engineering
South Dakota School of Mines
Rapid City, SD 57701

Telephone: 605-394-2461

Address to obtain records:

WWSSN records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
RCD	Rapid City----------	44.0750	103.2083	995	9/43	Open--	Belle Fourche Shale; Late Cretaceous.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
RCD	Benioff----------	Z,NS,EW	1.0	0.75	Photo paper	---	WWSSN.
	Sprengnether---------	Z,NS,EW	15.0	100.0	--do--------	---	Do.

Timing system: WWSSN standard.

System response curves: See figure 1, p. 363.

SHORT HISTORY

Although the station opened in 1943, operation did not become continuous until 1946 with the installation of a Wilson-Lamison vertical and a Wood-Anderson horizontal. In 1956 the instrumentation was expanded. On December 15, 1961, the WWSSN equipment was installed. Until 1974, recording was fairly continuous. Exceptions were a period between April 1967 and December 1969, when no recording was made, and from 1969 to 1973, when several months of data gaps occurred. In November 1974 the station was temporarily shut down because of construction nearby. An effort is being made to make the station operational again.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(AY-SD)	Academy	43.5278	99.1083	610	7/14/62	10/05/62	---
(CO-SD)	Colome	43.2867	99.6703	640	7/06/62	7/11/62	---
(DL-SD)	Dell Rapids	43.8328	96.7733	488	12/28/62	3/21/63	---
(MC-SD)	Mitchell	43.6544	97.9194	366	5/09/62	6/28/62	---
(RG-SD)	Redig	45.2164	103.5347	945	10/25/65	9/26/66	Granite.
(SX-SD)	Salem	43.8747	97.2500	488	11/09/62	12/12/62	---
(SY-SD)	Stickney	43.6056	98.4917	488	10/12/62	10/27/62	---
(WN-SD)	Winner	43.2522	100.1961	792	12/08/61 6/07/64 10/25/65 8/03/67	6/19/63 10/01/64 10/14/66 12/10/67	Mesozoic and Cenozoic clastic rocks and Paleozoic limestone.

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(AY-SD), (RG-SD), (SX-SD), (WN-SD) (last 3 oper.):	Benioff	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(AY-SD): 60 K (RG-SD): 70 K (SX-SD): 70 K (WN-SD): 60 K	---
	Sprengnether	Z,NS,EW	20.0	---	--do---	---	---
(CO-SD), (DL-SD), (MC-SD), (SY-SD), (WN-SO) (1st oper):	Benioff	Z,NS,EW	1.0	---	--do---	(CO-SD): 40 K (DL-SD): 260 K (MC-SD): 200 K (SY-SD): 70 K	---

Garland, TX

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

TENNESSEE

McMinnville, TN

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
McMinnville Observatory--Unmanned
McMinnville, TN 37110
(Obsolete)

Address to obtain records:

1962-1966:

Teledyne-Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

1966-present:

U.S. Geological Survey
Branch of Global Seismology
Stop 967
Box 25046, Denver Federal Center
Denver, CO 80225

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CPO	Cumberland Plateau------	35.5948	85.5704	574	2/13/63	Open--	Sandstone and limestone; Pennsylvanian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
CPO	Johnson-Matheson-----	Z	1.25	---	Develocorder, Helicorder.	400 K	Telemetered to GLD. Magnification at 1 sec.

Timing system: Time added at GLD.

System response curves: Available with records.

SHORT HISTORY

CPO was established as part of the VELA-Uniform project. Texas Instruments and Geotech alternated operation of the station until May 1967 when the USC&GS took over the operation. Originally, CPO was constructed like BMO: it had 19 instruments in an array, as well as 6 additional instruments in the tank farm. This extended operation ceased in September 1975, and currently the station only operates a single instrument, monitored remotely.

TENNESSEE

Memphis, TN

GENERAL INFORMATION

Operated by: Memphis State University

Address: Department of Geology
Memphis State University
Memphis, TN 38152

Telephone: 901-454-2177 and 454-2178

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
MET	Memphis----------	35.1231	89.9258	93	11/16/73	Open--	Loess; Pleistocene.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
MET	Sprengnether S-5100--	Z,NS,EW	30.0	0.78, 0.77, 0.73	Visual, photographic.	1 K	---

Timing system: Sprengnether TS-100 crystal chronometer checked with WWV.

System response curves: Not available.

SHORT HISTORY

MET was established to supply information about the area after public concern arose over the classification of Memphis in risk zone 3. The vertical unit was the first to be installed, followed by the horizontals in July 1975. Photo records were sent to Oxford, Miss., read, and then stored there. They are now stored at Memphis State University.

TENNESSEE

Oak Ridge, TN

GENERAL INFORMATION

Operated by: Union Carbide Corporation--Nuclear Division

Address: Office of Waste Isolation
Union Carbide Corporation--Nuclear Division
P.O. Box Y, Bldg. 9102-2
Oak Ridge, TN 37830

Telephone: 615-483-8611 ext. 3-5868

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
ORT	Oak Ridge----------	35.9095	84.3048	370	6/67	Open--	Knox Dolomite; Late Cambrian and Early Ordovician.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
ORT	Geotech 18300--------	Z,NS,EW	1.0	---	Heated pen	40-100 K	Magnification of Z is 60-120 K.
	Geotech 28280--------	Z	11.0	---	--do------	1-2.5 K	Magnification at 10 sec.

Timing system: Geotech TG-110.

System response curves: Available from station.

SHORT HISTORY

ORT operated from July 1967 to May 1973 with a single short-period vertical instrument. From May 1973 to February 1975, the station was inoperable; then it was moved within 1 km of the original site. The coordinates above are the current site. The station is located at what was known as the Oak Ridge National Laboratory.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(CP-SO)	Cumberland Plateau Observatory.	35.5947	85.5706	574	3/14/75	7/28/76	---
(CS-TN)	Crossville	35.8153	85.1594	579	1/01/63	3/21/63	---
(CV-TN)	Centerville	35.7700	87.3844	183	11/25/61 7/15/62	12/20/61 10/05/62	---
(JS-TN)	Jackson	35.6556	88.6128	152	12/11/61 5/10/62	12/19/61 6/28/62	---
(LE-TN)	Lewisburg	35.6347	86.7672	213	10/17/62	10/27/62	---
(MM-TN)	McMinnville	35.5644	85.5889	381	12/17/61	4/01/63	Sandstone and limestone; Paleozoic.
(MX-TN)	Manchester	35.5503	86.2700	305	11/14/62	12/12/62	---
(PB-TN)	Parsons	35.7361	88.1361	122	7/06/62	7/11/62	---
(WT-TN)	Wartburg	36.1097	84.7578	427	4/12/63	7/31/63	Sandstone.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(CP-SO):	Geotech S-13	Z,NS,EW	1.0	---	Magnetic tape	130 K	Portable system.
	Geotech	Z,NS,EW	10.0	---	--do---	---	Do.
	Johnson-Matheson	Z	1.0	---	--do---	---	Instruments in an array.
(CS-TN), (CV-TN), (JS-TN), (LE-TN), (MM-TN), (PB-TN), (WT-TN):	Benioff	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(CS-TN): 140 K (CV-TN): 260 K (JS-TN): 50 K (LE-TN): 160 K (PB-TN): 230 K (WT-TN): 320 K	---

Garland, TX

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(CV-TN) (2d oper.), (MX-TN):	Benioff---------	Z,NS,EW	1.0	---	---do---------	(MX-TN): 120 K	---
	Sprengnether----	Z,NS,EW	20.0	---	---do---------	---	---

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

GENERAL INFORMATION

Operated by: Saint Louis University

Address: Department of Earth and Atmospheric Sciences
Saint Louis University
P.O. Box 8099, Laclede Station
St. Louis, MO 63156

Telephone: 314-535-3300

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
DY1	Dyersburg (Lane)--------	36.1917	89.3917	120	1969	1970	Loess (Quaternary) overlying Wilcox Formation (Eocene).
DY2	Lassiter----------	36.3302	89.3520	110	1969	1970	Loess (Quaternary) overlying siltstone of the Wilcox Formation (Eocene).
DY3	Tiptonville----------	36.4430	89.5069	87	1969	1972	Gumbo sandy clay; Quaternary.
DY4	Samburg----------	36.4167	89.3031	140	1969	1972	Loess (Quaternary) overlying Wilcox Formation (Eocene).
DY5	Lassiter Corners--------	36.3247	89.3621	134	1970	1972	Do.
GRT	Gratio----------	36.2640	89.4250	137	6/28/74	Open--	Loess (Quaternary) overlying siltstone of the Wilcox Formation (Eocene).
HHT	Hurricane Hollow--------	36.1711	87.9014	113	Early 60's	Closed	---
(LTN)	Lenox----------	36.0720	89.4700	148	8/77	Open--	Loess (Quaternary) overlying Wilcox Formation (Eocene).
NKT	Nankipoo----------	35.8500	89.5540	153	6/26/74	--do--	Do.
OKG	Oak Grove----------	36.6260	89.8350	129	6/27/75	--do--	Do.
ZZT	Zu Zu----------	35.3640	89.3720	120	3/74	9/75	Do.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
DY1, DY2, DY4, DY5:	Hall Sears 10--------	Z	1.0	0.5	Magnetic tape	50 K	DY4 and DY5 telemetered to DY3. (Autocorders used before 1969.)
DY3:	Sprengnether---------	Z	.5	---	--do---------	50 K	Magnification at 2 Hz.
GRT:	Mark L4-C----------	Z	1.0	16 Hz	Develocorder, magnetic tape.	348 K	Magnification at 10 Hz. Telemetered to SLM.
HHT:	Unknown----------	---	---	---	---	---	---

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(LTN):	Mark L4-C----------	Z	1.0	16 Hz	Develocorder, magnetic tape.	400 K	Magnification at 10 Hz. Telemetered to SLM.
	EV-17H----------	NS,EW	1.0	16 Hz	--do---------	200 K	Do.
NKT	Mark L4-C----------	Z	1.0	16 Hz	Develocorder, magnetic tape.	410 K	Do.
OKG	--do----------	Z	1.0	16 Hz	--do-----	442 K	Do.
ZZT	Hall-Sears 10--------	Z	1.0	.2	Photo paper	50 K	Recorded on Autocorder.

Timing system: Sprengnether TS-100.

System response curves: Available from the University.

SHORT HISTORY

DY1 was founded as part of a tripartite network. It was too noisy and was moved to DY2 in early 1970.
DY2 was only a temporary site for the instrument moved from DY1. The instruments were ultimately moved to DY5.
GRT is part of the SIK array.
(LTN), NKT, and OKG are part of the PGA array.
The University publishes the quarterly bulletin of the Southeast Missouri Regional Seismic Network.

TEXAS

Dallas, TX

GENERAL INFORMATION

Operated by: Ralph W. McNeely

Address: Ralph W. McNeely
9612 Crestedge
Dallas, TX 75238

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
DLS	Dallas----------	32.8778	96.7056	169	2/20/71	1975	Austin Group; Late Cretaceous.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
DLS	Sprengnether 100-----	---	---	---	Helicorder	---	---
	Geotech 8700A--------	---	---	---	--do------	---	---
	Johnson-Matheson-----	---	---	---	--do------	---	---

Timing system: Geotech 5400A.

System response curves: Not available.

SHORT HISTORY

This station was the avocation of the owner.

TEXAS

Dallas, TX

GENERAL INFORMATION

Operated by: Southern Methodist University

Address: Dallas Seismological Observatory
Southern Methodist University
Dallas, TX 75275

Telephone: 214-692-2760

Address to obtain records:

As above.

WWSSN records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
DAL	Dallas----------	32.8461	96.7839	187	1953	Open--	Austin Group; Late Cretaceous.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
DAL	Benioff----------	Z,NS,EW	1.0	0.75	Photo paper	25 K	WWSSN.
	Sprengnether---------	Z,NS,EW	15.0	100.0	--do-------	1.5 K	Do.

Timing system: WWSSN standard.

System response curves: See figure 1, p. 363.

SHORT HISTORY

The WWSSN equipment began operating in June 1962.

GENERAL INFORMATION

Operated by: John W. Crain

Address: John W. Crain--Deceased
Denton, TX
(Obsolete)

Address to obtain records:

Apparently the only existing record is of a 1931 event, and it is held at the University of California, Berkeley.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
DNT	Denton----------	33.2167	97.1333	208	1925	Closed	Clay.

INSTRUMENTATION

Code	Seismometer			Galvo	Type recording	Magnification at T_o	Remarks
	Type	Component	T_o(sec)	T_g(sec)			
DNT	Custom, inverted----- pendulum.	EW	---	---	Smoked paper	---	---

Timing system: Not available.

System response curve: Not available.

SHORT HISTORY

The station was the avocation of the owner. His record of the August 16, 1931, earthquake in Texas was used by Perry Byerly in his analysis of that event.

GENERAL INFORMATION

Operated by: University of Texas

Address: Kidd Memorial Seismic Observatory
University of Texas at El Paso
El Paso, TX 79968

Telephone: 915-747-5776

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
EPT	El Paso----------	31.7717	106.5058	1186	2/61	Open--	Andesite; Eocene.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
EPT	Benioff----------	Z,NS,EW	1.0	0.75	Photo paper	---	WWSSN.
	Sprengnether---------	Z,NS,EW	15.0	100.0	--do-------	---	Do.

Timing system: WWSSN standard.

System response curves: See figure 1, p. 363.

SHORT HISTORY

The Kidd Memorial Seismic Observatory was founded in 1959 through donations made in the memory of Professor John Kidd, a key figure in the early history of the University at El Paso. Fulltime operation was begun in February 1962. The original instruments were three-component short-periods. The WWSSN instruments were moved from OXF, Oxford, Miss., and began operation on June 7, 1977.

TEXAS

Galveston, TX

GENERAL INFORMATION

Operated by: Marine Science Institute of the University of Texas

Address: Geophysics Laboratory
Marine Science Institute
University of Texas
700 The Strand
Galveston, TX 77550

Telephone: 713-765-2158

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
HKT	Hockley----------	29.9500	95.8333	-122	6/73	Open--	Salt dome.
MOT	McDonald Observatory----	30.6797	104.0082	2020	8/75	--do--	---
(MT2)	Eagle Mountain----------	30.8992	105.0146	2084	3/77	--do--	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
HKT	Geotech S-13---------	Z,NS,EW	1.0	---	Helicorder	300 K	Telemetered to the Institute.
MOT	--do----------	Z	1.0	---	--do------	100 K	Do.
MT2	--do----------	Z	1.0	---	--do------	---	---

Timing system: Geotech clock checked with WWV daily.

System response curves: Not available.

TEXAS

Garland, TX

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(AZ-TX)	Amarillo	35.4300	101.9306	988	8/28/63	3/06/64	Dolomite.
(BM-TX)	Balmorhea	30.9264	103.8550	1067	1/20/62	2/15/62	Limestone.
(EF-TX)	Eagle Flat	31.1764	105.1300	1433	1/25/62	5/03/62	Do.
(EO2TX)	Elmo	32.6481	96.1586	158	3/15/68	3/26/68	---
(EP-TX)	El Paso	31.9328	105.9667	1615	1/15/62	5/04/62	Limestone.
(FO-TX)	Fort Stockton	30.9017	102.6978	880	6/21/64	4/12/65	Alluvium.
(GA-TX)	Grand Saline	32.6569	95.7044	-86	10/16/68 10/25/68 3/13/70	4/23/69 4/23/69 8/11/70	---
(GA3TX)	--do	32.6597	95.7036	-94	10/01/71	11/10/71	---
(GL-TX)	Garland	32.9722	96.6350	168	1/19/68	1/19/68	---
(GR1TX)	Grit	30.7778	99.3842	518	5/19/67	5/23/67	---
(GR2TX)	--do	30.7864	99.4161	549	5/19/67	5/23/67	---
(GV-TX)	Grapevine	32.8858	96.9983	152	6/02/62	12/31/65	Clay and shale; Cretaceous.
(HE-TX)	Hempstead	30.1997	96.0919	67	7/25/63	3/16/64	Clay.
(JU-TX)	Juno	30.1119	101.0772	533	4/04/64	8/11/64	Alluvium.
(LP-TX)	La Pryor	29.1797	99.6764	274	11/27/61	5/16/62	Limestone.
(PO-TX)	Post	33.4756	101.3622	914	12/09/61	12/20/61	---
(SA2TX)	San Angelo	31.5500	100.9075	732	4/17/67 4/16/67	5/08/67 5/16/67	Limestone.
(SA4TX)	--do	31.8247	101.4264	792	4/17/67 5/18/67	5/08/67 5/23/67	Do.
(SJ-TX)	San Jose	27.6119	98.3128	114	11/11/61 10/26/65 8/03/67 1/16/68 8/21/69 9/23/71 5/08/73	7/08/63 11/15/65 9/18/67 1/19/68 10/10/69 11/09/71 5/22/73	Caliche; Cenozoic.

SITE INFORMATION--Continued

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(SK-TX)	Shamrock----------	35.0828	100.3639	671	8/19/63	3/06/64	Gypsum.
(SM-TX)	Seymour----------	33.6822	99.1897	396	12/06/61	12/20/61	---
(SS-TX)	Sanderson----------	30.0214	102.3281	732	10/19/61	6/11/63	Limestone; Cretaceous.
(ST1TX)	Streeter----------	30.7522	99.3556	518	4/15/67	5/23/67	Granite.
(ST2TX)	--do----------	30.7922	99.4478	579	4/16/67	5/23/67	Limestone.
(ST4TX)	--do----------	31.1633	100.0611	640	4/16/67	5/16/67	Limestone.
(WP-TX)	Wills Point----------	32.6069	95.8861	161	3/18/71	5/31/72	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(AZ-TX), (BM-TX), (GV-TX), (JU-TX), (SJ-TX) (2d and 3d oper.), (SK-TX), (SS-TX):	Benioff----------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(AZ-TX): 80 K (BM-TX): 300 K (GL-TX): 55 K (GV-TX): 35 K (JU-TX): 300 K (SK-TX): 150 K (SS-TX): 500 K	---
	Sprengnether----	Z,NS,EW	20.0	---	--do----------	---	---
(EF-TX), (EP-TX), (FO-TX), (HE-TX), (LP-TX), (PO-TX), (SJ-TX) (1st oper.), (SM-TX);	Benioff----------	Z,NS,EW	1.0	---	--do----------	(EF-TX): 500 K (EP-TX): 300 K (FO-TX): 360 K (HE-TX): 50 K (LP-TX): 400 K (PO-TX): 150 K (SJ-TX): 80 K (SM-TX): 150 K	---
(EO2TX), (GA3TX), (SA2TX), (SA4TX), (ST4TX):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	SA2TX: 250 K SA4TX: 210 K ST4TX: 140 K	Portable system.

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
(GA-TX), (GL-TX), (GR1TX), (GR2TX), (SA4TX) (2d oper.), (SJ-TX) (4th to 7th oper.), (ST1TX), ST2TX):	Geotech S-13----	Z,NS,EW	1.0	---	--do---------	SJ-TX: 80 K ST1TX: 350 K ST2TX: 300 K	Do.
	Geotech---------	Z,NS,EW	20.0	---	--do---------	---	Do.
(WP-TX):	Geotech 31300---	Triaxial	20.0	---	--do---------	---	---

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

TEXAS

Houston, TX

GENERAL INFORMATION

Operated by: Mandrel Industries, Inc.

Address: Ray Geophysical Division
Mandrel Industries, Inc.
6909 Southwest Freeway
P.O. Box 36306
Houston, TX 77036

Telephone: 713-774-7561

Telex: 077-252

Address to obtain records:

Unknown.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
HET	Houston - ET----------	29.7200	95.4699	6	1961	Spring 65	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
HET	Electro-Tech---------	Z	5.0	25.0	---	---	---

Timing system: Not available.

System response curve: Not available.

TEXAS

Houston, TX

GENERAL INFORMATION

Operated by: Rice University

Address: Seismographic Station
Geology Department
Rice University
P.O. Box 1892
Houston, TX 77001

Telephone: 713-527-4886

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
HOU	Houston----------	29.7189	95.4022	15	~1960	Open	Clay; Holocene.

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
HOU	Press-Ewing----------	Z,NS,EW	12.0	---	Pen and ink	1 K	---

Timing system: Tuning-fork chronometer synchronized with WWV.

System response curves: Available from station.

SHORT HISTORY

HOU is run on an experimental basis and has not been operated continuously.

TEXAS

Lubbock, TX

GENERAL INFORMATION

Operated by: Texas Technological University

Address: Seismological Observatory
Texas Technological University
P.O. Box 4109
Lubbock, TX 79409

Telephone: 807-742-3116

Address to obtain records:

WWSSN records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
LUB	Lubbock----------	33.5833	101.8667	979	6/48	Open--	Caliche; Pleistocene.
JCT	Junction----------	30.4794	99.8022	591	3/10/65	--do--	Edwards Limestone; Early Cretaceous.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
LUB	Benioff----------	Z,NS,EW	1.0	0.75	Photo paper	25 K	WWSSN.
	Sprengnether---------	Z,NS,EW	15.0	100.0	--do-------	1.5 K	Do.
JCT	Benioff----------	Z,NS,EW	1.0	.75	--do-------	200 K	Do.
	Sprengnether---------	Z,NS,EW	15.0	100.0	--do-------	1.5 K	Do.

Timing system: WWSSN standard.

System response curves: See figure 1, p. 363.

SHORT HISTORY

LUB started operating its WWSSN equipment on December 12, 1961, after several years of operation using other equipment. The JCT site was chosen for its quiet, aseismic characteristics, as evidenced by the high short-period magnifications. Operations were continuous, but occasionally reduced in scope to record only the short-period vertical instrument. Texas A & M University ran the station from the time of installation until September 1, 1971, when ownership of the host facility passed by legislative action to Texas Technological University.

TEXAS

Denver, CO

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
Branch of Earthquake Hazards
Stop 978
Box 25046, Denver Federal Center
Denver, CO 80225

Telephone: 303-234-5604

Telex: 45-509

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
KM2	Kermit----------	32.0925	103.0718	932	12/15/76	Open--	---
KM5	--do----------	31.8317	103.0317	874	10/15/76	--do--	---
KM6	--do----------	31.9825	102.8632	1030	10/16/76	--do--	---
KM9	--do----------	31.7482	102.8563	888	10/14/76	--do--	---
KME	--do----------	31.5782	103.1200	816	10/14/76	--do--	---
KT1	--do----------	32.0681	103.3261	930	11/08/75	--do--	---
KT2	--do----------	32.0894	103.1022	927	1/20/76	12/15/76	---
KT4	--do----------	31.9097	103.3153	948	1/17/76	Open--	---
KT5	--do----------	32.0680	103.3262	---	3/24/76	10/15/76	---
KT7	--do----------	31.7092	103.3061	847	11/13/75	Open--	---
KT8	--do----------	31.7036	103.0981	840	1/16/76	--do--	---
KT9	--do----------	31.7178	102.8811	869	1/17/76	10/14/76	---
KTE	--do----------	31.5278	103.0975	799	1/15/76	10/14/76	---
KTT	--do----------	31.5436	102.8819	795	11/10/75	Open--	---
KTX	--do----------	31.5306	103.2892	847	1/16/76	--do--	---

INSTRUMENTATION

Code	Seismometer			Galvo	Type	Magnification	Remarks
	Type	Component	T_o (sec)	T_g (sec)	recording	at T_o	
All stations	Mark L-4C----------	Z	1.0	---	Develocorder	15-25 K	Telemetered to GLD.

Denver, CO

Timing system: Time added at GLD.

System response curves: Not available.

SHORT HISTORY

This network was established to monitor seismicity in conjunction with the water table. The numbering in the codes reflects the order in which the stations were installed; X, E, and T are abbreviations for 10, 11, and 12. The KM designation reflects a changed location for the KT station of the same number; when no code for a KT station of the same number exists, the station was planned but never became operational.

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: National Center for Earthquake Research
U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025

Telephone: 415-323-8111

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CEC (TCEC)	Childress East Central-	34.5720	100.3258	548	---	1974	---
CNE (TCNE)	Childress Northeast----	34.5838	100.3103	555	---	1974	---
CNO (TCNO)	Childress North--------	34.5780	100.3352	562	---	1974	---
CNW (TCNW)	Childress Northwest----	34.5917	100.3597	540	---	1974	---
CSE (TCSE)	Childress Southeast----	34.5558	100.3305	521	---	1974	---
CSW (TCSW)	Childress Southwest----	34.5570	100.3480	546	---	1974	---
CWT (TCWC)	Childress West Central-	34.5703	100.3437	549	---	1974	---

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
All stations	Mark L-4C----------	Z	1.0	---	Magnetic tape	---	---

Timing system: Not available.

System response curves: See figure 1, p. 363.

GENERAL INFORMATION

Operated by: University of Utah

Address: Seismograph Stations
Department of Geology and Geophysics
611 Browning Building
University of Utah
Salt Lake City, UT 84112

Telephone: 801-581-6274

Address to obtain records:

As above.

FGU records from 1960 to 1969:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

UBO records:

Teledyne-Geotech
Seismic Data Analysis Center
314 Montgomery
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
AAU	Alta----------	40.5920	111.6383	2694	11/74	4/76	Shaly sandstone; Paleozoic.
ANU	Antelope Island----------	41.0397	112.2317	1353	11/75	Open--	Quartzite; Precambrian.
BDU	Big Dutch Hollow--------	40.8742	111.5340	2198	9/74	--do--	Conglomerate; Tertiary.
BPU	Bountiful Peak----------	40.9542	111.8175	2652	10/74	3/75	Schist, gneiss; Precambrian.
CCU	Cedar City----------	37.6753	113.0685	1775	12/68	Open--	Alluvium; Quaternary.
(CFU)	Cove Fort----------	38.6188	112.5387	2012	3/77	--do--	Volcanic flow; Tertiary.
CPU	Coon Peak----------	40.6730	112.1903	2228	11/74	--do--	Limestone; Paleozoic.
CWU	Camp Williams----------	40.4458	112.1022	1945	10/74	--do--	Do.
DAU	Daniels Canyon----------	40.4125	111.2558	2771	11/74	--do--	Do.
DCU	Deer Creek----------	40.4137	111.5268	1829	11/74	--do--	Do.
DUG	Dugway----------	40.1950	112.8133	1477	5/62	--do--	Rhyolite-quartz dacite flow; Tertiary.
EPU	East Promontory--------	41.3951	112.4088	1436	9/75	--do--	Limestone; Paleozoic.
ETU	East Traverse----------	40.4773	111.8445	1884	7/74	--do--	Do.
FGU	Flaming Gorge----------	40.9263	109.3862	1982	1960	6/76	Sandstone; Jurassic.
FPU	Francis Peak----------	41.0263	111.8368	2816	9/74	Open--	Schist, gneiss; Precambrian.
GMU	Granite Mountain--------	40.5755	111.7632	1829	8/70	--do--	Quartz monzonite; Cretaceous, Tertiary.
HDU	Hyde Park----------	41.8045	111.7648	1853	3/75	--do--	Limestone, dolomite; Paleozoic.
HTU	Hoyt Peak----------	40.6753	111.2202	2576	11/74	--do--	Sandstone; Paleozoic.
HVU	Hansel Valley----------	41.7797	112.7750	1609	11/76	--do--	Limestone; Paleozoic.
LMU	Lake Mountain----------	40.2832	111.9370	2316	9/74	--do--	Do.
LOG	Logan----------	41.7417	111.8133	1455	1/26/40	9/76	Alluvium; Quaternary.
LTU	Little Mountain--------	41.5918	112.2472	1585	9/74	Open--	Limestone; Paleozoic.

SITE INFORMATION--Continued

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
MCU	Monte Cristo----------	41.4617	111.5075	2664	12/74	Open--	Limestone, dolomite; Paleozoic.
(MNU)	Milford North----------	38.6198	112.8473	1664	1/77	--do--	Granitoid intrusive; Tertiary.
MSU	Marysvale----------	38.5133	112.1742	2141	11/75	--do--	Do.
NSU	North Stansbury---------	40.9082	112.5060	1422	10/76	--do--	Quartzite, argillite; Precambrian.
OGU	Ogden----------	41.2750	111.9440	1506	9/75	--do--	Quartzite; Paleozoic.
PBU	Perry Basin----------	41.4682	112.0097	1625	9/75	--do--	Metasediment; Precambrian.
PCU	Price----------	39.6067	110.8050	1714	5/62	--do--	Shale; Cretaceous.
PPU	Promontory Point--------	41.3107	112.4303	1874	9/74	8/75	Limestone, dolomite; Paleozoic.
(PTU)	Portage----------	41.9293	112.3247	2192	12/17/76	Open--	Limestone; Paleozoic.
(PUU)	Piute Reservoir---------	38.3580	112.2745	2598	1/77	--do--	Volcanic flow; Tertiary.
RBU	Red Butte----------	40.7808	111.8083	1676	6/74	--do--	Sandstone; Triassic.
(RFU)	Richfield----------	38.7857	112.1092	1871	1/77	--do--	Sandstone; Tertiary.
(RHU)	Roosevelt Hotsprings----	38.4723	112.8472	1905	1/77	--do--	---
SAU	Saltair----------	40.8197	112.0730	1283	3/74	--do--	Alluvium; Quaternary.
SBU	Stansbury Island--------	40.8218	112.4667	1317	7/74	10/76	Limestone; Paleozoic.
SLC	Salt Lake City----------	40.7638	111.8478	1423	4/62	Open--	Alluvium; Quaternary.
SQU	Squaw Peak----------	40.2817	111.6105	2353	9/74	--do--	Limestone, dolomite; Paleozoic.
SUU	Santaquin----------	39.8887	111.7917	1987	9/74	--do--	Do.
UBO	Uinta Basin----------	40.3217	109.5668	1596	4/70	9/73	Sandstone; Jurassic.
WHU	Wild Horse----------	39.3805	112.1698	1993	10/74	Open--	Sandstone, limestone; Cretaceous.
(WIU)	Willard----------	41.4222	111.9717	2643	11/74	3/75	---
WMU	West Mountain----------	40.0883	111.8227	2054	12/73	Open--	Limestone; Paleozoic.

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
AAU, BDU, BPU, CPU, DAU, EPU, ETU, FPU, GMU, HTU, LMU, LTU, MCU, (MNU), NSU, OGU, PBU, PPU, (PTU), (PUU), RBU, (RHU), SBU, SQU, SUU, (WIU):	Mark L-4C-------	Z	1.0	---	Develocorder	200-800 K	Telemetered to the University.

INSTRUMENTATION--Continued

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
ANU, (CFU), CWU, DCU, HDU, HVU, MSU, (RFU), SAU, WHU, AND WMU:	Geotech S-13----	Z	1.0	---	Develocorder	200-800 K	Do.
CCU:	Benioff---------	Z,NS,EW	1.0	---	Photo paper	70 K	---
DUG:	Benioff---------	Z,NS,EW	1.0	.75	Photo paper	200 K	WWSSN.
	Sprengnether----	Z,NS,EW	15.0	100.0	---do------	3 K	Do.
	Wood-Anderson---	NS,EW	---	---	---do------	2800	Non-standard instrument.
FGU:	Benioff---------	Z,NS,EW	1.0	---	35-mm film	200 K	---
LOG:	Wilson-Lamison--	Z,NS,EW	1.0	---	Photo paper	125 K	---
	Wood-Anderson---	NS,EW	6.24	---	---do------	2800	---
PCU:	Benioff---------	Z,NS,EW	1.0	---	---do------	20-68 K	---
	Wood-Anderson---	NS,EW	---	---	---do------	2800	---
SLC:	Benioff---------	Z,NS,EW	1.0	---	---do------	15-42 K	---
UBO:	Geotech---------	Z,NS,EW	1.0	---	Develocorder	600 K	---
	---do-----------	Z,NS,EW	Long	---	---do-------	100 K	---

Timing system: All telemetered stations record WWVB directly. CCU uses a Geotech TG-110. DUG uses WWSSN standard. PCU uses a Simplex Model 25. SLC uses a Geotech 19000.

System response curves: DUG--see figure 1, p. 363. Others available from station.

SHORT HISTORY

CCU is operated by Southern Utah State College for the University of Utah.

UBO was formerly run by AFTAC and was set up like BMO with a 10-station array. Its equipment and array pattern were identical to those of BMO.

LOG was owned and operated by the Utah State Agricultural College from 1940 to January 1964 when the University of Utah assumed responsibility for the station.

SLU was originally established in 1939 at a slightly different location from the current one.

FGU was operated by USC&GS for the U.S. Bureau of Reclamation until it was given to the University in July 1970.

Stations along the Wasatch Front were supported largely by USGS grants.

GENERAL INFORMATION

Operated by: Sandia Laboratories

Address: Sandia Laboratories
Albuquerque, NM 87115

Telephone: 505-264-1468

Address to obtain records:

As above.

Not generally made available.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
LEE	Leeds----------	37.2431	113.3767	1097	4/63	Open--	Chinle Formation (sandstone); Late Triassic.

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
LEE	Benioff----------	Z,87.9°,177.9°	1.0	0.2	Magnetic tape	Variable	---
	Geotech 18300------	Z	1.33	---	---do--------	---do---	---
	NGC-23----------	Z,87°,177°	.8	---	---do--------	---do---	---

Timing system: IRIG time code imposed at central recording site on the Nevada Test Site.

System response curves: Not available.

SHORT HISTORY

This station was a replacement for an earlier station in an unsatisfactory tunnel. It was placed as near as possible in a line from the Nevada Test Site to the AFTAC station at Kanab, Utah (KN-UT).

This station is part of a net surrounding the Nevada Test Site. It is used for recording scheduled explosions and does not operate all the time. It is controlled remotely from the test site and is sometimes recorded by the USGS in Las Vegas. Data are not available to the public.

UTAH

Denver, CO

GENERAL INFORMATION

Operated by: U.S. Geological Survey for the U.S. Bureau of Reclamation

Address: U.S. Geological Survey
Branch of Global Seismology
Stop 967
Box 25046, Denver Federal Center
Denver, CO 80225

Telephone: 303-234-3994

Telex: 73-2394

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
RMU	Rainbow Monument--------	37.0760	110.9700	1536	2/76	Open--	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
RMU	Mark L-4C----------	Z	1.0	---	Develocorder, Helicorder.	---	Telemetered to GLD.

Timing system: Sprengnether TG-120.

System response curve: Uncalibrated.

SHORT HISTORY

RMU was established to monitor the seismicity near Rainbow Bridge.

UTAH

Denver, CO

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
Engineering Geology Branch
Stop 903
Box 25046, Denver Federal Center
Denver, CO 80225

Telephone: 303-234-3818

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BCU	Bear Canyon----------	39.5983	110.3708	2438	1/62	3/77	Sandstone, Colton Formation; Eocene.
FLA	Flat----------	39.4700	110.4378	1670	1/62	3/77	Mancos Shale; Late Cretaceous.
HCU	Horse Canyon----------	39.4883	110.3450	2134	1/62	3/77	Bluecastle Sandstone Member of Price River Formation; Late Cretaceous.
PST	Pasture Canyon----------	39.5767	110.3517	2118	1/62	3/77	Do.
SCU	Sheep Canyon----------	39.4873	110.2417	2182	1/62	3/77	Sandstone, Colton Formation; Eocene.
SMU	Sunnyside Mine----------	39.6000	110.3817	1981	1/62	12/68	Sandstone, Sunnyside Member of Blackhawk Formation; Late Cretaceous.

INSTRUMENTATION

Code	Seismometer			Galvo	Type recording	Magnification at T_o	Remarks
	Type	Component	T_o (sec)	T_g (sec)			
All stations	Willmore Mark I, modified.	Z	0.67	---	Pen and ink, magnetic tape.	36 K	---

Timing system: Custom-made clock synchronized with WWV.

System response curves: Available from station.

SHORT HISTORY

This network was established to record tremors related to coal-mine bumps in the Sunnyside coal mining district. As many as 50,000 tremors of all amplitudes were recorded each year. The instrument system was continually improved until November 1976. Records are essentially complete from January 1963 to March 1977.

Garland, TX

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(BX-UT)	Blanding----------	37.5633	109.4347	1707	8/08/63	3/18/64	Sandstone.
(FM-UT)	Fillmore----------	39.2183	112.2069	1890	10/07/61 3/02/66	6/10/63 3/12/66	Limestone; early Paleozoic.
(KN-UT)	Kanab----------	37.0228	112.8275	1737	12/09/61 9/26/71	10/31/69 11/09/71	Sandstone; Mesozoic.
(VN-UT)	Vernal----------	40.5086	109.5792	1768	10/20/61	6/01/62	Sandstone.
(WW-UT)	Wah Wah Mountains-------	38.5139	113.5889	1829	4/16/63 4/23/68	7/15/63 4/26/68	Limestone.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(BX-UT), (KN-UT), (WW-UT):	Benioff---------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(BX-UT): 400 K (KN-UT): 380 K (WW-UT): 300 K	---
	Sprengnether----	Z,NS,EW	20.0	---	---do---------	---	---
(FM-UT), (VN-UT):	Benioff---------	Z,NS,EW	1.0	---	---do---------	(FM-UT): 240 K (VN-UT): 150 K	---
(FM-UT) (2d oper.), (KN-UT) (2d oper.), (WW-UT) (2d oper.):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.
	Geotech---------	Z,NS,EW	20.0	---	---do---------	---	Do.

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

UTAH

Livermore, CA

GENERAL INFORMATION

Operated by: Lawrence Livermore Laboratory
of the University of California

Address: Seismic Research Group, L-42
Lawrence Livermore Laboratory
P.O. Box 808
Livermore, CA 94550

Telephone: 415-447-1100 ext. 3475

Telex: 34-6407

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
KNB	Kanab----------	37.0166	112.8224	1715	11/68	Open--	Navajo Sandstone; Jurassic and Triassic(?).

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
KNB	Sprengnether---------	Z	20.0	---	Magnetic tape	100 K	Magnification at 1 sec. Telemetered to LLL.

Timing system: IRIG time codes B and C synchronized to WWV.

System response curves: See figure 5, p. 364.

SHORT HISTORY

This station was originally an AFTAC station. The seismometer is operated as a broadband instrument.

GENERAL INFORMATION

Operated by: University of Vermont

Address: Department of Geology
Perkins Hall
University of Vermont
Burlington, VT 05401

Telephone: 802-656-3396

Address to obtain records:

As above.

No records before 1937. Sporadic records after that time.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BUR	Burlington----------	44.4800	73.1971	100	12/32	1956	Compacted glacial clay; Pleistocene.

INSTRUMENTATION

Code	Seismometer Type	Seismometer Component	Seismometer T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
BUR	Milne-Shaw----------	N60°W,N30°E	12.0	---	Film	---	---
	Sprengnether---------	Z	---	---	---	---	Used briefly in the 1950's.

Timing system: Seth Thomas clock checked daily with WWV.

System response curves: Not available.

SHORT HISTORY

BUR was established with a grant-in-aid from the National Research Council. Its operation was intermittent.

GENERAL INFORMATION

Operated by: Lamont-Doherty Geological Observatory of Columbia University

Address: Department of Seismology
Lamont-Doherty Geological Observatory
Palisades, NY 10964

Telephone: 914-359-2900

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(ALV)	Saint Albans----------	44.7917	73.0467	271	11/76	Open--	Underhill Formation; Lower Cambrian(?).
(BRV)	Barre----------	44.2083	72.6000	402	10/05/76	10/26/76	Waits River Formation; Silurian and Devonian.
(COV)	Colchester----------	44.5777	73.1458	85	11/76	Open--	Cheshire Quartzite; Lower Cambrian.
(ESJ)	Essex Junction----------	44.5200	73.0317	213	9/76	11/76	Pinnacle Formation; Lower Cambrian(?).
MDV	Middlebury----------	43.9992	73.1812	134	3/70	Open--	Youngman and Carman Formations of Kay and Cady[1], 1947; Ordovician.

[1]Kay, G. M., and Cody, W. M., 1947, Ordovician Chazyan classification in Vermont: Science, v. 105, no. 2736, p. 601.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(ALV)	Geospace HS 10-2B----	Z	0.5	0.2	Develocorder, Helicorder.	3200 K	Magnification at 20 Hz[1]. Telemetered to the Observatory.
(BRV)	--do----------	Z	.5	.2	--do----------	3200 K	Do.
(COV)	--do----------	Z	.5	.2	--do----------	---	Do.
(ESJ)	--do----------	Z	.5	.2	--do----------	3200 K	Do.
MDV	--do----------	Z	.5	.2	--do----------	12800 K	Do.

[1]To obtain magnification at 1 Hz, multiply by 7.9×10^{-3}.

Timing system: Sprengnether TS-200.

System response curves: See figure 9, p. 366.

GENERAL INFORMATION

Operated by: Lamont-Doherty Geological Observatory of Columbia University

Address: Seismology Department
Lamont-Doherty Geological Observatory
Palisades, NY 10964

Telephone: 914-359-2900

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
ABV	Anegada----------	18.7222	64.3417	---	3/75	Open--	Marine deposits, limestone and sands; Cenozoic.
SCV	St. Croix----------	17.7820	64.7887	---	3/75	--do--	Marine deposits; Cretaceous.
SJV	St. John----------	18.3453	64.7625	---	6/75	--do--	Spilitic basalts; Cretaceous.
VST	St. Thomas----------	18.3542	64.9572	---	6/75	--do--	Do.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
All stations	Hall-Sears 10--------	Z	0.5	16 Hz	Develocorder	250-750 K	Magnification variable.

Timing system: Sprengnether TS-100.

System response curves: See figure 9, p. 366.

SHORT HISTORY

These stations were installed and are being maintained as part of the USGS Earthquake Hazards Reduction Program.

VIRGINIA

Blacksburg, VA

GENERAL INFORMATION

Operated by: Virginia Polytechnic Institute and State University

Address: Department of Geological Sciences
Virginia Polytechnic Institute and State University
Blacksburg, VA 24061

Telephone: 703-951-6521 (Department)
951-6729 (Station Director)

Address to obtain records:

As above.

WWSSN records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BAV	Blacksburg----------	37.2221	80.4250	622	9/73	Open--	Dolomite; Cambrian.
BLA	--do----------	37.2113	80.4210	634	9/04/62	Open--	Dolomite; Cambrian.
CLT	Charlottesville---------	38.0333	78.5167	150	1973	1973	Metamorphics; Precambrian.
KMV	Keen Mountain----------	37.2083	82.0258	500	1969	1969	Clastics; Pennsylvanian.
NAV	Narrows----------	37.3167	80.7931	610	1968	1968	Shale; Ordovician.
PUV	Pulaski----------	37.0889	80.8167	640	1968	1968	Shale; Devonian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
BAV:	Geotech S-13---------	Z	1.0	---	Pen and ink	2.6 K	---
BLA:	Benioff----------	Z,NS,EW	1.0	.75	Photo paper	50 K, 100 K	WWSSN.
	Sprengnether---------	Z,NS,EW	15.0	100.0	--do--------	1.5 K	Do.
	Johnson-Matheson-----	Z	1.0	---	Pen and ink	56 K	Non-standard instrument. Telemetered to GLD.
CLT, KMV, NAV, PUV:	Ranger----------	Z	1.0	---	Magnetic tape, smoked paper.	---	Temporary stations; records no longer exist.

Timing system: BLA uses a WWSSN standard system.

System response curves: Available from station.

SHORT HISTORY

BAV records are not archived, except for ones containing special-interest events.
BLA was established with the WWSSN equipment in 1962.
CLT, KMV, NAV, and PUV were established only as temporary stations for the purpose of short-term microearthquake surveys. The magnetic tapes and smoked-paper seismograms that recorded their data were not retained.
Nine additional installations are planned for mid-1978.

VIRGINIA

Charlottesville, VA

GENERAL INFORMATION

Operated by: Virginia Division of Mineral Resources

Address: Virginia Division of Mineral Resources
P.O. Box 3667
Charlottesville, VA 22903

Telephone: 804-293-5121

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CTV	Charlottesville---------	38.0326	78.5228	264	7/04/73	1/74	Rockfish Conglomerate; Precambrian.
CVV	Charlottesville---------	37.9814	78.4608	167	4/74	Open--	Catoctin Formation; Precambrian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
CTV	Geotech S-13---------	Z	1.0	---	Heated stylus	---	---
CVV	--do----------	Z,NS,EW	1.0	---	--do---------	125 K	Magnification 52 K in winter.

Timing system: Geotech TG-110 crystal clock.

System response curves: Available from station.

SHORT HISTORY

CTV operated for about 6 months, until the station was moved to a temporary site near CVV.
CVV, the permanent station, began recording on the vertical instrument in late April 1974. The horizontals were added in August 1974.

VIRGINIA

Corbin, VA

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: Fredericksburg Observatory
U.S. Geological Survey
Corbin, VA 22446

Telephone: 703-373-7601

Address to obtain records:

Department of Geological Sciences
Virginia Polytechnic Institute and State University
Blacksburg, VA 24061

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CBN	Corbin----------	38.2050	77.3733	70	1971	Open--	Sedimentary rocks; Cretaceous to Quaternary.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
CBN	Benioff----------	Z	1.0	0.2	Pen and ink	50 K	---

Timing system: Pendulum clock.

System response curve: Not available.

SHORT HISTORY

Fredericksburg Observatory is a magnetic observatory run by the Branch of Electromagnetism and Geomanetism of the USGS. It maintains the seismometer as a monitor of local events and as a cooperative effort with seismology branches.

VIRGINIA

Harrisonburg, VA

GENERAL INFORMATION

Operated by: James Madison University

Address: Department of Geology
James Madison University
Harrisonburg, VA 22801

Telephone: 703-433-6130

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
HBV	Harrisonburg----------	38.4383	78.8725	411	6/71	Open--	Edinburg Formation; Middle Ordovician.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
HBV	Sprengnether---------	Z	1.0	---	Visible	100 K	Magnification at 0.8 Hz.

Timing system: Sprengnether TS-200, with a 10-MHz crystal-oscillator frequency standard.

System response curves: Available from station.

SHORT HISTORY

The station was started with the installation of the above-mentioned equipment in 1971.

VIRGINIA

Lexington, VA

GENERAL INFORMATION

Operated by: Washington and Lee University

Address: Department of Geology
Washington and Lee University
Lexington, VA 24450

Telephone: 703-463-9111 ext 269

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
LEX	Lexington----------	37.7894	79.4417	311	5/71	1977	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
LEX	Sprengnether 3692----	Z	15.0	---	---	---	---

Timing system: Not available.

System response curves: Not available.

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
Office of Earthquake Studies
National Center, Stop 905
12201 Sunrise Valley Drive
Reston, VA 22092

Telephone: 703-860-6471

Telex: 89-9153

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
GSR	Reston----------	38.9479	77.3696	119	6/01/75	Open--	Boulder conglomerate, Newark Group; Late Triassic and Early Jurassic(?).

INSTRUMENTATION

Code	Seismometer			Galvo	Type	Magnification	Remarks
	Type	Component	T_o(sec)	T_g(sec)	recording	at T_o	
GSR	Johnson-Matheson----- 6480A.	Z	1.25	---	Helicorder	54.7 K	---

Timing system: Geotech TG-100.

System response curves: Available from station.

SHORT HISTORY

GSR was established when the USGS National Center was built in Reston in 1975. The single short-period instrument serves as a public display and can alert the personnel of the Office of Earthquake Studies to major earthquakes.

VIRGINIA

University, VA

GENERAL INFORMATION

Operated by: University of Virginia

Address: Rouss Physical Laboratory
University of Virginia
University, VA 22901

Telephone: 804-924-3437

Address to obtain records:

Unknown.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(CHA)	Charlottesville---------	38.0333	78.5233	150	1927	6/36	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o(sec)	Galvo T_g(sec)	Type recording	Magnification at T_o	Remarks
(CHA)	Custom, inverted----- pendulum.	NS,EW	17.0	---	Smoked paper	---	---

Timing system: Clock, which kept time to within 0.5 sec.

System response curve: Not available.

SHORT HISTORY

Interest in seismology at the University was evidenced by the unique and functional instrument built by Mr. Arthur J. Weed. Readings were submitted to the USC&GS and used to determine epicenters.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(BI-VA)	Big Stone Gap----------	36.8458	82.7069	549	11/07/62	12/12/62	---
(CG-VA)	Cumberland Gap----------	36.6264	83.2600	396	6/01/62 6/10/65	6/28/62 7/23/65	Dolomitic limestone.
(CI-VA)	Clintwood---------------	37.1936	82.4158	549	10/15/62	10/27/62	---
(GD-VA)	Grundy------------------	37.3928	81.9778	366	7/21/62	10/05/62	---
(SU-VA)	Schuyler----------------	37.7597	78.7267	165	6/19/65	7/23/65	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(CG-VA), (CI-VA), (GD-VA):	Benioff---------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(CG-VA): 410 K (CI-VA): 130 K (GD-VA): 140 K	---
(BI-VA), (CG-VA) (2d oper.):	Benioff---------	Z,NS,EW	1.0	---	--do----------	(BI-VA): 120 K	---
	Sprengnether----	Z,NS,EW	20.0	---	--do----------	---	---
(SU-VA):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	---	Portable system.
	Geotech---------	Z,NS,EW	20.0	---	--do---------	---	Do.

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

WASHINGTON

Auburn, WA

GENERAL INFORMATION

Operated by: Gerald Marshall

Address: Gerald Marshall
35765 26th South
Auburn, WA 98002

Telephone: 206-838-3578 or 927-4411

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
STT	Seattle (Marshall)------	47.4228	122.3137	110	4/64	4/76	Glacial till; Quaternary.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
STT	Galitzen----------	NS	10.0	0.1	Pen and ink	1-2 K	Magnification varied summer to winter.

Timing system: Jewelled timer checked with WWV daily.

System response curve: Not available.

SHORT HISTORY

The station was established to study microseisms, using magnifications of as much as 400 K. Continuous recordings were made until June 1970 when recordings became intermittent. The station was closed when the property was purchased by the Seattle-Tacoma Airport.

GENERAL INFORMATION

Operated by: Western Washington University

Address: Geology Department
Western Washington University
Bellingham, WA 98225

Telephone: 206-676-3000

Address to obtain records:

As above.

Records are not catalogued and may not be complete.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BLL	Bellingham----------	48.7389	122.4847	96	12/61	1969	---

INSTRUMENTATION

Code	Seismometer			Galvo	Type	Magnification	Remarks
	Type	Component	T_o (sec)	T_g (sec)	recording	at T_o	
BLL	Unknown----------	---	---	---	---	---	---

Timing system: Not available.

System response curve: Not available.

SHORT HISTORY

BLL was operated by Western Washington College of Education, later incorporated into Western Washington University.

WASHINGTON

Newport, WA

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
Newport Geophysical Observatory
Rt. 4, Box 56A
Newport, WA 99156

Telephone: 509-447-3195

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
NEW	Newport----------	48.2633	117.1200	760	6/66	Open--	Miocene slates with other Tertiary strata.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
NEW	Geotech 18300--------	Z	1.0	0.2	Visible	200 K	---
	Sprengnether---------	Z,NS,EW	15.0	30.0	--do---	1000 and 100	Magnification at 0.05 Hz.
	Geotech TS-220-------	NS,EW	.8	---	--do---	140 K, 14 K, 1.4 K	Magnification at 5.0 Hz.

Timing system: Geotech 11880, with a Geotech 5400A backup system.

System response curves: Available from station.

SHORT HISTORY

The station began operation in June 1966 under the USC&GS. It is part of the Tsunami Warning System and receives signals from a selection of nine other stations throughout the Unites States, telemetered to NEW through the NEIS in Golden, Colo.

GENERAL INFORMATION

Operated by: University of Washington

Address: Geophysics Department
202 ATG Building, AK-50
University of Washington
Seattle, WA 98195

Telephone: 206-543-6505

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BDG	Badger Mountain--------	46.2347	119.3175	475	3/69	Open--	Basalt; Miocene.
BFW	Baw Faw Mountain-------	46.4867	123.2148	902	10/25/72	--do--	Volcanics; Eocene.
BLN	Blyn Mountain----------	48.0074	122.9718	585	7/02/70	--do--	Do.
CBW	Chelan Butte-----------	47.8071	120.0327	1160	6/75	--do--	Gneiss; pre-Jurassic.
(CHW)	Chelan-----------------	47.8692	120.0333	790	5/73	6/75	Metamorphic gneissic migmatite; Mesozoic.
CLW	Colville---------------	48.5933	117.8820	585	6/75	11/76	Metamorphics; Cambrian.
CPW	Capitol Peak-----------	46.9738	123.1363	792	7/29/70	Open--	Volcanics; Eocene.
CRF	Corfu------------------	46.8252	119.3877	190	7/70	--do--	Basalt; Miocene.
DHW (DYH)	Dyer Hill--------------	47.9605	119.7693	850	6/75	--do--	Do.
DVW (DAV)	Davenport--------------	47.6383	118.2260	717	6/75	--do--	Do.
(ENT)	Entiat-----------------	47.6789	120.2300	550	11/76	--do--	Do.
EPW (EPH)	Ephrata----------------	47.3522	119.5962	628	6/75	--do--	Do.
ETP	Eltopia----------------	46.4648	119.0590	219	3/69	--do--	Do.
EUW (EUK)	Eureka-----------------	46.3958	118.5621	367	6/75	--do--	Do.
FMW	Mt. Fremont------------	46.9317	121.6720	1890	9/04/72	--do--	Volcanics; Quaternary.
FPW	Fields Point-----------	47.9667	120.2129	352	6/75	--do--	Gneiss; pre-Jurassic.
FTW	Fairmont---------------	47.8767	122.2014	147	9/24/75	--do--	Glacial material; Quaternary.
GBL	Gable Mountain---------	46.5977	119.4598	330	3/69	--do--	Basalt; Miocene.
GHW	Garrison Hill----------	47.0417	122.2725	268	9/24/75	--do--	Glacial material; Quaternary.
GMW	Gold Mountain----------	47.5479	122.7863	506	2/27/70	--do--	Volcanics; Eocene.
GSM	Grass Mountain---------	47.2032	121.7945	1305	6/11/70	--do--	Volcanics; Oligocene, Miocene.
HTW	Haystack Lookout-------	47.8035	121.7691	829	6/11/75	--do--	Volcanics; Eocene.
JCW	Jim Creek--------------	48.1935	121.9295	616	2/18/71	--do--	Metasedimentary rocks; Permian.

Seattle, WA

SITE INFORMATION--Continued

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(LLB)	Labor Lookout----------	48.7682	121.8160	3010	8/08/75	Open--	Volcanics; Quaternary.
LMW	Ladd Mountain----------	46.6680	122.2913	1195	6/30/75	--do--	Volcanics; Eocene.
LON	Longmire----------	46.7500	121.8100	854	3/12/58	--do--	Andesite; Quaternary
LYW	Lyman----------	48.5353	122.1017	107	4/16/75	--do--	Sandstone; Cretaceous.
MBW	Mt. Baker----------	48.7840	121.8997	1676	11/08/72	--do--	Volcanics; Quaternary.
MCW	Mt. Constitution-------	48.6797	122.8323	693	11/08/72	--do--	Metagraywacke; Carboniferous.
MDW	Midway----------	46.6133	119.7608	372	3/69	--do--	Basalt; Miocene.
ODS	Odessa----------	47.3067	118.7450	524	3/69	--do--	Do.
OHW	Oak Harbor----------	48.3233	122.5318	54	5/16/75	Open--	Glacial till; Pleistocene.
OMW (OMK)	Omak----------	48.4803	119.5608	421	6/75	--do--	Gneiss; pre-Jurassic.
OTH	Othello----------	46.7390	119.2165	384	3/69	--do--	Basalt; Miocene.
PRW (PRO)	Prosser----------	46.2127	119.6858	552	6/75	--do--	Do.
RMW	Rattlesnake Mountain---	47.4597	121.8053	1024	7/27/71	--do--	Volcanics; Eocene, Oligocene.
RSW	Rattlesnake Hills------	46.3912	119.5887	1037	7/70	--do--	Basalt; Miocene.
SAW	St. Andrews----------	47.7017	119.4010	704	6/75	--do--	Do.
SCW	Sherman Crater--------- (Mt. Baker).	48.7675	121.8167	2990	3/31/75	10/01/76	Volcanics; Quaternary.
SEA	Seattle----------	47.6550	122.3083	30	1906	11/01/70	Vashon till; Pleistocene.
SHW	Mt. St. Helens---------	46.1925	122.2367	1423	10/25/72	Open--	Volcanics; Quaternary.
SMW	South Mountain---------	47.3195	123.3417	840	3/24/75	--do--	Volcanics; Eocene.
SPW	Seward Park----------	47.5537	122.2459	8	9/17/69	--do--	Sandstone; Oligocene.
STW	Striped Peak----------	48.1502	123.6700	308	6/27/73	--do--	Volcanics; Eocene.
SYR	Smyrna----------	46.8630	119.6178	268	3/69	--do--	Basalt; Miocene.
TUM	Tumwater----------	47.0150	122.9083	83	5/58	--do--	Volcanics; Eocene.
VTG	Vantage----------	46.9580	119.9873	208	7/70	--do--	Basalt; Miocene.
WAH	Wahluke----------	46.7520	119.5780	231	7/70	--do--	Do.
(WAT)	Waterville----------	47.6986	119.9542	820	11/76	--do--	Do.
WBW	Wilson Butte----------	48.0178	119.1372	826	6/75	--do--	Do.
WGW	Wallila Gap----------	46.0447	118.9327	162	10/71	--do--	Do.
WIW	Wooded Island----------	46.4322	119.2882	122	7/70	--do--	Do.
WNW (WEN)	Wenatchee----------	47.5295	120.1942	1061	6/75	--do--	Sandstone; Miocene, Pliocene.
WRD	Warden----------	46.9698	119.1433	379	7/70	--do--	Balsalt; Miocene.

Seattle, WA

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
Most stations	Mark L-4C----------	Z	1.0	16 Hz	16-mm film	BFW: 150 K BLN: 115 K CPW: 135 K FMW: 100 K GMW: 145 K GSM: 165 K JCW: 120 K MCW: 70 K RMW: 190 K SHW: 45 K SPW: 65 K	---
CBW, VTG	--do----------	Z,NS	1.0	16 Hz	16-mm film	---	---
CHW:	Geotech S-13---------	Z	1.0	---	---	60 K	---
LON:	Benioff----------	Z,NS,EW	1.0	.75	Photo paper	100 K	WWSSN.
	Sprengnether---------	Z,NS,EW	15.0	100.0	--do--------	1.5 K	Do.
SEA:	Bosch-Omori----------	NS,EW	15.0	---	Smoked paper	---	---
TUM:	Geotech S-13---------	Z,NS,EW	1.0	.75	Photo paper	40 K	---
	Geotech SL-210-------	Z	15.0	90.0	--do--------	1 K	---
	Geotech SL-220-------	NS,EW	15.0	90.0	--do--------	850	---

Timing system: Most stations use an Astrodata Time Code Generator and WWVB. LON uses the WWSSN standard. TUM uses a Simplex quartz crystal clock.

System response curves: LON--see figure 1, p. 363. All Mark L-4C and Geotech S-13 instruments except TUM--see figure 11, p. 366. TUM--available from station.

SHORT HISTORY

BDG, CRF, ETP, GBL, MDW, ODS, OTH, RSW, SYR, VTG, WAH, WGW, WIW, and WRD make up the Hanford network. This network was supported by U.S. Department of Energy and was originally run by the USGS out of its Menlo Park office, until the entire network was transferred to the University in June 1975.

LON began operating the WWSSN equipment on August 22, 1962.

SEA records from 1906 to 1931 are not at the University. Records since 1931 are on file.

The stations in the Puget Sound area are supported by USGS grants.

Publications from the University include a quarterly hypocenter listing and an annual hypocenter listing.

GENERAL INFORMATION

Operated by: Mount Saint Michael's

Address: Seismograph Station
Mount Saint Michael's
Spokane, WA

Address to obtain records:

Unknown.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
SPO	Spokane----------	47.7300	117.3422	713	1909	1969	Basalt.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
SPO	Wiechert----------	NS,EW	---	---	---	---	---
	Wood-Anderson--------	NS,EW	---	---	---	---	---

Timing system: Wiechert clock.

System response curves: Not available.

SHORT HISTORY

The station initially began operating at Gonzaga University and then moved to Mount Saint Michael's in 1930. Gonzaga University published a yearly bulletin.

GENERAL INFORMATION

Operated by: Tera Corporation for
Portland General Electric Company

Address: Tera Corporation
2118 Milvia Street
Berkeley, CA 94704

Telephone: 415-845-5200

Address to obtain records:

Stuart W. Smith
Geophysics Program
202 ATG Building, AK-50
University of Washington
Seattle, WA 98195

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
ALD	Alter Ridge----------	45.8194	120.0667	427	11/75	Open--	Basalt; Miocene.
RPK	Roosevelt----------	45.7617	120.2306	549	11/75	--do--	Basalt; Miocene.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
ALD	Mark L-4C----------	Z	1.0	---	Helicorder	Variable	Gain adjusted seasonally. Telemetered to Arlington, OR.
RPK	--do----------	Z	1.0	---	--do------	--do----	Do.

Timing system: Sprengnether clock checked with WWVB daily.

System response curves: Curves slightly different from standard Mark L-4C microseismic system (fig. 2); peak at 5 Hz.

SHORT HISTORY

The stations are in an area where no other seismometers exist and where seismicity is low. Portland General is interested in being able to precisely locate occasional earthquakes when they do occur.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(CC-WA)	Cascade Tunnel----------	47.7692	121.0836	1036	11/08/67	7/29/68	Granodiorite.
(CE-WA)	Concrete----------	48.5225	121.6872	274	10/15/62	10/27/62	---
(EL-WA)	Ellensburg----------	46.9242	120.7300	975	5/28/62	6/28/62	---
(GC-WA)	Glacier Peak----------	48.1622	121.2822	671	11/08/62	12/12/62	---
(LY-WA)	Lynden----------	48.6475	122.2028	122	11/08/67	12/10/67	---
(MU-WA)	Mt. Baker----------	48.9167	121.9103	732	9/26/62	10/05/62	---
(PH-WA)	Pomeroy----------	46.3236	117.3281	945	11/08/67	12/10/67	---
(TK-WA)	Tonasket----------	48.7939	119.5878	549	8/21/63	5/17/64	Granite.
(YA-WA)	Yakima----------	46.5000	119.9200	610	1/29/63	3/29/63	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(CC-WA), (PH-WA), (TK-WA):	Benioff---------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(TK-WA): 200 K	---
	Sprengnether----	Z,NS,EW	20.0	---	--do----------	---	---
(CE-WA), (EL-WA), (GC-WA), (MU-WA), (YA-QA):	Benioff---------	Z,NS,EW	1.0	---	--do----------	(CE-WA): 200 K (EL-WA): 160 K (GC-WA): 60 K (MU-WA): 110 K	---
(CC-WA), (LY-WA):	Geotech S-13----	Z,NS,EW	1.0	---	Magnetic tape	(CC-WA): 350 K	Portable system.
	Geotech---------	Z,NS,EW	20.0	---	--do----------	---	Do.

Garland, TX

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
National Center for Earthquake Research
345 Middlefield Road
Menlo Park, CA 94025

Telephone: 415-323-8111 ext. 2571

Address to obtain records:

Records through 1974 on file as above.

Records from 1975 are at the University of Washington.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(B)	Badger Mountain---------	46.2347	119.3175	475	6/69	2/75	---
(DA)	Basin City----------	46.6032	119.1120	237	6/71	2/75	---
(CA)	Berg Ranch----------	46.7222	119.3472	287	6/71	2/75	---
CNL (C)	Connel----------	46.6530	118.9170	293	6/70	2/75	---
(EA)	Coyote Rapids----------	46.6388	119.6202	149	6/71	2/75	---
(AA)	Hatton----------	46.7468	118.8242	351	6/71	10/72	---
HSW (H)	Hot Spot----------	46.5295	119.5545	217	6/70	10/71	---
LSW (D)	Landslide----------	46.4813	119.2453	262	6/70	10/71	---
(AB)	Saddle Mountain---------	46.7955	119.4913	570	10/72	2/75	---
(N)	Sentinel Gap----------	46.7855	119.9222	189	6/71	2/75	---
(Y)	Yakima Ridge----------	46.5123	119.7155	361	10/71	2/75	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
All stations	Mark L4-C----------	Z	1.0	---	Develocorder	---	Telemetered to Menlo Park.

Timing system: WWVB recorded directly with a custom-chronometer backup.

System response curves: See figure 2, p. 363.

SHORT HISTORY

These stations are part of the Hanford array, run by the USGS from 1969 to 1975. In 1975 the above stations were discontinued and the rest of the network was given to the University of Washington.

GENERAL INFORMATION

Operated by: U.S. Coast and Geodetic Survey for the U.S. Bureau of Reclamation

Address: U.S. Coast and Geodetic Survey
Washington, D.C.
(Obsolete)

Address to obtain records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
GCW	Grand Coulee----------	47.9414	118.9800	462	1941	1949	Granite.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
GCW	Benioff----------	Z,NS,EW	1.5	---	35-mm film	---	---

Timing system: Chronometer with WWV automatically checked several times a day.

System response curves: Not available.

WEST VIRGINIA

Morgantown, WV

GENERAL INFORMATION

Operated by: West Virginia University

Address: Seismograph Station
213 College of Mineral and Energy Resources
White Hall West Virginia University
Morgantown, WV 26506

Telephone: 304-293-5695

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
MRG	Morgantown----------	39.6331	79.9544	282	10/50	Open--	Hard shale; Pennsylvanian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
MGR	Sprengnether---------	Z,NS,EW	1.5	1.5	Photo paper	5 K, 3 K, 3 K	Z component also recorded on a pen-and-ink recorder.

Timing system: Standard Electric pendulum clock.

System response curves: Available from station.

SHORT HISTORY

MGR has operated continuously since 1950 with hiatuses during the summer months. The station publishes a semiannual report.

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(BL-WV)	Beckley	37.7989	81.3100	610	12/13/61 5/31/66	7/23/65 6/03/66	Sandstone, limestone, and shale; Paleozoic.
(FN-WV)	Franklin	38.5494	79.5131	750	5/04/64 6/03/65 5/27/75	8/28/64 11/12/65 7/28/76	Alluvium.
(PE-WV)	Pineville	37.6147	81.6653	427	7/06/62	7/17/62	---
(RN-WV)	Rainelle	38.0764	80.8483	853	12/31/62	5/16/63	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(BL-WV), (FN-WV) (2d oper.), (RN-WV):	Benioff	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(BL-WV): 65 K (RN-WV): 150 K	---
	Sprengnether	Z,NS,EW	20.0	---	---do---	---	---
(FN-WV) (1st oper.), (PE-WV):	Benioff	Z,NS,EW	1.0	---	---do---	(FN-WV): 170 K (PE-WV): 140 K	---
(BL-WV) (2d oper.), (FN-WV) (3d oper.):	Geotech S-13	Z,NS,EW	1.0	---	Magnetic tape	(BL-WV): 65 K	Portable system.
	Geotech	Z,NS,EW	20.0	---	---do---	---	Do.

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

WISCONSIN

Madison, WI

GENERAL INFORMATION

Operated by: University of Wisconsin at Madison

Address: Department of Geology and Geophysics
University of Wisconsin
1215 W. Dayton Street
Madison, WI 53715

Telephone: 608-262-8960

Address to obtain records:

WWSSN records:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDS, D62
Boulder, CO 80302

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
MDS	Madison----------	43.3722	89.7600	278	1/16/62	6/10/68	Baraboo Quartzite; Precambrian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
MDS	Benioff----------	Z,NS,EW	1.0	0.75	Photo paper	100 K	WWSSN.
	Sprengnether------	Z,NS,EW	15.0	100.0	---do------	750	Do.

Timing system: WWSSN standard.

System response curves: See figure 1, p. 363.

SHORT HISTORY

MDS began operation with the installation of the WWSSN equipment.

GENERAL INFORMATION

Operated by: University of Wisconsin at Milwaukee

Address: Department of Geological Sciences
Sabin Hall
University of Wisconsin
Milwaukee, WI 53201

Telephone: 414-963-4561

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
UWM	University of Wisconsin-at Milwaukee.	43.0794	87.8784	204	9/72	Open--	Glacial till (Pleistocene) overlying the Milwaukee Formation (Middle Devonian).

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
UWM	Benioff 4681, 6102A--	Z,NS,EW	1.0	---	Pen and ink	20.5 K	---
	Geotech SL-210,------ SL-220.	Z,NS,EW	20.0	---	Helicorder	900	Bandpass filter 0.01-0.1 Hz.
	Geotech 7505A--------	Z	30.0	---	---do-----	---	---

Timing system: Geotech TG-110 and Sprengnether TS-250.

System response curves: Not available.

SHORT HISTORY

UWM started with the installation of the Benioff 4681. The three-component Geotech instruments were added in August 1973. The horizontal Benioff's were added in September, 1976, and the extra-long-period Geotech was added in May 1977.

WISCONSIN

Milwaukee, WI

GENERAL INFORMATION

Operated by: Marquette University

Address: Seismological Station
Department of Physics
Marquette University
Milwaukee, WI 53233

Telephone: 414-224-7700

Address to obtain records:

Unknown.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
MLW	Milwaukee----------	43.0333	87.9167	194	1909	1957	Alluvium.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
MLW	Wiechert----------	NS,EW	6.1, 5.4	---	---	51, 61	---

Timing system: Not available.

System response curves: Not available.

SHORT HISTORY

MLW was a member of the Jesuit Seismological Society.

WISCONSIN

Garland, TX

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(AR-WS)	Aurora----------	45.6967	88.1422	381	6/06/62	10/05/62	---
(BA-WS)	Baldwin----------	44.8994	92.2722	335	10/11/62	10/27/62	---
(CF-WS)	Colfax----------	45.0942	91.7664	366	11/04/62	12/12/62	---
(CN-WS)	Cornell----------	45.1928	91.1281	320	5/10/62	6/28/62	---
(MF-WS)	Medford----------	43.3475	90.5897	412	12/22/62	4/01/63	---
(NG-WS)	Niagra----------	45.7575	88.1492	396	11/19/61 10/13/62	5/26/62 6/14/63	Granite gneiss; Precambrian.
(RL-WS)	Rib Lake----------	45.3081	90.0986	472	4/10/63	5/13/63	Glacial till.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
All stations	Benioff----------	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(AR-WS): 160 K (BA-WS): 60 K (CF-WS): 140 K (CN-WS): 290 K (MF-WS): 130 K (NG-WS): 70 K (RL-WS): 170 K	---

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

WYOMING

Laramie, WY

GENERAL INFORMATION

Operated by: University of Wyoming

Address: Department of Geology
University of Wyoming
Laramie, WY 82070

Telephone: 307-766-1121

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
LAR	Laramie----------	41.3144	105.5831	2400	1954	1977	Chugwater Formation; Triassic.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
LAR	Benioff----------	Z,NS,EW	1.0	---	Photo paper	90 K	---

Timing system: Simplex quartz clock.

System response curves: Not available.

SHORT HISTORY

LAR was started as a result of interest in a local earthquake and the fortuitous availability of seismic equipment.

WYOMING

~~Berkshire, England~~

GENERAL INFORMATION

Operated by: Procurement Executive, Ministry of Defence, United Kingdom

Address: Procurement Executive, Ministry of Defence
Blacknest, Brimpton, North Reading
Berkshire, England

Telephone: Tadley 4111 ext. 7260

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
PMW	Pole Mountain----------	41.2100	105.3347	2440	12/08/61	8/63	Sherman Granite, batholith; Precambrian.

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
PMW	Willmore MK II-------	Z	1.0	---	Magnetic tape	---	Thirteen elements in an array Dec. 1961-Sept. 1962. Fourteen elements in an array Sept. 1962-Aug. 1963.

Timing system: AWRE (T9601).

System response curve: Not available.

SHORT HISTORY

PMW was the first operational large-aperature United Kingdom-type linear-cross array. It was installed for observation of the "Gnome" underground explosion at a 1000-km range and for studies of capability for recording underground explosions at teleseismic ranges. The array initially used Willmore MK I's and switched to the II's on December 16, 1962.

WYOMING

Garland, TX

GENERAL INFORMATION

Operated by: Teledyne Geotech

Address: Teledyne Geotech
3401 Shiloh Road
Garland, TX 75041

Telephone: 214-271-2561

Telex: 73-2394

Address to obtain records:

Teledyne Geotech
Seismic Data Analysis Center
314 Montgomery Street
Alexandria, VA 22314

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
(CY-WY)	Cheyenne	41.4167	104.8600	1920	7/06/62	7/11/62	---
(HK-WY)	Hawk Springs	41.6958	104.3569	1494	7/17/62	10/05/62	---
(PI-WY)	Pinedale	42.4528	109.5486	2170	1/22/64	4/29/64	Sandstone.
(PI2WY)	--do	42.7672	109.5619	2195	3/01/65	4/26/65	---
(PM-WY)	Pole Mountain	41.2075	105.3608	2469	11/25/61	7/10/63	Granitic basement; Precambrian.
(TL-WY)	Thermopolis	43.3917	108.0881	1615	11/08/67	12/10/67	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(CY-WY), (HK-WY), (PI2WY):	Benioff	Z,NS,EW	1.0	---	Magnetic tape, 35-mm film.	(CY-WY): 110 K (HK-WY): 50 K (PI2WY): 350 K	---
(PI-WY), (PM-WY), (TL-WY):	Benioff	Z,NS,EW	1.0	---	---do---	(PI-WY): 280 K (PM-WY): 150 K	---
	Sprengnether	Z,NS,EW	20.0	---	---do---	---	---

Timing system: Geotech crystal clock checked with WWV (50-msec tolerance).

System response curves: See figure 3, p. 364.

SHORT HISTORY

The LRSM program began in 1960 as part of the VELA-Uniform project. It continued until 1971, when it was replaced by the Special Data Collection System program which remains active. Work under these programs has been directed towards advancing the seismic-detection, identification, and location techniques necessary to detect and identify underground nuclear explosions. All work is accomplished under the technical direction of AFTAC, Vela Seismic Center, in Alexandria, Va.

WYOMING

Las Vegas, NV

GENERAL INFORMATION

Operated by: U.S. Geological Survey for
El Paso Natural Gas Co.

Address: U.S. Geological Survey
3060 S. Highland Drive
Las Vegas, NV 89102

Telephone: 702-734-3416

Address to obtain records:

U.S. Geological Survey
Branch of Global Seismology
Stop 967
Box 25046, Denver Federal Center
Denver, CO 80225

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
PI1	Pinedale	42.5953	109.5453	2195	6/08/73	8/13/73	---
PI2	---do---	42.7667	109.7400	2234	8/13/73	10/18/73	---
PI3	---do---	42.4417	109.5792	2164	10/18/73	12/11/73	---
PI4	---do---	42.6283	109.8933	2194	12/11/73	2/22/74	---
PI5	---do---	42.5671	109.9117	2273	3/74	6/01/76	---
PI6	---do---	42.7262	109.6055	2225	3/74	6/01/76	Granite.
PI7	---do---	42.4397	109.5725	2179	3/74	6/01/76	Alunite.
PIN	---do---	42.5825	109.7167	2225	3/22/73	6/08/73	---

INSTRUMENTATION

Code	Seismometer			Galvo	Type recording	Magnification at T_o	Remarks
	Type	Component	T_o(sec)	T_g(sec)			
All stations	Mark L-4C	Z	1.0	---	Develocorder	---	Telemetered to GLD.

Timing system: Timing added in Golden.

System response curves: See figure 2, p. 363.

SHORT HISTORY

The network was installed to monitor the seismicity in the area of the Wagon Wheel drill site, which has as its objective the extraction of natural gas by use of explosives. The stations were telemetered through Boulder, Colo., and then to Las Vegas until March 1974; the data obtained in Las Vegas were used in USGS Open-File Report 74-30, 1974, written by K. C. Bayer and G. M. Wuollet.

GENERAL INFORMATION

Operated by: U.S. Geological Survey

Address: U.S. Geological Survey
National Center for Earthquake Research
345 Middlefield Road
Menlo Park, CA 94025

Telephone: 415-323-8111 ext. 2571

Address to obtain records:

As above.

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
CJW (YPCJ)	Canyon Junction-------	44.7438	110.4975	2426	10/74	Open--	---
MHS (YPMH)	Mammoth Hot Springs---	44.9770	110.6853	1781	1964	10/74	---
MJW (YPMJ)	Madison Junction------	44.6483	110.8587	2111	1964	Open--	---
MVW (YPMV)	Mud Volcano-----------	44.6272	110.4458	2400	10/72	--do--	---
NJW (YPNJ)	Norris Junction-------	44.7303	110.6930	2290	10/72	--do--	---
WTW (YPWT)	West Thumb------------	44.4145	110.5712	2365	10/72	--do--	---
(CJ)	Canyon Junction-------	44.7438	110.4975	2395	1964	1965	---
(LJ)	Lake Junction---------	44.5660	110.4012	2440	1965	1968	---
(YPEE)	East Entrance---------	44.1363	110.6667	2134	10/74	10/76	---
(YPLK)	Lake Junction---------	44.5660	110.4012	2399	10/74	10/76	---
(YPMC)	Maple Creek-----------	44.7593	111.0062	2073	10/74	Open--	---
(YPML)	Mary Lake-------------	44.6028	110.6063	2519	10/74	--do--	---
(YPNG)	Natural Bridge--------	44.5245	110.4593	2390	10/74	--do--	---
(YPOF)	Old Faithful----------	44.4525	110.8413	2260	10/72	--do--	---
(YPPC)	Pelican Cone----------	44.6483	110.1930	2939	10/74	--do--	---
(YPPR)	Promontory------------	44.3923	110.2863	2390	10/74	10/76	---
(YPSE)	South Entrance--------	44.1363	110.6667	2073	10/74	10/76	---
(YPSG)	Silver Gate-----------	45.0030	109.9875	2270	1/73	Open--	---
(YPTC)	Trail Creek-----------	44.2965	110.2320	2360	8/73	--do--	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
(CJ), (LJ):	EV-17----------	Z	1.25	---	Photo paper	---	---
CJW, NJW, (YPEE), (YPMC), (YPPC), (YPPR), (YPSE), (YPSG), (YPTC):	Mark L4-C-------	Z	1.0	---	Develocorder	---	---
MHS:	Lehner-Griffith-	Z,NS,EW	1.25	---	--do--------	---	---
MJW, MVW, WTW, (YPLK), (YPML), (YPNB), (YPOF):	Mark L4-C-------	Z,NS	1.0	---	--do--------	---	---

Timing system: WWVB recorded directly with a custom-chronometer backup.

System response curves: See figure 2, p. 363 for short-period vertical instruments.

SHORT HISTORY

CJW operated for about one year (1964-65) at a slightly different locations than the current CJW site.
MHS and MJW have operated intermittently since their installation.
MVW has been located in two different locations but less than 1 km apart.
IDA, Idaho Array (43.7867° N., 113.0225° W., elevation 1524 m), was one of six stations run on a part-time basis; they were telemetered to Menlo Park after working hours and recorded on Develocorder. This array ran from December 1968 to August 1969.
Many of these stations have also been recorded on magnetic tape at various times, and these records are also available.
Short-term networks in the area of Yellowstone National Park have been established for special studies:

June 30-July 19, 1975: A 20-element array of short-period vertical instruments recorded on photo paper. Code names begin with YA, YD, and YL.

August 20-October 20, 1965: Five short-period vertical instruments rotated between nine locations and recorded on magnetic tape.

Older data (before 1972) may not be complete in the archives.

GENERAL INFORMATION

Operated by: U.S. Air Force

Address: 1035th Technical Operations Group
AFTAC/TGS
Patrick AFB, FL 32925

Telephone: 305-494-2291

Address to obtain records:

U.S. Geological Survey
Branch of Global Seismology
Stop 967
Box 25046, Denver Federal Center
Denver, CO 80225

SITE INFORMATION

Code	Station name	Latitude (deg N.)	Longitude (deg W.)	Elev (meters)	Date opened	Date closed	Foundation; geologic age
BDW (U4)	Boulder----------	42.7762	109.5683	2198	6/20/77	Open--	---
WYO (U6)	Wyoming Array----------	42.7778	109.5556	2182	6/20/77	--do--	---

INSTRUMENTATION

Code	Seismometer Type	Component	T_o (sec)	Galvo T_g (sec)	Type recording	Magnification at T_o	Remarks
BDW	Geotech 23900--------	Z	1.0	---	Develocorder, Helicorder.	1000 K, 500 K	Telemetered to GOL.
WYO	Geotech 18300--------	Z,NS,EW	1.0	---	Develocorder, magnetic tape.	---	Do.
	Geotech 7505A, 8700C-	Z,NS,EW	17.0	110.0	--do---------	---	Do.

Timing system: Time added at GOL.

System response curves: Available with records.

SHORT HISTORY

BDW is 1 element of a 13-element array, of which WYO is the center. WYO records a summed analog signal using all the elements of the array.

The Wyoming array is operated by the U.S. Air Force; the USGS began telemetering in June 1977.

APPENDIXES

Appendix 1.--*List of organizations that operate stations in more than one state*

Organization name	States
Arizona:	
Los Alamos Scientific Laboratory, Chinle	Arizona, New Mexico
Air Force Technical Applications Center, Payson	Arizona, Oklahoma
California:	
University of California, Berkeley	California, Nevada
U.S. Geological Survey, Menlo Park	California, Colorado, Idaho, Montana, Nevada, Washington, Wyoming, Arkansas
California Institute of Technology and the U.S. Geological Survey, Pasadena	Arizona, California
Lawrence Livermore Laboratory, Livermore	California, Nevada, Utah
Connecticut:	
University of Connecticut, Groton	Connecticut, Rhode Island
Colorado:	
University of Colorado, Boulder	Alaska, Colorado
U.S. Geological Survey, Denver	Arizona, Colorado, South Carolina, Texas, Utah
Maryland:	
National Earthquake Information Center, Rockville	District of Columbia, Maryland
Massachusetts:	
Massachusetts Institute of Technology, Cambridge	Massachusetts, New Hampshire
Weston Observatory, Weston	Maine, Massachusetts, New Hampshire
Michigan:	
University of Michigan, Ann Arbor	Michigan, Ohio
Missouri:	
Saint Louis University, St. Louis	Arkansas, Illinois, Kentucky, Missouri, Tennessee
Nevada:	
University of Nevada, Reno	California, Nevada
New Mexico:	
Sandia Laboratories, Albuquerque	California, Nevada, New Mexico
New York:	
Lamont-Doherty Geological Observatory, Palisades	Alaska, California, New Jersey, New York, Pennsylvania, Puerto Rico, Utah, Virgin Islands
Oregon:	
Portland General Electric Company, Portland	Oregon, Washington
Texas:	
Teledyne Geotech, Garland	Alabama, Alaska, Arizona, Arkansas, California, Colorado, Florida, Georgia, Hawaii and the Pacific, Idaho, Illinois, Iowa, Kansas, Kentucky, Louisiana, Maine, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, Wisconsin, Wyoming
Utah:	
University of Utah, Salt Lake City	Idaho, Utah
Washington:	
U.S. Geological Survey, Newport	Idaho, Washington
University of Washington	Oregon, Washington

Appendix 2.--*Response curves for commonly used instruments*

These response curves are typical of commonly used instrument systems. Using the curves and the magnifications found in the station lists, the absolute magnification curves of some of the instruments can be deduced. The curves are normalized at 1 sec for short-period instruments and 25 sec for long-period instruments. Graphs that can be used for scaling are available from the network operators.

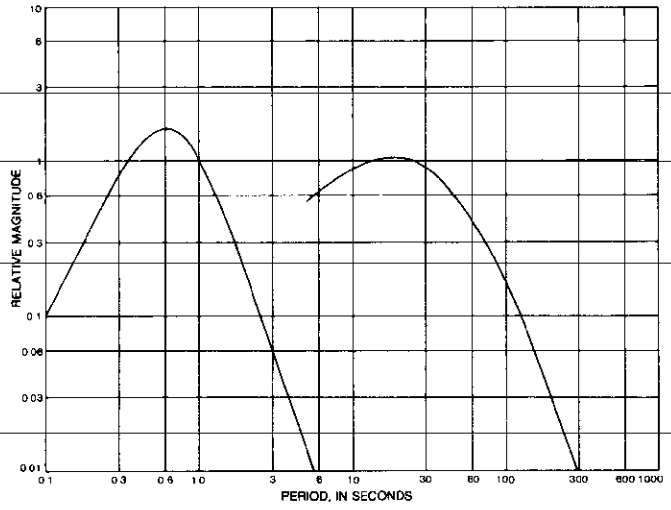


Figure 1.--Response curves characteristic of the standardized WWSSN instrumentation. The short-period curve is plotted to the left of the long-period curve.

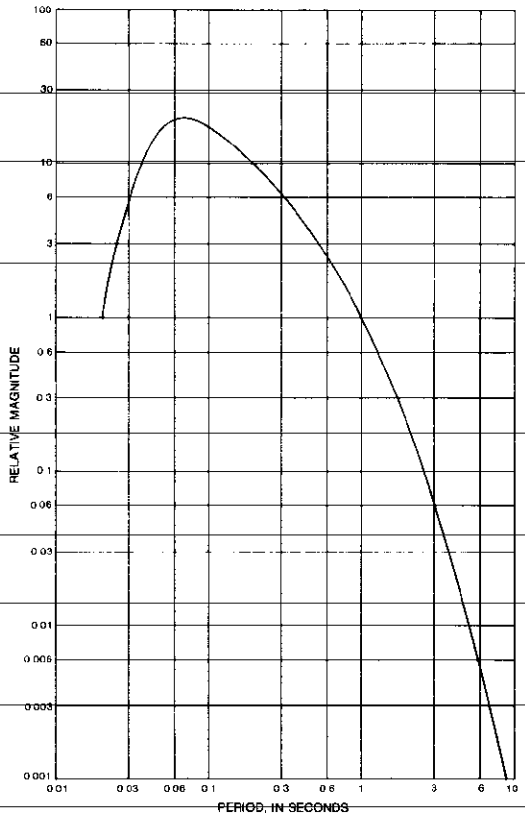


Figure 2.--Response curve characteristic of the Mark L-4C instrument system as designed by the USGS, Menlo Park. Other short-period instrument systems sometimes exhibit this same response.

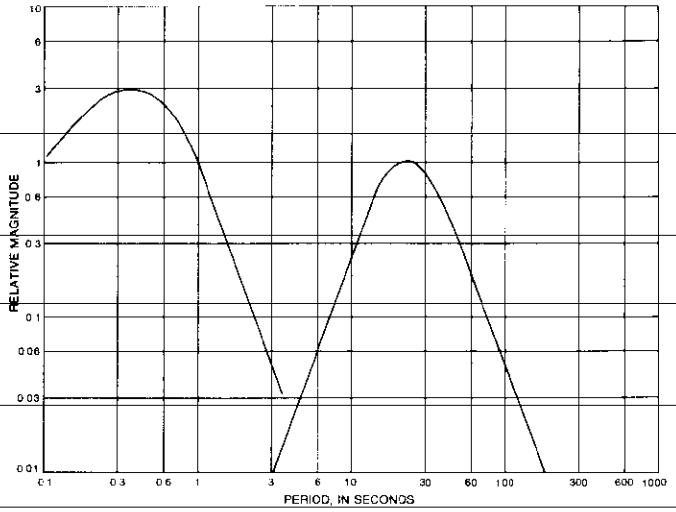


Figure 3.--Response curves characteristic of the standardized LRSM instrumentation. The short-period curve is plotted to the left of the long-period curve.

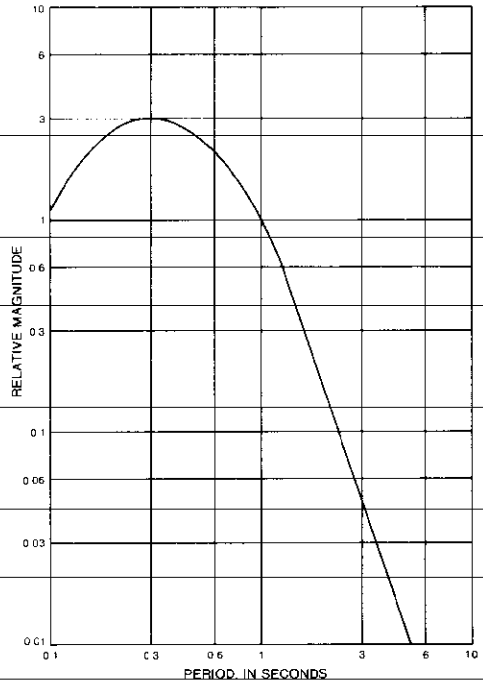


Figure 4.--Response curve characteristic of the short-period vertical instruments employed by the Alaska Tsunami Warning Center as well as by the station SIT.

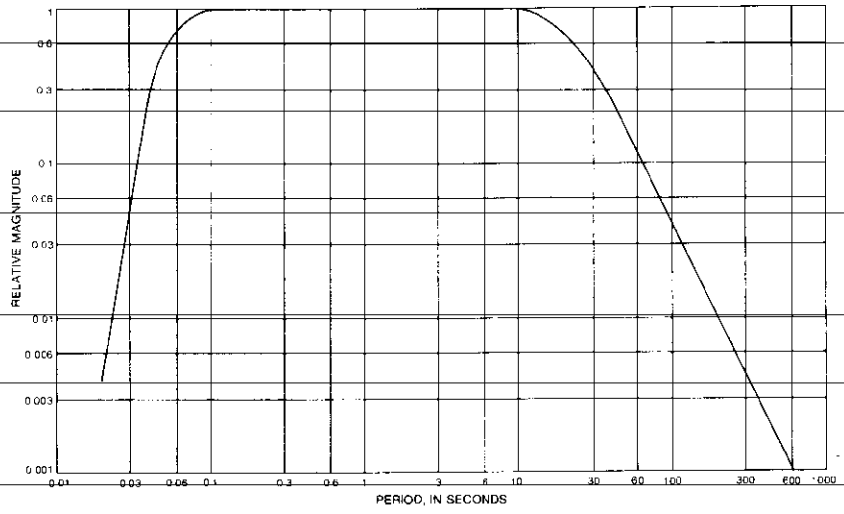


Figure 5.--Response curve characteristic of the broadband long-period Sprengnether instruments used by Lawrence Livermore Laboratory, Calif.

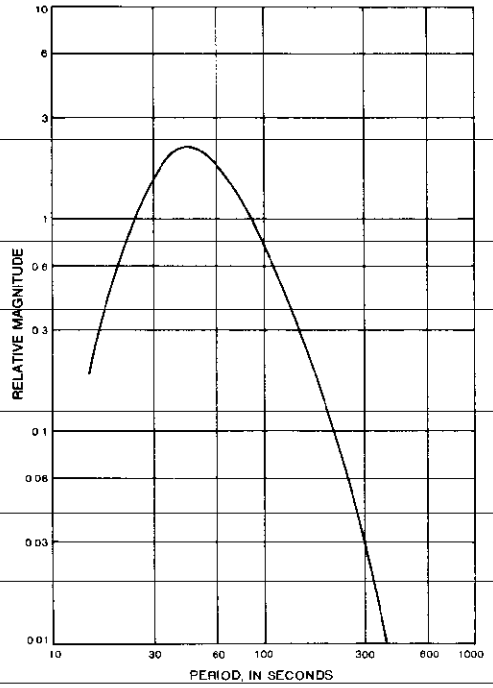


Figure 6.--Response curve characteristic of the standardized HGLP instrumentation.

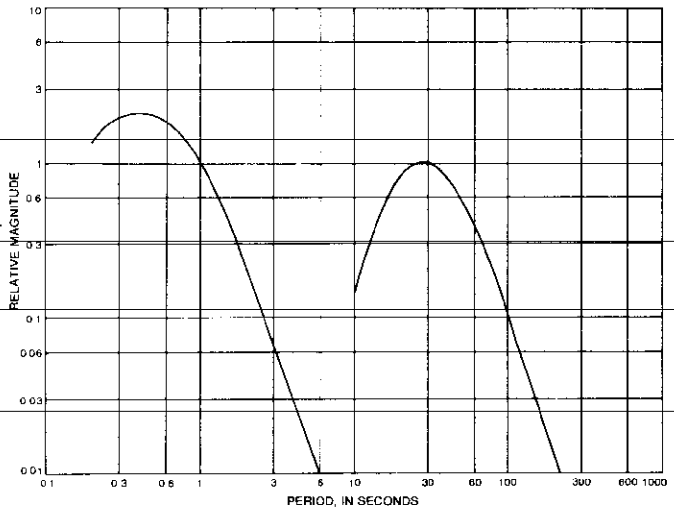


Figure 7.--Response curves characteristics of the standardized SRO instrumentation. The short-period curve is plotted to the left of the long-period curve.

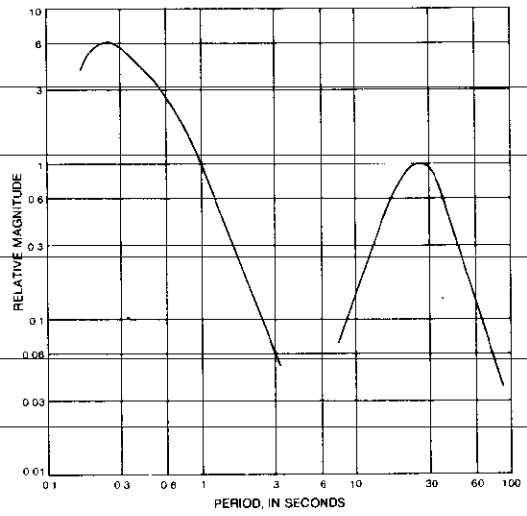


Figure 8.--Response curve characteristic of the LASA instruments. The short-period curve is to the left of the long-period curve.

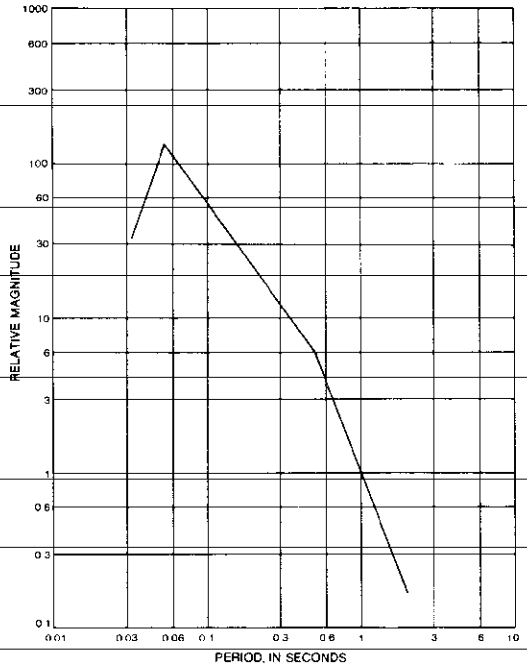


Figure 9.--Response curve characteristic of the short-period vertical instruments employed by Lamont-Doherty Geological Observatory, N.Y.

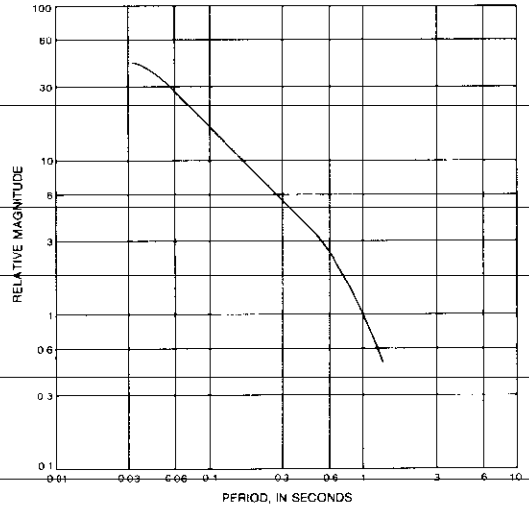


Figure 10.--Response curve characteristic of the Geotech S-13 instrument system used by the USGS in its South Carolina and Puerto Rico networks.

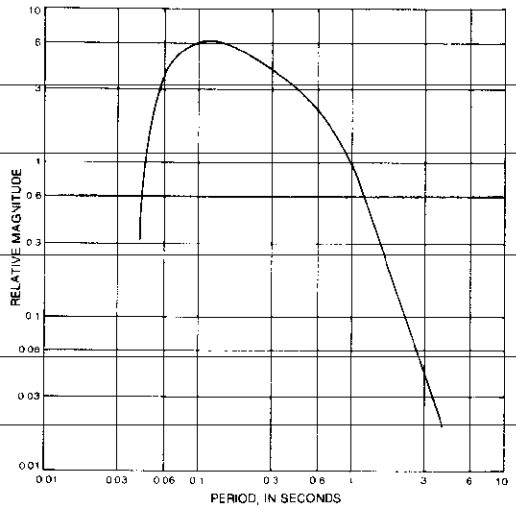


Figure 11.--Response curve characteristic of the short-period vertical instrument used by the University of Washington.

Appendix 3.--*Alphabetic listing of station codes*

Code	State	Operator	Page
(AA)	Washington	USGS (Menlo Park, Calif.)	343
(AA-IS)	Alaska	Teledyne Geotech	22
(AAF)	California	USGS (Menlo Park, Calif.)	67
AAM	Michigan	University of Michigan	170
AARM	California	USGS (Menlo Park, Calif.)	64
(AARS)	California	USGS (Menlo Park, Calif.)	64
AAU	Utah	University of Utah	313
(AB)	Washington	USGS (Menlo Park, Calif.)	343
(ABAB)	California	USGS (Menlo Park, Calif.)	64
(ABG)	Pennsylvania	Pennsylvania State University	272
ABJM	California	USGS (Menlo Park, Calif.)	64
(ABJS)	California	USGS (Menlo Park, Calif.)	64
(ABL)	California	USGS (Pasadena, Calif.) and C.I.T.	82
(ABP)	California	USGS (Menlo Park, Calif.)	64
ABQ	New Mexico	USGS (Albuquerque, N.Mex.)	217
ABRM	California	USGS (Menlo Park, Calif.)	64
(ABRS)	California	USGS (Menlo Park, Calif.)	64
ABV	Virgin Islands	Lamont-Doherty Geological Observ.	324
(AC-IS)	Alaska	Teledyne Geotech	22
ACA	Alaska	USGS (Las Vegas, Nev.)	24
ACB	Alaska	USGS (Las Vegas, Nev.)	24
ACC	Alaska	USGS (Las Vegas, Nev.)	24
ACD	Alaska	USGS (Las Vegas, Nev.)	24
ACE	Alaska	USGS (Las Vegas, Nev.)	24
ACF	Alaska	USGS (Las Vegas, Nev.)	24
(ACH)	California	USGS (Menlo Park, Calif.)	65
(AD-IS)	Alaska	Teledyne Geotech	22
AD1	Alaska	University of Colorado	21
AD2	Alaska	University of Colorado	21
AD3	Alaska	University of Colorado	21
AD4	Alaska	University of Colorado	21
AD5	Alaska	University of Colorado	21
AD6	Alaska	University of Colorado	21
AD7	Alaska	University of Colorado	21
AD8	Alaska	University of Colorado	21
ADA	Alaska	USGS (Menlo Park, Calif.)	30
ADC	California	USGS (Menlo Park, Calif.)	64
ADK	Alaska	NOAA (Adak, Alaska)	8
(ADL)	California	California Institute of Technology	75
ADM	Nevada	USGS (Las Vegas, Nev.)	198
ADN	New York	Lamont-Doherty Geological Observ.	232
ADR	California	USGS (Menlo Park, Calif.)	65
(ADWD)	California	USGS (Menlo Park, Calif.)	64
ADWM	California	USGS (Menlo Park, Calif.)	64
(AE-NC)	North Carolina	Teledyne Geotech	243
AFDM	California	USGS (Menlo Park, Calif.)	64
(AFHD)	California	USGS (Menlo Park, Calif.)	64
AFHM	California	USGS (Menlo Park, Calif.)	64
(AFHS)	California	USGS (Menlo Park, Calif.)	64
(AFID)	California	USGS (Menlo Park, Calif.)	64
AFRM	California	USGS (Menlo Park, Calif.)	64
AGC	California	USGS (Menlo Park, Calif.)	65
AGI	Alaska	University of Alaska	13
AGIM	California	USGS (Menlo Park, Calif.)	64
AGM	Maine	Weston Observatory	165
(AGRI)	California	USGS (Menlo Park, Calif.)	64
AHA	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
AHDM	California	USGS (Menlo Park, Calif.)	64
(AHDR)	California	USGS (Menlo Park, Calif.)	64
(AHFR)	California	USGS (Menlo Park, Calif.)	64
AHRM	California	USGS (Menlo Park, Calif.)	64
(AHU)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
(AI-NB)	Nebraska	Teledyne Geotech	195
AIC	California	USGS (Pasadena, Calif.) and C.I.T.	82
AIN	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
(AK-OK)	Oklahoma	Teledyne Geotech	255
AK1	Alaska	University of Colorado	21
AK2	Alaska	University of Colorado	21
AK3	Alaska	University of Colorado	21
(AL-OK)	Oklahoma	Teledyne Geotech	255
ALA	Nevada	USGS (Las Vegas, Nev.)	198
(ALB)	New Mexico	Sandia Laboratories	219
(ALC)	Colorado	NOAA (Boulder, Colo.)	101
ALD	Washington	Tera Corporation	340
ALF	New York	Lamont-Doherty Geological Observ.	232
(ALIN)	California	USGS (Menlo Park, Calif.)	64
(ALM)	California	USGS (Menlo Park, Calif.)	68
ALNM	California	USGS (Menlo Park, Calif.)	64
(ALO)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
(ALO)	Oregon	Southern Oregon State College	257
ALQ	New Mexico	USGS (Albuquerque, N.Mex.)	217
(ALV)	Vermont	Lamont-Doherty Geological Observ.	323
ALX	New York	Lamont-Doherty Geological Observ.	232
(ALX)	California	USGS (Menlo Park, Calif.)	67
(AM-OK)	Oklahoma	Teledyne Geotech	255
AMA	Alaska	USGS (Las Vegas, Nev.)	24
AMC	California	USGS (Menlo Park, Calif.)	68
AMG	Georgia	Georgia Southwestern College	123
AMMO	New Mexico	USGS (Albuquerque, N.Mex.)	217
AMS	California	USGS (Pasadena, Calif.) and C.I.T.	82
AMU	Alaska	Alaska Methodist University	9
(AN-MA)	Montana	Teledyne Geotech	191
AN1	Ohio	University of Michigan	249
(AN2)	Ohio	University of Michigan	249
(AN3)	Ohio	University of Michigan	249
(AN4)	Ohio	University of Michigan	249
(AN5)	Ohio	University of Michigan	249
(AN6)	Ohio	University of Michigan	249
ANA	Alaska	USGS (Las Vegas, Nev.)	24
ANB	Alaska	USGS (Las Vegas, Nev.)	24
(ANC)	Nevada	University of Nevada	200
AND	Alaska	USGS (Las Vegas, Nev.)	24
(AND)	California	USGS (Menlo Park, Calif.)	65
(ANG)	California	USGS (Menlo Park, Calif.)	65
ANU	Utah	University of Utah	313
ANV	Alaska	University of Alaska	13
(ANV)	California	USGS (Menlo Park, Calif.)	64
ANZ	California	USGS (Menlo Park, Calif.)	67
AODM	California	USGS (Menlo Park, Calif.)	64
AOHM	California	USGS (Menlo Park, Calif.)	64
(AOHO)	California	USGS (Menlo Park, Calif.)	64
(AOTD)	California	USGS (Menlo Park, Calif.)	64
(AP-OK)	Oklahoma	Teledyne Geotech	255
APH	New York	Lamont-Doherty Geological Observ.	232
(APHR)	California	USGS (Menlo Park, Calif.)	64
(APK)	Nevada	USGS (Las Vegas, Nev.)	198
APR	Puerto Rico	USGS (Cayey, P.R.)	277
APRM	California	USGS (Menlo Park, Calif.)	64
APT	Connecticut	Weston Observatory	115
(AR-WS)	Wisconsin	Teledyne Geotech	350
ARC	California	University of California, Berkeley	50
ARJM	California	USGS (Menlo Park, Calif.)	64
ARN	California	USGS (Menlo Park, Calif.)	65
(ARPW)	California	USGS (Menlo Park, Calif.)	64
ARRA	California	USGS (Menlo Park, Calif.)	64
ARRM	California	USGS (Menlo Park, Calif.)	64
(ARWJ)	California	USGS (Menlo Park, Calif.)	64
ARWM	California	USGS (Menlo Park, Calif.)	64
(AS-PA)	Pennsylvania	Teledyne Geotech	274
ASB	Alaska	USGS (Las Vegas, Nev.)	24
ASC	Alaska	USGS (Las Vegas, Nev.)	24
ASD	Alaska	USGS (Las Vegas, Nev.)	24
(ASHR)	California	USGS (Menlo Park, Calif.)	64
ASRM	California	USGS (Menlo Park, Calif.)	64
ASU	Arizona	Arizona State University	36
(AT-NV)	Nevada	Teledyne Geotech	205
ATL	Georgia	Georgia Institute of Technology	124
(ATR)	California	USGS (Menlo Park, Calif.)	71
ATT	New York	Lamont-Doherty Geological Observ.	232
(AUF)	Alaska	University of Alaska	13
(AUK)	Alaska	University of Alaska	13
(AUM)	Alaska	University of Alaska	13
(AUP)	Alaska	University of Alaska	13
(AVC)	California	University of Nevada	99
AVRM	California	USGS (Menlo Park, Calif.)	64
(AVRS)	California	USGS (Menlo Park, Calif.)	64
(AX-AL)	Alabama	Teledyne Geotech	6
(AX2AL)	Alabama	Teledyne Geotech	6

Appendix 3.--*Alphabetic listing of station codes*--Continued

Code	State	Operator	Page
(AY-SD)	South Dakota	Teledyne Geotech	290
(AZ-TX)	Texas	Teledyne Geotech	304
(B)	Washington	USGS (Menlo Park, Calif.)	343
(BA-WS)	Wisconsin	Teledyne Geotech	350
BAH	Hawaii-Pacific	NOAA (Ewa Beach, Calif.)	126
(BAL)	Alaska	USGS (Menlo Park, Calif.)	26
(BAM)	California	USGS (Menlo Park, Calif.)	68
BAR	California	California Institute of Technology	75
(BAR)	Hawaii-Pacific	NOAA (Ewa Beach, Calif.)	126
BAV	Virginia	Va. Polytechnic Inst. & State Univ.	325
BAVM	California	USGS (Menlo Park, Calif.)	64
(BB-PA)	Pennsylvania	Teledyne Geotech	274
BBC	California	California Institute of Technology	75
(BBD)	Delaware	Delaware Geological Survey	117
BBF	New York	Harry H. Larkin, Jr.	227
BBGM	California	USGS (Menlo Park, Calif.)	64
BBI	Idaho	USGS (Las Vegas, Nev.)	138
BBM	Montana	University of Montana	189
BBN	New Mexico	N.Mex. Institute of Mining and Tech.	222
BBNM	California	USGS (Menlo Park, Calif.)	64
BBR	California	USGS (Menlo Park, Calif.)	70
(BC2)	California	USGS (Pasadena, Calif.) and C.I.T.	82
BCB	Montana	University of Montana	189
BCC	California	USGS (Pasadena, Calif.) and C.I.T.	82
BCD	California	USGS (Pasadena, Calif.) and C.I.T.	82
BCGM	California	USGS (Menlo Park, Calif.)	64
(BCH)	California	USGS (Menlo Park, Calif.)	64
(BCH)	California	USGS (Pasadena, Calif.) and C.I.T.	82
BCHM	California	USGS (Menlo Park, Calif.)	64
BCL	California	USGS (Pasadena, Calif.) and C.I.T.	82
(BCM)	California	USGS (Pasadena, Calif.) and C.I.T.	82
BCN	Nevada	USGS (Boulder City, Nev.)	196
(BCR)	California	USGS (Menlo Park, Calif.)	68
(BCS)	Alaska	USGS (Menlo Park, Calif.)	26
(BCS)	South Carolina	USGS (Denver, Colo.)	285
BCT	Connecticut	Weston Observatory	115
BCU	Utah	USGS (Denver, Colo.)	318
(BD-PA)	Pennsylvania	Teledyne Geotech	274
BDA	Arizona	USGS (Denver, Colo.)	40
BDG	Washington	University of Washington	336
BDP	Alaska	University of Alaska	13
BDU	Utah	University of Utah	313
BDW	Wyoming	U.S. Air Force	357
(BE-FL)	Florida	Teledyne Geotech	121
BEA	Nevada	USGS (Las Vegas, Nev.)	198
BED	D.C.	Carnegie Institution of Washington	119
BEHM	California	USGS (Menlo Park, Calif.)	65
BEI	Idaho	University of Utah	142
BEMM	California	USGS (Menlo Park, Calif.)	65
(BEN)	California	USGS (Menlo Park, Calif.)	64
(BF-CL)	California	Teledyne Geotech	96
BFC	California	USGS (Pasadena, Calif.) and C.I.T.	82
(BFS)	California	USGS (Menlo Park, Calif.)	69
BFW	Washington	University of Washington	336
(BG-ME)	Maine	Teledyne Geotech	164
(BGA)	Alaska	USGS (Menlo Park, Calif.)	26
BGC	California	USGS (Menlo Park, Calif.)	65
(BGG)	California	USGS (Menlo Park, Calif.)	67
BGH	California	USGS (Menlo Park, Calif.)	68
(BGM)	California	USGS (Menlo Park, Calif.)	64
BGN	Nevada	University of Nevada	200
BGO	Ohio	Bowling Green State University	246
(BGR)	New York	Lamont-Doherty Geological Observ.	232
(BGU)	California	USGS (Menlo Park, Calif.)	65
BHI	Idaho	University of Montana	139
(BHM)	California	USGS (Pasadena, Calif.) and C.I.T.	82
BHP	Panama C.Z.	Panama Canal Company	266
(BHR)	California	University of Southern California	61
BHSM	California	USGS (Menlo Park, Calif.)	65
(BI-VA)	Virginia	Teledyne Geotech	332
BI1	Alaska	University of Alaska	13
BI2	Alaska	University of Alaska	13
BI3	Alaska	University of Alaska	13
BI4	Alaska	University of Alaska	13
BIG	Alaska	USGS (Menlo Park, Calif.)	26
BIO	Alaska	USGS (Sitka, Alaska)	20
BJCM	California	USGS (Menlo Park, Calif.)	65
BJOM	California	USGS (Menlo Park, Calif.)	65
(BK-AR)	Arkansas	Teledyne Geotech	46
BKC	California	USGS (Menlo Park, Calif.)	66
(BKH)	New York	Lamont-Doherty Geological Observ.	232
(BKO)	California	USGS (Menlo Park, Calif.)	67
BKS	California	University of California, Berkeley	50
(BL-WV)	West Virginia	Teledyne Geotech	346
BLA	Virginia	Va. Polytechnic Inst. & State Univ.	325
BLG	California	USGS (Pasadena, Calif.) and C.I.T.	82
BLK	Montana	University of Montana	189
BLL	Washington	Western Washington University	334
(BLM)	Nevada	University of Nevada	200
(BLMY)	New York	Woodward-Clyde Consultants	239
BLN	Washington	University of Washington	336
BLO	Indiana	University of Indiana	148
BLP	California	USGS (Pasadena, Calif.) and C.I.T.	82
BLR	Alaska	NOAA (Palmer, Alaska)	17
BLRM	California	USGS (Menlo Park, Calif.)	65
(BLU)	California	California Institute of Technology	75
(BLY)	Alaska	USGS (Menlo Park, Calif.)	26
(BM-TX)	Texas	Teledyne Geotech	304
BMCM	California	USGS (Menlo Park, Calif.)	65
BMHM	California	USGS (Menlo Park, Calif.)	65
BML	New York	Lamont-Doherty Geological Observ.	232
BMM	California	USGS (Pasadena, Calif.) and C.I.T.	82
BMN	Nevada	University of Nevada	200
(BMN)	Nevada	Sandia Laboratories	203
BMO	Oregon	USGS (Baker, Oreg.)	258
BMSM	California	USGS (Menlo Park, Calif.)	65
(BMT)	Alaska	University of Alaska	13
(BMT)	California	USGS (Menlo Park, Calif.)	65
(BMT)	California	USGS (Pasadena, Calif.) and C.I.T.	82
(BMT)	Nevada	USGS (Las Vegas, Nev.)	198
BNH	New Hampshire	Weston Observatory	214
BNY	New York	State Univ. of N.Y. at Binghamton	225
(BO-AL)	Alabama	Teledyne Geotech	6
(BOD)	Nevada	University of Nevada	200
(BOL)	California	USGS (Menlo Park, Calif.)	65
(BON)	California	USGS (Pasadena, Calif.) and C.I.T.	82
(BON)	Nevada	University of Nevada	200
BOU	Colorado	University of Colorado	102
BOZ	Montana	Montana State University	185
(BP-CL)	California	Teledyne Geotech	96
BPCM	California	USGS (Menlo Park, Calif.)	65
BPFM	California	USGS (Menlo Park, Calif.)	65
BPIM	California	USGS (Menlo Park, Calif.)	65
BPK	Arizona	USGS (Pasadena, Calif.) and C.I.T.	43
BPPM	California	USGS (Menlo Park, Calif.)	65
BPT	Connecticut	Weston Observatory	115
BPU	Utah	University of Utah	313
(BQ-AK)	Alaska	Teledyne Geotech	22
(BR-PA)	Pennsylvania	Teledyne Geotech	274
BRC	New Mexico	Los Alamos Scientific Laboratory	220
BRH	Alaska	University of Alaska	13
BRK	California	University of California, Berkeley	50
BRM	Missouri	Saint Louis University	179
BRMM	California	USGS (Menlo Park, Calif.)	65
(BRO)	California	USGS (Menlo Park, Calif.)	65
(BRP)	California	USGS (Menlo Park, Calif.)	70
BRR	Missouri	Saint Louis University	179
(BRV)	Vermont	Lamont-Doherty Geological Observ.	323
BRVM	California	USGS (Menlo Park, Calif.)	65
BRW	Alaska	USGS (College, Alaska)	12
(BRY)	California	Tera Corporation	54
(BS-MA)	Montana	Teledyne Geotech	191
BSBM	California	USGS (Menlo Park, Calif.)	65
BSC	California	USGS (Pasadena, Calif.) and C.I.T.	82
BSCM	California	USGS (Menlo Park, Calif.)	65
BSE	Idaho	Boise State University	135
BSGM	California	USGS (Menlo Park, Calif.)	65
BSLM	California	USGS (Menlo Park, Calif.)	65

Appendix 3.--*Alphabetic listing of station codes*--Continued

Code	State	Operator	Page
BSM	California	USGS (Pasadena, Calif.) and C.I.T.	82
BSN	California	USGS (Pasadena, Calif.) and C.I.T.	82
BSRM	California	USGS (Menlo Park, Calif.)	65
(BTL)	California	California Institute of Technology	75
(BTT)	California	USGS (Menlo Park, Calif.)	67
BTW	California	USGS (Menlo Park, Calif.)	71
BTY	Nevada	USGS (Las Vegas, Nev.)	198
BUF	New York	Canisius College	226
(BUI)	Idaho	U.S. Bureau of Mines	143
BUK	Nevada	USGS (Las Vegas, Nev.)	198
BUR	Vermont	University of Vermont	322
BUT	Montana	Mont. Col. of Mineral Sci. and Tech.	186
(BUZ)	California	USGS (Menlo Park, Calif.)	68
(BV-PA)	Pennsylvania	Teledyne Geotech	274
BVL	California	USGS (Menlo Park, Calif.)	65
BVLM	California	USGS (Menlo Park, Calif.)	65
(BVR)	Pennsylvania	Pennsylvania State University	272
BVYM	California	USGS (Menlo Park, Calif.)	65
(BWR)	California	USGS (Menlo Park, Calif.)	66
(BX-UT)	Utah	Teledyne Geotech	319
(BY-IO)	Iowa	Teledyne Geotech	152
(BZD)	California	Tera Corporation	54
BZE	Montana	Montana State University	185
BZM	Montana	Montana State University	185
(C)	Washington	USGS (Menlo Park, Calif.)	343
(CA)	Washington	USGS (Menlo Park, Calif.)	343
(CAC)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
CACM	California	USGS (Menlo Park, Calif.)	65
CADM	California	USGS (Menlo Park, Calif.)	65
(CAF)	South Carolina	USGS (Denver, Colo.)	285
CAG	Puerto Rico	USGS (Cayey, P.R.)	277
CAIM	California	USGS (Menlo Park, Calif.)	65
(CAL)	California	USGS (Menlo Park, Calif.)	65
CALM	California	USGS (Menlo Park, Calif.)	65
CAM	Massachusetts	M.I.T. and Harvard University	168
(CAM)	California	USGS (Pasadena, Calif.) and C.I.T.	82
(CAN)	California	USGS (Menlo Park, Calif.)	67
(CAN)	Nevada	University of Nevada	200
CAOM	California	USGS (Menlo Park, Calif.)	65
(CAR)	California	USGS (Menlo Park, Calif.)	70
(CAS)	California	USGS (Menlo Park, Calif.)	71
CBC	California	USGS (Menlo Park, Calif.)	67
(CBH)	California	USGS (Menlo Park, Calif.)	65
CBHM	California	USGS (Menlo Park, Calif.)	65
(CBL)	California	USGS (Menlo Park, Calif.)	68
CBM	Maine	Weston Observatory	165
CBN	Virginia	USGS (Corbin, Va.)	327
CBO	California	USGS (Menlo Park, Calif.)	68
CBRM	California	USGS (Menlo Park, Calif.)	65
CBW	Washington	University of Washington	336
CBWM	California	USGS (Menlo Park, Calif.)	66
(CC-WA)	Washington	Teledyne Geotech	341
CCA	Puerto Rico	USGS (Cayey, P.R.)	277
CCB	Alaska	University of Alaska	13
(CCC)	California	USGS (Menlo Park, Calif.)	67
(CCF)	California	USGS (Menlo Park, Calif.)	69
CCN	New Mexico	USGS (Albuquerque, N.Mex.)	217
CCNM	California	USGS (Menlo Park, Calif.)	66
CCO	California	California State University, Chico	56
CCOM	California	USGS (Menlo Park, Calif.)	66
(CCQ)	California	USGS (Menlo Park, Calif.)	66
(CCR)	California	USGS (Menlo Park, Calif.)	66
(CCS)	South Carolina	USGS (Denver, Colo.)	285
CCU	Utah	University of Utah	313
CCYM	California	USGS (Menlo Park, Calif.)	66
(CDA)	Alaska	University of Alaska	13
(CDA)	Alaska	NOAA (Palmer, Alaska)	17
CDC	California	USGS (Menlo Park, Calif.)	67
CDG	Georgia	Georgia Institute of Technology	124
CDN	New Mexico	USGS (Albuquerque, N.Mex.)	217
CDOM	California	USGS (Menlo Park, Calif.)	66
CDP	Puerto Rico	USGS (Cayey, P.R.)	277
(CDR)	California	USGS (Menlo Park, Calif.)	70
CDSM	California	USGS (Menlo Park, Calif.)	66
CDUM	California	USGS (Menlo Park, Calif.)	66
(CE-WA)	Washington	Teledyne Geotech	341
CEC	Texas	USGS (Menlo Park, Calif.)	312
CED	California	Calif. Department of Water Resources	87
CEH	North Carolina	University of North Carolina	241
(CEM)	California	USGS (Pasadena, Calif.) and C.I.T.	82
(CF-WS)	Wisconsin	Teledyne Geotech	350
CFI	Alaska	USGS (Menlo Park, Calif.)	26
CFM	Montana	University of Montana	189
(CFT)	California	California Institute of Technology	75
(CFU)	Utah	University of Utah	313
(CFW)	California	USGS (Menlo Park, Calif.)	66
CFWM	California	USGS (Menlo Park, Calif.)	66
(CG-VA)	Virginia	Teledyne Geotech	332
(CGB)	Alaska	USGS (Menlo Park, Calif.)	26
CGC	Colorado	NOAA (Boulder, Colo.)	101
CGM	Missouri	Saint Louis University	179
(CGS)	California	USGS (Menlo Park, Calif.)	66
CGSM	California	USGS (Menlo Park, Calif.)	66
CH5	Georgia	Georgia Institute of Technology	124
CH6	Georgia	Georgia Institute of Technology	124
(CHA)	Virginia	University of Virginia	331
CHC	North Carolina	University of North Carolina	241
(CHF)	South Carolina	USGS (Denver, Colo.)	285
CHI	Illinois	Loyola University	144
(CHI)	Alaska	University of Alaska	13
CHK	Illinois	Weather Bureau and Univ. of Chicago	145
(CHO)	Alaska	University of Alaska	13
CHP	California	California Institute of Technology	75
(CHR)	California	USGS (Menlo Park, Calif.)	67
(CHRY)	New York	Woodward-Clyde Consultants	239
(CHW)	Washington	University of Washington	336
CHX	Alaska	USGS (Menlo Park, Calif.)	26
(CI-VA)	Virginia	Teledyne Geotech	332
CIS	California	California Institute of Technology	75
(CJ)	Wyoming	USGS (Menlo Park, Calif.)	355
(CJP)	California	USGS (Pasadena, Calif.) and C.I.T.	83
CJW	Wyoming	USGS (Menlo Park, Calif.)	355
(CKC)	California	California Institute of Technology	75
CKK	Alaska	USGS (Menlo Park, Calif.)	26
CKM	Montana	University of Montana	189
(CL-ID)	Idaho	Teledyne Geotech	137
CLC	California	California Institute of Technology	75
CLCM	California	USGS (Menlo Park, Calif.)	66
CLE	Ohio	John Carroll University	248
CLH	Maryland	USC&GS (Cheltenham)	166
(CLI)	California	USGS (Pasadena, Calif.) and C.I.T.	83
CLN	New Mexico	N.Mex. Institute of Mining and Tech.	222
(CLO)	California	USGS (Menlo Park, Calif.)	66
CLP	New Mexico	Los Alamos Scientific Laboratory	220
(CLP)	California	USGS (Pasadena, Calif.) and C.I.T.	83
CLS	California	University of California, Berkeley	50
CLT	Virginia	Va. Polytechnic Inst. & State Univ.	325
CLW	Washington	University of Washington	336
CLY	New York	Lamont-Doherty Geological Observ.	232
(CM1)	Minnesota	University of Minnesota	172
(CM2)	Minnesota	University of Minnesota	172
(CM3)	Minnesota	University of Minnesota	172
(CM4)	Minnesota	University of Minnesota	172
(CM5)	Minnesota	University of Minnesota	172
(CM6)	Minnesota	University of Minnesota	172
CMA	Alaska	Department of the Air Force	10
CMCM	California	USGS (Menlo Park, Calif.)	66
CMH	California	USGS (Pasadena, Calif.) and C.I.T.	83
CMHM	California	USGS (Menlo Park, Calif.)	66
CMJM	California	USGS (Menlo Park, Calif.)	66
CMN	Nevada	University of Nevada	200
CMO	Alaska	USGS (College, Alaska)	11
CMOM	California	USGS (Menlo Park, Calif.)	66
CMRM	California	USGS (Menlo Park, Calif.)	66
(CMT)	California	USGS (Menlo Park, Calif.)	67
(CN-WS)	Wisconsin	Teledyne Geotech	350
CNA	Alaska	University of Alaska	13
(CNBC)	Nevada	UGSG (Menlo Park, Calif.)	208

Appendix 3.--*Alphabetic listing of station codes*--Continued

Code	State	Operator	Page
CNC	California	University of California, Berkeley	50
CNCM	California	USGS (Menlo Park, Calif.)	66
CND	Nevada	University of Nevada	200
CNE	Texas	USGS (Menlo Park, Calif.)	312
(CNEC)	Nevada	UGSG (Menlo Park, Calif.)	208
(CNHC)	Nevada	UGSG (Menlo Park, Calif.)	208
(CNHM)	Nevada	UGSG (Menlo Park, Calif.)	208
(CNHR)	Nevada	UGSG (Menlo Park, Calif.)	208
CNJ	New Jersey	Lamont-Doherty Geological Observ.	216
CNL	Washington	USGS (Menlo Park, Calif.)	343
CNM	New Mexico	USGS (Albuquerque, N.Mex.)	217
CNN	Ohio	Xavier University	247
CNO	Texas	USGS (Menlo Park, Calif.)	312
(CNPS)	Nevada	UGSG (Menlo Park, Calif.)	208
(CNR)	California	USGS (Menlo Park, Calif.)	64
(CNS)	California	USGS (Menlo Park, Calif.)	69
(CNSB)	Nevada	UGSG (Menlo Park, Calif.)	208
CNW	Texas	USGS (Menlo Park, Calif.)	312
CNY	New York	City College of New York	230
(CO-SD)	South Dakota	Teledyne Geotech	290
CO2	California	USGS (Pasadena, Calif.) and C.I.T.	83
COA	California	USGS (Pasadena, Calif.) and C.I.T.	83
(COB)	Colorado	USGS (Menlo Park, Calif.)	111
COE	California	USGS (Menlo Park, Calif.)	66
COH	New Mexico	USGS (Albuquerque, N.Mex.)	217
(COK)	California	USGS (Pasadena, Calif.) and C.I.T.	83
COL	Alaska	USGS (College, Alaska)	11
(COL)	Nevada	University of Nevada	200
(COP)	California	USGS (Menlo Park, Calif.)	69
(COQ)	California	California Institute of Technology	75
COR	Oregon	Oregon State University	259
(COR)	Nevada	University of Nevada	200
COT	California	USGS (Pasadena, Calif.) and C.I.T.	83
(COT)	Nevada	University of Nevada	200
(COV)	Vermont	Lamont-Doherty Geological Observ.	323
(COX)	California	USGS (Pasadena, Calif.) and C.I.T.	83
(COY)	California	California Institute of Technology	75
(CP-CL)	California	Teledyne Geotech	96
(CP-SO)	Tennessee	Teledyne Geotech	295
CPC	North Carolina	U.S. Department of the Navy	244
CPD	Puerto Rico	USGS (Cayey, P.R.)	277
CPE	California	California Institute of Technology	75
CPH	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
CPK	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
CPL	Connecticut	Weston Observatory	115
CPLM	California	USGS (Menlo Park, Calif.)	66
(CPM)	California	USGS (Pasadena, Calif.) and C.I.T.	83
CPN	Nevada	USGS (Las Vegas, Nev.)	198
CPO	Tennessee	USGS (McMinnville, Tenn.)	292
CPT	California	California Institute of Technology	75
(CPT)	California	USGS (Menlo Park, Calif.)	66
CPTM	California	USGS (Menlo Park, Calif.)	66
CPU	Utah	University of Utah	313
CPW	Washington	University of Washington	336
CPX	Nevada	USGS (Las Vegas, Nev.)	198
(CQ-NV)	Nevada	Teledyne Geotech	205
(CR-NB)	Nebraska	Teledyne Geotech	195
(CR2NB)	Nebraska	Teledyne Geotech	195
CRAM	California	USGS (Menlo Park, Calif.)	66
CRC	California	USGS (Menlo Park, Calif.)	66
CRD	California	USGS (Menlo Park, Calif.)	70
(CRE)	California	California Institute of Technology	75
CRF	Washington	University of Washington	336
(CRG)	California	USGS (Pasadena, Calif.) and C.I.T.	83
CRH	California	USGS (Menlo Park, Calif.)	69
(CRK)	California	USGS (Menlo Park, Calif.)	66
CRO	Oklahoma	University of Oklahoma	252
CRPM	California	USGS (Menlo Park, Calif.)	66
CRR	California	USGS (Pasadena, Calif.) and C.I.T.	83
CRU	Kentucky	Saint Louis University	159
(CRY)	California	USGS (Menlo Park, Calif.)	71
(CS-TN)	Tennessee	Teledyne Geotech	295
CSA	Alaska	NOAA (Palmer, Alaska)	17
CSB	Puerto Rico	USGS (Cayey, P.R.)	277
CSC	South Carolina	University of South Carolina	284
CSCM	California	USGS (Menlo Park, Calif.)	66
CSE	Texas	USGS (Menlo Park, Calif.)	312
CSH	California	USGS (Menlo Park, Calif.)	66
CSHM	California	USGS (Menlo Park, Calif.)	66
CSJ	Puerto Rico	Lamont-Doherty Geological Observ.	281
(CSL)	California	Calif. Department of Water Resources	87
CSP	California	Calif. Department of Water Resources	87
CSR	California	USGS (Menlo Park, Calif.)	67
(CSS)	California	USGS (Menlo Park, Calif.)	66
CSSM	California	USGS (Menlo Park, Calif.)	66
CSW	Texas	USGS (Menlo Park, Calif.)	312
(CT-OK)	Oklahoma	Teledyne Geotech	255
CTM	California	USGS (Menlo Park, Calif.)	71
CTR	New York	Lamont-Doherty Geological Observ.	232
CTV	Virginia	Va. Division of Mineral Resources	326
(CU-NV)	Nevada	Teledyne Geotech	205
CUP	Puerto Rico	Lamont-Doherty Geological Observ.	281
(CV-TN)	Tennessee	Teledyne Geotech	295
CVA	Alaska	USGS (Menlo Park, Calif.)	26
CVD	California	USGS (Menlo Park, Calif.)	67
CVR	California	USGS (Menlo Park, Calif.)	65
CVV	Virginia	Va. Division of Mineral Resources	326
(CW-AR)	Arkansas	Teledyne Geotech	46
CWC	California	California Institute of Technology	75
CWT	Texas	USGS (Menlo Park, Calif.)	312
CWU	Utah	University of Utah	313
(CY-WY)	Wyoming	Teledyne Geotech	353
CYC	California	USGS (Menlo Park, Calif.)	66
CYH	California	USGS (Menlo Park, Calif.)	66
(CYO)	California	USGS (Menlo Park, Calif.)	66
(CZD)	California	USGS (Menlo Park, Calif.)	67
(CZL)	New Mexico	Los Alamos Scientific Laboratory	220
(D)	Washington	USGS (Menlo Park, Calif.)	343
(D1A)	Maine	Weston Observatory	165
(D2A)	Maine	Weston Observatory	165
(D3A)	Maine	Weston Observatory	165
(DA)	Washington	USGS (Menlo Park, Calif.)	343
DAC	California	Sandia Laboratories	95
(DAH)	California	USGS (Pasadena, Calif.) and C.I.T.	83
DAL	Texas	Southern Methodist University	300
(DAN)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
DAU	Utah	University of Utah	313
(DAV)	Washington	University of Washington	336
(DB2)	California	California Institute of Technology	75
(DBB)	California	USGS (Pasadena, Calif.) and C.I.T.	83
(DBMY)	New York	Woodward-Clyde Consultants	239
DBQ	Iowa	Loras College	151
DCI	Idaho	USGS (Las Vegas, Nev.)	138
DCU	Utah	University of Utah	313
(DDG)	Colorado	USGS (Menlo Park, Calif.)	111
DDM	Alaska	University of Alaska	13
DEI	Idaho	University of Montana	139
DEN	Colorado	Regis College	103
DES	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
(DFCC)	California	USGS (Menlo Park, Calif.)	74
(DFHR)	California	USGS (Menlo Park, Calif.)	74
(DFHT)	California	USGS (Menlo Park, Calif.)	74
(DFLM)	Nevada	UGSG (Menlo Park, Calif.)	208
(DFMM)	Nevada	UGSG (Menlo Park, Calif.)	208
(DFOD)	Nevada	UGSG (Menlo Park, Calif.)	208
(DFVC)	California	USGS (Menlo Park, Calif.)	74
DGC	Colorado	NOAA (Boulder, Colo.)	101
(DH-NY)	New York	Teledyne Geotech	240
(DHN)	New York	Lamont-Doherty Geological Observ.	232
DHS	California	California Institute of Technology	75
(DHS)	California	University of Southern California	61
(DHS)	Colorado	USGS (Menlo Park, Calif.)	111
(DHT)	California	University of Southern California	61
(DHV)	Colorado	USGS (Menlo Park, Calif.)	111
DHW	Washington	University of Washington	336
(DI-MA)	Montana	Teledyne Geotech	191
(DIA)	California	Tera Corporation	54
DIL	California	USGS (Menlo Park, Calif.)	68

Appendix 3.--*Alphabetic listing of station codes*--Continued

Code	State	Operator	Page
DIR	California	USGS (Menlo Park, Calif.)	66
(DKN)	California	USGS (Menlo Park, Calif.)	66
DKNM	California	USGS (Menlo Park, Calif.)	66
(DL-SD)	South Dakota	Teledyne Geotech	290
(DLC)	Alabama	USGS and Alabama Geological Survey	7
DLS	Texas	Ralph W. McNeely	299
DLT	California	California Institute of Technology	75
DMA	Alaska	University of Alaska	13
(DMB)	Alaska	University of Alaska	13
DMI	Iowa	Mrs. M. M. Seeburger	150
(DMPK)	New Mexico	Los Alamos Scientific Laboratory	220
(DNH)	New Hampshire	Massachusetts Inst. of Technology	212
DNM	New Mexico	USGS (Albuquerque, N.Mex.)	217
DNT	Texas	John W. Crain	301
DNY	New York	Lamont-Doherty Geological Observ.	232
(DOG)	Nevada	University of Nevada	200
DON	Missouri	Saint Louis University	179
DOO	California	USGS (Menlo Park, Calif.)	66
DOS	Puerto Rico	USGS (Cayey, P.R.)	277
(DP-NY)	New York	Teledyne Geotech	240
(DPLY)	New York	Woodward-Clyde Consultants	239
(DPN)	Colorado	USGS (Menlo Park, Calif.)	111
(DPS)	Colorado	USGS (Menlo Park, Calif.)	111
(DR-CO)	Colorado	Teledyne Geotech	110
(DRP)	California	University of Southern California	61
(DRY)	California	USGS (Menlo Park, Calif.)	67
(DSB)	Alaska	USGS (Menlo Park, Calif.)	26
DSK	Alaska	USGS (Menlo Park, Calif.)	26
DSN	New York	Lamont-Doherty Geological Observ.	232
(DSR)	California	USGS (Menlo Park, Calif.)	66
(DTE)	California	USGS (Menlo Park, Calif.)	66
DTEM	California	USGS (Menlo Park, Calif.)	66
DTM	D.C.	Carnegie Institution of Washington	119
(DU-OK)	Oklahoma	Teledyne Geotech	255
DUC	California	USGS (Menlo Park, Calif.)	66
DUG	Utah	University of Utah	313
DUL	Minnesota	University of Minnesota	172
(DUR)	California	USGS (Menlo Park, Calif.)	66
(DUX)	Massachusetts	M.I.T. and Harvard University	168
(DV-CL)	California	Teledyne Geotech	96
(DVL)	California	USGS (Pasadena, Calif.) and C.I.T.	83
DVW	Washington	University of Washington	336
DWM	Missouri	Saint Louis University	179
DY1	Tennessee	Saint Louis University	297
DY2	Tennessee	Saint Louis University	297
DY3	Tennessee	Saint Louis University	297
DY4	Tennessee	Saint Louis University	297
DY5	Tennessee	Saint Louis University	297
(DYH)	Washington	University of Washington	336
(EA)	Washington	USGS (Menlo Park, Calif.)	343
EAC	California	USGS (Pasadena, Calif.) and C.I.T.	83
EBS	South Dakota	Jerome E. Payne	288
ECA	California	California Institute of Technology	75
ECC	California	California Institute of Technology	75
ECD	Missouri	Saint Louis University	179
(ECF)	California	USGS (Pasadena, Calif.) and C.I.T.	83
ECT	Connecticut	Weston Observatory	115
(ED-MI)	Michigan	Teledyne Geotech	171
(EF-TX)	Texas	Teledyne Geotech	304
EGC	Colorado	NOAA (Boulder, Colo.)	101
(EGG)	California	USGS (Pasadena, Calif.) and C.I.T.	83
EGN	New York	Lamont-Doherty Geological Observ.	232
EGR	California	USGS (Menlo Park, Calif.)	66
(EK-NV)	Nevada	Teledyne Geotech	205
EKH	California	USGS (Menlo Park, Calif.)	65
EKO	Nevada	University of Nevada	200
(EKO)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
(EKR)	California	Tera Corporation	54
(EL-WA)	Washington	Teledyne Geotech	341
ELC	Illinois	Saint Louis University	147
(ELG)	California	USGS (Menlo Park, Calif.)	68
ELK	Nevada	Lawrence Livermore Laboratory	207
(ELK)	California	USGS (Menlo Park, Calif.)	65
ELM	New York	Lamont-Doherty Geological Observ.	232
(ELR)	California	USGS (Pasadena, Calif.) and C.I.T.	83
ELV	Alaska	University of Alaska	13
ELY	Nevada	Sandia Laboratories	203
(EM-KA)	Kansas	Teledyne Geotech	155
EMA	Alabama	USGS and Alabama Geological Survey	7
EMM	Maine	Weston Observatory	165
(EMM)	California	USGS (Menlo Park, Calif.)	65
(EMM)	Maine	Massachusetts Inst. of Technology	163
EMT	California	USGS (Menlo Park, Calif.)	65
(EN-MO)	Missouri	Teledyne Geotech	182
ENG	Alaska	University of Alaska	13
(ENT)	Washington	University of Washington	336
(EO2TX)	Texas	Teledyne Geotech	304
(EP-TX)	Texas	Teledyne Geotech	304
(EPH)	Washington	University of Washington	336
(EPN)	Nevada	USGS (Las Vegas, Nev.)	198
EPT	Texas	University of Texas	302
EPU	Utah	University of Utah	313
EPW	Washington	University of Washington	336
ERI	Idaho	University of Montana	139
ERN	Alaska	USGS (Menlo Park, Calif.)	26
(ERP)	Pennsylvania	Pennsylvania State University	272
(ESJ)	Vermont	Lamont-Doherty Geological Observ.	323
ESR	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
EST	New Mexico	USGS (Albuquerque, N.Mex.)	217
(EST)	Nevada	University of Nevada	200
ETP	Washington	University of Washington	336
ETS	Nevada	USGS (Las Vegas, Nev.)	198
ETU	Utah	University of Utah	313
(EU-AL)	Alabama	Teledyne Geotech	6
(EU2AL)	Alabama	Teledyne Geotech	6
EUC	California	USGS (Menlo Park, Calif.)	68
(EUK)	Washington	University of Washington	336
EUM	New Mexico	Los Alamos Scientific Laboratory	220
EUR	Nevada	Willis A. DePaoli	197
EUW	Washington	University of Washington	336
(EW-IS)	Hawaii-Pacific	Teledyne Geotech	134
(EXC)	Nevada	University of Nevada	200
(EY-NV)	Nevada	Teledyne Geotech	205
(EY2NV)	Nevada	Teledyne Geotech	205
EYP	Puerto Rico	USGS (Cayey, P.R.)	277
(FA-NV)	Nevada	Teledyne Geotech	205
(FAL)	Nevada	University of Calif., Berkeley	204
(FAR)	California	USGS (Menlo Park, Calif.)	70
FAV	Arkansas	University of Arkansas	44
FAY	Arkansas	University of Arkansas	44
(FB-AK)	Alaska	Teledyne Geotech	22
(FB2AK)	Alaska	Teledyne Geotech	22
FBK	Alaska	Lamont-Doherty Geological Observ.	31
FCN	New Mexico	Los Alamos Scientific Laboratory	220
FEA	California	Calif. Department of Water Resources	87
(FEL)	California	USGS (Menlo Park, Calif.)	68
FER	California	City of Ferndale	57
(FER)	Nevada	University of Nevada	200
FGU	Utah	University of Utah	313
FHC	California	University of California, Berkeley	50
FID	Alaska	USGS (Menlo Park, Calif.)	26
FIS	Alaska	USGS (Menlo Park, Calif.)	26
(FK-CO)	Colorado	Teledyne Geotech	110
(FKH)	California	Tera Corporation	54
FLA	Utah	USGS (Denver, Colo.)	318
FLG	Arizona	USGS (Flagstaff, Ariz.)	32
FLO	Missouri	Saint Louis University	179
(FLP)	Alaska	University of Alaska	13
FLR	Massachusetts	Weston Observatory	169
FLT	Alabama	USGS and Alabama Geological Survey	7
(FM-UT)	Utah	Teledyne Geotech	319
(FMA)	California	University of Southern California	61
FMC	Oregon	Tera Corporation	263
FMF	South Carolina	USGS (Denver, Colo.)	285
FMW	Washington	University of Washington	336
(FN-WV)	West Virginia	Teledyne Geotech	346
(FNK)	California	USGS (Pasadena, Calif.) and C.I.T.	83
FNN	New Hampshire	New Hampshire Highway Department	211

Appendix 3.--*Alphabetic listing of station codes*--Continued

Code	State	Operator	Page
(FO-TX)	Texas	Teledyne Geotech	304
FOR	New York	Fordham University	231
(FOR)	California	USGS (Menlo Park, Calif.)	67
(FOX)	California	Tera Corporation	54
FPN	Nevada	University of Nevada	200
FPU	Utah	University of Utah	313
FPW	Washington	University of Washington	336
(FR-MA)	Montana	Teledyne Geotech	191
FRE	California	University of California, Berkeley	50
FRI	California	University of California, Berkeley	50
FRM	Missouri	Saint Louis University	179
FRP	California	USGS (Menlo Park, Calif.)	68
(FS-AZ)	Arizona	Teledyne Geotech	41
FTC	California	California Institute of Technology	75
FTC	California	USGS (Pasadena, Calif.) and C.I.T.	83
(FTH)	California	USGS (Menlo Park, Calif.)	68
(FTM)	Arizona	USGS (Pasadena, Calif.) and C.I.T.	43
FTR	California	USGS (Menlo Park, Calif.)	70
FTW	Washington	University of Washington	336
FVM	Missouri	Saint Louis University	179
(FWL)	California	USGS (Menlo Park, Calif.)	67
FY1	Alaska	University of Alaska	13
FY2	Alaska	University of Alaska	13
FY3	Alaska	University of Alaska	13
FY4	Alaska	University of Alaska	14
FY5	Alaska	University of Alaska	14
FYU	Alaska	University of Alaska	13
(GA-TX)	Texas	Teledyne Geotech	304
(GA3TX)	Texas	Teledyne Geotech	304
GAFM	California	USGS (Menlo Park, Calif.)	67
(GAR)	Nevada	University of Nevada	200
GAV	California	California Institute of Technology	75
GAXM	California	USGS (Menlo Park, Calif.)	67
(GB-NM)	New Mexico	Teledyne Geotech	223
GBGM	California	USGS (Menlo Park, Calif.)	67
GBL	Washington	University of Washington	336
GBM	Montana	University of Montana	189
GBOM	California	USGS (Menlo Park, Calif.)	67
(GBT)	Nevada	University of Nevada	200
(GC-WA)	Washington	Teledyne Geotech	341
GCA	Arizona	USGS (Denver, Colo.)	40
GCC	California	University of California, Berkeley	50
GCMM	California	USGS (Menlo Park, Calif.)	67
GCR	Montana	USGS (Menlo Park, Calif.)	193
GCVM	California	USGS (Menlo Park, Calif.)	67
GCW	Washington	USC&GS (Washington, D.C.)	344
GCY	New York	Victor S. Aiello	228
(GD-VA)	Virginia	Teledyne Geotech	332
GDCM	California	USGS (Menlo Park, Calif.)	67
(GDH)	California	USGS (Menlo Park, Calif.)	71
(GE-AZ)	Arizona	Teledyne Geotech	41
GEO	D.C.	Georgetown University	118
(GF-NV)	Nevada	Teledyne Geotech	205
GFN	New York	Lamont-Doherty Geological Observ.	232
(GFP)	California	University of Southern California	61
GGLM	California	USGS (Menlo Park, Calif.)	67
GGPM	California	USGS (Menlo Park, Calif.)	67
GHC	California	USGS (Menlo Park, Calif.)	71
GHCM	California	USGS (Menlo Park, Calif.)	67
GHGM	California	USGS (Menlo Park, Calif.)	67
GHI	Idaho	University of Montana	139
GHLM	California	USGS (Menlo Park, Calif.)	67
GHS	California	USGS (Menlo Park, Calif.)	68
GHW	Washington	University of Washington	336
(GI-MA)	Montana	Teledyne Geotech	191
GIA	Alaska	University of Alaska	14
GIL	Alaska	NOAA (Palmer, Alaska)	17
(GIL)	Nevada	University of Nevada	200
GKC	Alaska	University of Alaska	14
(GL-TX)	Texas	Teledyne Geotech	304
GLA	California	California Institute of Technology	76
(GLB)	Alaska	USGS (Menlo Park, Calif.)	26
(GLC)	Alaska	USGS (Menlo Park, Calif.)	26
GLD	Colorado	USGS (Denver, Colo.)	104
GLM	Alaska	University of Alaska	14
(GLN)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
GLO	Massachusetts	M.I.T. and Harvard University	168
GLR	Nevada	USGS (Las Vegas, Nev.)	198
(GLV)	California	USGS (Menlo Park, Calif.)	67
GMA	Alaska	NOAA (Palmer, Alaska)	17
GMCM	California	USGS (Menlo Park, Calif.)	67
GMI	Idaho	USGS (Las Vegas, Nev.)	138
GMKM	California	USGS (Menlo Park, Calif.)	67
GMOM	California	USGS (Menlo Park, Calif.)	67
GMU	Utah	University of Utah	313
GMW	Washington	University of Washington	336
(GN-NM)	New Mexico	Teledyne Geotech	223
GNM	New Mexico	USGS (Albuquerque, N.Mex.)	217
(GO-NB)	Nebraska	Teledyne Geotech	195
(GOBY)	New York	Woodward-Clyde Consultants	239
GOC	California	City of Los Angeles	60
GOL	Colorado	Colorado School of Mines	106
(GP-MN)	Minnesota	Teledyne Geotech	174
GPD	New Jersey	Lamont-Doherty Geological Observ.	216
GPMM	California	USGS (Menlo Park, Calif.)	67
(GR1TX)	Texas	Teledyne Geotech	304
(GR2TX)	Texas	Teledyne Geotech	304
GRMM	California	USGS (Menlo Park, Calif.)	67
(GRP)	California	USGS (Pasadena, Calif.) and C.I.T.	83
GRT	Tennessee	Saint Louis University	297
GRTM	California	USGS (Menlo Park, Calif.)	67
GRV	Missouri	Saint Louis University	179
(GRW)	California	USGS (Menlo Park, Calif.)	68
(GS-MS)	Mississippi	Teledyne Geotech	176
GSC	California	California Institute of Technology	76
(GSCY)	New York	Woodward-Clyde Consultants	239
GSGM	California	USGS (Menlo Park, Calif.)	67
GSM	Washington	University of Washington	336
GSMM	California	USGS (Menlo Park, Calif.)	67
GSNM	California	USGS (Menlo Park, Calif.)	67
GSR	Virginia	USGS (Reston, Va.)	330
GSSM	California	USGS (Menlo Park, Calif.)	67
(GT-PA)	Pennsylvania	Teledyne Geotech	274
GTD	Delaware	Delaware Geological Survey	117
GUA	Hawaii-Pacific	USGS (Agana, Guam)	132
GUMO	Hawaii-Pacific	USGS (Agana, Guam)	132
(GV-TX)	Texas	Teledyne Geotech	304
(GVF)	South Carolina	USGS (Denver, Colo.)	285
GVR	California	USGS (Menlo Park, Calif.)	70
GVS	South Carolina	USGS (Denver, Colo.)	285
(GWS)	California	Tera Corporation	54
(GY-MN)	Minnesota	Teledyne Geotech	174
(GYO)	Alaska	USGS (Menlo Park, Calif.)	26
(GYP)	California	USGS (Menlo Park, Calif.)	67
(GZ-OH)	Ohio	Teledyne Geotech	250
GZN	Nevada	USGS (Las Vegas, Nev.)	198
(H)	Washington	USGS (Menlo Park, Calif.)	343
(HAH)	California	Tera Corporation	54
HAI	California	California Institute of Technology	76
(HAL)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
HAR	Connecticut	Trinity College	113
HAV	California	California Institute of Technology	76
HAY	California	California Institute of Technology	76
HAZM	California	USGS (Menlo Park, Calif.)	67
(HB-OK)	Oklahoma	Teledyne Geotech	255
HBF	South Carolina	USGS (Denver, Colo.)	285
HBM	California	University of Nevada	99
HBT	California	University of Nevada	99
HBTM	California	USGS (Menlo Park, Calif.)	67
HBV	Virginia	James Madison University	328
HCAM	California	USGS (Menlo Park, Calif.)	67
HCBM	California	USGS (Menlo Park, Calif.)	67
HCC	California	USGS (Menlo Park, Calif.)	67
(HCI)	Arkansas	Saint Louis University	48
(HCM)	California	University of Southern California	61
HCOM	California	USGS (Menlo Park, Calif.)	67
HCRM	California	USGS (Menlo Park, Calif.)	67
HCU	Utah	USGS (Denver, Colo.)	318

Appendix 3.--*Alphabetic listing of station codes*--Continued

Code	State	Operator	Page
HCZM	California	USGS (Menlo Park, Calif.)	67
(HD-PA)	Pennsylvania	Teledyne Geotech	274
(HDA)	Alaska	University of Alaska	14
(HDG)	California	USGS (Pasadena, Calif.) and C.I.T.	83
HDLM	California	USGS (Menlo Park, Calif.)	68
HDM	Connecticut	Weston Observatory	115
HDQ	Colorado	Colorado School of Mines	106
HDU	Utah	University of Utah	313
(HDW)	Colorado	USGS (Menlo Park, Calif.)	111
(HE-TX)	Texas	Teledyne Geotech	304
(HEC)	California	USGS (Menlo Park, Calif.)	71
(HER)	California	USGS (Menlo Park, Calif.)	71
HET	Texas	Mandrel Industries, Inc.	307
HFEM	California	USGS (Menlo Park, Calif.)	68
HFHM	California	USGS (Menlo Park, Calif.)	68
HFPM	California	USGS (Menlo Park, Calif.)	68
HGSM	California	USGS (Menlo Park, Calif.)	68
HGWM	California	USGS (Menlo Park, Calif.)	68
(HH-ND)	North Dakota	Teledyne Geotech	245
(HH2ND)	North Dakota	Teledyne Geotech	245
HHI	Idaho	University of Montana	139
HHM	Montana	Roy E. Wendt	187
HHT	Tennessee	Saint Louis University	297
HID	Idaho	USGS (Las Vegas, Nev.)	138
HIG	Hawaii-Pacific	University of Hawaii	131
HIL	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
HIN	Alaska	USGS (Menlo Park, Calif.)	26
HJGM	California	USGS (Menlo Park, Calif.)	68
HJSM	California	USGS (Menlo Park, Calif.)	68
(HK-WY)	Wyoming	Teledyne Geotech	353
HKL	Hawaii-Pacific	NOAA (Ewa Beach, Calif.)	126
HKP	Pennsylvania	Lamont-Doherty Geological Observ.	276
HKRM	California	USGS (Menlo Park, Calif.)	68
HKT	Texas	Marine Science Institute	303
(HL)	Montana	USGS (Menlo Park, Calif.)	193
(HL-ID)	Idaho	Teledyne Geotech	137
(HL2ID)	Idaho	Teledyne Geotech	137
(HLB)	California	USGS (Menlo Park, Calif.)	70
HLK	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
HLM	Montana	University of Montana	189
(HLM)	California	USGS (Menlo Park, Calif.)	68
HLP	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
HLR	Colorado	Colorado School of Mines	106
(HLS)	California	USGS (Menlo Park, Calif.)	67
(HLT)	Alabama	USGS and Alabama Geological Survey	7
HLTM	California	USGS (Menlo Park, Calif.)	68
HMB	New York	Lamont-Doherty Geological Observ.	232
HMO	Oregon	Harold Mason	262
HMOM	California	USGS (Menlo Park, Calif.)	68
HMR	California	USGS (Menlo Park, Calif.)	70
(HN-ME)	Maine	Teledyne Geotech	164
HNH	New Hampshire	Weston Observatory	214
HNL	Hawaii-Pacific	University of Hawaii	131
HNY	New York	Lamont-Doherty Geological Observ.	232
(HOC)	California	USGS (Menlo Park, Calif.)	67
(HOG)	California	USGS (Menlo Park, Calif.)	67
(HOM)	Alaska	University of Alaska	14
HON	Hawaii-Pacific	NOAA (Ewa Beach, Calif.)	126
HORM	California	USGS (Menlo Park, Calif.)	68
(HOT)	California	California Institute of Technology	76
HOU	Texas	Rice University	308
HPHM	California	USGS (Menlo Park, Calif.)	68
HPI	Idaho	USGS (Las Vegas, Nev.)	138
HPLM	California	USGS (Menlo Park, Calif.)	68
HPP	Alaska	University of Alaska	14
HPRM	California	USGS (Menlo Park, Calif.)	68
HPU	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
HQN	Alaska	USGS (Menlo Park, Calif.)	26
HQRM	California	USGS (Menlo Park, Calif.)	68
(HR-AZ)	Arizona	Teledyne Geotech	41
HRC	California	University of California, Berkeley	50
HRO	Oregon	University of Washington	265
(HRS)	California	Tera Corporation	54
HRV	Massachusetts	M.I.T. and Harvard University	168
(HS-NB)	Nebraska	Teledyne Geotech	195
HSFM	California	USGS (Menlo Park, Calif.)	68
HSLM	California	USGS (Menlo Park, Calif.)	68
(HSP)	California	USGS (Pasadena, Calif.) and C.I.T.	83
(HSP)	Nevada	University of Nevada	200
(HSS)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
(HST)	California	USGS (Menlo Park, Calif.)	65
HSW	Washington	USGS (Menlo Park, Calif.)	343
(HT-MN)	Minnesota	Teledyne Geotech	174
HTU	Utah	University of Utah	313
HTW	Washington	University of Washington	336
(HUA)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
HUH	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
HUR	Alaska	University of Alaska	14
(HV-MA)	Montana	Teledyne Geotech	191
HVC	California	USGS (Menlo Park, Calif.)	71
(HVL)	Nevada	University of Nevada	200
HVO	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
HVU	Utah	University of Utah	313
(HW-IS)	Hawaii-Pacific	Teledyne Geotech	134
(HWS)	California	USGS (Menlo Park, Calif.)	68
HWSM	California	USGS (Menlo Park, Calif.)	68
(HY-MA)	Montana	Teledyne Geotech	191
IDE	Puerto Rico	USGS (Cayey, P.R.)	277
(IK-AR)	Arkansas	Teledyne Geotech	46
IKP	California	California Institute of Technology	76
ILM	Alaska	USGS (Menlo Park, Calif.)	26
IMA	Alaska	NOAA (Palmer, Alaska)	17
IMO	Puerto Rico	USGS (Cayey, P.R.)	277
IMR	Puerto Rico	USGS (Cayey, P.R.)	277
(IND)	California	USGS (Menlo Park, Calif.)	71
ING	California	USGS (Pasadena, Calif.) and C.I.T.	83
(INS)	California	USGS (Pasadena, Calif.) and C.I.T.	83
INY	New York	Cornell University	229
(IPC)	California	University of Southern California	61
IRC	California	California Institute of Technology	76
(IRN)	California	USGS (Pasadena, Calif.) and C.I.T.	83
ISA	California	California Institute of Technology	76
ITH	New York	Cornell University	229
JAC	Florida	U.S. Department of the Navy	122
JALM	California	USGS (Menlo Park, Calif.)	68
JAS	California	University of California, Berkeley	50
JBCM	California	USGS (Menlo Park, Calif.)	68
(JBF)	California	University of Southern California	61
JBGM	California	USGS (Menlo Park, Calif.)	68
JBLM	California	USGS (Menlo Park, Calif.)	68
JBMM	California	USGS (Menlo Park, Calif.)	68
(JBY)	California	Tera Corporation	54
JBZM	California	USGS (Menlo Park, Calif.)	68
JCBM	California	USGS (Menlo Park, Calif.)	68
JCT	Texas	Texas Technological University	309
JCW	Washington	University of Washington	336
(JE-LA)	Louisiana	Teledyne Geotech	161
JECM	California	USGS (Menlo Park, Calif.)	68
JEGM	California	USGS (Menlo Park, Calif.)	68
JHC	California	USGS (Menlo Park, Calif.)	65
JHLM	California	USGS (Menlo Park, Calif.)	68
JLTM	California	USGS (Menlo Park, Calif.)	68
JLXM	California	USGS (Menlo Park, Calif.)	69
JMGM	California	USGS (Menlo Park, Calif.)	69
(JN-IS)	Hawaii-Pacific	Teledyne Geotech	134
(JO-MN)	Minnesota	Teledyne Geotech	174
JOL	California	USGS (Menlo Park, Calif.)	71
(JON)	California	USGS (Menlo Park, Calif.)	65
JPLM	California	USGS (Menlo Park, Calif.)	69
JPPM	California	USGS (Menlo Park, Calif.)	69
JPRM	California	USGS (Menlo Park, Calif.)	69
JPSM	California	USGS (Menlo Park, Calif.)	69
(JR-AZ)	Arizona	Teledyne Geotech	41
JRGM	California	USGS (Menlo Park, Calif.)	69
JRRM	California	USGS (Menlo Park, Calif.)	69
(JRW)	California	USGS (Menlo Park, Calif.)	69
JRWM	California	USGS (Menlo Park, Calif.)	69
(JS-TN)	Tennessee	Teledyne Geotech	295

Appendix 3.--*Alphabetic listing of station codes*--Continued

Code	State	Operator	Page
JSAM	California	USGS (Menlo Park, Calif.)	69
JSC	South Carolina	USGS (Denver, Colo.)	285
JSCM	California	USGS (Menlo Park, Calif.)	69
JSFM	California	USGS (Menlo Park, Calif.)	69
JSGM	California	USGS (Menlo Park, Calif.)	69
JSJM	California	USGS (Menlo Park, Calif.)	69
JSMM	California	USGS (Menlo Park, Calif.)	69
(JSR)	California	USGS (Menlo Park, Calif.)	68
JSSM	California	USGS (Menlo Park, Calif.)	69
JSTM	California	USGS (Menlo Park, Calif.)	69
JTGM	California	USGS (Menlo Park, Calif.)	69
(JU-TX)	Texas	Teledyne Geotech	304
JUCM	California	USGS (Menlo Park, Calif.)	69
JWSM	California	USGS (Menlo Park, Calif.)	69
(KAA)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
KAE	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
KBF	California	University of Nevada	99
(KBY)	California	USGS (Pasadena, Calif.) and C.I.T.	83
(KC-MO)	Missouri	Teledyne Geotech	182
KDC	Alaska	NOAA (Palmer, Alaska)	17
KEA	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
(KEE)	California	California Institute of Technology	76
KFC	California	College of Marin	58
KFO	Oregon	Oregon State University	259
(KG-AZ)	Arizona	Teledyne Geotech	41
KGI	Idaho	U.S. Bureau of Mines	143
(KH-AZ)	Arizona	Teledyne Geotech	41
KHU	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
(KII)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
KIP	Hawaii-Pacific	NOAA (Ewa Beach, Calif.)	126
KKH	Hawaii-Pacific	NOAA (Ewa Beach, Calif.)	126
KKU	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
KLH	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
KLK	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
KLU	Alaska	USGS (Menlo Park, Calif.)	26
(KM-CL)	California	Teledyne Geotech	96
KM2	Texas	USGS (Denver, Colo.)	310
KM5	Texas	USGS (Denver, Colo.)	310
KM6	Texas	USGS (Denver, Colo.)	310
KM9	Texas	USGS (Denver, Colo.)	310
KME	Texas	USGS (Denver, Colo.)	310
KML	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
(KMO)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
(KMP)	Alaska	USGS (Menlo Park, Calif.)	26
KMV	Virginia	Va. Polytechnic Inst. & State Univ.	325
(KN-UT)	Utah	Teledyne Geotech	319
KNB	Utah	Lawrence Livermore Laboratory	321
KNH	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
KNK	Alaska	USGS (Menlo Park, Calif.)	27
KNO	California	California Institute of Technology	76
(KNR)	California	USGS (Menlo Park, Calif.)	68
KNW	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
KOH	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
KOR	Hawaii-Pacific	USGS (Agana, Guam)	132
KPH	Hawaii-Pacific	NOAA (Ewa Beach, Calif.)	126
(KPN)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
(KPR)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	128
KRC	California	California Institute of Technology	76
KRK	California	Calif. Department of Water Resources	87
KT1	Texas	USGS (Denver, Colo.)	310
KT2	Texas	USGS (Denver, Colo.)	310
KT4	Texas	USGS (Denver, Colo.)	310
KT5	Texas	USGS (Denver, Colo.)	310
KT7	Texas	USGS (Denver, Colo.)	310
KT8	Texas	USGS (Denver, Colo.)	310
KT9	Texas	USGS (Denver, Colo.)	310
KTA	Alaska	University of Alaska	14
KTE	Texas	USGS (Denver, Colo.)	310
KTM	Alaska	USGS (Menlo Park, Calif.)	27
KTT	Texas	USGS (Denver, Colo.)	310
KTX	Texas	USGS (Denver, Colo.)	310
KTZ	Pennsylvania	Kutztown State College	267
(KUB)	California	USGS (Pasadena, Calif.) and C.I.T.	83
KUH	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
KVN	Nevada	University of Nevada	200
KYK	Alaska	USGS (Menlo Park, Calif.)	27
(KYP)	California	USGS (Pasadena, Calif.) and C.I.T.	84
(LA-GA)	Georgia	Teledyne Geotech	125
LAO	Montana	Ford Aerospace and Commun. Corp.	183
LAC	California	Lawrence Livermore Laboratory	59
LAD	New Mexico	USGS (Albuquerque, N.Mex.)	217
LAF	Rhode Island	University of Connecticut	282
LAR	Wyoming	University of Wyoming	351
LAS	California	USGS (Menlo Park, Calif.)	69
LAW	Kansas	University of Kansas	153
(LB-NH)	New Hampshire	Teledyne Geotech	213
LB1	Montana	Ford Aerospace and Commun. Corp.	183
LB2	Montana	Ford Aerospace and Commun. Corp.	183
LB3	Montana	Ford Aerospace and Commun. Corp.	183
LB4	Montana	Ford Aerospace and Commun. Corp.	183
LBM	Montana	University of Montana	189
(LBP)	Nevada	University of Nevada	200
(LC-NM)	New Mexico	Teledyne Geotech	223
LC1	Montana	Ford Aerospace and Commun. Corp.	183
LC2	Montana	Ford Aerospace and Commun. Corp.	183
LC3	Montana	Ford Aerospace and Commun. Corp.	183
LC4	Montana	Ford Aerospace and Commun. Corp.	183
LCA	Alabama	USGS and Alabama Geological Survey	7
LCFM	California	USGS (Menlo Park, Calif.)	69
(LCH)	California	USGS (Menlo Park, Calif.)	66
(LCL)	California	University of Southern California	61
(LCM)	California	University of Southern California	61
LCV	New Mexico	Los Alamos Scientific Laboratory	220
(LD-MS)	Mississippi	Teledyne Geotech	176
LD1	Montana	Ford Aerospace and Commun. Corp.	183
LD2	Montana	Ford Aerospace and Commun. Corp.	183
(LD2MS)	Mississippi	Teledyne Geotech	176
LD3	Montana	Ford Aerospace and Commun. Corp.	183
(LD3MS)	Mississippi	Teledyne Geotech	176
LD4	Montana	Ford Aerospace and Commun. Corp.	183
(LDG)	Alabama	USGS and Alabama Geological Survey	7
LDM	Montana	Department of the Army	188
LDV	Nevada	University of Nevada	200
(LE-TN)	Tennessee	Teledyne Geotech	295
(LE1)	Montana	Ford Aerospace and Commun. Corp.	183
(LE2)	Montana	Ford Aerospace and Commun. Corp.	183
(LE3)	Montana	Ford Aerospace and Commun. Corp.	183
(LE4)	Montana	Ford Aerospace and Commun. Corp.	183
(LED)	California	USGS (Pasadena, Calif.) and C.I.T.	84
LEE	Utah	Sandia Laboratories	316
LEX	Virginia	Washington and Lee University	329
(LEX)	California	USGS (Menlo Park, Calif.)	69
(LEX)	Kentucky	University of Kentucky	156
(LF1)	Montana	Ford Aerospace and Commun. Corp.	183
(LF2)	Montana	Ford Aerospace and Commun. Corp.	183
(LF3)	Montana	Ford Aerospace and Commun. Corp.	183
(LF4)	Montana	Ford Aerospace and Commun. Corp.	183
LFC	New Mexico	Los Alamos Scientific Laboratory	220
LFM	Montana	University of Montana	189
(LG-AZ)	Arizona	Teledyne Geotech	41
(LGA)	Arizona	USGS (Pasadena, Calif.) and C.I.T.	43
LGC	California	California Institute of Technology	76
(LGD)	Colorado	USGS (Menlo Park, Calif.)	111
LGM	Idaho	University of Montana	139
(LHD)	California	USGS (Menlo Park, Calif.)	69
LHM	Montana	University of Montana	189
LHS	South Carolina	USGS (Denver, Colo.)	285
(LHU)	California	USGS (Pasadena, Calif.) and C.I.T.	84
LIN	Nebraska	Nebraska Wesleyan University	194
(LJ)	Wyoming	USGS (Menlo Park, Calif.)	355
LJC	California	California Institute of Technology	76
(LJC)	California	University of California, San Diego	91
LKC	California	USGS (Menlo Park, Calif.)	66
(LL-MS)	Mississippi	Teledyne Geotech	176
LLA	California	University of California, Berkeley	50
(LLB)	Washington	University of Washington	337
(LM-NV)	Nevada	Teledyne Geotech	205
LMO	California	University of Calif., Los Angeles	63

Appendix 3.--*Alphabetic listing of station codes*--Continued

Code	State	Operator	Page
LMS	California	University of Calif., Los Angeles	63
LMU	Utah	University of Utah	313
LMW	Washington	University of Washington	337
LMZM	California	USGS (Menlo Park, Calif.)	69
(LN-MA)	Montana	Teledyne Geotech	191
(LNA)	California	University of Southern California	61
(LNS)	California	USGS (Menlo Park, Calif.)	70
(LO-NV)	Nevada	Teledyne Geotech	205
LO2	Nevada	USGS (Las Vegas, Nev.)	198
LOA	New Mexico	Los Alamos Scientific Laboratory	220
LOC	California	USGS (Menlo Park, Calif.)	70
LOC	Utah	University of Utah	313
(LOG)	Alabama	USGS and Alabama Geological Survey	7
(LOL)	California	Tera Corporation	54
LON	Washington	University of Washington	337
(LOR)	California	USGS (Menlo Park, Calif.)	71
(LP-TX)	Texas	Teledyne Geotech	304
LPC	California	USGS (Pasadena, Calif.) and C.I.T.	84
LPM	New Mexico	USGS (Albuquerque, N.Mex.)	217
LPR	Puerto Rico	USGS (Cayey, P.R.)	277
LRA	Arkansas	Saint Louis University	48
LRC	California	USGS (Menlo Park, Calif.)	71
LRDM	California	USGS (Menlo Park, Calif.)	69
LRI	Idaho	USGS (Las Vegas, Nev.)	138
(LRR)	California	California Institute of Technology	76
LRS	Puerto Rico	USGS (Cayey, P.R.)	277
LRV	California	USGS (Menlo Park, Calif.)	65
(LS-NH)	New Hampshire	Teledyne Geotech	213
LSI	Alaska	USGS (Las Vegas, Nev.)	24
LSLM	California	USGS (Menlo Park, Calif.)	69
LSM	Nevada	USGS (Las Vegas, Nev.)	198
LSP	Puerto Rico	USGS (Cayey, P.R.)	277
LST	Missouri	Saint Louis University	179
LSW	Washington	USGS (Menlo Park, Calif.)	343
(LT-PA)	Pennsylvania	Teledyne Geotech	274
(LTC)	California	USGS (Pasadena, Calif.) and C.I.T.	84
LTM	California	USGS (Pasadena, Calif.) and C.I.T.	84
(LTN)	Tennessee	Saint Louis University	297
(LTP)	California	USGS (Menlo Park, Calif.)	69
LTR	California	USGS (Menlo Park, Calif.)	68
LTU	Utah	University of Utah	313
LTW	California	USGS (Menlo Park, Calif.)	68
(LU-MS)	Mississippi	Teledyne Geotech	176
(LUA)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
LUB	Texas	Texas Technological University	309
LUN	Nevada	University of Nevada	200
(LV-LA)	Louisiana	Teledyne Geotech	161
LVK	Nevada	University of Nevada	201
LVN	Nevada	USGS (Las Vegas, Nev.)	198
LVW	Nevada	USGS (Las Vegas, Nev.)	198
LVY	Alaska	University of Alaska	14
(LWR)	California	USGS (Menlo Park, Calif.)	65
LXR	California	USGS (Menlo Park, Calif.)	69
(LY-WA)	Washington	Teledyne Geotech	341
LYW	Washington	University of Washington	337
M12	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
(MAA)	Alaska	University of Alaska	14
(MAB)	Nevada	University of Nevada	201
MAC	California	USGS (Menlo Park, Calif.)	70
(MAM)	Nevada	University of Nevada	201
(MAR)	Nevada	University of Nevada	201
MAS	Idaho	University of Montana	139
(MB-MS)	Mississippi	Teledyne Geotech	176
MBFM	California	USGS (Menlo Park, Calif.)	69
MBI	Idaho	USGS (Las Vegas, Nev.)	138
MBW	Washington	University of Washington	337
(MC-SD)	South Dakota	Teledyne Geotech	290
MCB	Alaska	University of Alaska	14
MCHM	California	USGS (Menlo Park, Calif.)	69
MCK	Alaska	University of Alaska	14
(MCL)	California	USGS (Menlo Park, Calif.)	67
(MCM)	California	USGS (Menlo Park, Calif.)	69
MCN	Nevada	USGS (Las Vegas, Nev.)	198
(MCN)	Alaska	University of Alaska	14

Code	State	Operator	Page
MCP	Puerto Rico	USGS (Cayey, P.R.)	277
(MCP)	California	USGS (Menlo Park, Calif.)	65
MCR	Alaska	University of Alaska	14
(MCR)	Nevada	University of Nevada	201
MCSM	California	USGS (Menlo Park, Calif.)	69
MCU	Utah	University of Utah	314
MCUM	California	USGS (Menlo Park, Calif.)	69
MCV	Nevada	USGS (Las Vegas, Nev.)	198
MCW	Washington	University of Washington	337
(MDA)	California	California Institute of Technology	76
(MDA)	California	USGS (Pasadena, Calif.) and C.I.T.	84
MDC	California	USGS (Menlo Park, Calif.)	70
(MDO)	California	USGS (Menlo Park, Calif.)	70
MDS	Wisconsin	University of Wisconsin at Madison	347
(MDT)	California	USGS (Menlo Park, Calif.)	70
MDV	Vermont	Lamont-Doherty Geological Observ.	323
MDW	Washington	University of Washington	337
MDY	Hawaii-Pacific	University of Hawaii	131
(MEL)	Colorado	USGS (Menlo Park, Calif.)	111
MET	Tennessee	Memphis State University	293
(MF-WS)	Wisconsin	Teledyne Geotech	350
MFA	Alaska	USGS (Menlo Park, Calif.)	30
MFM	Minnesota	University of Minnesota	172
MFS	California	USGS (Menlo Park, Calif.)	70
MFSM	California	USGS (Menlo Park, Calif.)	70
MFW	Oregon	University of Washington	265
MGA	California	USGS (Menlo Park, Calif.)	69
MGL	California	Calif. Department of Water Resources	87
MGP	Puerto Rico	USGS (Cayey, P.R.)	277
(MGS)	South Carolina	USGS (Denver, Colo.)	285
(MH-NB)	Nebraska	Teledyne Geotech	195
(MHA)	Arkansas	Elmer E. Rexin	45
MHC	California	University of California, Berkeley	50
MHK	Kansas	Kansas State University	154
MHR	California	USGS (Menlo Park, Calif.)	66
MHS	Wyoming	USGS (Menlo Park, Calif.)	355
MHT	Kansas	Kansas State University	154
(MHT)	Kansas	Kansas State University	154
MIA	Florida	U.S. Department of the Navy	122
MID	Alaska	NOAA (Palmer, Alaska)	17
MIK	Alaska	University of Alaska	14
(MIL)	California	USGS (Menlo Park, Calif.)	66
(MIL)	Nevada	University of Nevada	201
MIM	Maine	Weston Observatory	165
MIN	California	University of California, Berkeley	50
(MIN)	Nevada	University of Nevada	201
MIX	California	USGS (Menlo Park, Calif.)	70
MJW	Wyoming	USGS (Menlo Park, Calif.)	355
MKA	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
MKC	South Carolina	USGS (Denver, Colo.)	285
MKH	Hawaii-Pacific	NOAA (Ewa Beach, Calif.)	126
(MKI)	California	USGS (Menlo Park, Calif.)	67
(ML-NM)	New Mexico	Teledyne Geotech	223
(ML1CL)	California	Teledyne Geotech	96
(ML2CL)	California	Teledyne Geotech	96
(ML3CL)	California	Teledyne Geotech	96
(ML4CL)	California	Teledyne Geotech	96
MLA	Alaska	USGS (Menlo Park, Calif.)	27
MLC	California	University of California, Berkeley	50
MLD	Missouri	Saint Louis University	179
MLF	Ohio	Xavier University	247
MLH	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
MLI	Idaho	University of Utah	142
(MLL)	California	California Institute of Technology	76
MLM	New Mexico	USGS (Albuquerque, N.Mex.)	217
(MLO)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
(MLS)	Alaska	USGS (Menlo Park, Calif.)	27
MLW	Wisconsin	Marquette University	349
MLX	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
(MM-TN)	Tennessee	Teledyne Geotech	295
MMA	Arizona	Willard L. Groene	35
(MMC)	Alaska	University of Alaska	14
(MMM)	Missouri	Saint Louis University	179
(MMR)	California	Tera Corporation	54

Appendix 3.--*Alphabetic listing of station codes*--Continued

Code	State	Operator	Page
(MMV)	Colorado	Colorado School of Mines	106
MMWM	California	USGS (Menlo Park, Calif.)	70
(MN-NV)	Nevada	Teledyne Geotech	205
MNA	Nevada	University of Nevada	201
MNHM	California	USGS (Menlo Park, Calif.)	70
MNM	Minnesota	University of Minnesota	172
MNN	Minnesota	University of Minnesota	172
MNR	California	USGS (Menlo Park, Calif.)	66
(MNU)	Utah	University of Utah	314
MNV	Nevada	Lawrence Livermore Laboratory	207
(MO-ID)	Idaho	Teledyne Geotech	137
MOB	California	USGS (Menlo Park, Calif.)	70
(MOF)	California	USGS (Menlo Park, Calif.)	67
MOK	Hawaii-Pacific	NOAA (Ewa Beach, Calif.)	126
(MOK)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
(MON)	California	USGS (Menlo Park, Calif.)	68
(MON)	Nevada	University of Nevada	201
MOP	California	USGS (Menlo Park, Calif.)	71
(MOR)	California	USGS (Menlo Park, Calif.)	66
MOT	Texas	Marine Science Institute	303
MOV	Puerto Rico	USGS (Cayey, P.R.)	277
MOYM	California	USGS (Menlo Park, Calif.)	70
(MP-AR)	Arkansas	Teledyne Geotech	46
MPA	Alaska	USGS (Menlo Park, Calif.)	27
MPK	California	University of Nevada	99
MPR	Puerto Rico	University of Puerto Rico	280
(MPR)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
(MR-PA)	Pennsylvania	Teledyne Geotech	274
MRC	Colorado	NOAA (Boulder, Colo.)	101
(MRD)	California	Calif. Department of Water Resources	87
MRFM	California	USGS (Menlo Park, Calif.)	70
MRG	West Virginia	West Virginia University	345
(MRH)	New York	Lamont-Doherty Geological Observ.	232
(MRN)	Alaska	USGS (Menlo Park, Calif.)	27
(MRS)	California	USGS (Menlo Park, Calif.)	65
(MS-PA)	Pennsylvania	Teledyne Geotech	274
MSA	New Mexico	Los Alamos Scientific Laboratory	220
MSJ	California	USGS (Menlo Park, Calif.)	66
(MSNY)	New York	Lamont-Doherty Geological Observ.	232
MSO	Montana	University of Montana	189
(MSP)	Alaska	USGS (Menlo Park, Calif.)	27
MSTM	California	USGS (Menlo Park, Calif.)	70
MSU	Utah	University of Utah	314
(MT2)	Texas	Marine Science Institute	303
MTB	California	USGS (Menlo Park, Calif.)	70
MTC	California	USGS (Menlo Park, Calif.)	66
MTG	Alaska	USGS (Menlo Park, Calif.)	27
(MTH)	California	USGS (Menlo Park, Calif.)	65
MTL	New Mexico	Los Alamos Scientific Laboratory	220
MTP	Puerto Rico	Lamont-Doherty Geological Observ.	281
MTR	California	USGS (Menlo Park, Calif.)	68
(MTT)	South Carolina	USGS (Denver, Colo.)	285
(MTV)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
(MU-WA)	Washington	Teledyne Geotech	341
MUL	Idaho	U.S. Bureau of Mines	143
(MV-CL)	California	Teledyne Geotech	96
MVH	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
(MVL)	Pennsylvania	Millersville State College	268
(MVR)	California	Tera Corporation	54
MVW	Wyoming	USGS (Menlo Park, Calif.)	355
MWC	California	California Institute of Technology	76
MWH	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
(MWS)	California	USGS (Menlo Park, Calif.)	70
(MWV)	California	USGS (Menlo Park, Calif.)	70
(MX-TN)	Tennessee	Teledyne Geotech	295
(MY-AR)	Arkansas	Teledyne Geotech	46
(MZ-AR)	Arkansas	Teledyne Geotech	46
(MZL)	California	USGS (Menlo Park, Calif.)	69
MZO	Oklahoma	University of Oklahoma	252
(N)	Washington	USGS (Menlo Park, Calif.)	343
(N119)	Nevada	UGSG (Menlo Park, Calif.)	208
(N124)	Nevada	UGSG (Menlo Park, Calif.)	209
(N222)	Nevada	UGSG (Menlo Park, Calif.)	209
NAA	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
(NAG)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
(NAL)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
NAV	Virginia	Va. Polytechnic Inst. & State Univ.	325
NBH	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
NBPM	California	USGS (Menlo Park, Calif.)	70
NBRM	California	USGS (Menlo Park, Calif.)	70
NCDM	California	USGS (Menlo Park, Calif.)	70
NCFM	California	USGS (Menlo Park, Calif.)	70
(NCR)	California	USGS (Menlo Park, Calif.)	66
(ND-CL)	California	Teledyne Geotech	96
(NE)	Montana	USGS (Menlo Park, Calif.)	193
NEA	Alaska	University of Alaska	14
NED	Delaware	Delaware Geological Survey	117
NEL	Nevada	Sandia Laboratories	203
NEW	Washington	USGS (Newport, Wash.)	335
NFIM	California	USGS (Menlo Park, Calif.)	70
NFRM	California	USGS (Menlo Park, Calif.)	70
(NG-WS)	Wisconsin	Teledyne Geotech	350
NGH	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
NGL	Alaska	USGS (Menlo Park, Calif.)	27
NGVM	California	USGS (Menlo Park, Calif.)	70
(NGY)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
NHB	Maryland	Natl. Earthquake Information Center	167
NHBM	California	USGS (Menlo Park, Calif.)	70
NHC	Connecticut	Yale University	114
NHMM	California	USGS (Menlo Park, Calif.)	70
(NHR)	California	USGS (Menlo Park, Calif.)	70
NHS	South Carolina	USGS (Denver, Colo.)	285
NIK	Alaska	NOAA (Palmer, Alaska)	17
NIN	Alaska	USGS (Menlo Park, Calif.)	27
NJW	Wyoming	USGS (Menlo Park, Calif.)	355
NKA	Alaska	USGS (Menlo Park, Calif.)	27
NKP	Pennsylvania	Fred A. Keller	269
NKT	Tennessee	Saint Louis University	297
(NL-AZ)	Arizona	Teledyne Geotech	41
(NL2AZ)	Arizona	Teledyne Geotech	41
NLM	Maryland	Natl. Earthquake Information Center	167
NLNM	California	USGS (Menlo Park, Calif.)	70
NMC	California	USGS (Menlo Park, Calif.)	70
NMGM	California	USGS (Menlo Park, Calif.)	70
NMHM	California	USGS (Menlo Park, Calif.)	70
NMM	Missouri	Saint Louis University	179
NMO	Oklahoma	University of Oklahoma	252
NMTM	California	USGS (Menlo Park, Calif.)	70
NMWM	California	USGS (Menlo Park, Calif.)	70
NMXM	California	USGS (Menlo Park, Calif.)	70
NNL	Alaska	USGS (Menlo Park, Calif.)	27
NOL	Louisiana	Loyola University	160
NOLM	California	USGS (Menlo Park, Calif.)	70
NPH	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
NPI	Idaho	University of Utah	142
NPM	Nevada	USGS (Las Vegas, Nev.)	198
(NPT)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
NRA	Alaska	University of Alaska	14
(NRCE)	Nevada	UGSG (Menlo Park, Calif.)	208
(NRCP)	Nevada	UGSG (Menlo Park, Calif.)	208
(NRGF)	Nevada	UGSG (Menlo Park, Calif.)	208
(NRGM)	Nevada	UGSG (Menlo Park, Calif.)	208
NRL	D.C.	Natl. Earthquake Information Center	120
NRM	Nevada	USGS (Las Vegas, Nev.)	198
NRR	Nevada	University of Nevada	201
(NRSL)	Nevada	UGSG (Menlo Park, Calif.)	208
(NRUB)	California	USGS (Menlo Park, Calif.)	74
(NRWP)	Nevada	UGSG (Menlo Park, Calif.)	208
NSC	Connecticut	Weston Observatory	115
NSHM	California	USGS (Menlo Park, Calif.)	70
NSPM	California	USGS (Menlo Park, Calif.)	70
NSU	Utah	University of Utah	314
(NT-NV)	Nevada	Teledyne Geotech	205
(NT11)	Nevada	UGSG (Menlo Park, Calif.)	208
(NT12)	Nevada	UGSG (Menlo Park, Calif.)	208
(NT13)	Nevada	UGSG (Menlo Park, Calif.)	208
(NT14)	Nevada	UGSG (Menlo Park, Calif.)	208
(NT15)	Nevada	UGSG (Menlo Park, Calif.)	208

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Code	State	Operator	Page
(NT16)	Nevada	UGSG (Menlo Park, Calif.)	208
(NT17)	Nevada	UGSG (Menlo Park, Calif.)	208
(NT18)	Nevada	UGSG (Menlo Park, Calif.)	208
(NT20)	Nevada	UGSG (Menlo Park, Calif.)	208
(NT21)	Nevada	UGSG (Menlo Park, Calif.)	209
(NT23)	Nevada	UGSG (Menlo Park, Calif.)	209
(NT2NV)	Nevada	Teledyne Geotech	205
NTI	Idaho	USGS (Newport, Wash.)	141
NTK	Alaska	USGS (Menlo Park, Calif.)	27
NTMM	California	USGS (Menlo Park, Calif.)	70
(NUT)	California	USGS (Menlo Park, Calif.)	70
(NWR)	California	USGS (Pasadena, Calif.) and C.I.T.	84
NWRM	California	USGS (Menlo Park, Calif.)	70
NYC	Nevada	UGSG (Menlo Park, Calif.)	209
(NYCH)	Nevada	UGSG (Menlo Park, Calif.)	209
NYJ	Nevada	UGSG (Menlo Park, Calif.)	209
(NYJT)	Nevada	UGSG (Menlo Park, Calif.)	209
NYM	Nevada	UGSG (Menlo Park, Calif.)	209
(NYMC)	Nevada	UGSG (Menlo Park, Calif.)	209
(NYNC)	Nevada	UGSG (Menlo Park, Calif.)	209
(NYND)	Nevada	UGSG (Menlo Park, Calif.)	209
NYR	Nevada	UGSG (Menlo Park, Calif.)	209
(NYRS)	Nevada	UGSG (Menlo Park, Calif.)	209
NYS	Nevada	UGSG (Menlo Park, Calif.)	209
(NYSR)	Nevada	UGSG (Menlo Park, Calif.)	209
NYV	Nevada	UGSG (Menlo Park, Calif.)	209
(NYVN)	Nevada	UGSG (Menlo Park, Calif.)	209
(OA-IS)	Hawaii-Pacific	Teledyne Geotech	134
OAK	New York	Lamont-Doherty Geological Observ.	233
(OAR)	California	USGS (Menlo Park, Calif.)	70
(OB2NV)	Nevada	Teledyne Geotech	205
(OB3NV)	Nevada	Teledyne Geotech	205
OBB	California	USGS (Pasadena, Calif.) and C.I.T.	84
(OBF)	California	USGS (Menlo Park, Calif.)	70
OBHM	California	USGS (Menlo Park, Calif.)	71
(OBID)	California	USGS (Menlo Park, Calif.)	71
(OBLO)	California	USGS (Menlo Park, Calif.)	71
OBS	California	Lamont-Doherty Geological Observ.	98
(OCAM)	California	USGS (Menlo Park, Calif.)	71
OCB	California	USGS (Pasadena, Calif.) and C.I.T.	84
OCHM	California	USGS (Menlo Park, Calif.)	71
OCN	New York	Lamont-Doherty Geological Observ.	233
(OCOR)	California	USGS (Menlo Park, Calif.)	71
(OCOX)	California	USGS (Menlo Park, Calif.)	71
OCR	California	USGS (Menlo Park, Calif.)	68
(ODAM)	California	USGS (Menlo Park, Calif.)	71
ODS	Washington	University of Washington	337
(OFIG)	California	USGS (Menlo Park, Calif.)	71
(OFOR)	California	USGS (Menlo Park, Calif.)	71
OGD	New Jersey	Lamont-Doherty Geological Observ.	216
OGOM	California	USGS (Menlo Park, Calif.)	71
(OGOO)	California	USGS (Menlo Park, Calif.)	71
OGU	Utah	University of Utah	314
OHCM	California	USGS (Menlo Park, Calif.)	71
(OHON)	California	USGS (Menlo Park, Calif.)	71
OHW	Washington	University of Washington	337
(OKAT)	California	USGS (Menlo Park, Calif.)	71
OKG	Tennessee	Saint Louis University	297
OLC	California	USGS (Menlo Park, Calif.)	71
OLO	Oklahoma	University of Oklahoma	252
(OLON)	California	USGS (Menlo Park, Calif.)	71
(OLQ)	California	USGS (Menlo Park, Calif.)	70
(OLUV)	California	USGS (Menlo Park, Calif.)	71
(OMK)	Washington	University of Washington	337
OMW	Washington	University of Washington	337
(ONE)	Colorado	USGS (Menlo Park, Calif.)	111
(ONH)	New Hampshire	Massachusetts Inst. of Technology	212
OPA	Hawaii-Pacific	NOAA (Ewa Beach, Calif.)	126
(OPT)	Alaska	University of Alaska	14
(OR-FL)	Florida	Teledyne Geotech	121
ORAM	California	USGS (Menlo Park, Calif.)	71
(ORAT)	California	USGS (Menlo Park, Calif.)	71
ORT	Tennessee	Union Carbide Corporation	294
ORV	California	Calif. Department of Water Resources	87
OSB	South Carolina	USGS (Denver, Colo.)	285
(OSBY)	New York	Woodward-Clyde Consultants	239
OSC	South Carolina	USGS (Denver, Colo.)	285
(OSHP)	California	USGS (Menlo Park, Calif.)	71
(OSTI)	California	USGS (Menlo Park, Calif.)	71
OSTM	California	USGS (Menlo Park, Calif.)	71
OSUM	California	USGS (Menlo Park, Calif.)	71
(OSUT)	California	USGS (Menlo Park, Calif.)	71
(OTAB)	California	USGS (Menlo Park, Calif.)	71
OTBM	California	USGS (Menlo Park, Calif.)	71
OTH	Washington	University of Washington	337
(OTL)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
(OTZ)	New Mexico	Los Alamos Scientific Laboratory	220
OUT	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
OVE	Nevada	USGS (Boulder City, Nev.)	196
OWYM	California	USGS (Menlo Park, Calif.)	71
(OWYN)	California	USGS (Menlo Park, Calif.)	71
OXF	Mississippi	University of Mississippi	175
(OXR)	Mississippi	University of Mississippi	175
PAC	California	University of California, Berkeley	50
PAH	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
PAL	New York	Lamont-Doherty Geological Observ.	233
(PAL)	California	USGS (Menlo Park, Calif.)	66
PAM	California	Calif. Department of Water Resources	87
(PAR)	Nevada	University of Nevada	201
PARM	California	USGS (Menlo Park, Calif.)	71
PAS	California	California Institute of Technology	76
(PAU)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
PAX	Alaska	University of Alaska	14
(PAX)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
(PB-TN)	Tennessee	Teledyne Geotech	295
PBS	South Carolina	USGS (Denver, Colo.)	285
PBU	Utah	University of Utah	314
PBWM	California	USGS (Menlo Park, Calif.)	71
(PC-MS)	Mississippi	Teledyne Geotech	176
PCA	Alaska	USGS (Menlo Park, Calif.)	27
PCAM	California	USGS (Menlo Park, Calif.)	71
PCC	California	University of California, Berkeley	50
(PCF)	California	California Institute of Technology	76
PCL	California	USGS (Menlo Park, Calif.)	68
(PCL)	Alaska	USGS (Menlo Park, Calif.)	27
PCRM	California	USGS (Menlo Park, Calif.)	71
PCU	Utah	University of Utah	314
(PE-WV)	West Virginia	Teledyne Geotech	346
(PEA)	Alabama	USGS and Alabama Geological Survey	7
PEC	California	Calif. Department of Water Resources	87
(PEM)	California	USGS (Menlo Park, Calif.)	71
(PEM)	California	California Institute of Technology	76
(PER)	California	USGS (Menlo Park, Calif.)	71
(PES)	California	USGS (Menlo Park, Calif.)	69
(PET)	Alabama	USGS and Alabama Geological Survey	7
PEV	California	USGS (Menlo Park, Calif.)	69
(PF-MI)	Michigan	Teledyne Geotech	171
PFA	Arizona	USGS (Denver, Colo.)	40
(PFO)	California	University of California, San Diego	91
(PFP)	California	USGS (Menlo Park, Calif.)	65
PGA	Arkansas	Saint Louis University	48
PGHM	California	USGS (Menlo Park, Calif.)	71
(PH-WA)	Washington	Teledyne Geotech	341
(PHA)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
PHCM	California	USGS (Menlo Park, Calif.)	71
PHH	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
PHI	Pennsylvania	The Franklin Institute	270
PHO	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
PHRM	California	USGS (Menlo Park, Calif.)	71
(PI-WY)	Wyoming	Teledyne Geotech	353
PI1	Wyoming	USGS (Las Vegas, Nev.)	354
PI2	Wyoming	USGS (Las Vegas, Nev.)	354
(PI2WY)	Wyoming	Teledyne Geotech	353
PI3	Wyoming	USGS (Las Vegas, Nev.)	354
PI4	Wyoming	USGS (Las Vegas, Nev.)	354
PI5	Wyoming	USGS (Las Vegas, Nev.)	354
PI6	Wyoming	USGS (Las Vegas, Nev.)	354
PI7	Wyoming	USGS (Las Vegas, Nev.)	354

Appendix 3.--*Alphabetic listing of station codes*--Continued

Code	State	Operator	Page
(PIC)	California	USGS (Pasadena, Calif.) and C.I.T.	84
PIN	Wyoming	USGS (Las Vegas, Nev.)	354
(PIN)	Alaska	USGS (Menlo Park, Calif.)	27
(PIN)	California	USGS (Menlo Park, Calif.)	65
PIT	Pennsylvania	University of Pittsburgh	271
(PIU)	California	USGS (Pasadena, Calif.) and C.I.T.	84
(PIV1)	Kentucky	Department of the Army	158
(PIV2)	Kentucky	Department of the Army	158
(PIV3)	Kentucky	Department of the Army	158
PIVM	California	USGS (Menlo Park, Calif.)	71
(PJ-PA)	Pennsylvania	Teledyne Geotech	274
PJD	Alaska	University of Alaska	14
PJG	Hawaii-Pacific	USGS (Agana, Guam)	132
PJRM	California	USGS (Menlo Park, Calif.)	71
(PK-OR)	Oregon	Teledyne Geotech	264
PKC	California	USGS (Menlo Park, Calif.)	68
PKF	California	USGS (Menlo Park, Calif.)	72
PKH	California	USGS (Menlo Park, Calif.)	68
(PKM)	California	USGS (Pasadena, Calif.) and C.I.T.	84
PLC	California	USGS (Menlo Park, Calif.)	66
PLM	California	California Institute of Technology	76
PLOM	California	USGS (Menlo Park, Calif.)	71
PLT	California	USGS (Pasadena, Calif.) and C.I.T.	84
(PLV)	California	USGS (Menlo Park, Calif.)	69
(PM-WY)	Wyoming	Teledyne Geotech	353
PMA	Alaska	NOAA (Palmer, Alaska)	17
PMN	Nevada	USGS (Las Vegas, Nev.)	198
PMPM	California	USGS (Menlo Park, Calif.)	71
PMR	Alaska	NOAA (Palmer, Alaska)	17
(PMR)	California	USGS (Menlo Park, Calif.)	68
PMS	Alaska	NOAA (Palmer, Alaska)	17
PMT	Oregon	University of Oregon	260
PMW	Wyoming	Ministry of Defence, United Kingdom	352
PNC	California	USGS (Menlo Park, Calif.)	65
PNC	California	USGS (Menlo Park, Calif.)	72
PNH	New Hampshire	Massachusetts Inst. of Technology	212
PNJ	New Jersey	Philip J. Del Vecchio	215
PNK	Montana	University of Montana	189
PNL	Alaska	USGS (Menlo Park, Calif.)	27
(PNM)	Alaska	University of Alaska	14
(PNM)	California	USGS (Menlo Park, Calif.)	67
(PNM)	California	USGS (Pasadena, Calif.) and C.I.T.	84
PNO	Oregon	University of Washington	265
PNP	Puerto Rico	USGS (Cayey, P.R.)	278
(PNP)	California	USGS (Menlo Park, Calif.)	65
(PNQ)	California	USGS (Menlo Park, Calif.)	65
PNR	Nevada	University of Nevada	201
PNY	New York	Lamont-Doherty Geological Observ.	233
(PO-ID)	Idaho	Teledyne Geotech	137
(PO-TX)	Texas	Teledyne Geotech	304
(POB)	California	California Institute of Technology	76
(POL)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
POM	California	California Institute of Technology	76
PON	Puerto Rico	USGS (Cayey, P.R.)	278
(PON)	Hawaii-Pacific	University of Hawaii	131
(POR)	California	USGS (Menlo Park, Calif.)	69
POW	Arkansas	Saint Louis University	48
PPFM	California	USGS (Menlo Park, Calif.)	72
(PPK)	Nevada	University of Nevada	201
PPL	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
(PPS)	South Carolina	USGS (Denver, Colo.)	285
PPTM	California	USGS (Menlo Park, Calif.)	72
PPU	Utah	University of Utah	314
PQN	New Jersey	Lamont-Doherty Geological Observ.	216
(PR-IS)	Hawaii-Pacific	Teledyne Geotech	134
PRC	California	University of California, Berkeley	50
(PRG)	Alaska	USGS (Menlo Park, Calif.)	27
PRI	California	University of California, Berkeley	50
(PRIN)	New Jersey	Lamont-Doherty Geological Observ.	216
PRM	South Carolina	USGS (Denver, Colo.)	285
PRN	Nevada	USGS (Las Vegas, Nev.)	198
(PRO)	California	USGS (Menlo Park, Calif.)	69
(PRO)	Washington	University of Washington	337
PRR	California	California Institute of Technology	76
PRS	California	University of California, Berkeley	50
PRW	Washington	University of Washington	337
(PSA)	Alaska	Petersburg Public School	19
PSD	California	USGS (Menlo Park, Calif.)	69
PSMM	California	USGS (Menlo Park, Calif.)	72
(PSP)	California	California Institute of Technology	76
PST	Utah	USGS (Denver, Colo.)	318
(PT-OR)	Oregon	Teledyne Geotech	264
PTD	Oregon	Oreg. Museum of Science and Industry	261
(PTD)	California	USGS (Pasadena, Calif.) and C.I.T.	84
PTE	Alaska	USGS (Menlo Park, Calif.)	27
PTG	Missouri	Saint Louis University	179
(PTK)	California	Tera Corporation	54
PTN	New York	Lamont-Doherty Geological Observ.	233
PTR	Alabama	USGS and Alabama Geological Survey	7
(PTR)	Alaska	USGS (Menlo Park, Calif.)	27
(PTU)	Utah	University of Utah	314
PTV	California	USGS (Menlo Park, Calif.)	72
PTYM	California	USGS (Menlo Park, Calif.)	72
(PU-MS)	Mississippi	Teledyne Geotech	176
(PUB)	Alaska	University of Alaska	14
PUH	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
PUP	Hawaii-Pacific	NOAA (Ewa Beach, Calif.)	126
(PUU)	Utah	University of Utah	314
PUV	Virginia	Va. Polytechnic Inst. & State Univ.	325
(PV-AR)	Arkansas	Teledyne Geotech	46
PVN	New Jersey	Lamont-Doherty Geological Observ.	216
PVR	California	California Institute of Technology	76
(PVR)	California	USGS (Menlo Park, Calif.)	72
(PW-IL)	Illinois	Teledyne Geotech	146
PWA	Alaska	NOAA (Palmer, Alaska)	17
PWH	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
PWKM	California	USGS (Menlo Park, Calif.)	72
PWL	Alaska	USGS (Menlo Park, Calif.)	27
PWP	Puerto Rico	Lamont-Doherty Geological Observ.	281
(PY-AZ)	Arizona	Teledyne Geotech	41
PYR	California	Calif. Department of Water Resources	87
(PZC)	Nevada	University of Nevada	201
QRV	Nevada	University of Nevada	201
(QRY)	California	USGS (Menlo Park, Calif.)	72
QSR	California	USGS (Menlo Park, Calif.)	68
QUA	Massachusetts	Weston Observatory	169
(QUA)	Nevada	University of Nevada	201
(RAD)	Colorado	USGS (Menlo Park, Calif.)	111
(RAI)	Alaska	University of Alaska	14
RAT	Alaska	USGS (Las Vegas, Nev.)	24
(RAY)	California	California Institute of Technology	76
RBC	Colorado	USGS (Denver, Colo.)	104
(RBM)	California	USGS (Menlo Park, Calif.)	65
RBU	Utah	University of Utah	314
RCD	South Dakota	South Dakota School of Mines	289
(RCP)	California	University of Southern California	61
(RCW)	California	USGS (Menlo Park, Calif.)	72
RCWM	California	USGS (Menlo Park, Calif.)	72
(RDG)	Colorado	USGS (Menlo Park, Calif.)	111
(RDM)	California	USGS (Menlo Park, Calif.)	67
(RDM)	California	California Institute of Technology	76
(RDR)	California	USGS (Menlo Park, Calif.)	69
RDS	Alaska	University of Alaska	14
RDT	Alaska	USGS (Menlo Park, Calif.)	27
(RED)	Alaska	University of Alaska	14
(RED)	California	USGS (Menlo Park, Calif.)	69
REN	Nevada	University of Nevada	201
REX	Idaho	Ricks College	136
(RFR)	California	USGS (Menlo Park, Calif.)	70
(RFU)	Utah	University of Utah	314
(RG-SD)	South Dakota	Teledyne Geotech	290
RGC	Colorado	Chevron Oil Company	108
(RGD)	Alaska	USGS (Menlo Park, Calif.)	27
(RGR)	California	USGS (Menlo Park, Calif.)	69
(RH-NV)	Nevada	Teledyne Geotech	205
RHA	Alabama	USGS and Alabama Geological Survey	7
(RHD)	Alabama	USGS and Alabama Geological Survey	7
(RHU)	Utah	University of Utah	314

Appendix 3.--*Alphabetic listing of station codes*--Continued

Code	State	Operator	Page
(RI-MS)	Mississippi	Teledyne Geotech	176
RIM	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
RIO	New Mexico	Los Alamos Scientific Laboratory	220
(RIU)	Alaska	USGS (Menlo Park, Calif.)	27
(RL-WS)	Wisconsin	Teledyne Geotech	350
RLO	Oklahoma	University of Oklahoma	252
RMB	Missouri	Saint Louis University	179
RMO	New York	George E. Mercier	236
(RMR)	California	USGS (Pasadena, Calif.) and C.I.T.	84
RMU	Utah	USGS (Denver, Colo.)	317
RMW	Washington	University of Washington	337
(RN-WV)	West Virginia	Teledyne Geotech	346
ROC	New York	McQuaid Jesuit High School	237
(ROD)	California	USGS (Pasadena, Calif.) and C.I.T.	84
ROL	Missouri	University of Missouri	178
RON	Alaska	University of Alaska	14
RPK	Washington	Tera Corporation	340
RRD	Puerto Rico	Lamont-Doherty Geological Observ.	281
(RS-KY)	Kentucky	Teledyne Geotech	157
(RSE)	California	USGS (Pasadena, Calif.) and C.I.T.	84
RSW	Washington	University of Washington	337
(RT-NM)	New Mexico	Teledyne Geotech	223
(RTM)	California	USGS (Menlo Park, Calif.)	67
RUN	California	USGS (Pasadena, Calif.) and C.I.T.	84
(RUS)	California	USGS (Menlo Park, Calif.)	66
RUT	Nevada	California Institute of Technology	210
(RVC)	California	USGS (Menlo Park, Calif.)	72
RVCM	California	USGS (Menlo Park, Calif.)	72
(RVM)	California	USGS (Pasadena, Calif.) and C.I.T.	84
RVR	California	California Institute of Technology	76
(RVR)	Colorado	USGS (Menlo Park, Calif.)	111
RVS	California	USGS (Pasadena, Calif.) and C.I.T.	84
RXF	Montana	Department of the Army	188
(RY-ND)	North Dakota	Teledyne Geotech	245
(RYN)	California	Tera Corporation	54
(RYN)	Nevada	University of Nevada	201
(RYS)	California	USGS (Pasadena, Calif.) and C.I.T.	84
(SA2TX)	Texas	Teledyne Geotech	304
(SA4TX)	Texas	Teledyne Geotech	304
SAC	California	USGS (Menlo Park, Calif.)	69
(SAD)	California	USGS (Pasadena, Calif.) and C.I.T.	84
(SAL)	California	USGS (Menlo Park, Calif.)	72
SAO	California	University of California, Berkeley	51
SAU	Utah	University of Utah	314
SAW	Washington	University of Washington	337
(SAW)	Alaska	USGS (Menlo Park, Calif.)	27
(SAW)	California	USGS (Menlo Park, Calif.)	69
(SBAI)	California	USGS (Pasadena, Calif.) and C.I.T.	82
SBB	California	California Institute of Technology	77
SBC	California	California Institute of Technology	77
(SBCC)	California	USGS (Pasadena, Calif.) and C.I.T.	82
(SBCD)	California	USGS (Pasadena, Calif.) and C.I.T.	82
(SBCL)	California	USGS (Pasadena, Calif.) and C.I.T.	82
(SBLC)	California	USGS (Pasadena, Calif.) and C.I.T.	84
(SBLG)	California	USGS (Pasadena, Calif.) and C.I.T.	82
(SBLP)	California	USGS (Pasadena, Calif.) and C.I.T.	82
(SBSC)	California	USGS (Pasadena, Calif.) and C.I.T.	82
(SBSM)	California	USGS (Pasadena, Calif.) and C.I.T.	82
(SBSN)	California	USGS (Pasadena, Calif.) and C.I.T.	82
SBT	California	USGS (Menlo Park, Calif.)	64
SBU	Utah	University of Utah	314
(SBVC)	California	San Bernardino Valley College	89
SBY	Alaska	USGS (Menlo Park, Calif.)	30
(SCA)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
SCC	California	University of California, Berkeley	51
(SCF)	Alaska	University of Alaska	14
SCI	California	California Institute of Technology	77
SCL	California	University of Santa Clara	93
SCM	Alaska	University of Alaska	14
SCN	Arizona	Sunset Crater National Monument	33
SCP	Pennsylvania	Pennsylvania State University	272
(SCR)	California	USGS (Menlo Park, Calif.)	67
SCT	Alaska	University of Alaska	14
SCU	Utah	USGS (Denver, Colo.)	318
SCV	Virgin Islands	Lamont-Doherty Geological Observ.	324
SCW	Washington	University of Washington	337
SCY	California	California Institute of Technology	77
(SCZ)	California	USGS (Menlo Park, Calif.)	72
(SDW)	California	California Institute of Technology	77
(SE-MN)	Minnesota	Teledyne Geotech	174
SEA	Washington	University of Washington	337
SEC	California	USGS (Menlo Park, Calif.)	69
(SEC)	Colorado	USGS (Menlo Park, Calif.)	111
(SEG)	Alaska	USGS (Menlo Park, Calif.)	27
SEW	Alaska	USGS (Menlo Park, Calif.)	28
(SF-AZ)	Arizona	Teledyne Geotech	41
SFB	California	University of California, Berkeley	51
SFL	California	USGS (Menlo Park, Calif.)	68
SFM	California	Golden Gate Park	92
SFO	New York	Lamont-Doherty Geological Observ.	233
SFR	California	USGS (Menlo Park, Calif.)	72
SFT	California	USGS (Menlo Park, Calif.)	69
(SG-AZ)	Arizona	Teledyne Geotech	41
SGA	Alaska	USGS (Menlo Park, Calif.)	28
(SGA)	Alaska	USGS (Menlo Park, Calif.)	27
SGC	California	USGS (Menlo Park, Calif.)	69
SGL	California	USGS (Pasadena, Calif.) and C.I.T.	84
(SGM)	California	USGS (Menlo Park, Calif.)	67
SGS	South Carolina	USGS (Denver, Colo.)	285
(SH-PA)	Pennsylvania	Teledyne Geotech	274
SHA	Alabama	Spring Hill College	5
SHC	California	USGS (Menlo Park, Calif.)	72
SHG	California	USGS (Menlo Park, Calif.)	65
(SHH)	California	USGS (Pasadena, Calif.) and C.I.T.	84
(SHQ)	California	USGS (Menlo Park, Calif.)	70
(SHR)	California	USGS (Menlo Park, Calif.)	70
SHS	California	University of California, Berkeley	51
SHS	California	USC&GS (Washington, D.C.)	100
(SHU)	Alaska	University of Alaska	14
(SHV)	Colorado	USGS (Menlo Park, Calif.)	111
SHW	Washington	University of Washington	337
SIG	Colorado	USGS (Denver, Colo.)	104
(SII)	Alaska	University of Alaska	14
(SIL)	California	California Institute of Technology	77
(SIM)	Nevada	University of Nevada	201
(SIP)	California	USGS (Pasadena, Calif.) and C.I.T.	84
SIT	Alaska	USGS (Sitka, Alaska)	20
(SIX)	Colorado	USGS (Menlo Park, Calif.)	111
(SJ-TX)	Texas	Teledyne Geotech	304
SJG	Puerto Rico	USGS (Cayey, P.R.)	278
(SJG)	California	USGS (Menlo Park, Calif.)	68
SJGC	Puerto Rico	USGS (Cayey, P.R.)	278
SJH	California	USGS (Menlo Park, Calif.)	69
SJP	Puerto Rico	USGS (Cayey, P.R.)	278
SJQ	California	California Institute of Technology	77
SJV	Virgin Islands	Lamont-Doherty Geological Observ.	324
(SK-TX)	Texas	Teledyne Geotech	305
SKG	California	USGS (Menlo Park, Calif.)	67
SKL	Alaska	USGS (Menlo Park, Calif.)	27
SKN	New York	Lamont-Doherty Geological Observ.	233
(SKN)	Alaska	USGS (Menlo Park, Calif.)	27
(SKS)	Alaska	University of Alaska	14
SKT	Alaska	USGS (Menlo Park, Calif.)	27
(SL1)	California	USGS (Menlo Park, Calif.)	72
(SL2)	California	USGS (Menlo Park, Calif.)	72
(SL3)	California	USGS (Menlo Park, Calif.)	72
(SL4)	California	USGS (Menlo Park, Calif.)	72
(SL5)	California	USGS (Menlo Park, Calif.)	72
(SL6)	California	USGS (Menlo Park, Calif.)	72
(SL7)	California	USGS (Menlo Park, Calif.)	72
(SL8)	California	USGS (Menlo Park, Calif.)	68
(SLA)	California	USGS (Menlo Park, Calif.)	69
SLC	Utah	University of Utah	314
SLD	California	Calif. Department of Water Resources	87
SLM	Missouri	Saint Louis University	179
(SLU)	Arizona	USGS (Pasadena, Calif.) and C.I.T.	43
SLV	Alaska	USGS (Menlo Park, Calif.)	27
(SLV)	California	USGS (Menlo Park, Calif.)	65

Appendix 3.--*Alphabetic listing of station codes*--Continued

Code	State	Operator	Page
(SM-TX)	Texas	Teledyne Geotech	305
SMA	South Carolina	USGS (Denver, Colo.)	285
SMC	Colorado	USGS (Denver, Colo.)	104
(SME)	California	California Institute of Technology	77
SML	Alaska	USGS (Menlo Park, Calif.)	27
(SMM)	California	USGS (Menlo Park, Calif.)	72
SMN	Nevada	USGS (Las Vegas, Nev.)	198
(SMO)	California	California Institute of Technology	77
(SMR)	California	USGS (Menlo Park, Calif.)	72
SMU	Utah	USGS (Denver, Colo.)	318
SMV	Illinois	Saint Louis University	147
SMW	Washington	University of Washington	337
(SMW)	California	USGS (Menlo Park, Calif.)	72
SMWM	California	USGS (Menlo Park, Calif.)	72
SMY	Alaska	NOAA (Palmer, Alaska)	17
(SN-AZ)	Arizona	Teledyne Geotech	41
SNC	California	California Institute of Technology	77
SND	California	San Diego State University	90
SNH	Alaska	USGS (Menlo Park, Calif.)	28
SNM	New Mexico	N.Mex. Institute of Mining and Tech.	222
(SNO)	California	USGS (Menlo Park, Calif.)	67
(SNPY)	New York	Woodward-Clyde Consultants	239
SNR	California	USGS (Pasadena, Calif.) and C.I.T.	84
SNS	California	California Institute of Technology	77
SNT	California	USGS (Menlo Park, Calif.)	70
(SNT)	California	USGS (Menlo Park, Calif.)	69
(SOD)	Nevada	University of Nevada	201
SOS	California	USGS (Menlo Park, Calif.)	69
(SP-IS)	Alaska	Teledyne Geotech	22
SPD	New Mexico	Los Alamos Scientific Laboratory	220
SPH	California	USGS (Pasadena, Calif.) and C.I.T.	84
(SPL)	Alaska	University of Alaska	15
SPM	California	USGS (Pasadena, Calif.) and C.I.T.	85
SPO	Washington	Mount Saint Michael's	339
(SPSY)	New York	Woodward-Clyde Consultants	239
SPT	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
(SPT)	California	USGS (Menlo Park, Calif.)	70
SPU	Alaska	USGS (Menlo Park, Calif.)	27
SPW	Washington	University of Washington	337
(SQ-IS)	Alaska	Teledyne Geotech	22
SQU	Utah	University of Utah	314
(SR-OR)	Oregon	Teledyne Geotech	264
(SRA)	California	USGS (Menlo Park, Calif.)	66
SRC	California	USGS (Menlo Park, Calif.)	72
SRF	New Mexico	N.Mex. Institute of Mining and Tech.	222
SRM	New Mexico	N.Mex. Institute of Mining and Tech.	222
(SRMY)	New York	Woodward-Clyde Consultants	239
(SRPD)	South Carolina	E. I. du Pont de Nemours	283
(SRPN)	South Carolina	E. I. du Pont de Nemours	283
(SRPW)	South Carolina	E. I. du Pont de Nemours	283
(SRQ)	California	USGS (Menlo Park, Calif.)	65
(SRS)	California	USGS (Menlo Park, Calif.)	72
(SS-TX)	Texas	Teledyne Geotech	305
SSH	Alaska	University of Alaska	15
SSI	Alaska	USGS (Las Vegas, Nev.)	24
(SSK)	California	California Institute of Technology	77
SSL	Pennsylvania	Lamont-Doherty Geological Observ.	276
(SSN)	Alaska	USGS (Menlo Park, Calif.)	28
SSP	Nevada	USGS (Las Vegas, Nev.)	198
(SSP)	Alaska	USGS (Menlo Park, Calif.)	28
SST	Alaska	USGS (Menlo Park, Calif.)	28
(SSV)	California	California Institute of Technology	77
SSX	Nevada	USGS (Las Vegas, Nev.)	198
(ST-NV)	Nevada	Teledyne Geotech	205
(ST1TX)	Texas	Teledyne Geotech	305
(ST2TX)	Texas	Teledyne Geotech	305
(ST4TX)	Texas	Teledyne Geotech	305
STC	California	USGS (Menlo Park, Calif.)	72
(STF)	California	USGS (Menlo Park, Calif.)	68
(STG)	Alaska	USGS (Menlo Park, Calif.)	28
STI	Idaho	University of Utah	142
(STJ)	California	USGS (Menlo Park, Calif.)	69
(STLY)	New York	Woodward-Clyde Consultants	239
STM	Nevada	University of Nevada	201
(STN)	California	USGS (Menlo Park, Calif.)	70
STP	California	USGS (Pasadena, Calif.) and C.I.T.	85
(STQ)	California	USGS (Menlo Park, Calif.)	65
STT	Washington	Gerald Marshall	333
(STV)	California	USGS (Menlo Park, Calif.)	69
STW	Washington	University of Washington	337
STX	Nevada	USGS (Las Vegas, Nev.)	199
STY	Alaska	USGS (Menlo Park, Calif.)	28
(SU-VA)	Virginia	Teledyne Geotech	332
SUA	Alaska	USGS (Menlo Park, Calif.)	28
(SUF)	California	USGS (Pasadena, Calif.) and C.I.T.	85
SUG	Michigan	University of Michigan	170
SUK	Alaska	USGS (Menlo Park, Calif.)	28
(SUP)	California	USGS (Pasadena, Calif.) and C.I.T.	85
SUU	Utah	University of Utah	314
(SV-AZ)	Arizona	Teledyne Geotech	41
SVC	California	USGS (Menlo Park, Calif.)	66
(SVS)	South Carolina	USGS (Denver, Colo.)	285
SVW	Alaska	NOAA (Palmer, Alaska)	17
(SW-MA)	Montana	Teledyne Geotech	191
(SWB)	California	USGS (Menlo Park, Calif.)	65
(SWC)	Colorado	USGS (Menlo Park, Calif.)	111
(SWD)	Alaska	USGS (Menlo Park, Calif.)	28
SWM	California	California Institute of Technology	77
(SWN)	Nevada	Univeraity of Nevada	201
SWP	Montana	University of Montana	189
(SWR)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
(SX-SD)	South Dakota	Teledyne Geotech	290
(SY-SD)	South Dakota	Teledyne Geotech	290
SYP	California	California Institute of Technology	77
SYR	Washington	University of Washington	337
(SZ-NV)	Nevada	Teledyne Geotech	205
(TAN)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
(TAY)	California	USGS (Menlo Park, Calif.)	72
TBR	New York	Lamont-Doherty Geological Observ.	233
(TC-NM)	New Mexico	Teledyne Geotech	223
TCC	California	California Institute of Technology	77
(TCEC)	Texas	USGS (Menlo Park, Calif.)	312
(TCNE)	Texas	USGS (Menlo Park, Calif.)	312
(TCNO)	Texas	USGS (Menlo Park, Calif.)	312
(TCNW)	Texas	USGS (Menlo Park, Calif.)	312
(TCSE)	Texas	USGS (Menlo Park, Calif.)	312
(TCSW)	Texas	USGS (Menlo Park, Calif.)	312
(TCWC)	Texas	USGS (Menlo Park, Calif.)	312
(TD-NM)	New Mexico	Teledyne Geotech	223
TDC	Colorado	NOAA (Boulder, Colo.)	101
TEE	Montana	University of Montana	189
(TEE)	Nevada	University of Nevada	201
(TF-CL)	California	Teledyne Geotech	96
TFO	Arizona	AFTAC	34
(TG-IS)	Hawaii-Pacific	Teledyne Geotech	134
(TGR)	California	USGS (Menlo Park, Calif.)	69
THI	Indiana	Gerald J. Shea	149
(THI)	Indiana	Gerald J. Shea	149
THO	Arizona	Willard L. Groene	35
(THR)	California	California Institute of Technology	77
TIN	California	California Institute of Technology	77
(TIT)	California	Tera Corporation	54
TJC	Colorado	Trinidad State Junior College	109
(TK-WA)	Washington	Teledyne Geotech	341
(TL-WY)	Wyoming	Teledyne Geotech	353
(TLD)	Colorado	Colorado School of Mines	106
TLK	Alaska	USGS (Menlo Park, Calif.)	28
(TMB)	California	USGS (Pasadena, Calif.) and C.I.T.	85
TMI	Idaho	USGS (Las Vegas, Nev.)	138
TMN	Nevada	USGS (Las Vegas, Nev.)	199
(TMN)	California	USGS (Menlo Park, Calif.)	70
TMT	Connecticut	Weston Obaervatory	115
(TN-CL)	California	Teledyne Geotech	96
TNA	Alaska	University of Alaska	15
TNK	California	University of Nevada	99
TNN	Alaska	University of Alaska	15
TNP	Nevada	University of Nevada	201
(TO-OK)	Oklahoma	Teledyne Geotech	255

Appendix 3.--*Alphabetic listing of station codes*--Continued

Code	State	Operator	Page
TOA	Alaska	NOAA (Palmer, Alaska)	17
(TP-NV)	Nevada	Teledyne Geotech	205
TPC	California	California Institute of Technology	77
TPH	Nevada	Sandia Laboratories	203
(TPO)	California	California Institute of Technology	77
(TPR)	California	University of Southern California	61
TPV	Nevada	USGS (Las Vegas, Nev.)	199
TRC	California	USGS (Menlo Park, Calif.)	72
TRM	Maine	Weston Observatory	165
TRU	Hawaii-Pacific	USGS (Agana, Guam)	132
TRY	New York	Rensselaer Polytechnic Institute	238
(TS-ND)	North Dakota	Teledyne Geotech	245
(TSI)	Alaska	USGS (Menlo Park, Calif.)	28
TSL	Arizona	Los Alamos Lab and Navajo Comm. Col.	37
TSO	Oklahoma	Senturion Sciences, Inc.	254
TSP	New Mexico	Los Alamos Scientific Laboratory	220
TSV	Nevada	USGS (Las Vegas, Nev.)	199
TTA	Alaska	NOAA (Palmer, Alaska)	17
TTM	California	USGS (Pasadena, Calif.) and C.I.T.	85
TTP	New Mexico	Los Alamos Scientific Laboratory	220
(TU-PA)	Pennsylvania	Teledyne Geotech	274
TUC	Arizona	Arizona Bureau of Mines	38
TUL	Oklahoma	University of Oklahoma	252
TUM	Washington	University of Washington	337
TUO	Arizona	Arizona Bureau of Mines	38
TUS	New York	Lamont-Doherty Geological Observ.	233
TUT	Arizona	Arizona Bureau of Mines	38
TWL	California	California Institute of Technology	77
TWN	California	USGS (Menlo Park, Calif.)	72
(TXC)	Colorado	USGS (Menlo Park, Calif.)	111
(TYL)	California	USGS (Menlo Park, Calif.)	72
TYS	Missouri	Saint Louis University	179
(U4)	Wyoming	U.S. Air Force	357
(U6)	Wyoming	U.S. Air Force	357
UBO	Utah	University of Utah	314
(UCS)	California	USGS (Menlo Park, Calif.)	69
UCT	Connecticut	Weston Observatory	115
(UK-OR)	Oregon	Teledyne Geotech	264
UKI	California	NOAA (Ukiah, Calif.)	94
(UKL)	Alaska	University of Alaska	15
UNA	Alaska	USGS (Menlo Park, Calif.)	30
UOA	Arizona	University of Arizona	39
(UOA)	Alabama	USGS and Alabama Geological Survey	7
USC	California	University of Southern California	61
(USF)	California	University of California, Berkeley	51
UVN	Nevada	University of Nevada	201
UWE	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
UWL	New York	Lamont-Doherty Geological Observ.	233
UWM	Wisconsin	University of Wisconsin at Milwaukee	348
(VGR)	California	California Institute of Technology	77
VIL	Maryland	Natl. Earthquake Information Center	167
VIN	California	University of California, Berkeley	51
VIT	California	University of California, Berkeley	51
VLZ	Alaska	USGS (Menlo Park, Calif.)	28
(VN-UT)	Utah	Teledyne Geotech	319
(VO-IO)	Iowa	Teledyne Geotech	152
(VOL)	New Mexico	USGS (Albuquerque, N.Mex.)	217
VPD	California	California Institute of Technology	77
(VPE)	California	USGS (Menlo Park, Calif.)	72
VPEM	California	USGS (Menlo Park, Calif.)	72
VPK	California	University of Nevada	99
VQS	Puerto Rico	USGS (Cayey, P.R.)	278
VSC	South Carolina	USGS (Denver, Colo.)	285
VST	Virgin Islands	Lamont-Doherty Geological Observ.	324
(VST)	California	California Institute of Technology	77
(VT-OR)	Oregon	Teledyne Geotech	264
VTG	Washington	University of Washington	337
(VYD)	California	USGS (Menlo Park, Calif.)	65
VZS	Alaska	USGS (Menlo Park, Calif.)	28
VZW	Alaska	USGS (Menlo Park, Calif.)	28
(WA-OK)	Oklahoma	Teledyne Geotech	255
(WAC)	South Carolina	USGS (Denver, Colo.)	285
WAH	Washington	University of Washington	337
WAL	Idaho	U.S. Bureau of Mines	143
(WAR)	California	USGS (Menlo Park, Calif.)	72
WAS	D.C.	Natl. Earthquake Information Center	120
(WAT)	Washington	University of Washington	337
(WAX)	Alaska	USGS (Menlo Park, Calif.)	28
WAY	Pennsylvania	Waynesburg College	273
WBI	Idaho	University of Montana	139
WBW	Washington	University of Washington	337
WCK	Kentucky	Saint Louis University	159
WCM	Montana	University of Montana	189
WCN	Nevada	University of Nevada	201
WDC	California	University of California, Berkeley	51
WDS	California	USGS (Menlo Park, Calif.)	69
WDY	California	California Institute of Technology	77
(WEL)	California	USGS (Pasadena, Calif.) and C.I.T.	85
(WEN)	Washington	University of Washington	337
WES	Massachusetts	Weston Observatory	169
(WF-MN)	Minnesota	Teledyne Geotech	174
WFF	Florida	U.S. Department of the Navy	122
WFM	Massachusetts	M.I.T. and Harvard University	168
(WGLY)	New York	Woodward-Clyde Consultants	239
WGW	Washington	University of Washington	337
WH2	California	USGS (Pasadena, Calif.) and C.I.T.	85
WHA	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
(WHA)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
WHI	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
WHM	Montana	University of Montana	189
(WHP)	California	USGS (Pasadena, Calif.) and C.I.T.	85
WHU	Utah	University of Utah	314
(WHW)	California	USGS (Menlo Park, Calif.)	70
(WI-NV)	Nevada	Teledyne Geotech	205
(WIS)	California	USGS (Pasadena, Calif.) and C.I.T.	85
(WIU)	Utah	University of Utah	314
WIW	Washington	University of Washington	337
WKC	California	Tera Corporation	54
WKE	Hawaii-Pacific	University of Hawaii	131
WKR	California	USGS (Menlo Park, Calif.)	72
WLA	Arkansas	Saint Louis University	48
(WLD)	Nevada	University of Nevada	201
WLG	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
(WLI)	New York	Lamont-Doherty Geological Observ.	233
WLK	California	USGS (Pasadena, Calif.) and C.I.T.	85
WLM	Alaska	USGS (Menlo Park, Calif.)	28
(WLO)	Oklahoma	University of Oklahoma	252
(WM-AZ)	Arizona	Teledyne Geotech	41
WMA	New Mexico	USGS (Albuquerque, N.Mex.)	217
(WML)	California	USGS (Pasadena, Calif.) and C.I.T.	85
WMN	Nevada	University of Nevada	201
WMO	Oklahoma	AFTAC	251
WMU	Utah	University of Utah	314
(WN-SD)	South Dakota	Teledyne Geotech	290
WNC	North Carolina	Carolina Power and Light Company	242
WND	New York	Lamont-Doherty Geological Observ.	233
(WNH)	New Hampshire	Massachusetts Inst. of Technology	212
WNW	Washington	University of Washington	337
WNY	New York	Lamont-Doherty Geological Observ.	233
(WO-AZ)	Arizona	Teledyne Geotech	41
(WP-TX)	Texas	Teledyne Geotech	305
WPH	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
WPM	Michigan	University of Michigan	170
WPR	New York	Lamont-Doherty Geological Observ.	233
(WPT)	Hawaii-Pacific	USGS (Hawaii National Park, Hawaii)	129
(WQ-IL)	Illinois	Teledyne Geotech	146
(WR-AR)	Arkansas	Teledyne Geotech	46
WRC	California	California Institute of Technology	77
WRD	Washington	University of Washington	337
WRG	Alaska	USGS (Menlo Park, Calif.)	28
WSC	Maryland	Natl. Earthquake Information Center	167
WSN	Nevada	USGS (Las Vegas, Nev.)	199
WSR	Nevada	USGS (Las Vegas, Nev.)	199
(WT-TN)	Tennessee	Teledyne Geotech	295
WTC	Colorado	Colorado School of Mines	106
(WTN)	Colorado	Colorado School of Mines	106
WTR	Maine	Colby College	162
WTW	Wyoming	USGS (Menlo Park, Calif.)	355

Appendix 3.--*Alphabetic listing of station codes*--Continued

Code	State	Operator	Page
(WTX)	New Mexico	USGS (Albuquerque, N.Mex.)	217
(WW-UT)	Utah	Teledyne Geotech	319
(WWR)	California	California Institute of Technology	77
WYO	Wyoming	U.S. Air Force	357
(WZ-NV)	Nevada	Teledyne Geotech	205
(Y)	Washington	USGS (Menlo Park, Calif.)	343
(YA-WA)	Washington	Teledyne Geotech	341
YAH	Alaska	USGS (Menlo Park, Calif.)	28
(YCB)	Alaska	University of Alaska	15
YCM	Montana	University of Montana	189
(YEG)	California	USGS (Pasadena, Calif.) and C.I.T.	85
(YER)	Nevada	University of Calif., Berkeley	204
(YKG)	Alaska	USGS (Menlo Park, Calif.)	28
YKM	Montana	Department of the Army	188
YKT	Alaska	USGS (Menlo Park, Calif.)	28
(YMD)	Arizona	USGS (Pasadena, Calif.) and C.I.T.	43
(YPBB)	Montana	USGS (Menlo Park, Calif.)	193
(YPCJ)	Wyoming	USGS (Menlo Park, Calif.)	355
(YPDC)	Montana	USGS (Menlo Park, Calif.)	193
(YPEE)	Wyoming	USGS (Menlo Park, Calif.)	355
(YPGC)	Montana	USGS (Menlo Park, Calif.)	193
(YPHB)	Montana	USGS (Menlo Park, Calif.)	193
(YPHR)	Montana	USGS (Menlo Park, Calif.)	193
(YPLK)	Wyoming	USGS (Menlo Park, Calif.)	355
(YPMC)	Wyoming	USGS (Menlo Park, Calif.)	355
(YPMF)	Idaho	USGS (Menlo Park, Calif.)	140
(YPMH)	Wyoming	USGS (Menlo Park, Calif.)	355
(YPMJ)	Wyoming	USGS (Menlo Park, Calif.)	355
(YPML)	Wyoming	USGS (Menlo Park, Calif.)	355
(YPMV)	Wyoming	USGS (Menlo Park, Calif.)	355
(YPNG)	Wyoming	USGS (Menlo Park, Calif.)	355
(YPNJ)	Wyoming	USGS (Menlo Park, Calif.)	355
(YPOF)	Wyoming	USGS (Menlo Park, Calif.)	355
(YPPC)	Wyoming	USGS (Menlo Park, Calif.)	355
(YPPR)	Wyoming	USGS (Menlo Park, Calif.)	355
(YPRL)	Montana	USGS (Menlo Park, Calif.)	193
(YPSE)	Wyoming	USGS (Menlo Park, Calif.)	355
(YPSG)	Wyoming	USGS (Menlo Park, Calif.)	355
(YPTC)	Wyoming	USGS (Menlo Park, Calif.)	355
(YPTS)	Idaho	USGS (Menlo Park, Calif.)	140
(YPWT)	Wyoming	USGS (Menlo Park, Calif.)	355
(YPWY)	Montana	USGS (Menlo Park, Calif.)	193
(YR-CL)	California	Teledyne Geotech	96
(YTT)	Alaska	USGS (Menlo Park, Calif.)	28
ZOX	Nevada	USGS (Las Vegas, Nev.)	199
ZZT	Tennessee	Saint Louis University	297

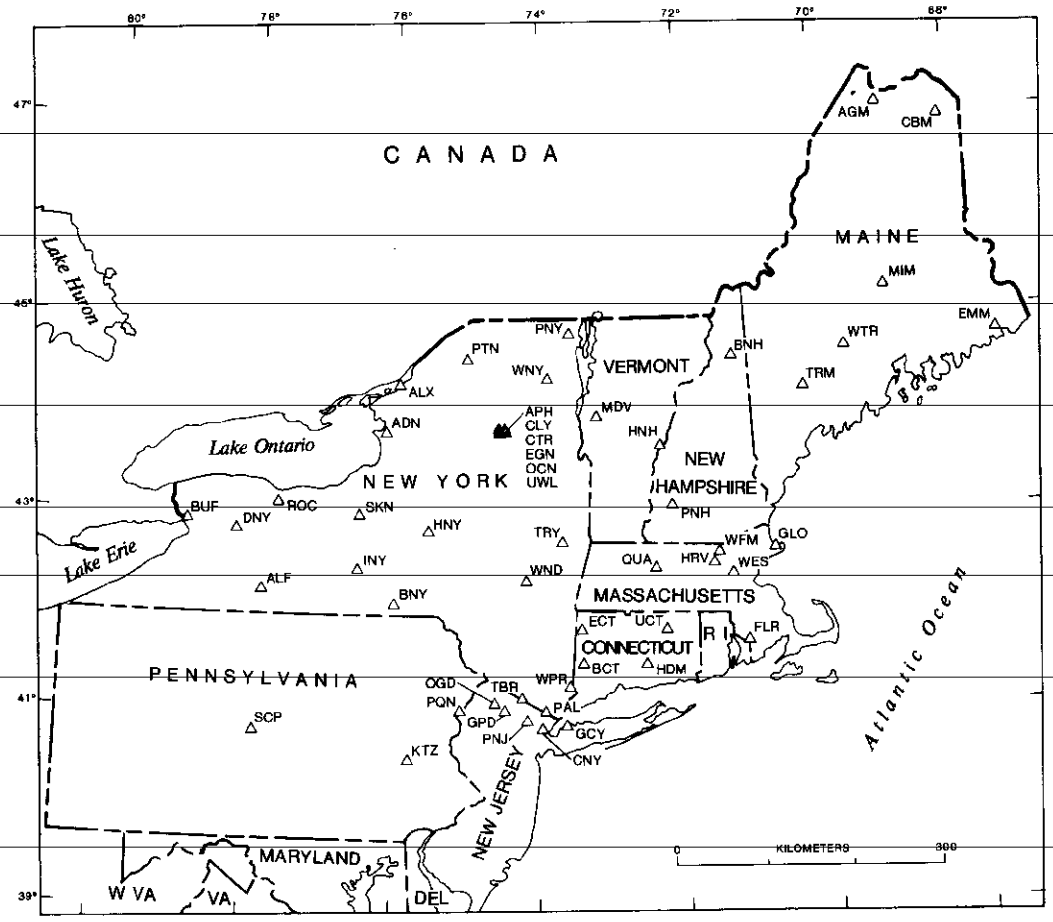

Figure 12.--Stations operating in mid-1977 in Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

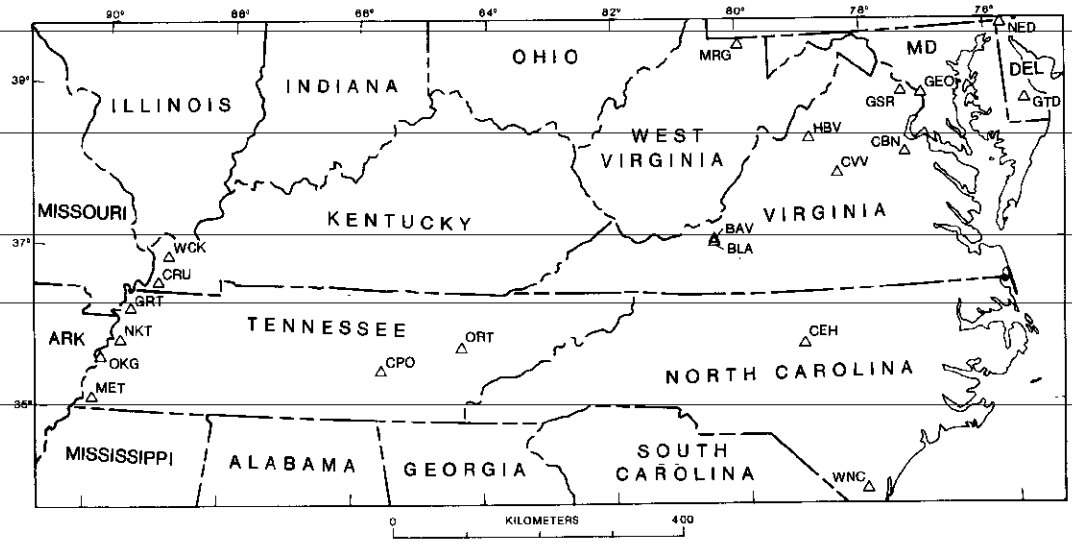

Figure 13.--Stations operating in mid-1977 in Delaware, District of Columbia, Kentucky, Maryland, North Carolina, Tennessee, Virginia, and West Virginia.

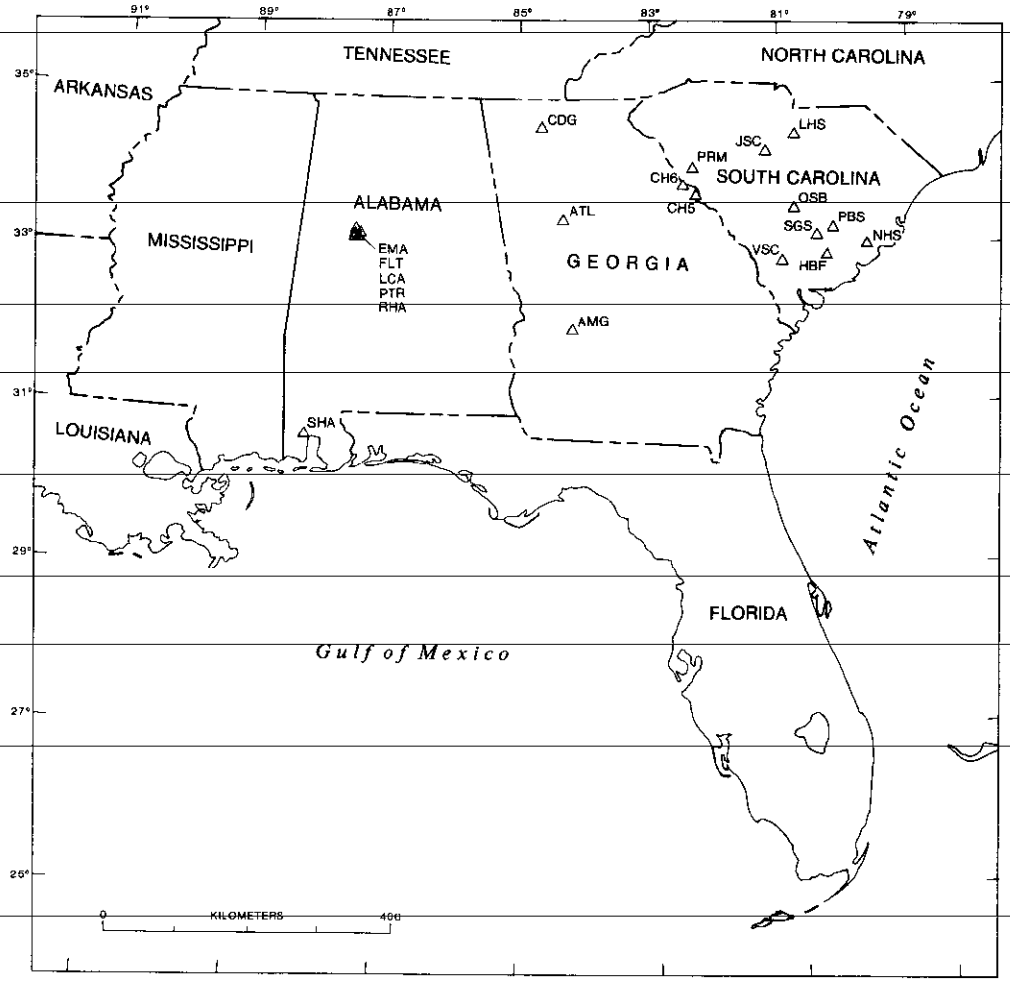

Figure 14.--Stations operating in mid-1977 in Alabama, Florida, Georgia, Mississippi, and South Carolina.

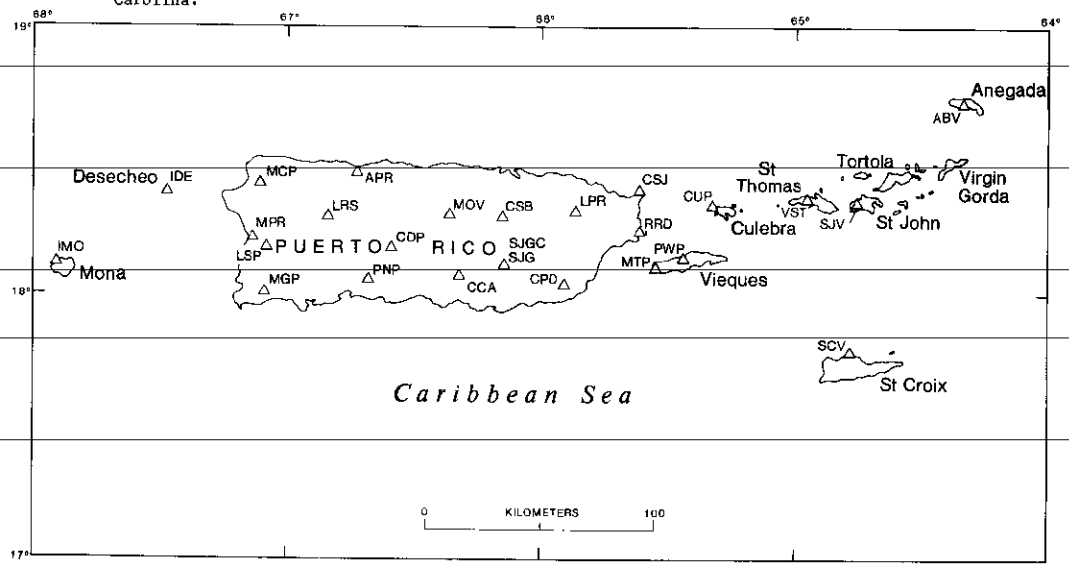

Figure 15.--Stations operating in mid-1977 in Puerto Rico and U.S. Virgin Islands.

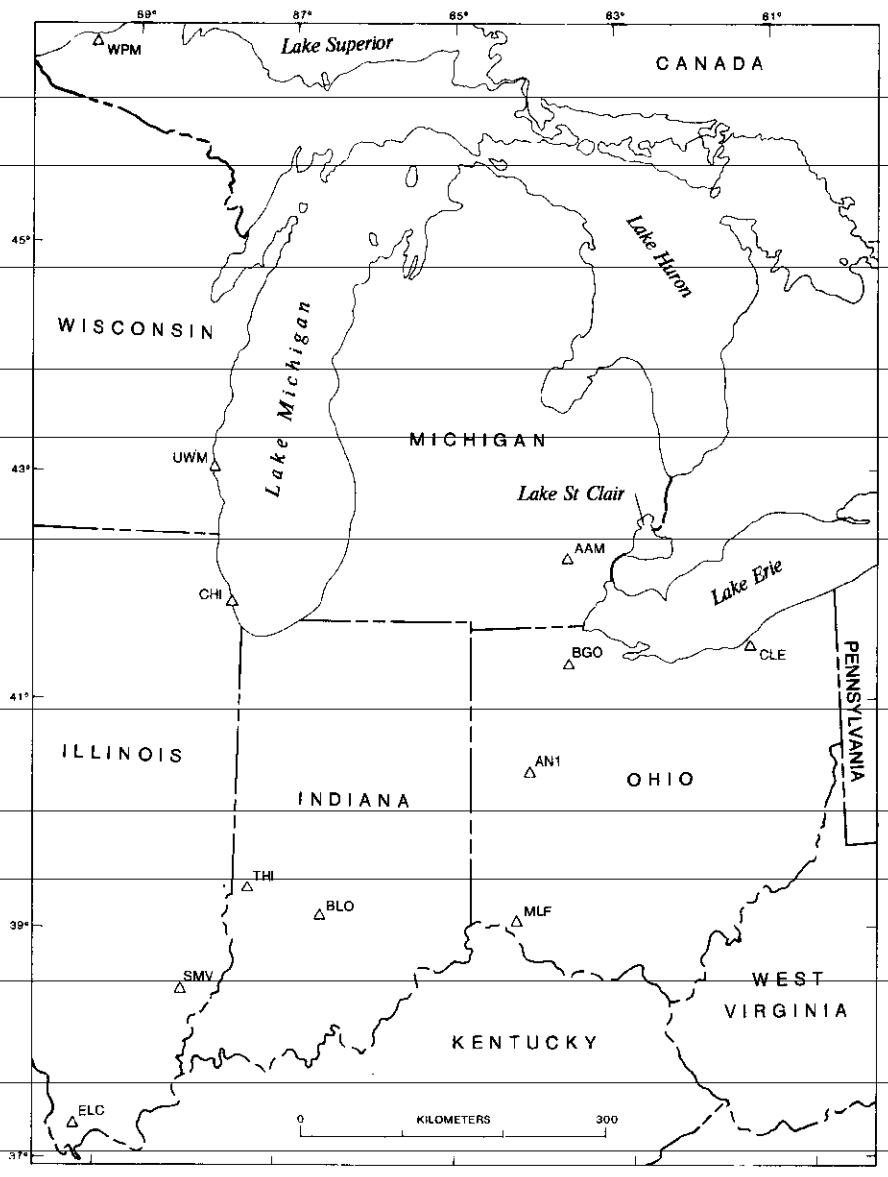

Figure 16.--Stations operating in mid-1977 in Illinois, Indiana, Michigan, Ohio, and Wisconsin.

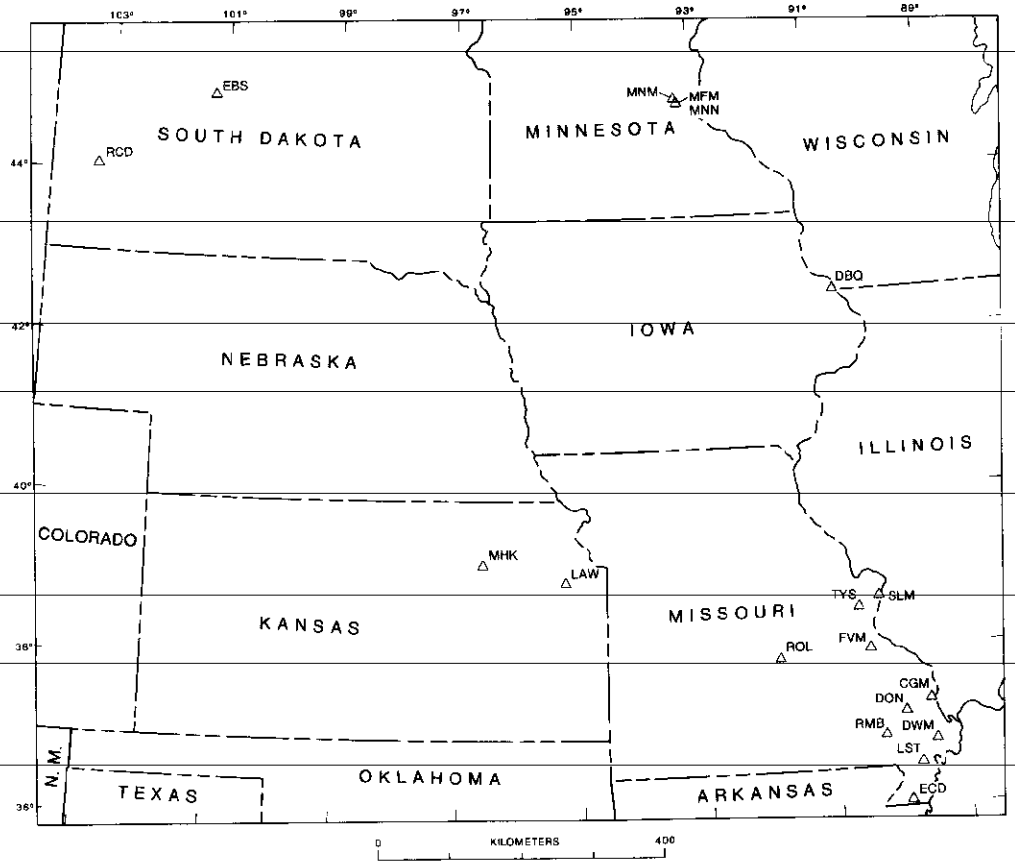

Figure 17.--Stations operating in mid-1977 in Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota.

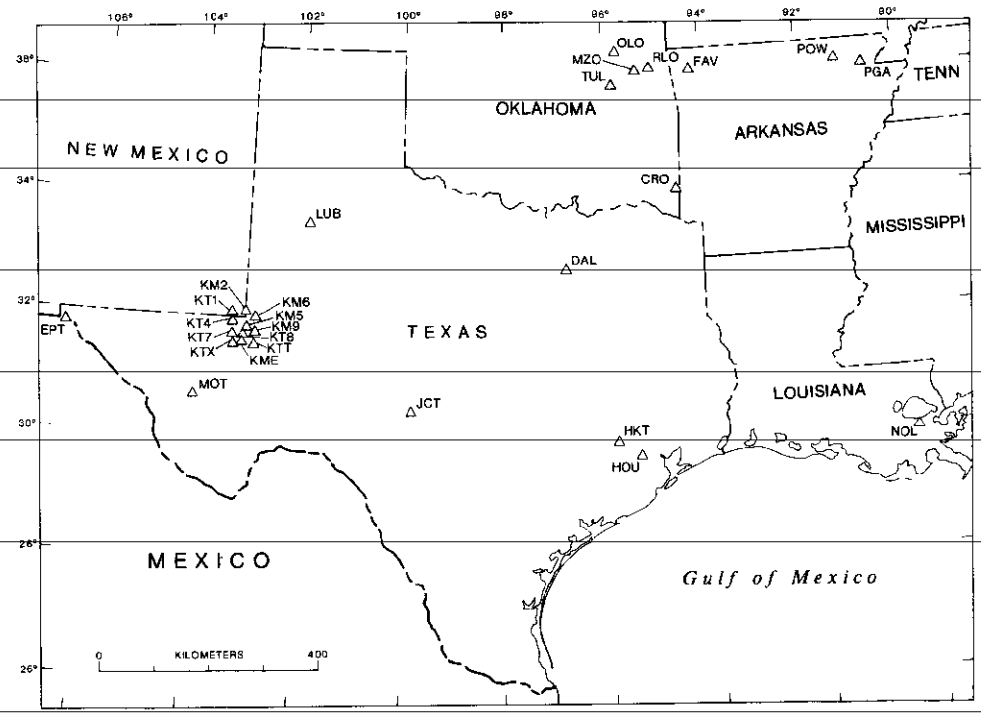

Figure 18.--Stations operating in mid-1977 in Arkansas, Louisana, Oklahoma, and Texas.

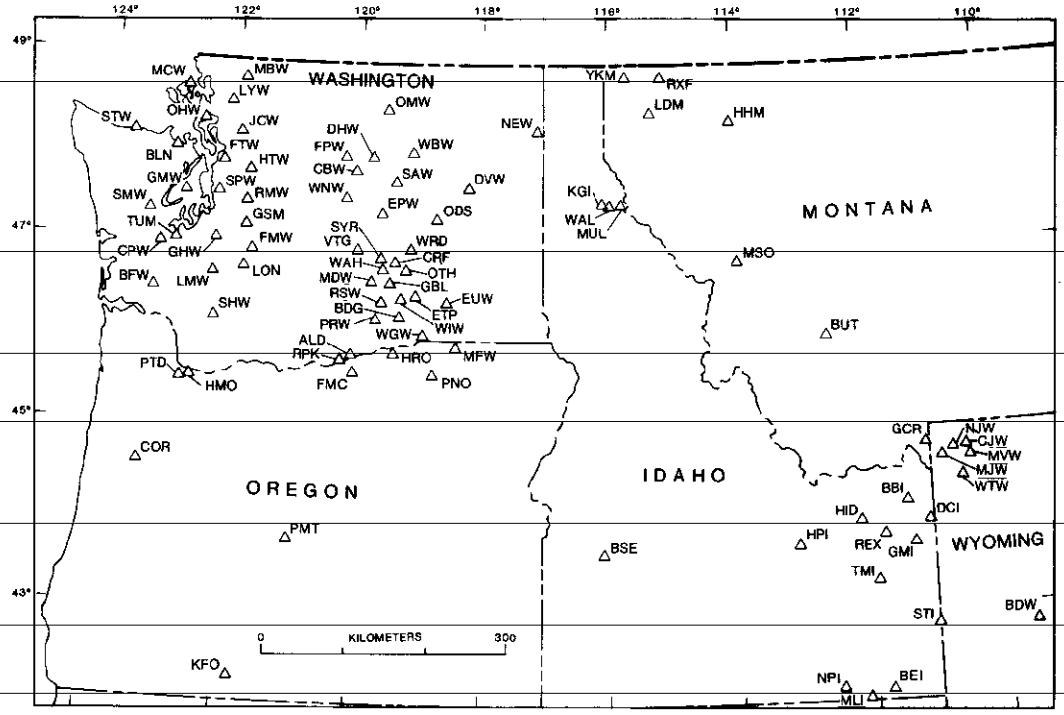

Figure 19.--Stations operating in mid-1977 in Idaho, Montana, Oregon, Washington, and Wyoming.

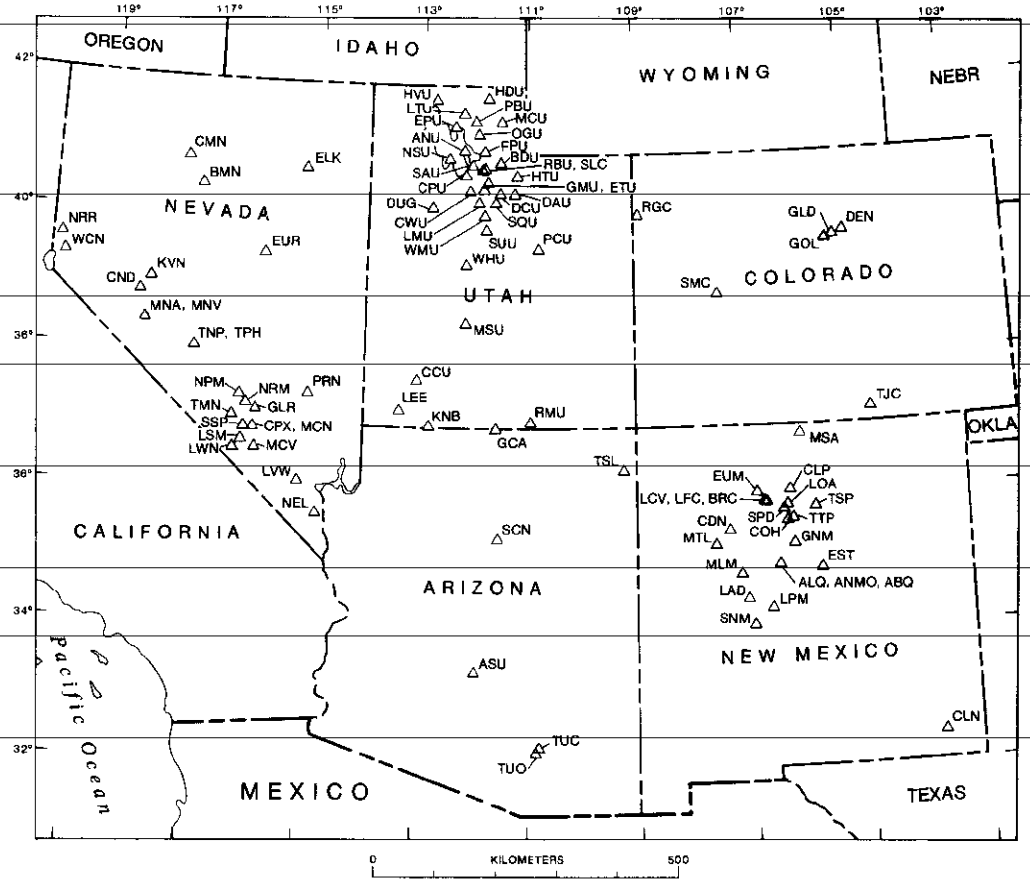

Figure 20.--Stations operating in mid-1977 in Arizona, Colorado, Nevada, New Mexico, and Utah.

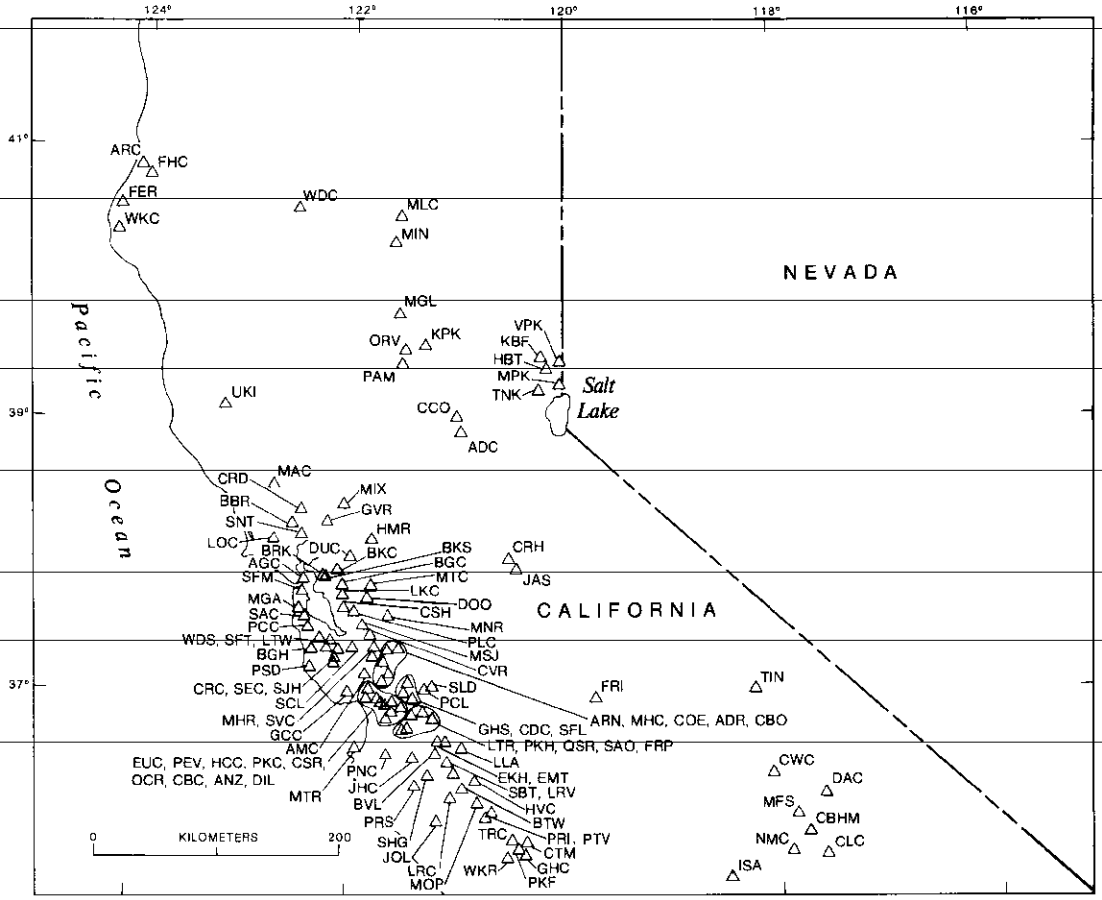

Figure 21.--Stations operating in mid-1977 in northern California.

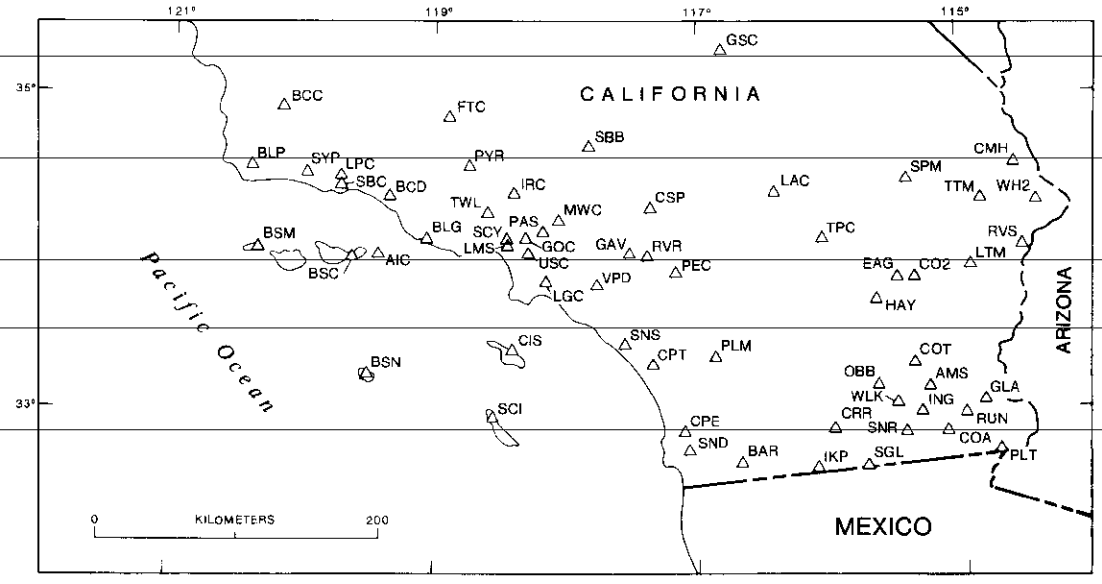

Figure 22.--Stations operating in mid-1977 in southern California.

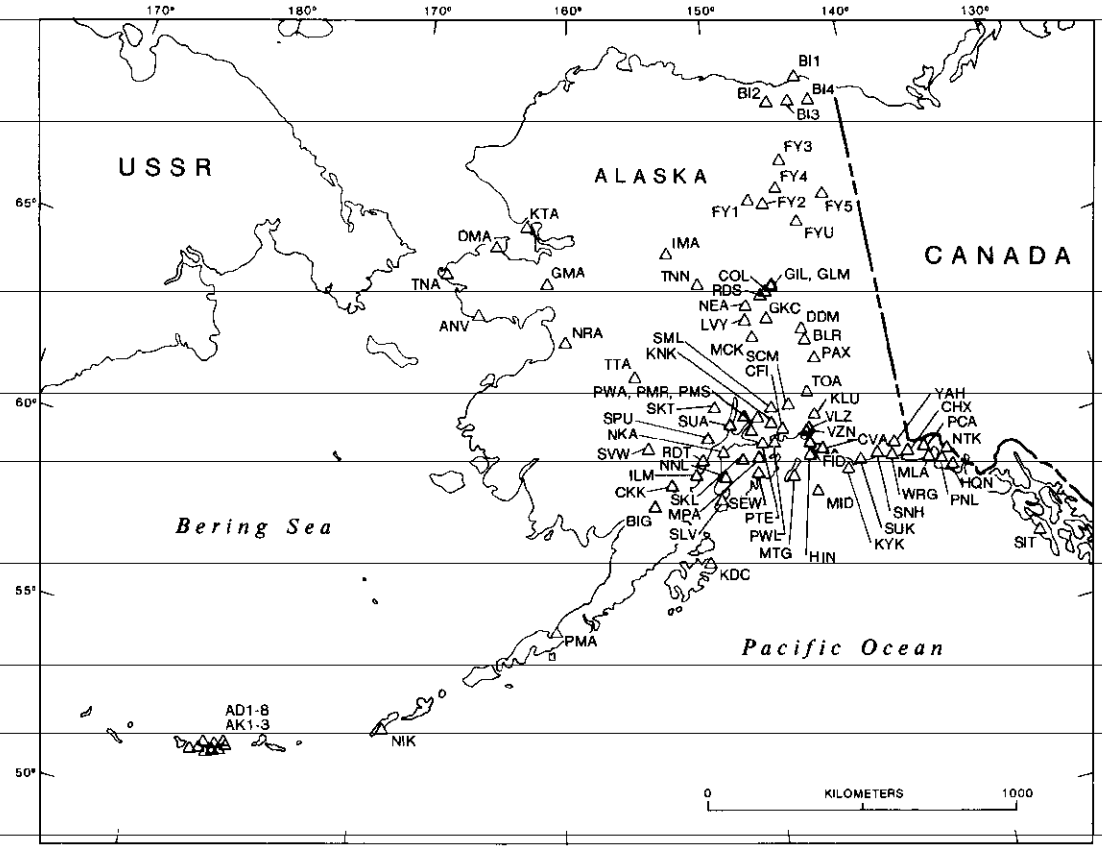

Figure 23.--Stations operating in mid-1977 in Alaska.

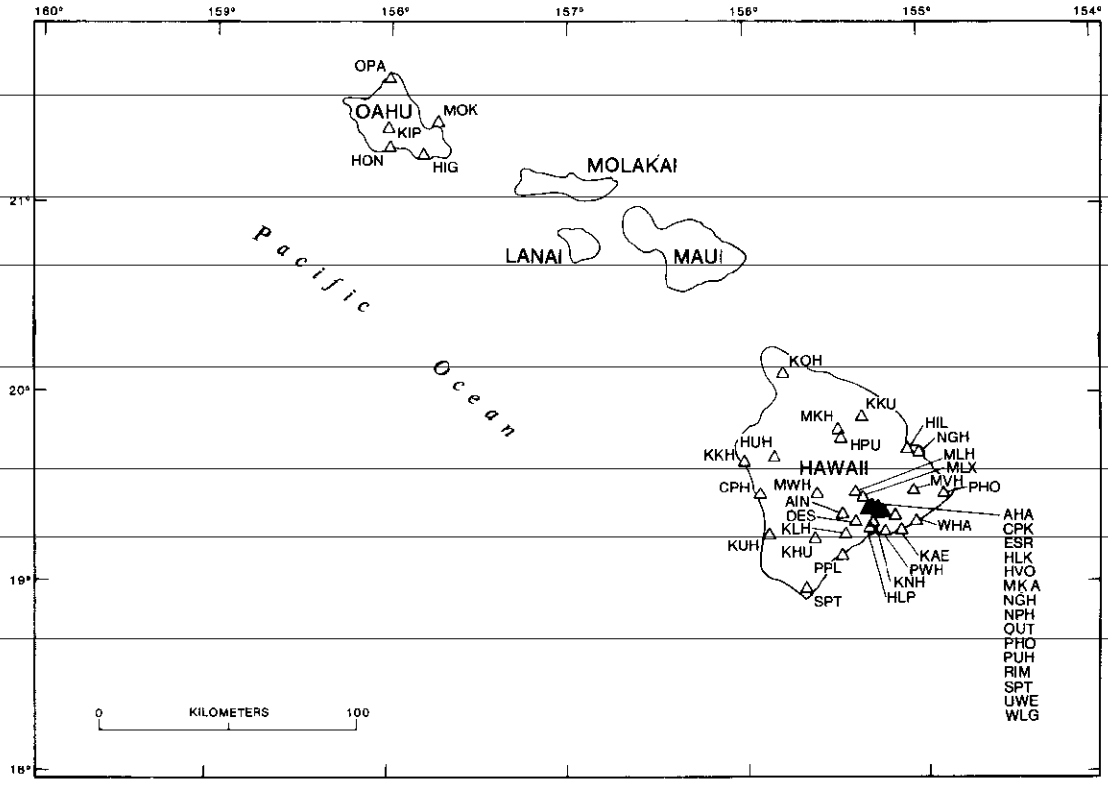

Figure 24.--Stations operating in mid-1977 in Hawaii.

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