NATIONAL CENTER FOR EARTHQUAKE ENGINEERING RESEARCH

State University of New York at Buffalo

CATALOG OF STRONG MOTION STATIONS IN EASTERN NORTH AMERICA

by

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Technical Report NCEER-90-0004

April 3, 1990

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This catalog contains information on all strong motion stations operating in Eastern North America known to NCEER. The location, coordinates, installation dates, type of instrument, operator, structure type and size, and site geology are listed for each station. The format of the catalog is patterned after the USGS Open-File Report 81-664, "Western Hemisphere Strong-Motion Accelerograph Station List-1980" but the entries have been updated as of January 1990. There are 237 stations listed in this catalog which include 414 recording instruments. One third of these stations are intended to record free-field ground motion while the rest are associated with large engineered structures. The relationship of station location to seismicity is shown in a series of figures and a method is described to predict peak acceleration levels from an earthquake where the magnitude and distance to station are known. An on-line database encompassing this catalog is maintained at Lamont-Doherty Geological Observatory for NCEER which can be accessed via Internet or distributed on floppy disk to personal computer users. Subsequently printed versions of this catalog may be released again as NCEER Technical Reports as the need for revisions arises.

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PREFACE

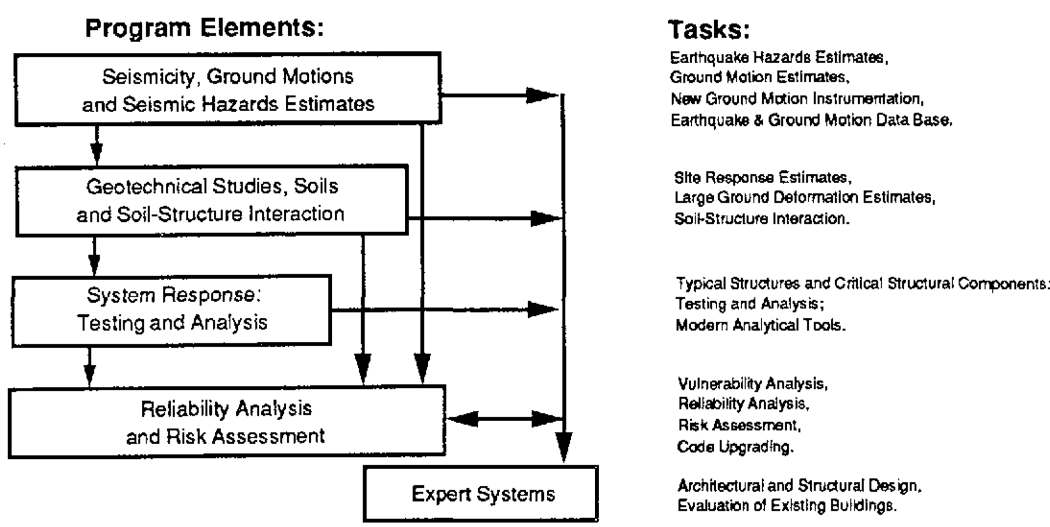
The National Center for Earthquake Engineering Research (NCEER) is devoted to the expansion and dissemination of knowledge about earthquakes, the improvement of earthquake-resistant design, and the implementation of seismic hazard mitigation procedures to minimize loss of lives and property. The emphasis is on structures and lifelines that are found in zones of moderate to high seismicity throughout the United States.

NCEER's research is being carried out in an integrated and coordinated manner following a structured program. The current research program comprises four main areas:

- Existing and New Structures
- Secondary and Protective Systems
- Lifeline Systems
- Disaster Research and Planning

This technical report pertains to Program 1, Existing and New Structures, and more specifically to seismic hazards studies.

The long term goal of research in Existing and New Structures is to develop seismic hazard mitigation procedures through rational probabilistic risk assessment for damage or collapse of structures, mainly existing buildings, in regions of moderate to high seismicity. The work relies on improved definitions of seismicity and site response, experimental and analytical evaluations of systems response, and more accurate assessment of risk factors. This technology will be incorporated in expert systems tools and improved code formats for existing and new structures. Methods of retrofit will also be developed. When this work is completed, it should be possible to characterize and quantify societal impact of seismic risk in various geographical regions and large municipalities. Toward this goal, the program has been divided into five components, as shown in the figure below:



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Seismic hazard studies constitute one of the important areas of research in Existing and New Structures. Current research activities include the following:

1. Development of ground motion instrumentation and a strong ground motion data base.
2. Development of seismicity catalogs, and improved seismicity analysis methods and models.
3. Development of improved ground motion data analysis methods, computational methods and ground motion models.
4. Estimation of earthquake hazards.

The ultimate goal of projects concerned with seismic hazard studies is to provide an engineering estimation of seismic hazards and ground motion, initially for the eastern and central United States.

This report provides a long overdue compilation of the instrumental means by which the ground motion data that are so vital for quantitative earthquake hazards studies are, have been, and (in the near future) continue to be collected. This catalog is a quantitative reference book which allows those with the need to access pertinent information to find the station parameters for already collected strong motion data. Moreover, this compilation is a much required planning tool for how to improve the now existing, rapidly aging strong motion instrument inventory in this part of the continent. Improvements are required in order to obtain a better geographic coverage and to raise the quality and quantity of strong motion data in the regions east of the Rocky Mountains. In this large region of North America, past strong motion data are still too sparse in many instances to contribute the data required for regionalized earthquake hazards assessment.

In short, this catalog is one of the varied but systematically planned contributions of NCEER to facilitate earthquake hazards assessment in general, and for the eastern U.S. in particular.

ABSTRACT

This catalog contains information on all strong motion stations operating in Eastern North America known to NCEER. The location, coordinates, installation dates, type of instrument, operator, structure type and size, and site geology are listed for each station. The format of the catalog is patterned after the USGS Open-File Report 81-664, "Western Hemisphere Strong-Motion Accelerograph Station List -1980" but the entries have been updated as of January 1990. There are 237 stations listed in this catalog which include 414 recording instruments. One third of these stations are intended to record free-field ground motion while the rest are associated with large engineered structures. The relationship of station location to seismicity is shown in a series of figures and a method is described to predict peak acceleration levels from an earthquake where the magnitude and distance to station are known. An on-line database encompassing this catalog is maintained at Lamont-Doherty Geological Observatory for NCEER which can be accessed via Internet or distributed on floppy disk to personal computer users. Subsequently printed versions of this catalog may be released again as NCEER Technical Reports as the need for revisions arises.

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SECTION 1
INTRODUCTION

This catalog contains information on strong-motion stations operating in Eastern North America. All operators of strong motion instruments in Eastern North America known to the National Center for Earthquake Engineering Research (NCEER) have been solicited for station information. The catalog is complete and up to date as of Jan. 1, 1990 as practically possible given the nature of developing instrumentation programs and the inevitable reconfiguration of existing programs. The purpose of this catalog is to ; 1) identify all possible sources of strong motion data, 2) aid in the planning of future instrument locations, 3) foster a closer relationship between groups interested in strong ground motions. While we have concentrated our efforts on Eastern North America, any attempt at a national or global catalog will be met with our enthusiastic cooperation.

A station in this catalog refers to a place where one or more recording instruments are continuously monitoring ground motion for accelerations up to at least a fraction of g, these levels being potentially damaging to engineered structures and of primary concern in earthquake-related hazard assessment. Several fields are included for each station to indicate the location and to qualify the type of recording likely to be produced, as well as indicating the operator of the equipment. The entries for each field have been provided by the operators themselves, subject to some standardization in terminology by the author. An up to date and online version of this catalog is maintained at Lamont for NCEER in the form of a database and is freely available to those interested. Updates from all operators are incorporated in this database as they are received.

A statistical summary of the catalog provides insight to strong motion monitoring in Eastern North America. There are 237 stations listed, which includes 414 recording instruments. Of these stations, the largest operator is the U.S. Army Corps of Engineers with 32% of the total stations. The U.S. Geological Survey operates 27% of the stations, the Geological Survey of Canada 9.7% and the NCEER Digital Strong Motion Network comprises 7.5%. Alternatively, one can separate stations into those intended to monitor free-field ground motion, 33%, and those associated with large engineered structures, 67%. It is clear the motivation for most installations is regulatory policy rather than the optimal monitoring of seismic zones. The Figures 1-1 to 1-10 illustrate the geographical distribution of stations and their relationship to seismicity. Figure 1-1 shows all the stations in the catalog and Figure 1-2 is a plot of the entire EPRI catalog of earthquake locations for this region. The Electric Power Research Institute (EPRI) earthquake catalog includes historical and recorded earthquakes up to March 1985 which have a magnitude or intensity greater than or equal to 3. Subsequent figures focus on three distinct regions; the New Madrid Seismic Zone, the Southern Appalachian Region, and the Northeastern Region. The operators are identified in these plots to illustrate the diversity of programs undertaken in each region.

The limited number of well recorded strong earthquakes in Eastern North America has prompted NCEER to undertake several parallel efforts to collect a more robust dataset. This catalog is part of an effort to ensure that records already produced and new records which may not normally be available to the research community are recognized, collected and made available to interested users. An isolated recording produced at an industrial facility which exhibits acceleration levels posing no danger to this structure may be of marginal use to the operator yet be important to other researchers studying attenuation or propagation effects. The first step is to know where the recorders are. NCEER has also deployed state of the art recorders in seismically active zones to increase the number of recorded earthquakes. A third effort to increase the strong motion dataset in Eastern North America is the maintenance of a number of portable digital recorders dedicated for immediate deployment in aftershock studies. The method of collecting records from existing instrumentation is not only the most cost effective, it produces the most data.

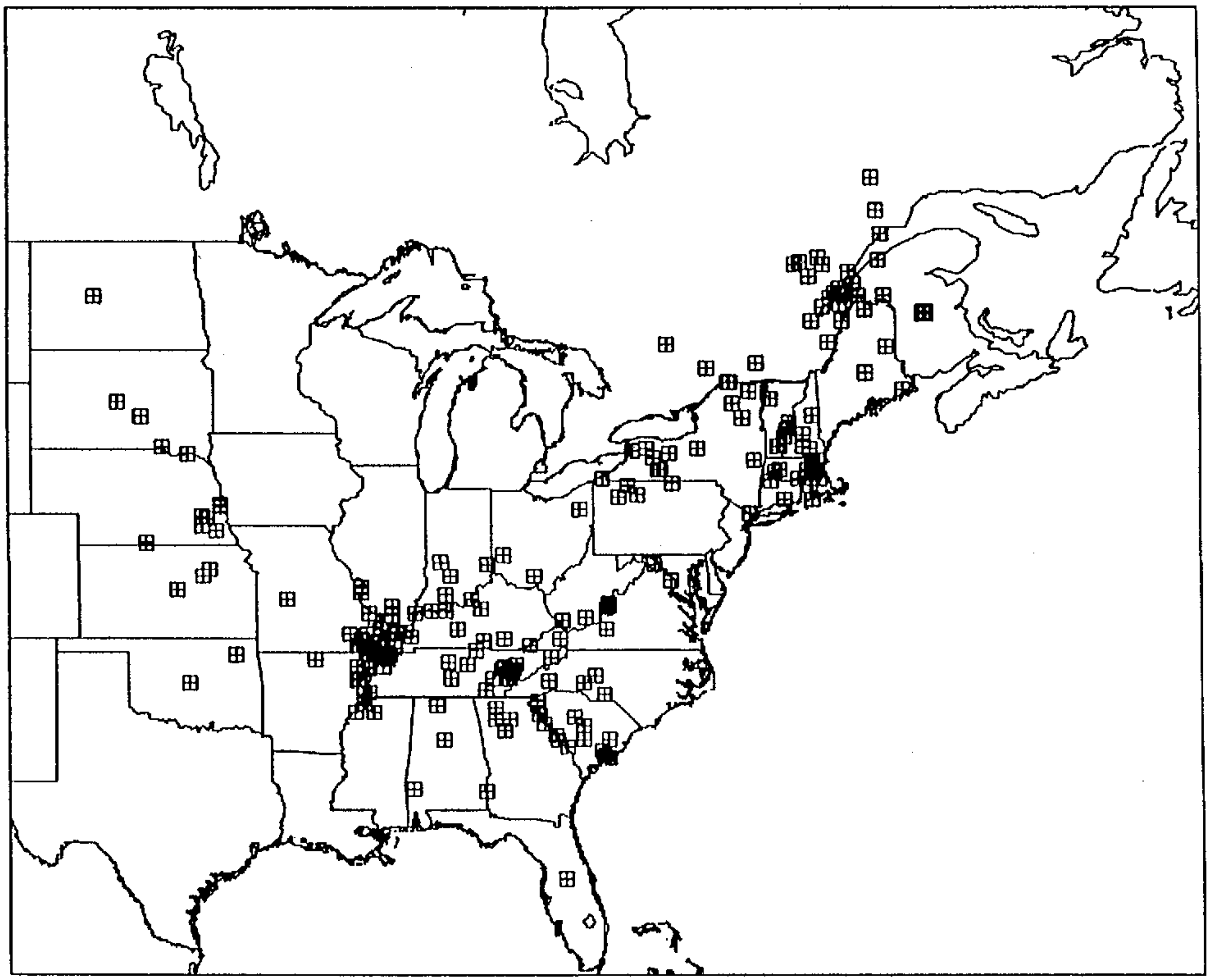

FIGURE 1-1 Strong Motion Stations in Eastern North America.

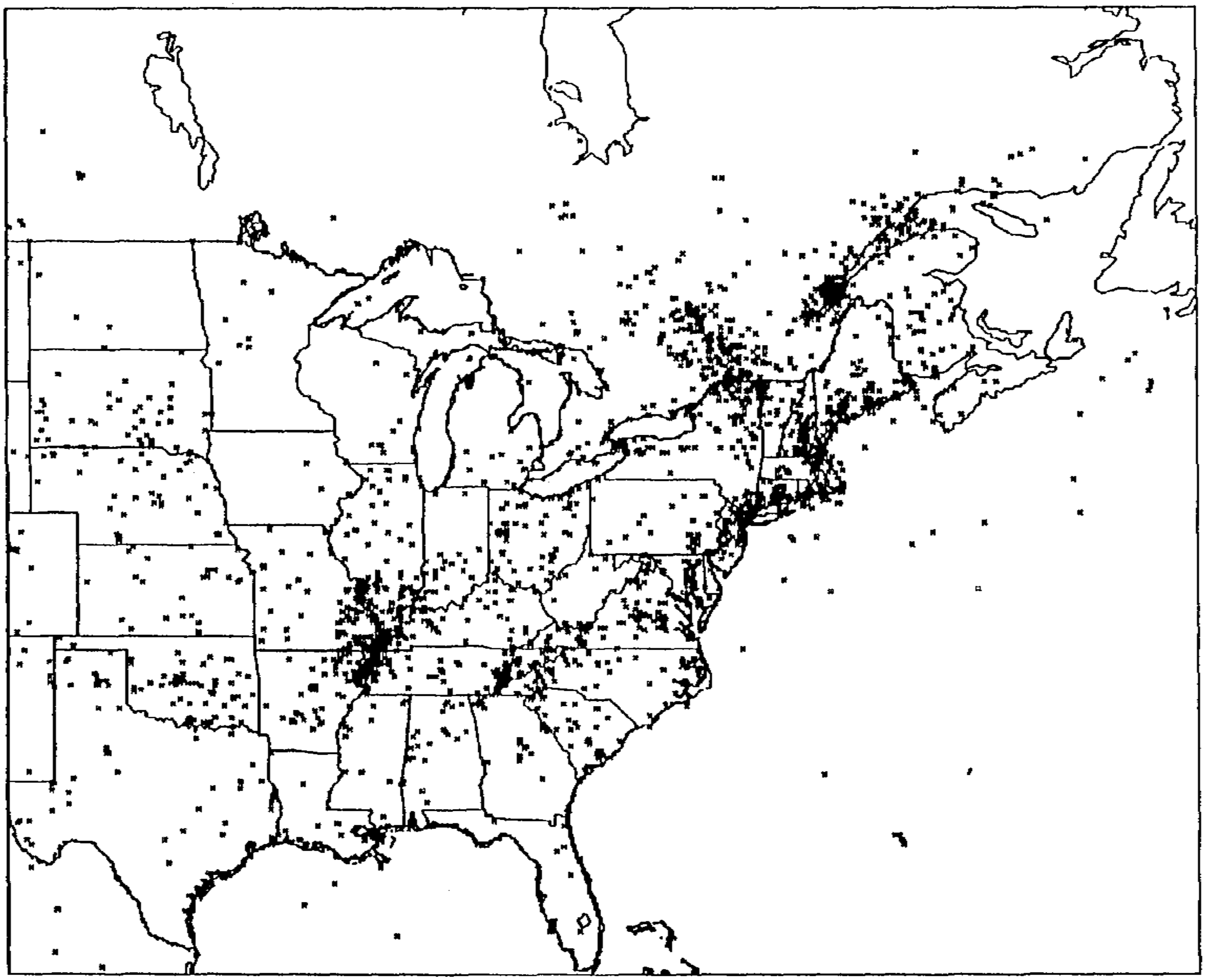

FIGURE 1-2 Seismicity in Eastern North America from the EPRI Earthquake Catalog

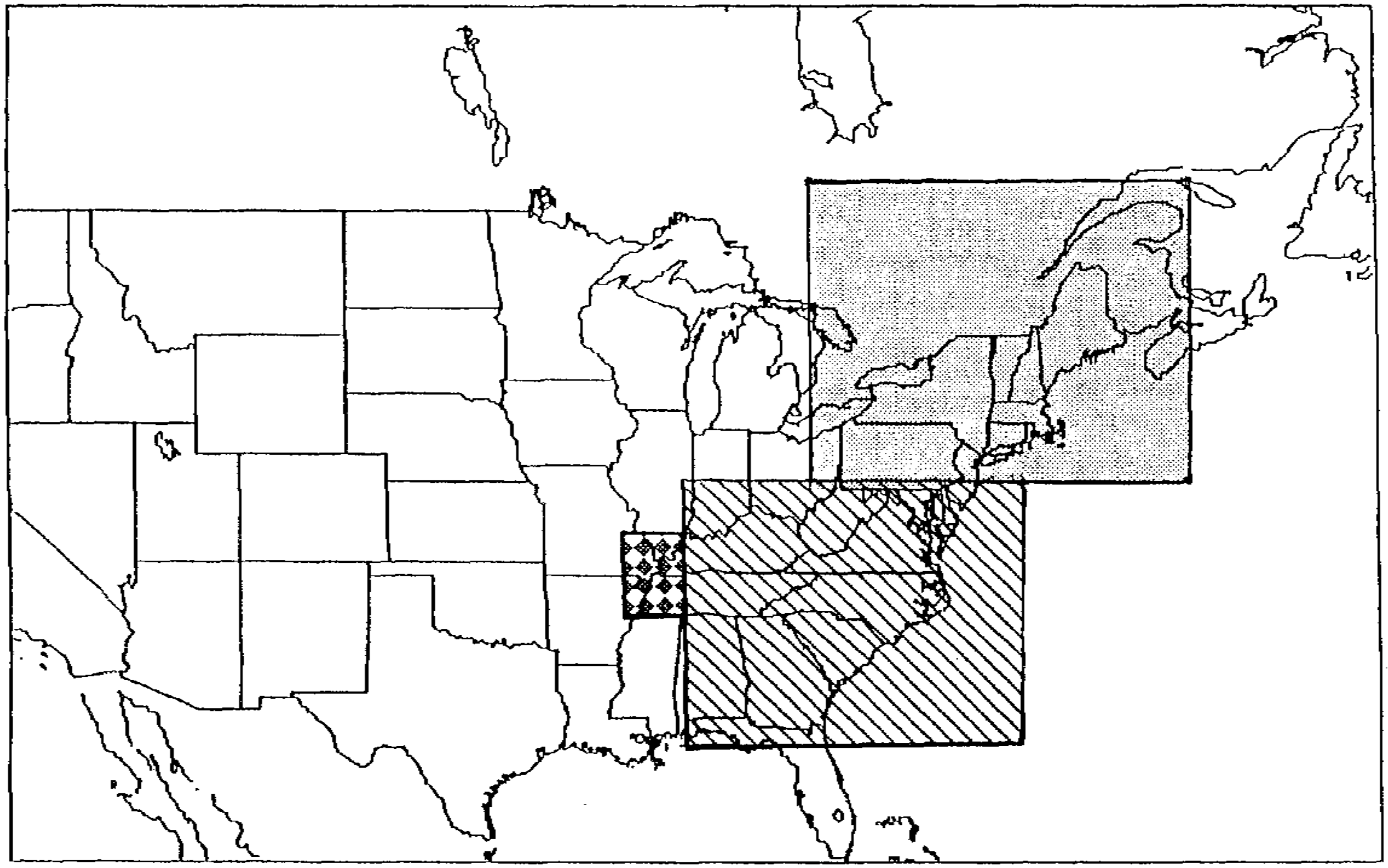

FIGURE 1-3 Geographic regions shown in expanded detail in Figures 1-4 to 1-9

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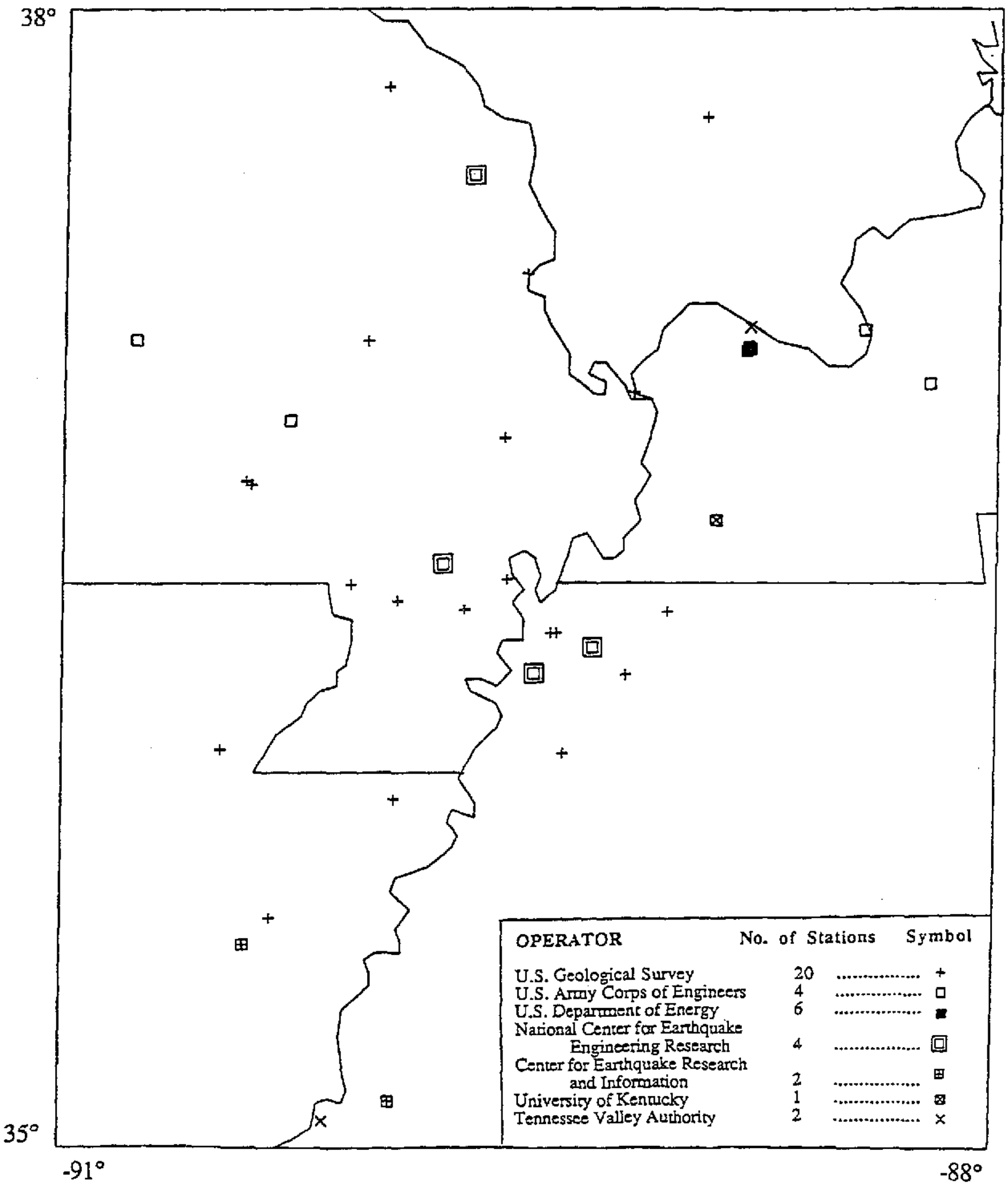

FIGURE 1-4 Strong Motion Stations in the New Madrid Seismic Zone

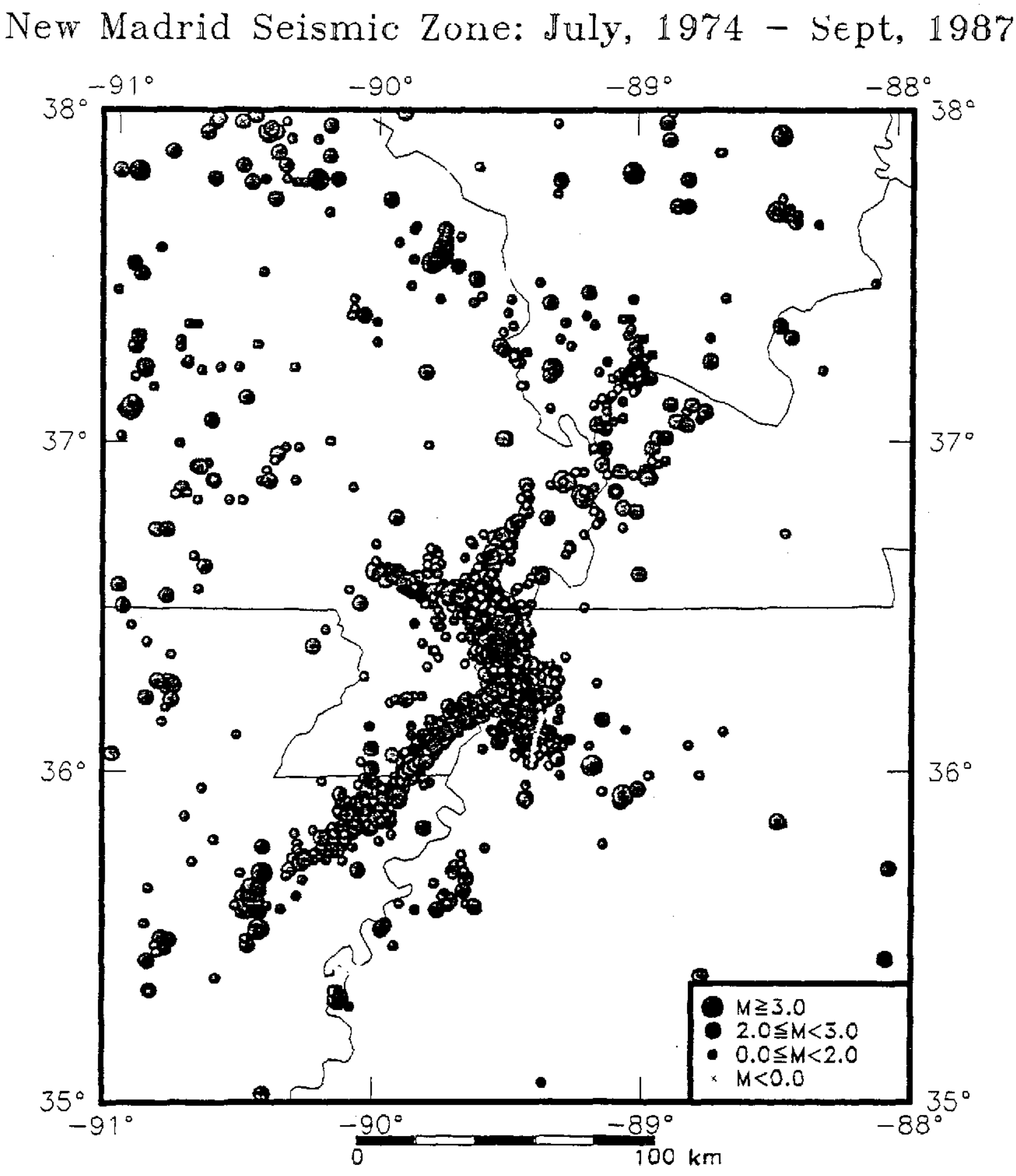

FIGURE 1-5 Seismicity in the New Madrid Seismic Zone (Source; CERI)

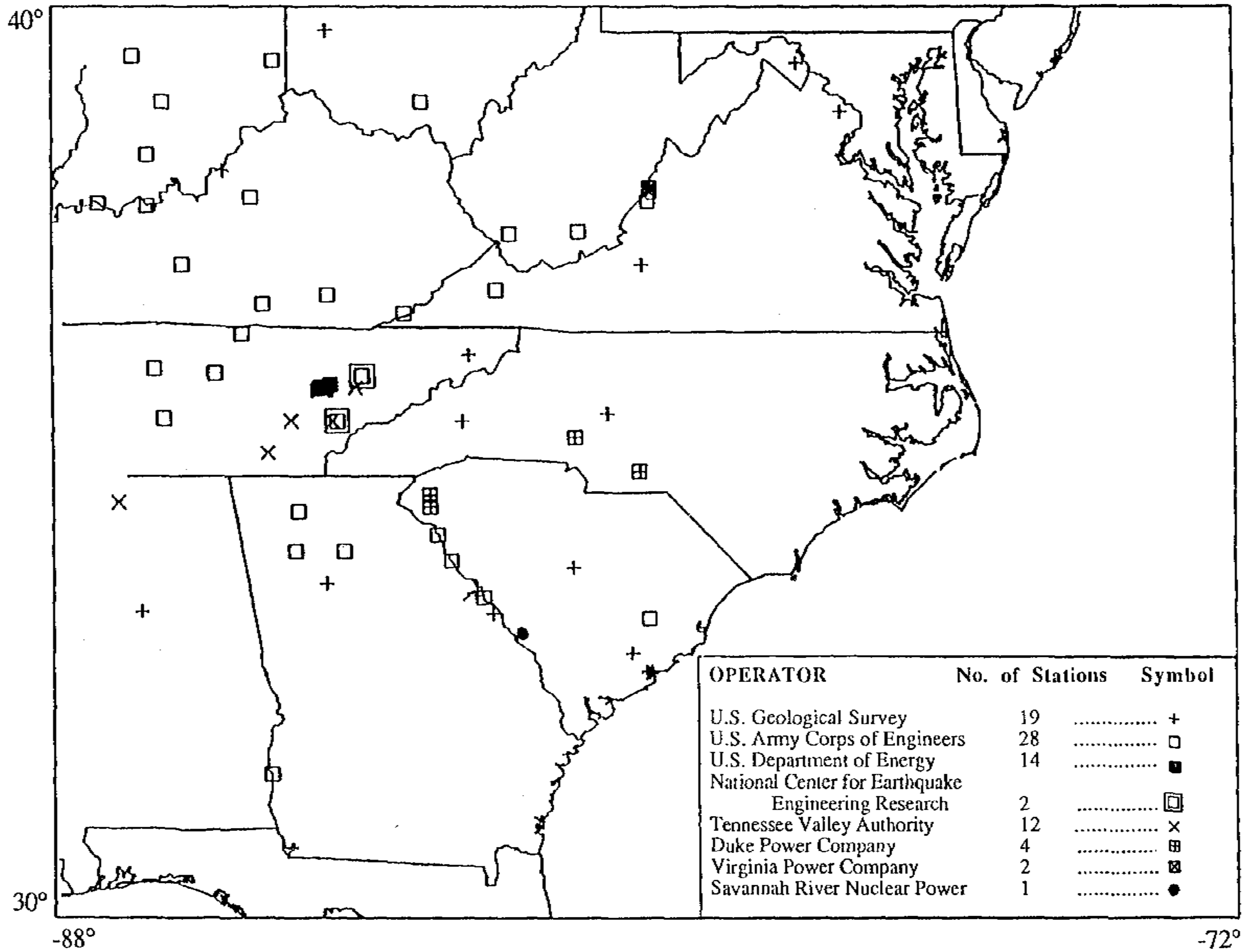

FIGURE 1-6 Strong Motion Stations in the Southern Appalachian Region

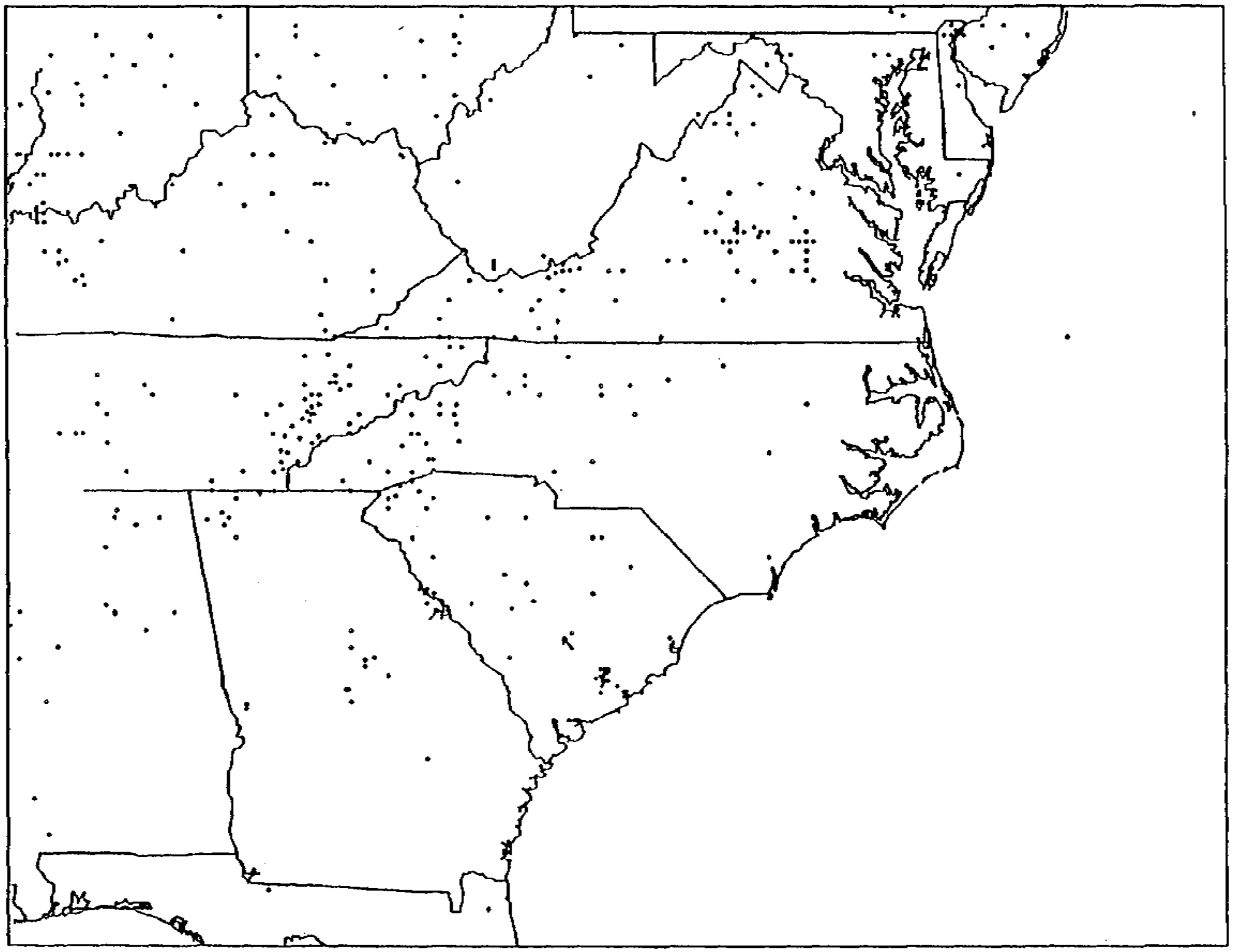

FIGURE 1-7 Seismicity in the Southern Appalachian Region from EPRI Earthquake Catalog

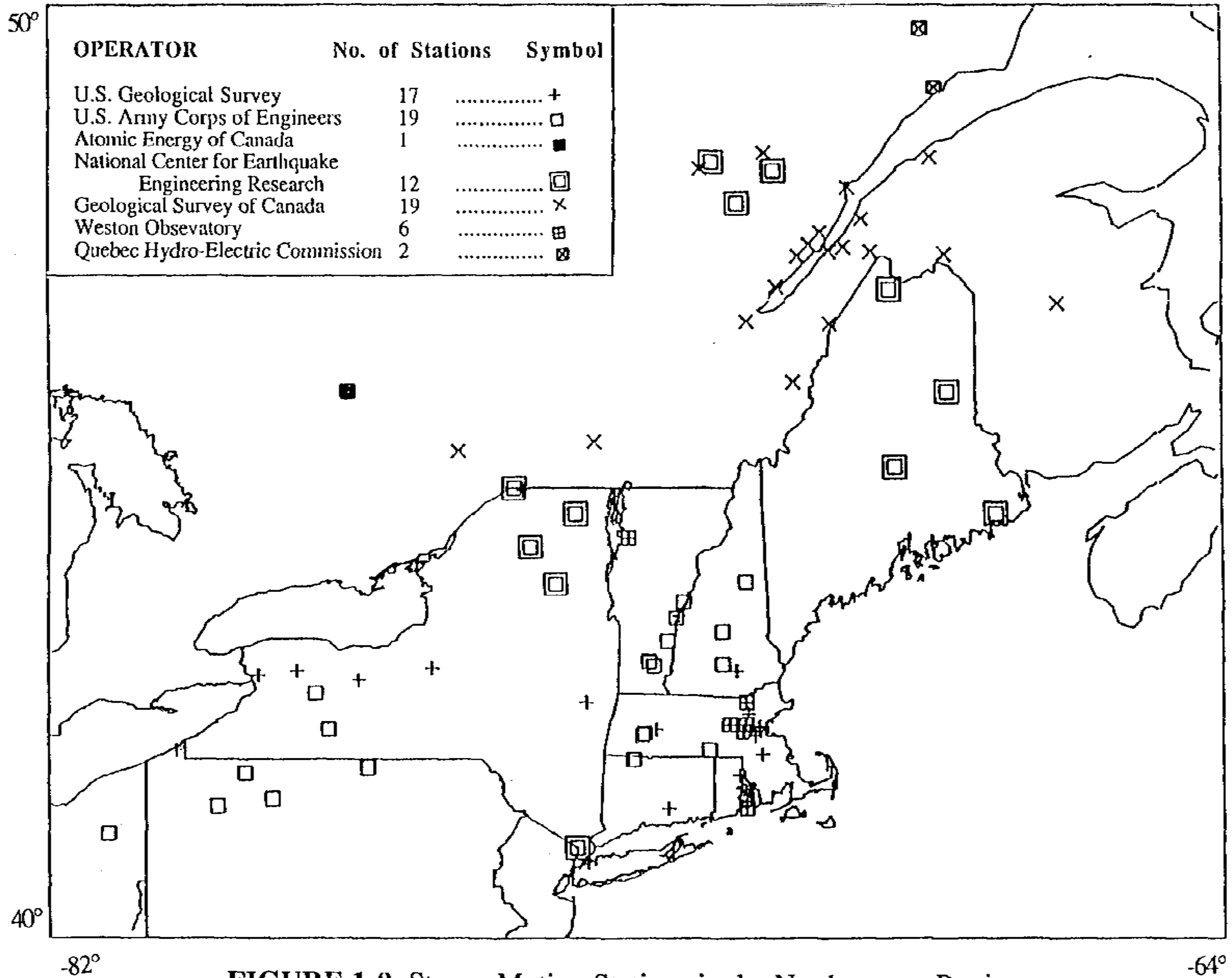

FIGURE 1-8 Strong Motion Stations in the Northeastern Region

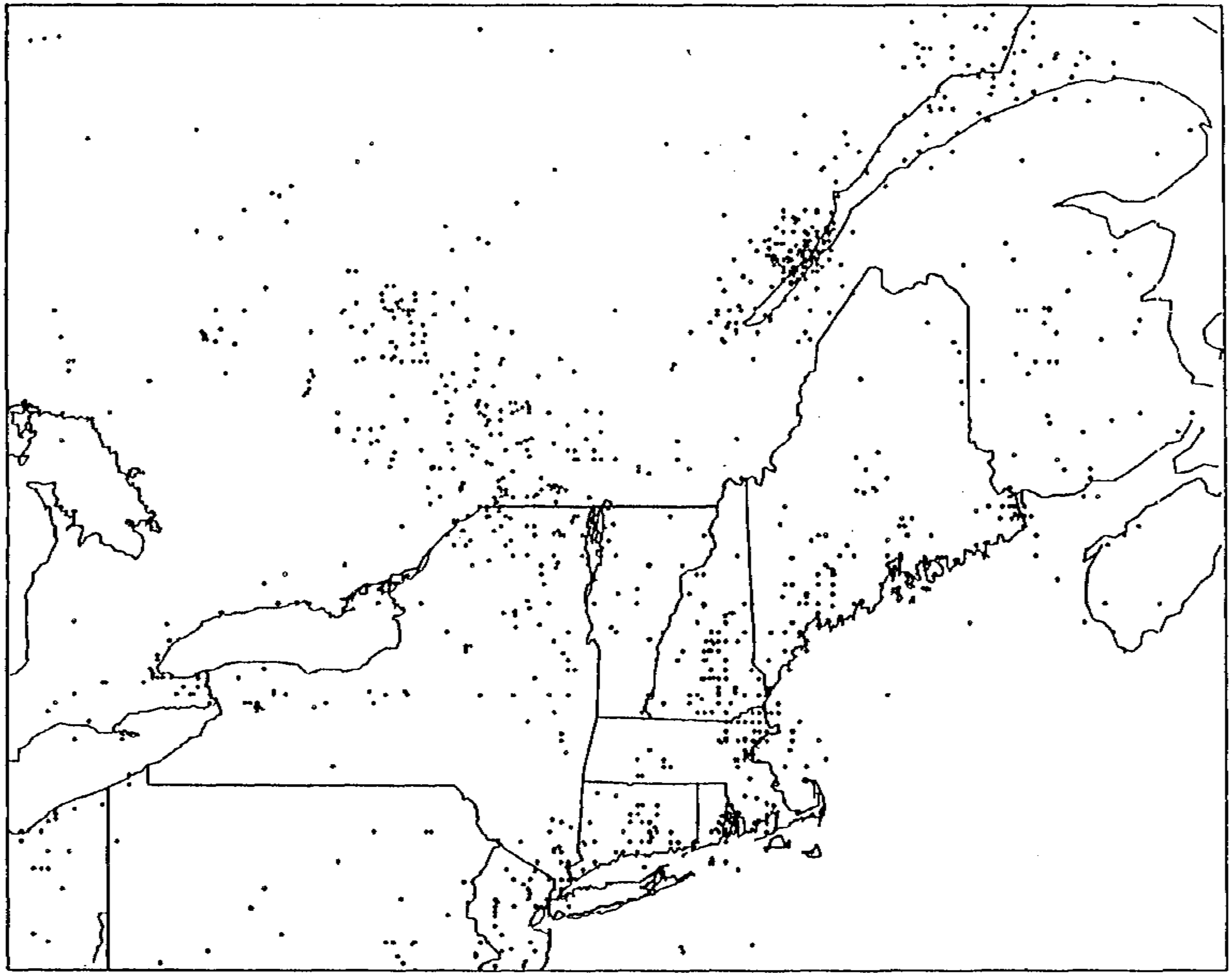

FIGURE 1-9 Seismicity in the Northeastern Region from the EPRI Earthquake Catalog

SECTION 2
CATALOG INFORMATION

2.1 Using the Catalog

The most common expected use of this catalog is to identify the strong-motion stations in the vicinity of a particular location either because an earthquake occurred there or a new station is to be installed and the location of other nearby recorders may contribute to the new site's selection. As a result, this catalog is organized geographically. The stations are in the following order;

1.) Alphabetically by state or province with Canadian stations following the U.S.
2.) North to south within the state or province.
3.) East to west within the state or province.
4.) By operator.

Each station is listed once. One inherent drawback in this method is the instrumenting of facilities which lie along state boundaries, notably dams. A computerized database search (e.g., by coordinates) does not suffer this limitation and is the preferred method for systematic retrieval of station information. The simplicity of a printed catalog is warranted, however, in the case of the occasionally interested observer who is willing to hunt around a little.

The entries and fields in this catalog are patterned after the U.S. Geological Survey Open File Report 81-664 [6]. Each field is described in detail in section 2.2. Some entries have special meanings. These include those left blank, the entry "none", and the entry "N/A". A blank entry means no information was supplied by the operator. The entry "none" as in the case for Timing Device indicates that there is no timing device at the station, whereas a blank means there may or may not be a timing device. N/A means the field does not apply and is rarely used. For example, an instrument measuring response spectra does not have a maximum acceleration in the context used here.

Once a station has been selected based on its location, further information about the station's capabilities and environment may be obtained from the rest of the fields in the catalog. Instrument, Timing Device, and Maximum Acceleration may be used to infer the capability of the instrument and the quality of data produced. Film-type recorders such as the Kinemetrics SMA-1 require a site visit to collect the data and considerable effort thereafter to produce a digital timeseries. Hence queries about the nature of the recorded motion on these instruments may take longer to answer. An accurate phase arrival time from a close-in onscale instrument may aid in the location of significant earthquakes. The Instrument Location, Site Geology, and Structure Type/Size may provide clues to possible influence of soil amplification, soil-structure interaction, or structural response on the recorded motion. Similar structures instrumented by different operators can also be identified through these fields.

An additional listing of all the stations in the catalog by their station code is provided in section 4.3. Digital time series often contain only the station code within the header of the file. This cross-reference list allows the user to find the complete catalog entry for this station from such an abbreviated reference.

When searching the catalog for possible sources of strong motion data from a particular earthquake, one must consider two factors. One is the acceleration levels produced at the recording instrument and the second is the triggering threshold of the recorder. If the acceleration level exceeds the threshold the recorder produces a timeseries. Triggering thresholds for most SMA-1 recorders are customarily set at 1% of the Max Acceleration or 0.01 g. Kinemetrics SSA-1 recorders are capable of reliable triggering at less than 0.001 g. Site conditions that contribute to many false triggers are much more of a problem for an instrument which cannot be refreshed easily. The instrument is often full to capacity or has a threshold set to a level rarely or never exceeded by earthquake related ground motion. Predicting the acceleration levels at a distance from a known earthquake is the subject of considerable study. An estimate may be obtained from the formula;

$$\log A = 3.49 + 0.54(M-6) - \log R - (0.00281)R \qquad (2.1)$$

where R is the hypocentral distance in kilometers, M is the Nuttli magnitude, and A is the peak ground acceleration in cm/sec/sec for an arbitrarily oriented horizontal component, valid for the range $4.5 < M < 7.5$ and $10 < R < 400$ km, [1]. Considerable variation in acceleration levels can result from azimuthally dependant radiation patterns related to the source mechanism, by local site conditions causing amplification in narrow frequency bands, by path dependant attenuation, or, in the case of structures, by soil-structure interaction and the structural response itself. Still, using the equation above and a default threshold of, say, 0.01 g, one can adequately search the catalog for stations that might produce a time series for a given magnitude and distance. Figure 2-1 shows the predicted acceleration levels from equation (2.1) for four different magnitudes of earthquakes. Also shown are the typical triggering thresholds of two strong motion instruments, the Kinemetrics SSA-1 used in the NCEER Digital Strong Motion Network and the Kinemetrics SMA-1 used by the U.S.G.S. and U.S. Army Corps of Engineers. A magnitude 4.5 earthquake would be expected to trigger SMA-1's within 40 km and SSA-1's within 170 km. In a source region like New Madrid where the annual number of earthquakes with magnitude greater than or equal to 4.5 is about 0.42, this would trigger a few SMA-1's but nearly all the SSA-1's in the region. On April 27, 1989 a magnitude 4.7 earthquake occurred near Blytheville AR. (36.05N 89.83W) triggering two SMA-1's and all functioning SSA-1's, including the one 170 km north.

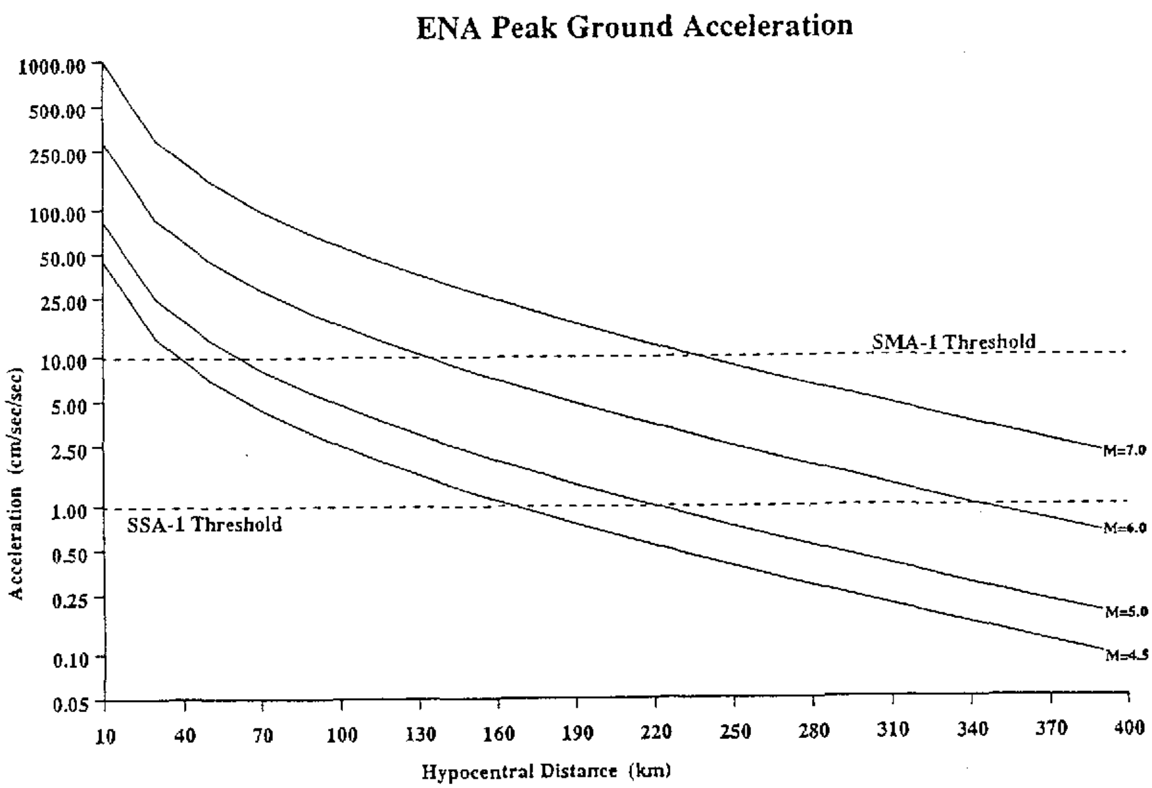

FIGURE 2-1 Predicted peak acceleration of a arbitrarily oriented horizontal component as a function of distance for earthquakes in Eastern North America having Nuttli magnitudes of 4.5, 5.0, 6.0, and 7.0 (after Atkinson and Boore, 1990). Also shown are typical triggering thresholds for two strong motion instruments made by Kinemetrics. Acceleration levels below the threshold do not result in a recorded time series.

2.2 Description of Fields

Location: The name of the prominent near-by town, dam, lake or river by which the station area is commonly known and any further information regarding the station's whereabouts that may be useful. Grouping of the stations by state has one notable drawback when facilities such as dams lie along state boundaries. In such cases, the state with the nearest sizable town is used.

Coordinates: The latitude and longitude of each station is given in decimal degrees. The elevation is given in meters.

Date Installed: The period for which this site was instrumented in the format MM/DD/YR or MM/YR or YEAR. The general form of this field is "installation date" TO "removal date" where TO PRESENT has been omitted. Stations which never produced any records are dropped from the catalog. Note that an instrument may be nonoperational during this period for any number of reasons. No attempt is made here to track station downtime.

Recording Instrument: The manufacturer, model, and, in parentheses, the number of recorders at this site. In some cases only the sensor is listed, when no information is provided as to how the data is recorded. See section 4.1.1 for a brief summary of the technical specifications for most of the instruments in this catalog.

Timing Device: Usually a device is supplied as optional equipment to the recorder which references the recorded time-series to an absolute or relative time. The accuracy of this time stamp varies considerably. Information on most of the timing devices can be found in section 4.1.2.

Max. Accel.: The peak acceleration which can be recorded onscale by this instrument. On some instruments this level can be changed readily, but in practice once a station has been established the selected value is not often changed. Note that typical triggering thresholds are 1% of the Max. Accel. for analog instruments and 0.1% for digital units.

Operator: The organization responsible for installation, maintenance and data collection of the station. Operators have different goals in mind when deploying strong-motion instruments and this plays a role in the type of data collected. Within each organization, the individual who is handling data requests is listed in section 4.2.

Station Code: The identification code used by the operator. It is included here to provide a convenient, unique reference when discussing this station, especially with the operator. Station Codes may not be unique from operator to operator since each organization has their own naming convention. Fortunately, in this catalog each Station Code is used once. Section 4.3 lists stations by Station Code for each operator.

Instrument Location(s): This provides a general description of where the recorders are found throughout a station. In the case of multichannel recording systems the sensor locations are given. In some cases the extent to which a structure is instrumented can be discerned. In others the conditions in the immediate vicinity of a recorder are noted.

Structure type/size: A brief description of the structure in which the instrument is contained or attached. This structure may contribute substantially to the recorded motion and is included here to indicate this possibility.

Site Geology: A description of the geology near the instruments or at least in the general region. A considerable range of sophistication is present throughout the entries in the catalog owing to the varying levels of expertise applied to collect this information.

2.3 Data Collection, Maintenance and Distribution

The data in this catalog was collected by distributing blank data entry forms to all known operators of strong motion instruments in Eastern North America and compiling the data as it has returned. The dataset was then distributed to all operators for their review and subsequently revised. This step has served to reduce the number of errors or omissions and to enhance the uniformity of responses to fields like "Timing Device" and "Site Geology." It is our intent to keep the catalog as current as possible by revising an online copy whenever new data is provided. Access to this active catalog is best obtained through a more general strong-motion database facility developed at Lamont under the auspices of the National Center for Earthquake Engineering Research (NCEER) by Paul Friberg and known as the NCEER Strong Motion Database [4]. Further updates of the catalog will be published in NCEER Technical Reports as the need arises. Electronic or printed versions of the active catalog can be produced on request. Electronic versions are distributed on floppy disks in a tab-separated ASCII format file which is readable by most of the popular database managers.

We are aware of some omissions in this catalog. these are mainly some of the operators of nuclear power plants and of large industrial facilities who have a few instruments at a site for code compliance. While we have made an effort to contact these operators, the marginal return has not led us to expend much additional effort where we did not receive responses. Our hope is that while we continue to be interested in their operations, they might become aware of this catalog and contribute their stations to it. As of press time, information has not been received from Dr. Frances Wu at SUNY Binghampton. Dr. Wu operates about six instruments in New York State.

SECTION 3

CATALOG OF STRONG MOTION STATIONS IN EASTERN NORTH AMERICA

Catalog printed April 3, 1990

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Alabama										
Browns Ferry Nuclear Plant Athens, AL.	34.70° N 87.12° W 158.2 M		Kinemetrics SMA-2	None	1 g	Tennessee Valley Authority	BFN	Base level	Nuclear Plant Unit 1 Reactor Building	Sound bedrock
Browns Ferry Nuclear Plant Athens, AL.	34.70° N 87.12° W 172.5 M		Kinemetrics SMA-2	None	1 g	Tennessee Valley Authority	BFN	Base level	Nuclear Plant Diesel Generator Building	Soil and crushed rock fill, approx. 40 feet thick
VA Hospital Birmingham, AL.	33.50° N 86.80° W M	3/24/73	Kinemetrics SMA-1	Internal 2 PPS time marks	1 g	Veteran's Administration / U.S. Geological Survey	2509 VBM	Basement	10-story building	
Coffeville Lock and Dam, AL.	31.757° N 88.128° W M		Kinemetrics SMA-1	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2540 CVD	Third level	Earth and gravity dam, height 27m	
Arkansas										
Norfork Dam, AR.	36.25° N 92.23° W M		Kinemetrics SMA-1 (2)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2401 NFD	Lower gallery, Crest	Concrete dam, height 71 m	Alluvium
Post Office Paragould, AR.	36.06° N 90.49° W M	7/13/78	Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2459 PRG	Basement	1-story building, concrete block	Alluvium
Fire Station Blytheville AR.	35.928° N 89.926° W M	10/22/77	Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2449 BLY	Ground Level	1-story building, steel frame	Alluvium
Lepanto, AR.	35.613° N 90.330° W M	7/12/78	Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2458 LEP	Ground Level	1-story building, concrete block	Alluvium

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Marked Tree, AR.	35.543° N 90.416° W M	9/6/84	Kinemetrics SMA-1 SER# 5557	Internal 2 PPS time marks	1 g	Center for Earthquake Research & Information		Outside garden shed with concrete floor slab	Single story residence	Quaternary alluvium
Post Office Corning, AR.	34.41° N 90.58° W M	10/19/77	Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2455 COR	Ground Level	1-story building, concrete block	Alluvium
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx						**Connecticut**		xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx		
Colebrook River, CT.	42.005° N 73.037° W M		Kinemetrics SMA-1 (2)			U.S. Army Corps of Engineers		Crest, abutment	Earth and rock dam, height 68m	
Conn Yankee Nuclear Power Plant. Haddam, CT.	41.46° N 72.52° W M		Kinemetrics SMA-1			U.S. Geological Survey / CYNP	2601 CYP	Basement	Power Plant	
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx						**Florida**		xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx		
Buckman Lock, FL.	28.51° N 81.71° W M		Kinemetrics SMA-1	Kinemetric TCG-1a	1 g	U. S. Army Corps of Engineers	2519 BKL	Basement	1-story Building	
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx						**Georgia**		xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx		
Carters Dam, GA.	34.613° N 84.685° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2535 CRD	Crest, abut, downstream	Earth and rock-fill dam, height 136m	
Hartwell Dam, GA.	34.34° N 82.81° W M		Kinemetrics SMA-1 (5)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2526 HWD	Crust, toe, abut, spillway, downstream	Concrete and earth dam, height 73m	

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Allatoona Dam, GA.	34.163° N 84.728° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2533 ALD	Crest, abut, lower gallery	Arch-gravity concrete dam, height 66m	
Buford Dam, GA.	34.160° N 84.074° W M		Kinemetrics SMA-1 (2)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2534 BUD	Crest, ground	Earth dam, height 70m	
Richard B. Russell Dam, GA.	34.054° N 82.622° W M		Kinemetrics SMA-1 (5), Geotech RFT-250 (1)	Kinemetric TCG-1a, ?	1 g	U.S. Army Corps of Engineers	2536 RRD		Concrete and earth dam, height 73m	
VA Hospital Atlanta, GA.	33.80° N 84.31° W M	4/14/75	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2531 VAT	Ground level	1-story building	
VA Hospital, Building 34 Augusta, GA.	33.47° N 82.05° W M	3/26/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2508 VAG	Basement	4-story building	Alluvium
Walter F. George Lock & Dam, GA.	31.627° N 85.063° W M		Kinemetrics SMA-1	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2537 GLD	Crest	Earth and gravity dam, height 45m	

Illinois

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Rend Lake, IL.	38.038° N 88.970° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2422 RLD	Crest, toe, spillway gallery	Earth and gravity dam, height 16m	
VA Hospital, Building 15 Marion, IL.	37.72° N 88.95° W M	5/14/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2411 VMN	Ground Level	1-story building	
Smithland Lock & Dam, IL.	37.164° N 88.433° W M		Kinemetrics SMA-1 (5)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2462 SML	Upper gallery (2), downstrem, Lower gallery, Free-field rock		

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Fire Station Cairo, IL.	37.003° N 89.173° W M	10/17/77	Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2451 CRO	Ground Level	1-story building	Alluvium
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX							**Indiana**	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX		
Cagles Mill Dam, IN.	39.486° N 86.916° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2464 CMD	Crest, abut, downstream	Earth dam, height 45m	
Brookville Dam, IN.	39.439° N 85.000° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2463 BVD	Crest, abut, downstream	Earth and rock-fill dam, height 55m	
Monroe Lake Dam, IN.	39.008° N 86.512° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2466 MLD	Crest, abut, downstream	Earth and rock-fill dam, height 28m	
Patoka Dam, IN.	38.433° N 86.708° W M		Kinemetrics SMA-1 (2)	Kinemetric TCG-1		U.S. Army Corps of Engineers	2468 PAD	Crest, abut	Earth and rock-fill dam, height 26m	
Newburg Lock and Dam, IN.	37.932° N 87.373° W M		Kinemetrics SMA-1 (2)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2467 NBD	Crest, gallery	Concrete dam, height 33m	
Cannelton Dam, IN.	37.900° N 86.704° W M		Kinemetrics SMA-1 (2)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2465 CLD	Crest, gallery	Concrete dam, height 47m	
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX							**Kansas**	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX		
Tuttle Creek Dam, KS.	39.25° N 96.60° W M		Kinemetrics SMA-1 (5)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2439 TCD	Abut, downstream, toe, crest, intake tower	Earth dam, height 47m	

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Milford Dam, KS.	39.07° N 96.90° W M		Kinemetrics SMA-1 (5)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2442 MDD	Abut, downstream, toe, crust, intake tower	Earth and rock-fill dam, height 43m	
Kanopolis Dam, KS.	38.602° N 97.986° W M		Kinemetrics SMA-1 (2)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2470 KND	Crest, abut	Rock-fill dam, height 39m	

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx Kentucky xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
VA Hospital Louisville, KY.	38.27° N 85.70° W M	5/15/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2412 VLV	Basement	9-story building	
Taylorsville Lake, KY.	38.008° N 85.317° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2478 TVD	Abutment, crest, downstream	Earth and rock-fill dam, height 44m	
Uniontown Lock and Dam, KY.	37.793° N 87.991° W M		Kinemetrics SMA-1 (2)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2469 UND	Crest, gallery	Concrete dam, height 16m	
Nolin Dam, KY.	37.277° N 86.247° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2471 NLD	Abut, crest, downstream	Earth and rock-fill dam, height 50m	
Shawnee Steam Plant Paducah, KY.	37.17° N 88.80° W 102.4 M	1/6/83	Kinemetrics FBA-3	None	1 g	Tennessee Valley Authority	SHF	Base level	Fossil Power Plant Control Building	unconsolidated sediments, approx 350 feet thick
Paducah Gaseous Diffusion Plant Paducah, KY.	37.122° N 88.808° W M	1982	Kinemetrics DSA-1		1 g	Martin Marietta Energy Systems for DOE		1-1st floor 1-2nd floor 1-roof (3 total)	2-story steel 1.065E6 sq. ft. (970' x 1098')	Approx. 400 ft of sediments overlying bedrock
Paducah Gaseous Diffusion Plant Paducah, KY.	37.116° N 88.810° W M	1982	Kinemetrics DSA-1		1 g	Martin Marietta Energy Systems for DOE		Ground-free field	Inside a heated enclosure on a cement pad in an open field	Approx. 400 ft. of sediments overlying bedrock

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Paducah Gaseous Diffusion Plant Paducah, KY.	37.115° N 88.808° W M	1982	Kinemetrics DSA-1		1 g	Martin Marietta Energy Systems for DOE		First floor	2-story steel 515,364 sq. ft. (804' x 642')	Approx. 400 ft. of sediments overlying bedrock
Paducah Gaseous Diffusion Plant Paducah, KY.	37.114° N 88.804° W M	1982	Kinemetrics DSA-1 (2)		1 g	Martin Marietta Energy Systems for DOE		1. first floor 2. On a column 37' 2" above first floor	1 story steel	Approx. 400 ft. of sediments overlying bedrock
Paducah Gaseous Diffusion Plant Paducah, KY.	37.113° N 88.811° W M	1982	Kinemetrics DSA-1		1 g	Martin Marietta Energy Systems for DOE		First floor	One story & basement Super reinforced concrete	Approx. 400 ft. of sediments overlying bedrock
Paducah Gaseous Diffusion Plant Paducah, KY.	37.111° N 88.813° W M	1982	Kinemetrics DSA-1		1 g	Martin Marietta Energy Systems for DOE		First floor	2 story reinforced office building	Approx. 400 ft. of sediments overlying bedrock
Barkley Dam, KY.	37.02° N 88.22° W M		Kinemetrics SMA-1 (6)	Kinemetric TCG-1a	1 g	U. S. Army Corps of Engineers	2427 BYD	Crest (2), abut, gallery, downstream, spillway	Earth and gravity dam, height 48m	
Wickliffe, KY.	36.971° N 89.092° W M	8/16/89	Kinemetrics SSA-1	Omega Receiver	0.25 g	University of Kentucky	WIKY		Free-field	clays and gravel
Laurel River Dam, KY.	36.961° N 84.268° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2437 LRD	Crest, abut, gallery powerhouse	Rock-fill dam, height 86m	
Wolf Creek Dam, KY.	36.869° N 85.146° W M		Kinemetrics SMA-1 (5)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2432 WCD	Crest, abut, downstream, spillway (2)	Earth and concrete dam, height 79m	
Martins Fork Dam, KY.	36.752° N 83.258° W M		Kinemetrics SMA-1 (4)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2475 MFD	Crest, downstream, gallery, abutment	Concrete dam, height 30m	
Western Kentucky	36.664° N 88.909° W M	3/88	Kinemetrics SSA-1/FBA-13DH		1 g	University of Kentucky	FMKY	Borehole installation	325 foot borehole	clay

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Mickman, KY.	36.551° N 89.183° W M	8/2/89	Kinemetrics SSA-1	Omega Receiver	0.25 g	University of Kentucky	MIKY	On concrete floor	One story concrete building	clays and gravel
Rough River Dam, KY.	35.619° N 86.501° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2472 RHD	Abut, crest, downstream	Earth and rock-fill dam, height 45m	
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx						**Maine**		xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx		
Dickey, ME.	47.1010° N 69.0819° W M	11/88	Kinemetrics SSA-1	Kinemetric TCG-1b	0.25 g	National Center for Earthquake Engineering Research / L-DGO	DCKY	Ground level	sensor on bedrock in an open field	bedrock, meta-sedimentary pelite
Island Falls, ME.	46.0306° N 68.2061° W M	11/88	Kinemetrics SSA-1	Kinemetric TCG-1b	0.125 g	National Center for Earthquake Engineering Research / L-DGO	ISFL	Ground level	Instrument on bedrock under plastic cover in open field	bedrock, granite
Milo, ME.	45.2444° N 69.0428° W 140 M	11/24/87	Kinemetrics SSA-1	Kinemetric TCG-1b	0.5 g	National Center for Earthquake Engineering Research / L-DGO	MIME	Ground level on a concrete pier adjacent to short period vertical seismometer.	Small aluminum hut	bedrock, meta-sedimentary phyllite
East Machias, ME.	44.7392° N 67.4894° W 20 M	11/23/87	Kinemetrics SSA-1	Kinemetric TCG-1b	0.5 g	National Center for Earthquake Engineering Research / L-DGO	EMME	Ground level on a concrete pier adjacent to short period vertical seismometer.	Small aluminum hut	bedrock, granitic syenite
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx						**Massachusetts**		xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx		
Lowell, MA.	42.6623° N 71.3023° W 46 M	5/11/88	Kinemetrics SMA-1	Internal 2 PPS	1 g	Weston Observatory of Boston College		Basement	70 year old house, 2.5 stories	bedrock
VA Hospital Bedford, MA.	42.51° N 71.28° W M	1/18/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2702 VBD	Basement	4-story Building	

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Hudson, MA.	42.3938° N 71.5428° W M	6/22/88	Kinemetrics SMA-1	Internal 2 PPS	1 g	Weston Observatory of Boston College		In garage	Garage	~30 M from Assabet river wetlands-soil overlying bedrock of Andover Granite
Weston, MA.	42.3847° N 71.3221° W 60 M	5/5/88	Kinemetrics SMA-1	Internal 2 PPS	1 g	Weston Observatory of Boston College		On pier with WWSSN long period instruments		bedrock
Tang Hall, MIT Cambridge, MA.	42.354° N 71.104° W M	9/22/75	Kinemetrics SMA-1 (3)	Internal 2 PPS	1 g	Massachusetts Institute of Technology/ U.S. Geological Survey	2620 MIT	Basement, twelfth, and twenty-fifth floors	24-story Building, reinforced concrete shearwall	Alluvium, more than 65 m
VA Hospital Northhampton, MA.	42.35° N 72.68° W M	1/26/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2606 VNH	Basement	2-story Building	Glacial till, more than 5 m
Jamaica Plains VA Hospital Boston, MA.	42.32° N 71.11° W M	2/4/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2610 VJP	Basement	17-story Building	
Natick, MA.	42.3075° N 71.3373° W 52 M	5/5/88	Kinemetrics SMA-1	Internal 2 PPS	1 g	Weston Observatory of Boston College		Basement	House	sand/rock (till?)
Knightville Dam, MA.	42.291° N 72.863° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2624 KVD	Crest, abut, downstream	Earth Dam, height 48m	
Littleville Dam, MA.	42.265° N 72.882° W M		Kinemetrics SMA-1 (1), Geotech RFT-250 (2)	Kinemetric TCG-1a, ?	1 g	U.S. Army Corps of Engineers	2625 LFD	Crest, abut, downstream	Earth and rock dam, height 50m	
West Roxbury VA Hospital Boston, MA.	42.26° N 71.17° W M	2/3/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2609 VWR	Basement	6-story Building	Alluvium, more than 180 m
Hodges Village Dam, MA.	42.117° N 71.880° W M	8/8/88	Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2623 HVD	Crest, abut, downstream	Earth Dam, height 17m	

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
VA Hospital Brockton, MA.	42.06° N 71.05° W M	1/31/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2608 VBR	Basement	8-story Building	Glacial soils
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx						**Mississippi**				xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Arkabutla Dam, MS.	34.75° N 90.12° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2444 AKD	Abut, toe, crest	Earth Dam, height 29m	
Sardis Dam, MS.	34.41° N 89.80° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2445 SRD	Abut, toe, crest	Earth Dam, height 36m	
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx						**Missouri**				xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
VA Hospital St. Louis, MO.	38.64° N 90.23° W M	5/10/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2408 VLU	Basement	10-story Building	
VA Hospital Jefferson Barracks, MO.	38.49° N 90.28° W M	5/9/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2407 VJB	Ground Level	1-story Building	
Harry S. Truman Dam, MO.	38.267° N 93.402° W M		Kinemetrics SMA-1 (2)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2473 HTD	Crest, abut	Earthfill dam, height 40m	
Dexter, MO.	37.796° N 89.966° W M	7/16/78	Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2457 DXT	Ground Level	1-story Building	Sedimentary rocks
Southwestern Bell hut CF 8616, Old Appleton, MO.	37.5722° N 89.6878° W 180 M	8/88	Kinemetrics SSA-1	Kinemtric TCG-1b	1 g	National Center for Earthquake Engineering Research / L-DGO	OLAP	Ground level on floor slab	Small cinder block hut 2m x 2m with concrete floor slab	<2 m soil overlying rock

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Magill Hall, MSU Cape Girardeau, MO.	37.31° N 89.52° W M	4/3/69	Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2403 CGU	Basement	2-story Building	
Clearwater dam, MO.	37.137° N 90.772° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers		Crest, abutment, downstream	Earth dam, height 46m	
Wappapello Dam, MO.	36.930° N 90.278° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2415 WPD	Crest, toe, spillway	Earth and rock dam, height 33m	
Fire Station Sikeston, MO.	36.883° N 89.580° W M	10/18/77	Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2453 SIK	Ground Level	1-story Building, Concrete block	Alluvium
VA Hospital Poplar Bluff, MO.	36.77° N 90.42° W M	5/11/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2409 VPB	Basement	6-story Building	
Twin Towers Apts 506 Hazel Poplar Bluff, MO.	36.76° N 90.40° W M	Removed	Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2419 PBT	Ground Level	14-story Building	
Southwestern Bell Hut CP 8531 Risco, MO.	36.5503° N 89.7736° W 85 M	8/88	Kinemetrics SSA-1	Kinemetric TCG-1b	0.25 g	National Center for Earthquake Engineering Research / L-DGO	RSCO	Ground level on floor slab	Small cinder block hut 2m x 2m with concrete floor slab	Unconsolidated sediments, middle of Mississippi Embayment
Noranda Alum Plant New Madrid, MO.	36.51° N 89.57° W M	2/29/72	Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2420 NMR	Ground Level	1-story Building	
Fire Station Campbell, MO.	36.494° N 90.075° W M	10/18/77	Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2454 CAM	Ground level	1-story Building, steel frame, concrete block wall	Sedimentary rocks
City Hall Gideon, MO.	36.454° N 89.919° W M	10/20/77	Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2456 GID	Ground Level	1-story Building	Alluvium

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Post Office Portageville, MO.	36.428° N 89.704° W M	10/18/77	Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2452 PGV	Ground Level	1-story Buiding, steel frame, concrete block walls	Alluvium

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx **Nebraska** xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Old Mill Area, Omaha, NE.	41.264° N 96.084° W M		Kinemetrics SMA-1	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2484 OMA	Ground		rock
Papillion Creek 20, NE.	41.2° N 96.1° W M		Kinemetrics SMA-1 (2)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers		Downstream, Crest	Earth dam, height 18m	
Papillion Creek 11, Cunningham Lake NE.	41.173° N 96.151° W M		Kinemetrics SMA-1 (2)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2486 PLD	Crest, downstream	Earth dam, height 20m	
Salt Creek Dam 18, Branched Oak NE.	40.9° N 96.9° W M		Kinemetrics SMA-1 (2)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers		Crest, downstream	Earth dam, height 17m	
Federal Building Lincoln, NE.	40.814° N 96.699° W M		Kinemetrics SMA-1	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2480 LFB	Basement		
Salt Creek Dam 2, Olive Creek, NE.	40.6° N 96.9° W M		Kinemetrics SMA-1 (2)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers		Crest, downstream	Earth dam, height 14m	
Salt Creek Dam 17, Holmes Lake NE.	40.5° N 96.3° W M		Kinemetrics SMA-1 (2)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers		Crest, downstream	Earth dam, height 21m	
Harlan County Dam, NE.	40.067° N 99.202° W M		Kinemetrics SMA-1 (2)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2474 HND	Crest, Gallery	Dam, earthfill embankment, height 32m	

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
New Hampshire										
Surry Mountain Dam, NH.	43.996° N 71.312° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2628 SYD	Crest, abut, downstream	Earth Dam, height 26m	
Franklin Falls Dam, NH.	43.447° N 71.660° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2627 FFD	Crest, abut, downstream	Earth dam, height 43m	
Everett Dam, NH.	43.092° N 71.660° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2626 EVD	Center crest, abut, downstream	Earth/rock-fill dam, height 35m	
VA Hospital Manchester, NH.	43.01° N 71.44° W M		Kinemetrics SMA-1			Veteran's Administration / U.S. Geological Survey	2603 VMA	Basement	6-story Building	Alluvium, 6 m; granite
New York										
Barnhart Island Massena, NY.	44.9983° N 74.8472° W 66 M	11/7/87	Kinemetrics SSA-1	Kinemetric TCG-1b	0.5 g	National Center for Earthquake Engineering Research / L-DGO	MSNA	2.3 meters below grade inside concrete vault	Buried concrete vault 4m x 4m	50 feet of silty clay on bedrock. Chazy formation.
Massena International Bridge Massena, NY.	44.988° N 74.739° W M	10/6/76	Kinemetrics SMA-1 (2)	Internal 2 PPS	1 g	U.S. Geological Survey	2622 MIB	Ground level and base of bridge pier	Concrete & Steel Bridge	
Lyon Mountain, NY.	44.7264° N 73.9111° W 536 M	11/6/87	Kinemetrics SSA-1	Kinemetric TCG-1b	0.5 g	National Center for Earthquake Engineering Research / L-DGO	LYON	Ground level directly on rock	Three story wood frame school building without floor slab.	rock outcrop, pyroxene hornblende granitic gneiss
Tupper Lake, NY.	44.3778° N 74.6050° W 463 M	9/24/87	Kinemetrics SSA-1	Kinemetric TCG-1b	0.5 g	National Center for Earthquake Engineering Research / L-DGO	JORD	Basement level with concrete floor	Two story log building	20 meters sediment on top of bedrock, (Hornblende biotite gneiss)

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Newcomb, NY.	43.9708° N 74.2236° W 524 M	11/07/87	Kinemetrics SSA-1	Kinemetric TCG-1b	0.5 g	National Center for Earthquake Engineering Research / L-DGO	NEWC	Ground level free-field. Adjacent to three component seismometer.	Field cover over instrument bolted directly to rock	Exposed bedrock, (calcsilicates, grenville marble)
VA Hospital Syracuse, NY.	43.04° N 76.13° W M	5/17/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2613 VSY	Basement	9-story Building	Alluvium, 3 m; limestone
VA Hospital Batavia, NY.	43.01° N 78.20° W M	5/13/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2611 VBA	Ground Level	4-story Building	Glacial till, more than 3 m
VA Hospital Buffalo, NY.	42.95° N 78.81° W M	5/22/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2615 VBU	Basement	11-story Building	Limestone
VA Hospital Canandaigua, NY.	42.90° N 77.27° W M	5/16/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2612 VCA	Basement	3-story Building	Alluvium
Mt Morris Dam, NY.	42.75° N 77.91° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2621 MMD	Abut, crest, gallery	Concrete Dam, (gravity) height 75m	
VA Hospital Albany, NY.	42.65° N 73.77° W M	1/24/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2605 VAY	Basement	11-story Building	Glacial till, 24 m; shale
Arkport Dam, NY.	42.397° N 77.716° W M	Removed	Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2640 RPD	Crest, abut, downstream	Earth dam, height 36m	
Almond Lake Dam, NY.	42.342° N 77.702° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers		Downstream, free-field, crest	Earth Dam, height 27m	
Palisades, NY.	41.0042° N 73.9092° W 91 M	10/13/87	Kinemetrics SSA-1	Kinemetric TCG-1b	0.125 g	National Center for Earthquake Engineering Research / L-DGO	PAL	Ground level on concrete pier adjacent to WWSSN and various other seismometers	Low-lying rock wall vault 10m x 10m	Triassic Diabase

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
						North Carolina				
VA Hospital Salisbury, NC.	35.68° N 80.49° W M	3/7/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2506 VSA	Basement	5-story Building	
VA Hospital Oteen, NC.	35.59° N 82.48° W M	3/29/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2510 VOT	Basement	5-story Building	
						North Dakota				
Garrison Dam & Power Plant, ND.	47.50° N 101.43° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2235 GRD	Crest, downstream, basement	Earth and gravel Dam, height 62m. Power Plant	
						Ohio				
Kirwan Dam, OH.	41.149° N 81.080° W M		Kinemetrics SMA-1	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2476 KRD	Crest	Earthfill Dam, height 25m	
VA Hospital Building 28 Dayton, OH.	39.74° N 84.27° W M	10/23/78	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2414 VDY	Ground Level	1-story Building	
Portsmouth Gaseous Diffusion Plant Portsmouth OH	39.010° N 82.998° W M	1982	Kinemetrics DSA-1		1 g	Martin Marietta Energy Systems for DOE		Ground level- free field	Inside a heated enclosure on a cement pad in an open field	Approx. 20' glacial outwash sediments overlying bedrock
Portsmouth Gaseous Diffusion Plant Portsmouth OH	39.010° N 82.998° W M	1982	Kinemetrics DSA-1		1 g	Martin Marietta Energy Systems for DOE		1-basement 1-1st floor (2-total)	1 story & basement super reinforced concrete	Approx. 20' glacial outwash sediments overlying bedrock

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Portsmouth Gaseous Diffusion Plant Portsmouth OH	39.009° N 83.001° W M	1982	Kinemetrics DSA-1 (3)		1 g	Martin Marietta Energy Systems for DOE		1-first floor 1-2nd floor 1-roof in penthouse	2 story & Penthouse Steel & reinforced concrete	Approx. 20' glacial outwash sediments overlying bedrock
Portsmouth Gaseous Diffusion Plant Portsmouth OH	39.009° N 83.001° W M	1982	Kinemetrics DSA-1		1 g	Martin Marietta Energy Systems for DOE		Ground level- free field	Inside a heated enclosure on a cement pad in an open field	Approx. 20' glacial outwash sediments overlying bedrock

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx **Oklahoma** xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Kaw Dam, OK.	36.42° N 95.55° W M		Kinemetrics SMA-1 (2)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2447 KWD	Spillway (2)	Earth Dam	
VA Hospital Oklahoma City, OK.	35.48° N 97.49° W M	5/8/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2406 VOC	Basement	10-story building	

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx **Pennsylvania** xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
VA Hospital Erie, PA.	42.10° N 80.06° W M	5/21/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2614 VER	Basement	8-story Building	
Tioga-Hammond Lakes, PA.	41.902° N 77.128° W M		Kinemetrics SMA-1 (2)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers		Abutment, downstream	Earth/rock-fill Dam, height 43/37m	
Kinzua, Allegheny Res. Dam, PA.	41.840° N 79.003° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2633 KZD	Crest, toe, earth crest	Concrete dam with earth wing, height 55m	
East Branch Clarion River Dam, PA.	41.562° N 78.594° W M		Kinemetrics SMA-1	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2635 EBD	Crest	Earth Dam, height 56m	

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Tionesta Dam, PA.	41.476° N 79.437° W M		Kinemetrics SMA-1	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2634 TSD	Slope	Earth dam, height 47m	

Rhode Island

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
VA Hospital Providence, RI.	41.83° N 71.43° W M	1/30/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2607 VPR	Basement	7-story Building	Glacial deposits
Newport, RI.	41.45° N 71.33° W M		Kinemetrics SMA-1	Internal 2 PPS	1 g	Weston Observatory of Boston College		Basement	House	

South Carolina

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
McGuire Nuclear Station, Cornelius SC.	35.433° N 80.949° W M	1981	Kinemetrics SMA-3 (2)		1 g	Duke Power Company		Basement (below ground level)	Large reinforced concrete reactor building	Building founded on bedrock
Catawba Nuclear Station, Clover SC.	35.051° N 81.069° W M	1984	Kinemetrics SMA-3 (2)		1 g	Duke Power Company		Basement (below ground level)	Large reinforced concrete reactor building	Building founded on bedrock
Oconee Nuclear Station, Seneca SC.	34.794° N 82.899° W M		Kinemetrics SMA-3 (2)		1 g	Duke Power Company		Basement (below ground level)	Large reinforced concrete and prestressed concrete reactor building	Building founded on bedrock
Jocasse Hydro Station, Pickens SC.	34.659° N 82.915° W M	1980	Kinemetrics SMA-1 (3)	Kinemetric TCG-1	1 g	Duke Power Company		One outside powerhouse, one in switchyard, one at crest of dam	Rock filled dam	Instruments on small concrete slab
Monticello Dam, SC.	34.304° N 81.333° W M	Removed	Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2532 MTD	Downstream, abut		

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
VA Hospital Building 100 Columbia, SC.	33.98° N 80.96° W M	2/20/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2505 VCO	Ground Level	6-story Building	
Strom Thurmond Dam, SC.	33.65° N 82.19° W M		Kinemetrics SMA-1 (6)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2524 CKD	Toe, crest, powerhouse,downstream (2), gallery, spillway	Earth and concrete dam, height 61m	
Mason Hall, OSU Orangeburg, SC.	33.46° N 80.94° W M	Removed	Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2522 ORB	Ground Level	1-story Building	
St. Stephens, Cooper River Rediversion, SC.	33.423° N 79.925° W M		Kinemetrics SMA-1 (4)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers		Abutment, crest (powerhouse), gallery, free-field	Earth and gravity dam, height 39m	
Savannah River Nuclear Power Plant, SC.	33.25° N 81.68° W M					Savannah River Nuclear Power Plant	2501 SRN	Ground, -40 & +66	Power Plant	
National Guard Armory Summerville, SC.	33.03° N 80.18° W M	7/31/80	Kinemetrics SMA-1 ser. # 595	Internal 2 PPS	1 g	U.S. Geological Survey	2538 SVA	Ground Level	1-story Building	
Middleton Gardens, SC.	32.895° N 80.135° W M	Removed	Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2539 MGA	Ground Level	1-story Building	
Fire Station 3 Highway 61 & Ashley Charleston, SC.	32.8° N 79.9° W M	1/27/83	Kinemetrics SMA-1 ser # 2543	2 pps	1 g	U.S. Geological Survey		Ground level	one story woodframe	alluvium
Omni Hotel Charleston Place 130 Market St. Charleston, SC.	32.8° N 79.9° W M	12/12/86	Kinemetrics SMA-1 ser # 320	2 pps	1 g	U.S. Geological Survey		Ground level- free field	Small box 200 ft. from building	
Omni Hotel Charleston Place 130 Market St. Charleston, SC.	32.8° N 79.9° W M	12/12/86	Kinemetrics CRA-1 ser # 294			U.S. Geological Survey		Sensors at E, Ctr, W of ground, fourth and eighth floors	8-story reinforced concrete	

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Citadel College Charleston, SC.	32.798° N 79.960° W M	5/15/72	Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2521 CCC	Ground Level	1-story Building	
VA Hospital Motor Pool Shop Charleston, SC.	32.79° N 79.95° W M		Kinemetrics SMA-1			Veteran's Administration / U.S. Geological Survey	2520 CMP	Ground Level	1-story Building	
VA Hospital Building I Charleston, SC.	32.788° N 79.954° W M	2/15/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2504 VCH	6th Level	5-story Building	

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx **South Dakota** xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Oahe Dam, SD.	44.450° N 100.386° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2231 OHD	Crest, abut, downstream	Earth Dam, height 75m	
Big Bend Dam, SD.	44.04° N 99.45° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2243 BBD	Crest, spillway, downstream	Earth Dam, height 29m	
Fort Randall Dam, SD.	43.07° N 98.56° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2233 FRD	Crest, spillway, downstream	Earth Dam, concrete spillway, height 50m	
Gavins Point Dam, SD.	42.846° N 97.482° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2237 GPD	Crest, spillway, downstream	Earth Dam, height 23m	

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx **Tennessee** xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
VA Hospital Memphis, TN.	37.14° N 90.03° W M	5/12/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2410 VMS	Basement	15-story Building	

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Dale Hollow Dam, TN.	36.538° N 85.451° W M		Kinemetrics SMA-1 (4)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2436 DHD	Crest, abut, gallery, downstream	Concrete gravity dam, height 61m	
Fire Station Union City, TN.	36.426° N 89.061° W M		Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2450 UNC	Ground Level	1-story Building concrete block	
Reelfoot Lake Tiptonville, TN.	36.37° N 89.41° W M	12/5/75	Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2446 TVL	Ground Level	1-story Building	
National Guard Armory Tiptonville, TN.	36.37° N 89.43° W M	Removed	Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2404 TIP	Ground Level	1-story Building	
South Central Bell CDO Hornbeak, TN.	36.3325° N 89.2958° W 140 M	8/88	Kinemetrics SSA-1	Kinemetric TCG-1b	0.25 g	National Center for Earthquake Engineering Research / L-DGO	HNBK	Ground level	Inside partially buried steel field box. Presumably free-field.	Clay type soil
VA Hospital, Building 52 Mountain Home TN.	36.31° N 82.37° W M	3/9/74	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2405 VMH	Basement	2-story Building	
South Central Bell CDO Ridgely, TN.	36.2642° N 89.4806° W 87 M	8/88	Kinemetrics SSA-1	Kinemetric TCG-1b	0.25 g	National Center for Earthquake Engineering Research / L-DGO	RIDG	Ground level	Inside partially buried steel field box. Presumably free-field.	Unconsolidated sediments in the Mississippi Embayment.
Obion, TN.	36.259° N 89.192° W M	7/15/78	Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2460 OBN	Ground Level	1-story Building	
J. Percy Priest Dam, TN.	36.15° N 86.61° W M		Kinemetrics SMA-1 (5)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2430 PPD	Abut, crest, downstream, spillway (2)	Earth and concrete dam, height 40m	
Center Hill Dam, TN.	36.098° N 85.827° W M		Kinemetrics SMA-1 (5)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2434 CHD	Abut, crest, downstream, spillway (2)	Earth and concrete dam, height 76m	

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Corryton TN.	36.080° N 83.800° W 354 M	5/2/89	Kinemetrics SSA-1	Kinemetric TCG-1b	0.25 g	National Center for Earthquake Engineering Research /L-DGO	OUSL	Instrument bolted directly to rock in open field	None	Limestone outcrop
Dyersburg, TN.	36.05° N 89.39° W M		Kinemetrics SMA-1	Internal 2 PPS	1 g	U.S. Geological Survey	2461 DYR	Ground Level	1-story Building	
Y-12 Plant Oak Ridge, TN.	35.987° N 84.261° W M	1982	Kinemetrics DSA-1		1 g	Martin Marietta Energy Systems for DOE		1st floor, effectively free field	1-story wood frame	
Y-12 Plant Oak Ridge, TN.	35.986° N 84.258° W M	1982	Kinemetrics DSA-1		1 g	Martin Marietta Energy Systems for DOE		1st floor & 2nd floor (2 total)	2-story steel with masonry walls	
Y-12 Plant Oak Ridge, TN.	35.985° N 84.260° W M	1982	Kinemetrics DSA-1		1 g	Martin Marietta Energy Systems for DOE		1st floor & 3rd floor (2 total)	3-story reinforced concrete	
Liberty Building Knoxville, TN.	35.96° N 83.92° W M	12/5/84	Kinemetrics FBA-3	None	1 g	Tennessee Valley Authority	LBK	Basement	2-story building with basement.	residuum, thickness uncertain
Oak Ridge Gaseous Diffusion Plant Oak Ridge, TN.	35.941° N 84.387° W M	1982	Kinemetrics DSA-1		1 g	Martin Marietta Energy Systems for DOE		Ground - free field	Very small pre-fab metal enclosure with slab on grade	limestone/dolomite bedrock
Oak Ridge Gaseous Diffusion Plant Oak Ridge, TN.	35.939° N 84.404° W M	1982	Kinemetrics DSA-1		1 g	Martin Marietta Energy Systems for DOE		1-1st floor 1-2nd floor 1-roof (3 total)	2-story steel with 1.42E6 sq. ft. (980' x 1450')	limestone/dolomite bedrock
Oak Ridge National Laboratory Oak Ridge, TN.	35.932° N 84.307° W M	1982	Kinemetrics DSA-1		1 g	Martin Marietta Energy Systems for DOE		1st floor	2-story steel frame with concrete floors & block walls	clay soil approx 20' average depth overlies limestone/dolmite bedrock
Oak Ridge Gaseous Diffusion Plant Oak Ridge, TN.	35.931° N 84.394° W M	1982	Kinemetrics DSA-1		1 g	Martin Marietta Energy Systems for DOE		1-1st floor 1-2nd floor (2 total)	2-story precast concrete	limestone/dolomite bedrock

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Oak Ridge Gaseous Diffusion Plant Oak Ridge, TN.	35.931° N 84.397° W M	1982	Kinemetrics DSA-1		1 g	Martin Marietta Energy Systems for DOE		1st floor	2-story steel 520' x 550'	limestone/dolomite bedrock
Oak Ridge National Laboratory Oak Ridge, TN.	35.928° N 84.317° W M	12/1985	Kinemetrics DSA-1		1 g	Martin Marietta Energy Systems for DOE		Basement	Steel frame with metal siding	
Oak Ridge National Laboratory Oak Ridge, TN.	35.918° N 84.304° W M	1982	Kinemetrics DSA-1		1 g	Martin Marietta Energy Systems for DOE		1st floor	5-story & basement reinforced concrete frame. High Flux Isotope Reactor	clay soil approx. 20' average depth overlies limestone/dolmite bedrock
Alcoa, TN.	35.795° N 83.971° W M	1/84 to 8/89	Kinemetrics SMA-1 SER# 5558	Internal 2 PPS time marks	1 g	Center for Earthquake Research & Information		Basement, Isolated from weak concrete floor slab, 36 inch deep trapzoidal pier	2 story residence	thin red clay residuum near ordivician limestone soil depth <1M
Greenback TN.	35.610° N 84.149° W 286 M	5/3/89	Kinemetrics SSA-1	Kinemetric TCG-1b	0.25 g	National Center for Earthquake Engineering Research / L-DGO	GNBK	Sensor buried 0.3m in soil	None	
Vonore, TN.	35.60° N 84.23° W M	11/25/83	Kinemetrics FBA-3	None	1 g	Tennessee Valley Authority	VNT	Base level	1-story building, abandoned lab	residuum, probably less than 10 feet thick
Watts Bar Nuclear Plant Spring City TN	35.60° N 84.79° W 214.3 M	1985	Kinemetrics FBA-3	None	1 g	Tennessee Valley Authority	WBN	Base level	Nuclear Plant Unit 1, Reactor Building	sound bedrock
Watts Bar Nuclear Plant Spring City TN	35.60° N 84.79° W 214.3 M	1985	Engdahl PSR 1200-H/V-12A	None	N/A	Tennessee Valley Authority	WBN	Base level	Nuclear Plant Unit 1, Reactor Building	sound bedrock
Watts Bar Nuclear Plant Spring City TN	35.60° N 84.79° W 226.2 M	1985	Kinemetrics FBA-3	None	1 g	Tennessee Valley Authority	WBN	Base level	Nuclear Plant Diesel Generator Building	in situ gravel / crushed rock fill, approx. 30 feet
Watts Bar Nuclear Plant Spring City TN	35.60° N 84.79° W 226.2 M	1985	Engdahl PSR 1200-H/V	None	N/A	Tennessee Valley Authority	WBN	Base level	Nuclear Plant Diesel Generator Building	in situ gravel / crushed rock fill, approx. 30 feet thick

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Sequoyah Nuclear Plant Daisy, TN.	35.23° N 85.09° W 207.3 M	1980	Kinemetrics FBA-3	None	1 g	Tennessee Valley Authority	SQN	Base level	Nuclear Plant Unit 1, Reactor Building	sound bedrock
Sequoyah Nuclear Plant Daisy, TN.	35.23° N 85.09° W 207.3 M	1980	Engdahl PSR 1200-H/V-4A	None	N/A	Tennessee Valley Authority	SQN	Base level	Nuclear Plant Unit 1, Reactor Building	sound bedrock
Sequoyah Nuclear Plant Daisy, TN.	35.23° N 85.09° W 220.1 M	1980	Kinemetrics SMA-2	None	1 g	Tennessee Valley Authority	SQN	Base level	Nuclear Plant Diesel Generator Building	alluvium / residuum, between 45-80 feet thick
Sequoyah Nuclear Plant Daisy, TN.	35.23° N 85.09° W 220.1 M	1980	Engdahl PSR 1200-H/V	None	N/A	Tennessee Valley Authority	SQN	Base level	Nuclear Plant Diesel Generator Building	alluvium / residuum, between 45-80 feet thick
Memphis, TN.	35.122° N 89.934° W 93 M	9/83	Kinemetrics SMA-1 Ser# 5559	Internal 2 PPS time marks	1 g	Center for Earthquake Research & Information		Basement, Concrete floor slab, adjacent to long period seismometer pier	Single story residence	Pleistocene loess
Allen Steam Plant Memphis, TN.	35.07° N 90.15° W 61.9 M	1/5/83	Kinemetrics FBA-3	None	1 g	Tennessee Valley Authority	ALF	Base level	Fossil Power Plant Main Power House Building	unconsolidated sediments, Middle Mississippi Embayment

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Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Essex Junction, VT.	44.4878° N 73.1037° W M	8/4/84	Kinemetrics SMA-1	Internal 2 PPS	1 g	Weston Observatory of Boston College		Basement	House	
Union Village Dam, VT.	43.772° N 72.257° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2632 UVD	Crest, abut, downstream	Earth gravity dam, height 52m	
VA Hospital White River Junction, VT.	43.63° N 72.33° W M	1/22/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2604 VWT	Basement	3-story Building	Glacial till

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
North Hartland Dam, VT.	43.604° N 72.361° W M		Kinemetrics SMA-1 (2)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2629 NHD	Crest, abut	Earth Dam, height 37m	
North Springfield Dam, VT.	43.338° N 72.511° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2630 NSD	Crest, abut, downstream	Earth gravity dam, height 57m	
Ball Mountain Dam, VT.	43.12° N 72.78° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2617 BMD	Abut, crest, downstream	Earth and rock dam, height 81m	
Townshend Dam, VT.	43.055° N 72.706° W M		Kinemetrics SMA-1 (3)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2631 TWD	Crest, abut, downstream	Earth Dam, height 41m	
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116 N. Johnson Road, Sterling, VA.	38.9° N 77.3° W M	6/2/88	Kinemetrics SMA-1 ser # 4218	Internal 2 pps	1 g	U.S. Geological Survey		Basement	2 story woodframe house	
Bath County Pumped Storage Upper Dam Mtn Grove VA.	38.1° N 79.9° W M	10/1/84	Kinemetrics SMA-1 (3)	WWV Receiver	1 g	Virginia Power	A101 A102 A103	Crest, Toe, Left or East Abutment	Earth and rockfill embankment dam, 460 feet high 2200 feet long	Instruments on Clay core of Upper dam, alluvium, and rock.
Bath County Pumped Storage Lower Dam Mtn. Grove VA.	38.05° N 79.9° W M	10/1/84	Kinemetrics SMA-1 (3)	WWV Receiver	1 g	Virginia Power	A201 A202 A203	Crest, Toe, Left or East Abutment	Earth and rockfill embankment dam, 145 feet high 2400 feet long	Instruments on Clay core of Lower dam, alluvium, and rock.
Gathright Dam, VA.	37.955° N 79.952° W M		Kinemetrics SMA-1 (4)	Kinemetric TCG-1a	1 g	U.S. Army Corps of Engineers	2528 GAD	Crest, downstream, control tower (2)	Earth/rock-fill Dam, height 78m	
VA Hospital Salem, VA.	37.27° N 80.02° W M	3/8/73	Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2507 VSM	Basement	5-story Building	

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
J. W. Flannagan, VA.	37..233° N 82..345° W M	1985	Terra Technology DCA-333 (3)			U.S. Army Corps of Engineers		Downstream, tower, crest	Earth and rock-fill dam, height 76m	
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx						**West Virginia**			xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	
VA Hospital Building 218 Martinsburg, WV.	39.41° N 77.91° W M		Kinemetrics SMA-1	Internal 2 PPS	1 g	Veteran's Administration / U.S. Geological Survey	2511 VMB	Basement	1-story building	Sandstone
Bluestone Lake, WV.	37.640° N 80.887° W M	1985	Terra Technology DCA-333 (2)			U.S. Army Corps of Engineers		Pier / crest, downstream	Concrete Dam, height 50m	
R. D. Bailey Lake, WV.	37.592° N 81.822° W M	1985	Terra Technology DCA-333 (4)			U.S. Army Corps of Engineers		Tower, crest, toe, downstream	Rock-fill dam, height 94m	
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx						**New Brunswick**			xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	
Edmundston, N.B.	47.462° N 68.241° W M	8/84	Kinemetrics SMA-1	Kinemetric TCG-1b	1 g	Geological Survey of Canada		Ground Level	Above ground seismic vault.	bedrock
Mitchell Lake Miramichi, N.B.	47.034° N 66.612° W M	2/82 to 6/85	Kinemetrics SMA-1	Kinemetric TCG-1a	1 g	Geological Survey of Canada		Ground Level	Above ground seismic vault.	bedrock
Hickey Lakes Miramichi, N.B.	47.006° N 66.547° W M	6/82 to 6/85	Kinemetrics SMA-1	Kinemetric TCG-1a	1 g	Geological Survey of Canada		Ground Level	Above ground seismic vault.	bedrock
"Loggie Lodge II" Miramichi, N.B.	46.973° N 66.530° W M	10/86	Kinemetrics SMA-1	Kinemetric TCG-1a	1 g	Geological Survey of Canada		Ground Level	Above ground seismic vault.	bedrock

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Holmes Lake Miramichi, N.B.	46.946° N 66.595° W M	2/82 to 6/85	Kinemetrics SMA-1	Kinemetric TCG-1a	1 g	Geological Survey of Canada		Ground Level	Above ground seismic vault.	bedrock

Ontario

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Chalk River Reactor Building, Ont.	46.05° N 77.38° W M					Atomic Energy of Canada, Ltd.	202	Basement	Reactor Building, steel frame	bedrock
EPB Building #7 Ottawa, Ont.	45.394° N 75.717° W M	8/84	Kinemetrics SMA-1		0.5 g	Geological Survey of Canada		Instrument on concrete pier.	Underground seismic vault.	bedrock

Quebec

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Daniel Johnson Dam, Baie Comeau Que.	50.67° N 68.73° W M	6/74	Kinemetrics SMA-1 (6)		0.5 g	Quebec Hydro-Electric Commission	201	Several locations from bedrock to 183m level	Reinforced concrete dam of multiarch construction	Bedrock
Manic Trois Dam, Baie Comeau Que.	49.77° N 68.62° W M	9/74	Kinemetrics SMA-1 (5)		0.5 g	Quebec Hydro-Electric Commission	200	Concrete pier in rock tunnel, four on 3 different levels of dam.	Earth dam	Bedrock, alluvium
Outardes Deux Dam, Chute -aux-Outardes Que.	49.17° N 68.40° W M	10/79	Kinemetrics SMA-1 (4)		1 g	Quebec Hydro-Electric Commission		One in spillway structure, three on dam	Earth dam	Bedrock, alluvium
Chicoutimi-Nord, Que.	48.490° N 71.012° W M	9/84	Kinemetrics SMA-1	Kinemetric TCG-1a	0.5 g	Geological Survey of Canada		Outcrop in Basement	2-story wood frame house.	bedrock
Rimouski, Que.	48.445° N 68.482° W M	9/84	Kinemetrics SMA-1	Kinemetric TCG-1b	1 g	Geological Survey of Canada		Ground Level	Above ground seismic vault.	bedrock

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Hebertville, Que.	48.4069° N 71.8069° W 152 M	12/9/88	Kinemetrics SSA-1	Kinemetric TCG-1b	0.5 g	National Center for Earthquake Engineering Research / L-DGO	HERB	Sensor buried in soil 0.5 m	None	Glacial till
St-Andre-du-Lac -St.-Jean, Que.	48.325° N 71.992° W M	9/84	Kinemetrics SMA-1	Kinemetric TCG-1a	1 g	Geological Survey of Canada		Ground Level	Above ground seismic vault.	bedrock
La Baie, Que	48.3172° N 70.8483° W 15 M	12/9/88	Kinemetrics SSA-1	Kinemetric TCG-1b	0.5 g	National Center for Earthquake Engineering Research / L-DGO	LBAY	Ground level. Free field.	Small plastic cover over instrument bolted directly to rock.	bedrock, pegmatitic granite
Tadoussac, Que.	48.15° N 69.72° W M	5/79	Kinemetrics SMA-1	Kinemetric TCG-1b	1 g	Geological Survey of Canada	211	Concrete pier to bedrock in crawl space of 1-story building	1-story building	bedrock
Mont Apica, Que.	47.9775° N 71.4314° W 884 M	12/10/88	Kinemetrics SSA-1	Kinemetric TCG-1b	1 g	National Center for Earthquake Engineering Research / L-DGO	MTAP	Ground level. Free field.	Small plastic cover over instrument bolted directly to rock.	bedrock, granite
Post Office Riviere-du-Loup Que.	47.82° N 69.53° W M	6/80	Kinemetrics SMA-1	Kinemetric TCG-1b	1 g	Geological Survey of Canada		Instrument on basement slab.	2-story reinforced concrete.	bedrock
La Malbaie, Que.	47.68° N 70.15° W M	9/67	Kinemetrics SMA-1	Kinemetric TCG-1b	1 g	Geological Survey of Canada	203	Instrument on concrete pier on basement floor slab.	1-story steel frame, masonary walls.	bedrock
Les Eboulements, Que.	47.55° N 70.33° W M	6/85	Kinemetrics SMA-1	Kinemetric TCG-1b	1 g	Geological Survey of Canada		Ground Level	Above ground seismic vault.	bedrock
Post Office St.-Pascal, Que.	47.53° N 69.80° W M	10/69	Kinemetrics SMA-1	Kinemetric TCG-1b	1 g	Geological Survey of Canada	210	Instrument on concrete basement floor slab.	1-story reinforced concrete and masonary.	bedrock
St.-Eleuthere, Que.	47.495° N 69.363° W M	8/84	Kinemetrics SMA-1	Kinemetric TCG-1b	0.5 g	Geological Survey of Canada		Ground Level	Above ground seismic vault.	bedrock

Location	Coordinates	Date Installed	Recording Instrument	Timing Device	Max Accel	Operator	Station Code	Instrument Location(s)	Structure type/size	Site geology
Riviere-Ouelle, Que.	47.476° N 69.996° W M	8/84	Kinemetrics SMA-1	Kinemetric TCG-1b	1 g	Geological Survey of Canada		Ground level.	Above ground seismic vault.	bedrock
Post Office Baie-St.-Paul, Que.	47.44° N 70.51° W M	10/82	Kinemetrics SMA-1	Kinemetric TCG-1b	1 g	Geological Survey of Canada		Instrument on basement slab.	2-story brick building.	Alluvium valley
St.-Aubert, Que.	47.220° N 70.153° W M	8/84 TO 6/85				Geological Survey of Canada		Crawl space beneath 1-story wood frame house. Closed 6/85	1-story wood frame house	bedrock
St.-Ferreol, Que.	47.12° N 70.83° W M	1/66	Kinemetrics SMA-1	Kinemetric TCG-1a	1 g	Geological Survey of Canada	209	Instrument on concrete pier	Underground seismic vault	bedrock
Quebec, Que.	46.78° N 71.28° W M	6/67	Kinemetrics SMA-1	Kinemetric TCG-1a	1 g	Geological Survey of Canada	208	Instrument on concrete pier on basement floor slab.	3-story reinforced concrete	bedrock
Ste.-Lucie-de-Beauregarde, Que.	46.741° N 70.017° W M	8/84	Kinemetrics SMA-1	Kinemetric TCG-1b	1 g	Geological Survey of Canada		Ground Level	Above ground seismic vault.	bedrock
St.-Georges, Que.	46.140° N 70.580° W M	8/84	Kinemetrics SMA-1	Kinemetric TCG-1b	1 g	Geological Survey of Canada		Ground Level	Above ground seismic vault.	bedrock
Jean-de-Brebeuf College Montreal, Que.	45.50° N 73.62° W M	12/73	Kinemetrics SMA-1		0.5 g	Geological Survey of Canada	205	Instrument in basement seismic vault.	4-story steel frame, curtain wall, poured concrete.	bedrock

SECTION 4
RELATED TABLES

4.1 Summary of Strong Motion Instrumentation

The technical details of the instruments below have come from the manufacturer's specifications of these products. No endorsement of any product or manufacturer is expressed or implied nor should the omission of other manufacturers or products related to strong motion instrumentation be considered adversely. Products mentioned here are simply those that are used in Eastern North America. This summary is provided to assess the type and quality of data available from stations listed in the catalog.

4.1.1 Recording Instrument and Sensors

Kinemetrics SMA-1; Clearly the most numerous strong-motion accelerograph. This is a triaxial, photographic recorder with an internal sensor. The standard model has a range of +/- 1 g with a response from 0-25 hertz. It triggers only on the vertical channel and is typically set at 0.01g. There is no pretrigger recording, but up to 20 seconds of post-event recording. The capacity is about 25 minutes and dynamic range can be 72 dB depending on the quality of the optical alignment and digitization techniques. A two pulse per second time trace and two reference traces accompany the data traces on modern versions. The data is recovered by collecting the film from the recorder, developing it, and, utilizing a laser digitization technique, constructing a digital time series.

Kinemetrics SMA-2; A similar instrument to the SMA-1 except the recording media is an analog magnetic tape. The response is 0-50 hertz with a dynamic range of 46 dB. No pretrigger recording. The recording capacity is about 30 minutes. A special playback unit is required to convert the recorded FM signal into a digital timeseries.

Kinemetrics CRA-1; A photographic multichannel recorder including up to 12 data channels and two timing traces. No pretrigger recording, up to 10 seconds post event recording. The recorder has a response 0-150 hertz and 25 minutes capacity. Varoius external sensors can be used with this recorder.

Kinemetrics DSA-1; A triaxial recorder with an internal sensor which records a digital signal on magnetic tape. The standard instrument has a range of +/- 1 g and a response from 0-50 hertz with 22 minutes of recording capacity. The dynamic range is 72 dB. The sampling rate is 200 samples per second per channel. Optional pre-event memory modules of 2.5 to 10 seconds are available. A special playback unit is required to convert the instrument tapes to digital timeseries.

Kinemetrics DSA-3; This is a multichannel version of the DSA-1 in which sensors are connected to a central recording unit, usually as three component sets. Typical sensors are the Kinemetrics FBA-3, FBA-13, FBA-23 or FBA-11 (a uniaxial sensor).

Kinemetrics SSA-1; A triaxial recorder with an internal sensor which records digital signals in solid-state RAM. An onboard microprocessor enables remote communication with the instrument via dial-up telephone lines. Data can be uploaded and triggering parameters modified with any PC compatible computer. Range is settable from +/- 0.25 g to 2 g. The response is 0-50 hertz at 200 samples per second with a dynamic range of 72 dB. Pretrigger recording up to 15 seconds and postevent of up to 60 seconds. Recording capacity is 20 minutes standard with an option for 40 minutes available.

Terra Technology DCA-333; A triaxial recorder with internal sensor which records a digital signal on magnetic tape. The range is +/- 2 g with a response from 0-30 hertz standard. Pretrigger recording is 1 second with a postevent time of 15 seconds. The sampling rate is 100 or 200 samples per second per channel with a recording capacity of 14 minutes. The dynamic range is 72 dB. An internal clock has an accuracy of 1 part per million. Cross-axis sensitivity of the sensor is 0.0005 g / g.

Geotech RFT-250; No information was available for this product. It has largely been phased out of most instrumentation programs.

Engdahl PSR 1200-H/V-12A; No information was available for this product which measures spectral response.

Kinemetrics FBA-3, FBA-13, FBA-23, FBA-13DH; These are models of triaxial, force-balance accelerometers (sensors) which are typically used with Kinemetrics recorders. The internal sensors on Kinemetrics recorders are comparable to these external sensors. These models differ mainly in their packaging for different applications. They have a uniform response from 0-50 hertz and about 100 dB of dynamic range. The cross-axis sensitivity is 0.03 g / g.

4.1.2 Timing Devices

Kinemetrics TCG-1; A single printed circuit board which can be interfaced to most Kinemetrics Recorders to provide an accurate time signal recorded simultaneously with ground motion. This board is set from another, presumably absolute, time reference. A TCG-1a is accurate to +/- 10 parts per million while the TCG-1b is accurate to +/- 0.3 parts per million.

Omega Receiver; A VLF radio signal containing time information that can be received worldwide. The receiver decodes the time and locks itself to the signal to within 1 millisecond.

WWV Receiver; A radio signal containing time information that can be received within the continental United States. The receiver synchronizes its time to a series of tone pulses and can maintain an accuracy of perhaps 10 milliseconds.

More specific information can be obtained from the manufacturers directly;

Kinemetrics Systems
222 Vista Avenue
Pasadena, CA. 91107
818-795-2220

Terra Technology Corporation
3860 148th Avenue NE
Redmond, WA. 98052
206-883-7300

Teledyne Geotech
Seismic Instruments Division
3401 Shiloh Road
Garland, TX. 75041
214-271-2561

Sprengnether Instruments, Inc.
4150 Laclede Avenue
St. Louis, MO. 63108
314-535-1682

4.2 Operators of Strong-Motion Instruments in Eastern North America

Operator	Contact Person
Atomic Energy of Canada	
Center for Earthquake Research and Information, Memphis State University	Dr. Jim Dorman CERI Memphis State University Memphis TN 38152 901-678-2007
Duke Power Company	David Kulla Duke Power Company P.O. Box 33189 Charlotte NC 28242 704-373-6197
Geological Survey of Canada	Philip Munro Geophysics Division Geological Survey of Canada 1 Observatory Crescent Ottawa Ontario K1A 0Y3 613-995-4669
Martin Marietta for the Department of Energy	Ken Fricke Martin Marietta P.O. Box 2003 Building K-1550-I MS 231 Oak Ridge TN 37831 615-576-0465
National Center for Earthquake Engineering Research / Lamont-Doherty Geological Observatory	Robert W. Busby Seismology Group Lamont-Doherty Geological Observatory Palisades NY 10964 914-359-2900 X424
Quebec Hydro-Electric Commission	
Savannah River Nuclear Power Plant	
Tennessee Valley Authority	Jeff Munsey Tennessee Valley Authority 175 Liberty Building LB-1N 184F-K Knoxville TN 37902 615-632-4777

United States Army Corps of Engineers	Frank Chang Earthquake Engineering and Geophysics Div. Geotechnical Laboratory Waterways Experiment Station P.O. Box 631 Vicksburg MS 39180-0631 601-634-2661
United States Geological Survey	Dick Maley USGS MS977 345 Middlefield Road Menlo Park CA 94025 415-329-5670
United States Geological Survey for Veterans Administration	See above.
University of Kentucky	Dr. Ron Street Dept. of Geological Sciences Bowman Hall University of Kentucky Lexington KY 40506-0059 606-257-4777
Virginia Power Company	Michael Wood Bath County Pumped Storage Station Rt. A Box 280 Warm Springs VA 24484 703-279-3204
Weston Observatory of Boston College	Jack Foley Weston Observatory of Boston College 381 Concord Road Weston MA 02193 617-899-0950
Yankee Power	

4.3 Station Code Listing

Stations are listed by Station Code for each operator. If no Station Code is given, the list is ordered north to south. Note that Veteran's Administration stations are distinct from USGS stations.

Station Code	Location	Latitude	Longitude
Atomic Energy of Canada, Ltd.			
202	Chalk River Reactor Building, Ont.	46.05	77.38
Center for Earthquake Research & Information			
	Alcoa, TN.	35.795	83.971
	Marked Tree, AR.	35.543	90.416
	Memphis, TN.	35.122	89.934
Duke Power Company			
	McGuire Nuclear Station, Cornelius SC.	35.433	80.949
	Catawba Nuclear Station, Clovér SC.	35.051	81.069
	Oconee Nuclear Station, Seneca SC.	34.794	82.899
	Jocasse Hydro Station, Pickens SC.	34.659	82.915
Geological Survey of Canada			
	Chicoutimi- Nord, Que.	48.490	71.012
	Rimouski, Que.	48.445	68.482
	St.-Andre-du-Lac -St.-Jean, Que.	48.325	71.992
	Post Office Riviere-du-Loup Que.	47.82	69.53
	Les Eboulements, Que.	47.55	70.33
	St.-Eleuthere, Que.	47.495	69.363
	Riviere-Ouelle, Que.	47.476	69.996
	Edmundston, N.B.	47.462	68.241
	Post Office Baie-St.-Paul, Que.	47.44	70.51
	St.-Aubert, Que.	47.220	70.153
	Mitchell Lake Miramichi, N.B.	47.034	66.612
	Hickey Lakes Miramichi, N.B.	47.006	66.547
	"Loggie Lodge II" Miramichi, N.B.	46.973	66.530
	Holmes Lake Miramichi, N.B.	46.946	66.595
	Ste.-Lucie-de- Beauregarde, Que.	46.741	70.017
	St.-Georges, Que.	46.140	70.580
	EPB Building #7 Ottawa, Ont.	45.394	75.717
203	La Malbaie, Que.	47.68	70.15
205	Jean-de-Brebeuf College Montreal, Que.	45.50	73.62
208	Quebec, Que.	46.78	71.28
209	St.-Ferreol, Que.	47.12	70.83
210	Post Office St.-Pascal, Que.	47.53	69.80
211	Tadoussac, Que.	48.15	69.72
Martin Marietta Energy Systems for DOE			
	Portsmouth Gaseous Diffusion Plant Portsmouth OH	39.010	82.998
	Portsmouth Gaseous Diffusion Plant Portsmouth OH	39.010	82.998
	Portsmouth Gaseous Diffusion Plant Portsmouth OH	39.009	83.001
	Portsmouth Gaseous Diffusion Plant Portsmouth OH	39.009	83.001
	Paducah Gaseous Diffusion Plant Paducah, KY.	37.122	88.808

Station Code	Location	Latitude	Longitude
	Paducah Gaseous Diffusion Plant Paducah, KY.	37.116	88.810
	Paducah Gaseous Diffusion Plant Paducah, KY.	37.115	88.808
	Paducah Gaseous Diffusion Plant Paducah, KY.	37.114	88.804
	Paducah Gaseous Diffusion Plant Paducah, KY.	37.113	88.811
	Paducah Gaseous Diffusion Plant Paducah, KY.	37.111	88.813
	Y-12 Plant Oak Ridge, TN.	35.987	84.261
	Y-12 Plant Oak Ridge, TN.	35.986	84.258
	Y-12 Plant Oak Ridge, TN.	35.985	84.260
	Oak Ridge Gaseous Diffusion Plant Oak Ridge, TN.	35.941	84.387
	Oak Ridge Gaseous Diffusion Plant Oak Ridge, TN.	35.939	84.404
	Oak Ridge National Laboratory Oak Ridge, TN.	35.932	84.307
	Oak Ridge Gaseous Diffusion Plant Oak Ridge, TN.	35.931	84.394
	Oak Ridge Gaseous Diffusion Plant Oak Ridge, TN.	35.931	84.397
	Oak Ridge National Laboratory Oak Ridge, TN.	35.928	84.317
	Oak Ridge National Laboratory Oak Ridge, TN.	35.918	84.304
Massachusetts Institute of Technology/ U.S. Geological Survey			
2620 MIT	Tang Hall, MIT Cambridge, MA.	42.354	71.104
National Center for Earthquake Engineering Research / L-DGO			
DCKY	Dickey, ME.	47.1010	69.0819
EMME	East Machias, ME.	44.7392	67.4894
GNBK	Greenback TN.	35.610	84.149
HEBB	Hebertville, Que.	48.4069	71.8069
HNBK	South Central Bell CDO Hornbeak, TN.	36.3325	89.2958
ISFL	Island Falls, ME.	46.0306	68.2061
JORD	Tupper Lake, NY.	44.3778	74.6050
LBAY	La Baie, Que	48.3172	70.8483
LYON	Lyon Mountain, NY.	44.7264	73.9111
MIME	Milo, ME.	45.2444	69.0428
MSNA	Barnhart Island Massena, NY.	44.9983	74.8472
MTAP	Mont Apica, Que.	47.9775	71.4314
NEWC	Newcomb, NY.	43.9708	74.2236
OLAP	Southwestern Bell hut CF 8616, Old Appleton, MO.	37.5722	89.6878
OUSL	Corryton TN.	36.080	83.800
PAL	Palisades, NY.	41.0042	73.9092
RIDG	South Central Bell CDO Ridgely, TN.	36.2642	89.4806
RSCO	Southwestern Bell Hut CF 8531 Risco, MO.	36.5503	89.7736
Quebec Hydro-Electric Commission			
	Outardes Deux Dam, Chute -aux-Outardes Que.	49.17	68.40
200	Manic Trois Dam, Baie Comeau Que.	49.77	68.62
201	Daniel Johnson Dam, Baie Comeau Que.	50.67	68.73
Savannah River Nuclear Power Plant			
2501 SRN	Savannah River Nuclear Power Plant, SC.	33.25	81.68
Tennessee Valley Authority			
ALF	Allen Steam Plant Memphis, TN.	35.07	90.15
BFN	Browns Ferry Nuclear Plant Athens, AL.	34.70	87.12
BFN	Browns Ferry Nuclear Plant Athens, AL.	34.70	87.12

Station Code	Location	Latitude	Longitude
LBK	Liberty Building Knoxville, TN.	35.96	83.92
SHF	Shawnee Steam Plant Paducah, KY.	37.17	88.80
SQN	Sequoyah Nuclear Plant Daisy, TN.	35.23	85.09
SQN	Sequoyah Nuclear Plant Daisy, TN.	35.23	85.09
SQN	Sequoyah Nuclear Plant Daisy, TN.	35.23	85.09
SQN	Sequoyah Nuclear Plant Daisy, TN.	35.23	85.09
VNT	Vonore, TN.	35.60	84.23
WBN	Watts Bar Nuclear Plant Spring City TN	35.60	84.79
WBN	Watts Bar Nuclear Plant Spring City TN	35.60	84.79
WBN	Watts Bar Nuclear Plant Spring City TN	35.60	84.79
WBN	Watts Bar Nuclear Plant Spring City TN	35.60	84.79
U.S. Army Corps of Engineers			
	Almond Lake Dam, NY.	42.342	77.702
	Colebrook River, CT.	42.005	73.037
	Tioga-Hammond Lakes, PA.	41.902	77.128
	Papillion Creek 20, NE.	41.2	96.1
	Salt Creek Dam 18, Branched Oak NE.	40.9	96.9
	Salt Creek Dam 2, Olive Creek, NE.	40.6	96.9
	Salt Creek Dam 17, Holmes Lake NE.	40.5	96.3
	Bluestone Lake, WV.	37.640	80.887
	R. D. Bailey Lake, WV.	37.592	81.822
	Clearwater dam, MO.	37.137	90.772
	J. W. Flannagan, VA.	37..233	82..345
	St. Stephens, Cooper River Rediversion, SC.	33.423	79.925
2231 OHD	Oahe Dam, SD.	44.450	100.386
2233 FRD	Fort Randall Dam, SD.	43.07	98.56
2235 GRD	Garrison Dam & Power Plant, ND.	47.50	101.43
2237 GPD	Gavins Point Dam, SD.	42.846	97.482
2243 BBD	Big Bend Dam, SD.	44.04	99.45
2401 NRD	Norfork Dam, AR.	36.25	92.23
2415 WPD	Wappapello Dam, MO.	36.930	90.278
2422 RLD	Rend Lake, IL.	38.038	88.970
2427 BYD	Barkley Dam, KY.	37.02	88.22
2430 PPD	J. Percy Priest Dam, TN.	36.15	86.61
2432 WCD	Wolf Creek Dam, KY.	36.869	85.146
2434 CHD	Center Hill Dam, TN.	36.098	85.827
2436 DHD	Dale Hollow Dam, TN.	36.538	85.451
2437 LRD	Laurel River Dam, KY.	36.961	84.268
2439 TCD	Tuttle Creek Dam, KS.	39.25	96.60
2442 MDD	Milford Dam, KS.	39.07	96.90
2444 AKD	Arkabutla Dam, MS.	34.75	90.12
2445 SRD	Sardis Dam, MS.	34.41	89.80
2447KWD	Kaw Dam, OK.	36.42	95.55
2462 SML	Smithland Lock & Dam, IL.	37.164	88.433
2463 BVD	Brookville Dam, IN.	39.439	85.000
2464 CMD	Cagles Mill Dam, IN.	39.486	86.916
2465 CLD	Cannelton Dam, IN.	37.900	86.704
2466 MLD	Monroe Lake Dam, IN.	39.008	86.512
2467 NBD	Newburg Lock and Dam, IN.	37.932	87.373

Station Code	Location	Latitude	Longitude
2468 PAD	Patoka Dam, IN.	38.433	86.708
2469 UND	Uniontown Lock and Dam, KY.	37.793	87.991
2470 KND	Kanopolis Dam, KS.	38.602	97.986
2471 NLD	Nolin Dam, KY.	37.277	86.247
2472 RHD	Rough River Dam, KY.	35.619	86.501
2473 HTD	Harry S. Truman Dam, MO.	38.267	93.402
2474 HND	Harlan County Dam, NE.	40.067	99.202
2475 MFD	Martins Fork Dam, KY.	36.752	83.258
2476 KRD	Kirwan Dam, OH.	41.149	81.080
2478 TVD	Taylorsville Lake, KY.	38.008	85.317
2480 LFB	Federal Building Lincoln, NE.	40.814	96.699
2484 OMA	Old Mill Area, Omaha, NE.	41.264	96.084
2486 PLD	Papillion Creek 11, Cunningham Lake NE.	41.173	96.151
2519 BKL	Buckman Lock, FL.	28.51	81.71
2524 CKD	Strom Thurmond Dam, SC.	33.65	82.19
2526 HWD	Hartwell Dam, GA.	34.34	82.81
2528 GAD	Gathright Dam, VA.	37.955	79.952
2533 ALD	Allatoona Dam, GA.	34.163	84.728
2534 BUD	Buford Dam, GA.	34.160	84.074
2535 CRD	Carters Dam, GA.	34.613	84.685
2536 RRD	Richard B. Russell Dam, GA.	34.054	82.622
2537 GLD	Walter F. George Lock & Dam, GA.	31.627	85.063
2540 CVD	Coffeville Lock and Dam, AL.	31.757	88.128
2617 BMD	Ball Mountain Dam, VT.	43.12	72.78
2621 MMD	Mt Morris Dam, NY.	42.75	77.91
2623 HVD	Hodges Village Dam, MA.	42.117	71.880
2624 KVD	Knightville Dam, MA.	42.291	72.863
2625 LFD	Littleville Dam, MA.	42.265	72.882
2626 EVD	Everett Dam, NH.	43.092	71.660
2627 FFD	Franklin Falls Dam, NH.	43.447	71.660
2628 SYD	Surry Mountain Dam, NH.	43.996	71.312
2629 NHD	North Hartland Dam, VT.	43.604	72.361
2630 NSD	North Springfield Dam, VT.	43.338	72.511
2631 TWD	Townshend Dam, VT.	43.055	72.706
2632 UVD	Union Village Dam, VT.	43.772	72.257
2633 KZD	Kinzua, Allegheny Res. Dam, PA.	41.840	79.003
2634 TSD	Tionesta Dam, PA.	41.476	79.437
2635 EBD	East Branch Clarion River Dam, PA.	41.562	78.594
2640 RPD	Arkport Dam, NY.	42.397	77.716
U.S. Geological Survey			
	116 N. Johnson Road, Sterling, VA.	38.9	77.3
	Fire Station 3 Highway 61 & Ashley Charleston, SC.	32.8	79.9
	Omni Hotel Charleston Place 130 Market St. Charleston, SC.	32.8	79.9
	Omni Hotel Charleston Place 130 Market St. Charleston, SC.	32.8	79.9
2403 CGU	Magill Hall, MSU Cape Girardeau, MO.	37.31	89.52
2404 TIP	National Guard Armory Tiptonville, TN.	36.37	89.43
2419 PBT	Twin Towers Apts 506 Hazel Poplar Bluff, MO.	36.76	90.40
2420 NMR	Noranda Alum Plant New Madrid, MO.	36.51	89.57
2446 TVL	Reelfoot Lake Tiptonville, TN.	36.37	89.41

Station Code	Location	Latitude	Longitude
2449 BLY	Fire Station Blytheville AR.	35.928	89.926
2450 UNC	Fire Station Union City, TN.	36.426	89.061
2451 CRO	Fire Station Cairo, IL.	37.003	89.173
2452 PGV	Post Office Portageville, MO.	36.428	89.704
2453 SIK	Fire Station Sikeston, MO.	36.883	89.580
2454 CAM	Fire Station Campbell, MO.	36.494	90.075
2455 COR	Post Office Corning, AR.	34.41	90.58
2456 GID	City Hall Gideon, MO.	36.454	89.919
2457 DXT	Dexter, MO.	37.796	89.966
2458 LEP	Lepanto, AR.	35.613	90.330
2459 PRG	Post Office Paragould, AR.	36.06	90.49
2460 OBN	Obion, TN.	36.259	89.192
2461 DYR	Dyersburg, TN.	36.05	89.39
2521 CCC	Citadel College Charleston, SC.	32.798	79.960
2522 ORB	Mason Hall, OSU Orangeburg, SC.	33.46	80.94
2532 MTD	Monticello Dam, SC.	34.304	81.333
2538 SVA	National Guard Armory Summerville, SC.	33.03	80.18
2539 MGA	Middleton Gardens, SC.	32.895	80.135
2622 MIB	Massena International Bridge Massena, NY.	44.988	74.739

U.S. Geological Survey / CYNP

Station Code	Location	Latitude	Longitude
2601 CYP	Conn Yankee Nuclear Power Plant. Haddam, CT.	41.46	72.52

University of Kentucky

Station Code	Location	Latitude	Longitude
FMKY	Western Kentucky	36.664	88.909
MIKY	Mickman, KY.	36.551	89.183
WIKY	Wickliffe, KY.	36.971	89.092

Veteran's Administration

Station Code	Location	Latitude	Longitude
2405 VMH	VA Hospital, Building 52 Mountain Home TN.	36.31	82.37
2406 VOC	VA Hospital Oklahoma City, OK.	35.48	97.49
2407 VJB	VA Hospital Jefferson Barracks, MO.	38.49	90.28
2408 VLU	VA Hospital St. Louis, MO.	38.64	90.23
2409 VPB	VA Hospital Poplar Bluff, MO.	36.77	90.42
2410 VMS	VA Hospital Memphis, TN.	37.14	90.03
2411 VMN	VA Hospital, Building 15 Marion, IL.	37.72	88.95
2412 VLV	VA Hospital Louisville, KY.	38.27	85.70
2414 VDY	VA Hospital Building 28 Dayton, OH.	39.74	84.27
2504 VCH	VA Hospital Building 1 Charleston, SC.	32.788	79.954
2505 VCO	VA Hospital Building 100 Columbia, SC.	33.98	80.96
2506 VSA	VA Hospital Salisbury, NC.	35.68	80.49
2507 VSM	VA Hospital Salem, VA.	37.27	80.02
2508 VAG	VA Hospital, Building 34 Augusta, GA.	33.47	82.05
2509 VBM	VA Hospital Birmingham, AL.	33.50	86.80
2510 VOT	VA Hospital Oteen, NC.	35.59	82.48
2511 VMB	VA Hospital Building 218 Martinsburg, WV.	39.41	77.91
2520 CMP	VA Hospital Motor Pool Shop Charleston, SC.	32.79	79.95
2531 VAT	VA Hospital Atlanta, GA.	33.80	84.31
2603 VMA	VA Hospital Manchester, NH.	43.01	71.44
2604 VWT	VA Hospital White River Junction, VT.	43.63	72.33

Station Code	Location	Latitude	Longitude
2605 VAY	VA Hospital Albany, NY.	42.65	73.77
2606 VNH	VA Hospital Northhampton, MA.	42.35	72.68
2607 VPR	VA Hospital Providence, RI.	41.83	71.43
2608 VBR	VA Hospital Brockton, MA.	42.06	71.05
2609 VWR	West Roxbury VA Hospital Boston, MA.	42.26	71.17
2610 VJP	Jamaica Plains VA Hospital Boston, MA.	42.32	71.11
2611 VBA	VA Hospital Batavia, NY.	43.01	78.20
2612 VCA	VA Hospital Canandaigua, NY.	42.90	77.27
2613 VSY	VA Hospital Syracuse, NY.	43.04	76.13
2614 VER	VA Hospital Erie, PA.	42.10	80.06
2615 VBU	VA Hospital Buffalo, NY.	42.95	78.81
2702 VBD	VA Hosptial Bedford, MA.	42.51	71.28
Virginia Power			
A101 A102	Bath County Pumped Storage Upper Dam Mtn Grove VA.	38.1	79.9
A201 A202	Bath County Pumped Storage Lower Dam Mtn. Grove VA.	38.05	79.9
Weston Observatory of Boston College			
	Essex Junction, VT.	44.4878	73.1037
	Lowell, MA.	42.6623	71.3023
	Hudson, MA.	42.3938	71.5428
	Weston, MA.	42.3847	71.3221
	Natick, MA.	42.3075	71.3373
	Newport, RI.	41.45	71.33

SECTION 5
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