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How-to Suggestions for Implementing Executive Order 12941 on Seismic Safety of Existing Federal Buildings, A Handbook

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PREFACE

On December 1, 1994, the President signed Executive Order 12941, *Seismic Safety of Existing Federally Owned or Leased Buildings*. The order adopted minimum technical standards for all future seismic safety evaluation and rehabilitation projects for Federally owned and leased buildings. These standards, *Standards of Seismic Safety for Existing Federally Owned or Leased Buildings*, are referred to in this document as ICSSC RP4. In addition, the order called for all agencies and departments owning or leasing buildings to develop, by December 1, 1998, a seismic inventory of their owned and leased buildings, and to estimate the costs of mitigating unacceptable seismic risks in that inventory.

The inventory and cost information is being collected in order to develop reliable information upon which to build future public policy. At the time the order was signed, only limited data on the vulnerability of the approximately half-million Federally-owned buildings existed. The government-wide seismic rehabilitation cost estimates that could be generated based on this data were judged to be too uncertain to allow for reliable budget planning.

The order directs the Interagency Committee on Seismic Safety in Construction (ICSSC) to issue guidance on how to develop the inventory and cost estimate. Thirty Federal departments and agencies with an interest in seismic safety participate in the ICSSC. A major role of the ICSSC is to encourage the adoption of consistent and effective seismic safety practices by all entities of the Executive Branch of the Federal government. This is accomplished in part by developing and issuing Recommended Practices. A Recommended Practice (ICSSC RP document) must be approved by at least two thirds of the member departments and agencies before it is issued.

The ICSSC Guidance on how to implement the Executive Order was published as RP5, *ICSSC Guidance on Implementing Executive Order 12941 on Seismic Safety of Existing Federally Owned or Leased Buildings*. This document, TR-17, is meant to supplement the RP5 document by giving examples of how to put this guidance into practice.

Each agency's inventory and cost estimate is to be forwarded to the Federal Emergency Management Agency (FEMA) by December 1, 1998. FEMA will use the data to examine a wide variety of potential programs to upgrade the seismic safety of existing Federal buildings. The order directs FEMA to submit to Congress, by December 1, 2000, a "comprehensive report on how to achieve an adequate level of seismic safety in federally owned and leased buildings in an economically feasible manner." It is hoped that this effort will lead to the adoption of a pro-active program of systematic upgrading of the seismic safety of Federal buildings.

The Technical Secretariat of the ICSSC is maintained by the Building and Fire Research Laboratory at the National Institute of Standards and Technology (NIST). For additional copies of this or other ICSSC documents, write to:

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ABSTRACT

This Handbook supplements ICSSC RP5, *ICSSC Guidance on Implementing Executive Order 12941 on Seismic Safety of Existing Federally Owned or Leased Buildings*. RP5 describes the approach recommended by the Interagency Committee on Seismic Safety in Construction (ICSSC) to fulfill the inventorying and cost estimating requirements of Executive Order 12941, *Seismic Safety of Federally Owned or Leased Buildings*. This Handbook describes detailed methodologies for developing inventories, screening for exempt buildings, identifying buildings for evaluation, and developing cost estimate information. These methodologies are not mandatory requirements of the ICSSC recommended program but provide guidance for agencies which do not have agency-specific programs in place and would like a model to follow. The Handbook also outlines the specific fields to be entered into each agency's electronic database for owned buildings as well as the specific items which should be discussed in the supporting documentation. Each agency is required to follow the format outlined in these sections when submitting their information in order to ensure that data received from all agencies is compatible and machine-readable.

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1.0 GOAL AND PROCESS

1.1 Introduction

This document supplements ***ICSSC Guidance on Implementing Executive Order 12941 on Seismic Safety of Existing Federally Owned or Leased Buildings*** (RP5) [Todd, 1995]. RP5 presents recommendations of the Interagency Committee on Seismic Safety in Construction (ICSSC) to agencies affected by Section 2 of Executive Order 12941, *Seismic Safety of Existing Federally Owned or Leased Buildings*. Section 2 states that all Federal departments and agencies that own or lease buildings "shall develop an inventory of their owned and leased buildings and shall estimate the costs of mitigating unacceptable risks in those buildings. . . Cost estimates with supporting documentation shall be submitted to the Director of the Federal Emergency Management Agency (FEMA) no later than four years after the signing of this order."

This Handbook offers two additional levels of guidance beyond that presented in RP5:

1) detailed methodologies for fulfilling the RP5 recommendations for inventorying and cost estimating, which can be followed as default procedures by agencies which do not have agency-specific programs in place and which do not wish to develop agency-specific programs, and
2) detailed specifications for preparing and submitting the cost estimate and supporting documentation called for in the Executive Order. While the first type of guidance, presented in Sections 1-4 of this Handbook, is optional, the second type, presented in Section 5, is to be considered mandatory in order to ensure uniform reporting.

1.2 The Recommended Program: Owned Buildings

The recommended program for owned buildings outlined in the Guidance Document and discussed in detail in this Handbook emphasizes the collection of data based on seismic evaluations on all high risk/high priority buildings and on a representative sample of lower risk/lower priority buildings, as determined by the agency in both cases. This approach will give thorough and accurate information on the population of buildings considered by the agencies to be at the highest risk. The sample information which is collected for the lower risk/lower priority buildings will be used to estimate the extent of necessary rehabilitation in the non-evaluated buildings and the costs of those rehabilitation efforts. All data will eventually be used to examine a wide variety of possible overall Federal seismic rehabilitation programs. The recommended inventorying and cost estimating program for owned buildings is outlined in the decision tree shown in Figure 1-1. The numbers in each block represent Sections of this Handbook which contain guidance related to that particular issue.

1.3 The Recommended Program: Leased Buildings

Executive Order 12941 adopts *Standards of Seismic Safety for Existing Federally Owned or Leased Buildings* (RP4) [Todd, 1994] as a minimum standard for use by Federal departments

and agencies. RP4 states that existing leases may be held without action (concerning their seismic safety) until the lease expires, but that new leases and lease renewals are not to be made in seismically unsafe space. Through this mechanism, it is expected that the seismic safety of leased space will be gradually, systematically reduced. The ICSSC does not expect that a more aggressive program for reducing seismic risk in leased buildings will be recommended any time in the foreseeable future.

Despite this, the Executive Order does require that an inventory of leased buildings be developed, and that an estimate of the cost of mitigating unacceptable seismic risk in leased buildings be submitted. Agencies may submit any existing inventory of leased buildings to fulfill this requirement. No special formatting or data collection is needed. Note that buildings leased from GSA or another Federal department or agency need not be reported by the leasing agency. Such buildings are to be reported as owned buildings by the owning agency.

Agencies are asked to determine the costs of implementing the RP4 program for reducing risks in leased buildings, and to report their findings in the supporting documentation. This brief report should address, at a minimum, the following issues:

- How are the requirements that leases not be entered into or renewed in seismically unsafe space being implemented in the leasing programs of the department or agency?

- What administrative costs are expected within the agency for including this consideration of seismic safety in the leasing process?

- Are leases in seismically-acceptable space expected to be more costly than leases in seismically-hazardous space?

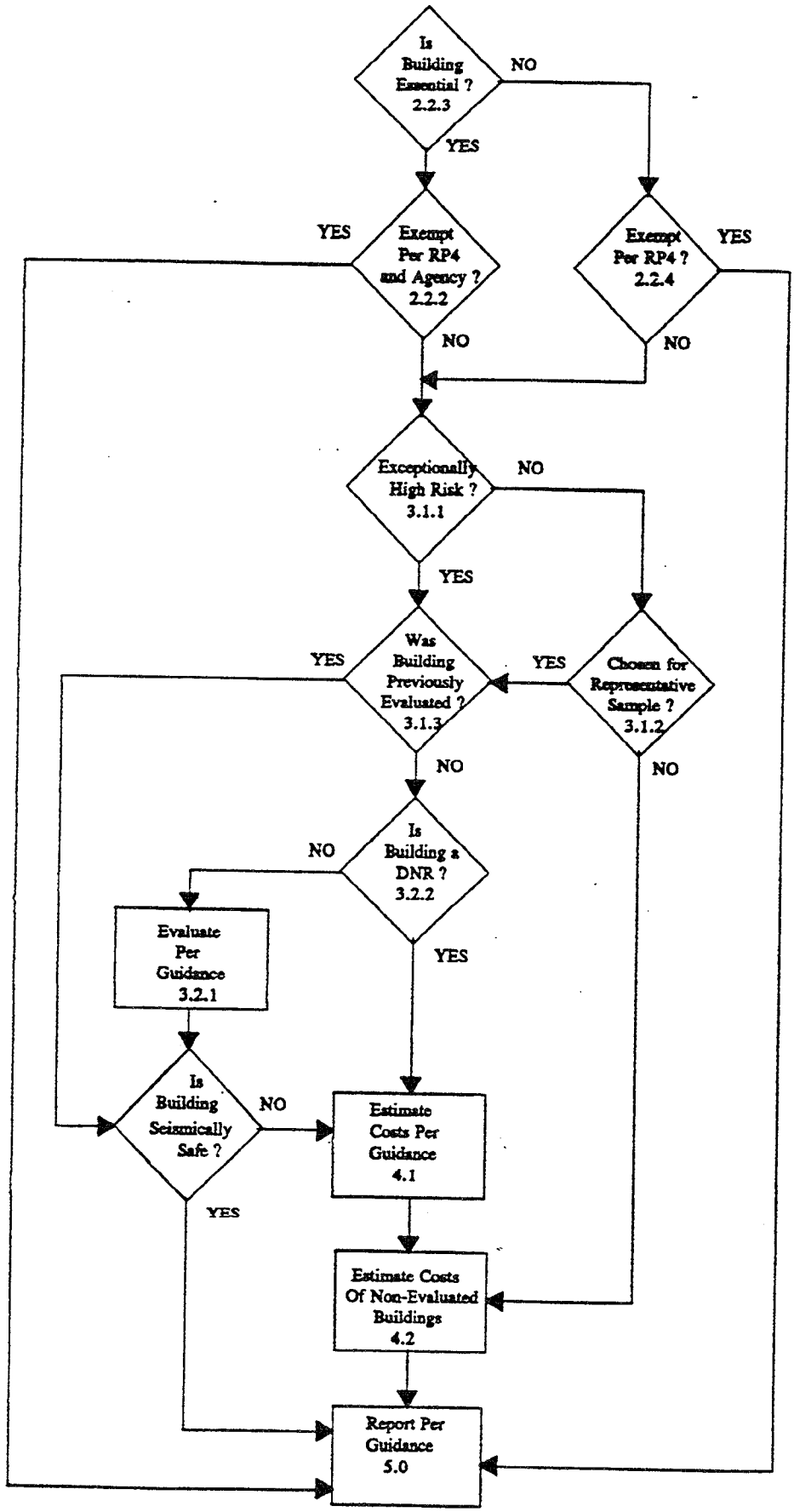
1.4 Products to be Produced by Each Agency

Each agency is to submit an electronic inventory database of its owned buildings, including the types of information specified in RP5, using the format specified in Section 5 of this Handbook. This database will contain building-by-building specific information as well as seismic hazard mitigation cost estimates for each building selected for evaluation and found to be deficient. An inventory of leased buildings is also to be submitted, in any format that is convenient for the agency but preferably in an electronic format. This inventory should contain any information pertinent to seismic safety that the agency already has regarding leased buildings. Supporting written documentation is to accompany the inventory databases, including an estimate of the rate of attrition of buildings from the agency's inventory, and a record of the costs of performing seismic evaluations completed to fulfill the requirements of the Executive Order. An estimate of mitigation costs for the owned buildings which were not evaluated is to be included in the supporting documentation along with any agency specific definitions and methodologies used in the inventorying and cost estimating process. The minimum content of the supporting documentation is described in Section 5.1.2 of this Handbook.

1.5 Organization of the Handbook

This Handbook is written in parallel with RP5 so that the main section numbers are the same in each. Sections 2 and 3 of this Handbook give suggested methodologies for screening exempt buildings, identifying exceptionally high risk buildings, and establishing a representative sample from the remaining non-exempt buildings. These methodologies are not mandatory; they simply give guidance to agencies which do not have methodologies of their own. Section 4 describes acceptable cost-estimating approaches. Section 5 of this Handbook describes the format for the inventory database of owned buildings which must be followed by all agencies in order to ensure a consistent and machine-readable total database.

Figure 1-1 - Decision Tree for Owned Buildings



2.0 OWNED INVENTORY DATABASE

An inventory database containing information on all buildings owned by the department or agency is to be created and submitted in electronic format. See Section 5 of this Handbook for details of the database reporting format. (The discussion in this section and the detailed format information contained in Section 5 apply only to owned buildings, not leased buildings.)

2.1 Relationship to Existing Real Property Inventories

The General Services Administration Real Property Database

Most Federal agencies currently submit an inventory of their owned and leased real property to the General Services Administration (GSA) annually. The seismic inventory to be produced in response to Executive Order 12941 will use much of the same information already collected for that effort, and many of the same codes. Therefore, for many agencies, it may be time and cost-effective to build their seismic inventory using the GSA-required inventory as a base.

The GSA office which collects and collates the real-property information has informed the ICSSC that most agencies owning large numbers of buildings and other property submit the information electronically. However, there remains a significant number of agencies that submit their inventories on paper (manually). In these cases, GSA enters the manually-submitted data into their electronic database. The GSA database is available at no cost to other Federal agencies, in both electronic and paper formats. Therefore, if an agency typically submits their real-property information to GSA manually, they can get an electronic version to use as the base for the seismic inventory by contacting the GSA Office of Governmentwide Real Property Policy on (202) 219-0077. The GSA database is supplied in a generic form that can be read and manipulated by most PC-based word processing, spreadsheet, and database programs.

Other Databases

Some agencies have electronic seismic inventories already in place. In most cases, the information already collected will be usable for the Executive Order 12941 inventory. In some instances some translation of data will be needed, for example, translating Uniform Building Code (UBC) seismic zones to NEHRP-based seismicities of High, Moderate, and Low. Algorithms to make this and similar translations automatically can be developed. The ICSSC Technical Secretariat will be available to offer suggestions and ideas for how to address these types of problems.

2.2 Scope and Screening of Inventory

All owned buildings are to be listed in the inventory database and screened into "exempt" and "non-exempt" categories. This section of the Handbook gives detailed suggestions on how to identify (screen) exempt buildings. Note that the Executive Order applies only to buildings within the United States, as defined in the Earthquake Hazards Reduction Act of 1977 as amended. That definition, from Public Law 95-124 as amended, is:

Section 4 (5) - The term "United States" means, when used in a geographical sense, all the States as defined in section 4 (4).

Section 4 (4) - The term "State" means each of the States in the United States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Mariana Islands, and any other territory or possession of the United States.

2.2.1 Grouped Buildings Versus Building-by-Building Reporting

Similar buildings may be reported in the electronic database in groups, rather than as individual entries, if they meet the criteria given below. When buildings are reported in groups, the number of buildings included in the group and the total area in square meters for all buildings must be reported.

Exempt buildings can be reported in the database in groups if they share the same occupancy class, the same state, county and seismicity and the same reason for exemption (e.g. 152 picnic shelters in the same county which collectively total 30,400 square feet, exempted because they are small, single-story, wood-frame structures, may be reported in one entry in the inventory database; reporting details are given in Section 5).

Non-exempt, non-evaluated buildings may be reported in groups only if they have the following characteristics in common:

- all characteristics identified above for groups of exempt buildings, except for "reason for exemption",
- similar ($\pm$ 10%) size and number of stories,
- similar date of construction ($\pm$ 5 years)
- same model building type
- same classification in historic, essential, and exceptionally high risk categories

Non-exempt, evaluated buildings may be reported in groups only if they have the following characteristics in common:

- all characteristics identified above for groups of non-exempt, non-evaluated buildings
- same soil type
- same foundation type

For groups of buildings sharing these characteristics, a representative building may be selected for evaluation rather than evaluating each building in the group individually. In these cases, the same evaluation outcome, reason for deficiency (if any), and cost per square meter for rehabilitation are to be assumed for all buildings in the group.

All characteristics identified above are described in detail in Section 2.3 of this document.

For agencies which choose to use the GSA-required database as a starting base, it is

important to note that it includes many multiple-building entries. In some cases, some of the buildings in a multiple-building entry will be exempt, and others will be non-exempt. In other cases, all the buildings in a group will be exempt for the same reason (e.g. one- or two-family dwellings in regions where the expected seismic acceleration is less than 0.15 g). Agencies that utilize their GSA-required database as a starting point are encouraged to identify as many exempt groups of buildings as possible before making the effort to reconstitute the database into a building-by-building listing.

2.2.2 Identifying Exempt Buildings (Screening the Inventory)

Buildings are to be labeled as exempt if they meet the criteria for exemption given in Section 1.3 of RP4. RP4 exemptions are reprinted below. The codes to be used in reporting the reason for exemption in the inventory database are given in Section 5 of this Handbook.

Buildings are also considered to be exempt if they will no longer be used by any branch of the Federal government in five years because they are scheduled to be abandoned, demolished, sold or otherwise removed from government service. The purpose of adding this exemption is to not include in the cost estimate any building which is already scheduled to be removed from the Federal inventory and hence will not be part of this inventory for any future seismic rehabilitation actions. For purposes of this cost estimating exercise, any building which is scheduled to be given to the private sector within the next five years will be considered exempt. If the Federal government is passing on a facility which it knows to be seismically deficient to the private sector it should identify and/or act upon this information. The five years used in this exemption is not directly tied to any "base" year. The five years will be a "rolling" five years which starts from the time an agency is screening a particular building to identify exemptions.

Agencies are urged to keep in mind that the screening procedure used in developing this seismic inventory is specifically intended for developing a reasonable estimate of the cost of achieving adequate seismic safety. It may be appropriate to make simplifying assumptions in order to minimize the cost of developing the inventory and cost estimate. However, any assumptions made for purposes of this inventory should be verified for any building "triggered" for seismic evaluation and rehabilitation under Section 1 of Executive Order 12941. (Section 1 adopts RP4 seismic standards for evaluation, including specific triggers for action.) Any assumptions made in identifying exempt buildings should be documented in the supporting documentation.

RP4 exemptions are intended to remove from further consideration those buildings that present an extremely low threat to life-safety in the event of an earthquake. Agencies are urged to keep in mind that a "life safe" building may be severely damaged in an earthquake, to the extent that it is not salvageable. Therefore, it may be inappropriate to exempt some buildings that need a performance level higher than life-safety. For the purposes of this inventory and cost estimate, all buildings which require a level of performance higher than life-safety are to be classified as Essential. Agencies are encouraged to identify their Essential buildings prior to screening for exemptions. See Section 2.3.3 for guidance on identifying Essential buildings.

The most expedient process for identifying exempt buildings will vary from agency to agency, depending on what type of information they already have available. The goal of the screening process is to accurately identify exempt buildings by collecting only the minimum additional amount of information needed. The information needed will vary from agency to agency and building to building. Agencies should exempt first the most readily identifiable buildings. For example, agencies which include expected remaining life in their existing inventories will be quickly able to exempt buildings with fewer than five years of remaining life. Agencies which do not have this data readily available will want to identify as many other exemptions as possible before they start collecting information on expected remaining life.

One suggested screening methodology is given in Sections 2.2.3 and 2.2.4. The order of the exemption checks is given first in Section 2.2.3. The details of how to perform each exemption check follows in Section 2.2.4, in order of RP4 exemption.

2.2.3 One Possible Screening Process

1. Be sure the inventory includes only buildings, not other special structures (RP4 exemption c). Remove non-building listings from the inventory database.
2. Be sure the inventory includes only buildings owned by the Federal government, not private buildings on Federal land or buildings held in trust for others by the Federal government (RP4 exemption h). Remove these buildings from the database.
3. Be sure the inventory includes only buildings within the United States (as defined by Executive Order 12941, see first paragraphs of Section 2.2 above), not foreign buildings. Remove foreign buildings from the database.
4. Identify and mark as exempt all buildings with fewer than 5 years of remaining life.
5. Identify and mark as exempt all buildings designed for the Federal government after Jan. 5, 1990 (RP4 exemption h).
6. Identify all buildings less than 280 m^2 (3,000 square feet) in area; separate them into single-story and multi-story; for single story, determine whether building is wood or light steel frame; if yes, mark building as exempt (RP4 exemption d); all others are non-exempt unless they are exempt for some other reason.
7. Identify and mark as exempt all buildings that have been previously evaluated and judged OK (RP4 exemption g - agencies are encouraged to review Section 2.2.4 of this Handbook before using this exemption)
8. Identify and mark as exempt all buildings that have been previously rehabilitated (RP4 exemption e).
9. Identify and mark as exempt all one- and two-family dwellings in low seismic areas. In moderate seismic areas, identify and mark as exempt one- and two-family dwellings where $A_v < 0.15g$ (RP4 exemption b - See Table A-1 in Appendix A for identification of areas with $A_v < 0.15g$).
10. Identify and mark as exempt agricultural buildings and those with minimal human occupancy (RP4 exemption a).
11. Identify and mark as exempt all buildings designed during or after the benchmark year appropriate for the building structural type and location (RP4 exemption f).

2.2.4 RP4 Exemptions and How to Identify Them

RP4 exemptions are reprinted below in italics. Non-italicized text provides suggestions on how to identify the exempt buildings.

a. buildings classified for agricultural use, or intended only for incidental human occupancy, or occupied by persons for a total of less than 2 hours a day

Most agencies will probably not have this type of information in their existing database in this exact form. However, agencies should, within their GSA-required database, have each building (or group of buildings) identified by occupancy class. (Occupancy classes are described in more detail in Section 2.3.3.) Buildings that will be exempt for the reasons cited above will most likely be classified in the "storage" and "miscellaneous" occupancy classes. Additional information that is already available should be used to identify the exempt buildings within these classes. For example, buildings housing unmanned data-collection instruments or storing infrequently used equipment could be readily identified as intended only for incidental human occupancy. Other buildings will be readily identifiable as <u>not</u> belonging in this category, for example offices, schools, hospitals, and so forth. Once the clearly exempt and clearly non-exempt buildings have been identified, a person at each site who is familiar with their use should be asked to determine whether each of the remaining buildings is exempt for this reason or not.

b. detached one- and two- family dwellings that are located in areas having a governing acceleration coefficient less than 0.15 (within the United States, where A_v is less than 0.15 as delineated on Map 4 of the 1991 NEHRP Recommended Provisions for the Development of Seismic Regulations for New Buildings [BSSC, 1992]), (note: Map 4 is identical in the 1991 and 1994 editions of the NEHRP Recommended Provisions).

To be exempt under this criteria, a building must meet three criteria: 1) it must be a residence (a category tracked in the GSA database); 2) it must be a detached one- or two-family dwelling (this information is not available in the GSA database); and 3) it must be located where expected seismic ground accelerations are less than 0.15g. To eliminate unnecessary effort in distinguishing between multifamily housing units and detached dwellings, the inventory should first be sorted by seismicity. Tables A-1 and A-2 in Appendix A of this document list those states and counties and territories that are mapped on the specified NEHRP map as expecting A_v below 0.15g. Only those buildings categorized as housing in the $A_v < 0.15$g states and counties need be assessed for possible exemption under this category. Housing where $A_v \geq 0.15$ is not exempt unless it qualifies as exempt for some other reason.

The GSA-required inventory occupancy class for housing does not require a distinction between one- and two-family dwellings, apartment buildings, barracks, and the like. A reasonable assumption that could be used in making this distinction is that if a building is smaller than 185 m^2 (2,000 square feet) it is a one-family dwelling (exempt) and if it is larger than 465 m^2 (5,000) it houses three or more families or is a barracks (non-exempt for this category). For the in-between size buildings classified as housing (that are in areas of A_v less than 0.15), a person familiar with the site should be asked to indicate which are one- or two-

family dwellings.

Agencies are reminded that the simplifying assumptions made for the purposes of developing the cost estimate required under Section 2 of Executive Order 12941 should be verified for every exempt building which is "triggered" for seismic evaluation under Section 1 of Executive Order 12941 (details listed in Section 2.1 of RP4) to ascertain that the building is indeed exempt from evaluation.

c. *special structures including, but not limited to: bridges, transmission towers, industrial towers and equipment, piers and wharves, and hydraulic structures*

Within the GSA-required inventory, buildings are identified with the code 30 to differentiate them from land (code 20) and other types of structures (code 40). If agencies have reason to believe that some of the types of structures defined as exempt in RP4 have been labeled with code 30 for GSA-reporting purposes, an effort should be made to identify the non-building structures and remove them from the inventory database.

d. *one-story buildings of steel light frame or wood construction with areas less than 280 m^2 (3000 square feet)*

In order to qualify for this exemption, a building must meet three different criteria: it must be small; it must be one-story; and it must be of steel light frame or wood construction. Agencies that have already collected information on all three of these criteria will have no trouble sorting their inventory to identify these buildings. Many agencies will only have information on size, and will have to collect additional information.

The logical first step is to sort out the small buildings (less than 280 m^2) for further investigation. In the GSA database, all individual buildings smaller than 3,000 square feet would be potentially eligible for exemption. Groups of buildings with a total collective area of less than 3,000 square feet are also potentially eligible for exemption. Groups with sum total areas larger than 3,000 square feet may have one or more buildings smaller than the minimum and thus eligible for exemption. A precise and complete approach to the effort to exempt buildings would require that all groups of buildings be broken down into their constituent individual building listings. Presumably this could be done by returning to the source of the original data submission. However, it may be possible for some agencies to make reasonable assumptions to limit effort spent at this point in breaking apart groups of buildings. For example, groups of certain occupancy classes, such as hospitals, prisons, and schools, are very unlikely to have any small buildings among them. Agencies should consider the characteristics of their own building population, and, bringing to bear any additional information that may be available, identify those groups with an average size (the total area divided by the number of buildings in the group) of 280 m^2 or less that are unlikely to contain any individual large (non-exempt) buildings. These groups need not be broken down into their constituent individual buildings. (Those planning this inventory effort should keep in mind that most non-exempt buildings must be listed on a building-by-building basis, so many groups of buildings will need to be broken down into their individual listings in any case if the agency starts with the GSA database.)

The next two steps for each potentially exempt small building are probably most efficiently accomplished if done at the same time: determine whether the building is one-story, and whether it is light steel frame or wood construction. The most-complete and accurate approach would be to have a person on site make the distinction for all the identified small buildings. However, some reasonable assumptions may be appropriate in order to minimize the level of on-site effort. For example, in some parks it may be reasonable to assume that all picnic shelters, restrooms, and cabins are one-story wood buildings, and thus are exempt. In other parks, the cabins may be one-story and wood (exempt), but the restrooms and picnic shelters may be masonry (non-exempt).

e. fully-rehabilitated buildings which comply with the RP4 seismic safety standards in all four compliance categories (structural, nonstructural, geologic/site hazards, and adjacency)

Some agencies maintain records in a central office of those buildings which have been seismically rehabilitated. For those agencies, identifying buildings exempt for the above reason will be straightforward. The rehabilitation criteria should be briefly reviewed to ascertain that structural, nonstructural, geologic/site hazards, and adjacency issues were reasonably considered at the time of the rehabilitation.

For agencies without a central repository of information on seismic rehabilitation, identifying buildings exempt for this reason may be extremely difficult. Each facility manager should be asked to identify which of the buildings on the site have been rehabilitated.

f. post-benchmark buildings as defined in Table 1 of RP4 which also comply with the nonstructural, geologic/site, and adjacency compliance categories

Table 1 of RP4 (reproduced at the end of this Section as Table 2-3) tabulates suggested "benchmark years", by code or standard and structural system, for use in identifying exempt buildings. A benchmark year is the year a given code or standard first adopted what is now considered modern seismic design requirements for a particular type of building. Any building designed and built using the requirements of the benchmark year (or more recent) code or standard is assumed to provide adequate seismic resistance for life-safety purposes, and can be exempted.

Benchmark years vary in different regions of the country because the three major model codes (BOCA, SBCCI, and UBC) that serve as the basis for the legally enforceable local codes incorporated seismic design requirements at different points in time. Typically, benchmark years are later in the midwest, south, and east than they are on the west coast because BOCA and SBCCI model codes, which are in dominant use in those areas, adopted improvements in seismic design several years after the UBC. Table 2-1 lists the areas of the country, by state, in which the three major model codes have traditionally been used.

Benchmark years also vary by model building type, because the engineering community understood the particular problems of some types of structures before others. Thus, some parts of the codes became "modern" before others were, because information became available at different points in time. For some types of structural systems, there is no

benchmark year listed. These are typically systems no longer used in regions of high seismicity; the seismic safety of such systems in regions of moderate and low seismicity is not well understood.

Table 2-1 - Predominant Building Code Use

Model Code	States and Territories of Predominant use
BOCA	Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, Maryland, Washington DC, Pennsylvania, Virginia, West Virginia, Ohio, Michigan, Illinois, Missouri, Oklahoma, Kentucky,
SBCCI	North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas, Tennessee, Southeastern Texas (Beaumont, Brownsville, Bryan, Corpus Christi, El Paso, Laredo, Temple, Texarkana, Tyler, Waco)
UBC	North Dakota, South Dakota, Iowa, Kansas, Nebraska, Wyoming, Montana, Colorado, New Mexico, Arizona, Utah, Idaho, Washington, Oregon, Nevada, California, Minnesota, Indiana, Hawaii, Alaska, Guam, Virgin Islands (for public works), Northwest Texas (Abilene, Amarillo, Arlington, Austin, Dallas, Fort Worth, Garland, Houston, Irving, Lubbock, Plano, San Antonio)
State-written or Territory-written	New York , Wisconsin, Puerto Rico, Virgin Islands

The benchmark years given in RP4 are advisory only. Each agency may develop its own list of appropriate benchmark years for the various model building types in various parts of the country. This is especially appropriate for the Defense agencies, for example, that have for many years used their own design procedures and have not used the model building codes. It is also appropriate for agencies such as GSA, that have required for many years that all their buildings, across the country, be designed and built for seismic concerns using the appropriate sections of the UBC, rather than using whichever model building code happened to be in use at that location. Each agency can establish their own benchmark years; those using other than the RP4 benchmark years must report what they used and the rationale behind it in the supporting documentation.

A default procedure for identifying exempt buildings based on RP4 benchmark years is given in this section. The following considerations were taken into account in developing this procedure.

- Because it generally takes a year or more for changes in the model codes to be adopted into the locally enforceable code, the date used for allowing exemptions is one year later than the benchmark year in RP4 Table 1. (Note: This is an assumption based on the average amount of time for updated information to be included in a local code. If an agency knows that the code which the agency followed did not meet these benchmark years, it should use agency specific benchmark years).

- No benchmark years are listed in RP4 Table 1 for several structural systems. There are two reasons for this. First some systems represent little risk, such as wood and light metal

frame. Second, some systems are no longer allowed in regions of high seismicity (where the UBC predominates). For this default exemption procedure, it is reasonable to make the following assumptions:

- for the systems which represent little risk, it is conservative to use the same benchmark year as for the majority of other types of construction.

- for the systems which are disallowed-in-high-seismicity areas, it is reasonable to assume 1) that these construction types were not used in high seismic areas after they became disallowed, therefore there will not be any buildings of these structural types which have a construction date after the benchmark date and 2) that these structural systems provide adequate safety under current design loads in regions of moderate and low seismicity (where BOCA and SBCCI codes predominate). Therefore, the same benchmark year is used for these un-assigned types as for the majority of the other structural systems for a given model code.

- Where recommended benchmark years in RP4 Table 1 for a given model code vary based on model building type, the latest year listed is used for all model building types (steel braced frames excepted). This is a conservative assumption.

For purposes of practical application, the benchmark year table is simplified as follows:

Table 2-2 - Simplified Benchmark Years

Building Type / Model Code	BOCA	SBCCI	UBC
Steel Braced Frame	1991	1992	1989
All Other	1988	1992	1977

In order to identify buildings exempt by virtue of benchmark year, the year of design must be known. The GSA-required database includes a year of acquisition. This may be later than the year of design, for either or both of two reasons. 1) Buildings may have been pre-existing when acquired by the Federal government. 2) Buildings may have been constructed several years after being designed. Therefore, assuming that the date of acquisition is the same as the date of design is a non-conservative assumption. Each agency should consider whether their population of buildings was acquired primarily as pre-existing buildings or was primarily designed and built specifically for Federal use. If the latter is the case and no ready source of information on date of design is available, it is reasonable to assume that the date of acquisition and the date of design are the same. If this assumption cannot be made, information on actual date of design must be sought out on a building-by-building basis.

To be exempt, the building must not only have been designed after the relevant benchmark year, but must also provide the nonstructural, geologic/site hazard, and adjacency safety levels specified in RP4. For the purposes of this cost estimate, where this information is not

readily available, it is reasonable to assume that the building meets these requirements if it meets the benchmark year. However, if the agency does have information regarding the geologic/site and adjacency conditions of a building, the agency should include this information in its consideration of this exemption. The effects of geologic conditions and adjacency concerns can have large implications on the seismic safety as well as the cost to rehabilitate a building in many instances.

Again, agencies are reminded that the simplifying assumptions made for the purposes of developing the cost estimate required under Section 2 of Executive Order 12941 should be verified for every exempt building which is "triggered" for seismic evaluation under Section 1 of Executive Order 12941 (Section 2.1 of RP4) to ascertain that the building is indeed exempt from evaluation.

To use this default procedure to identify exempt buildings based on benchmark year, sort the list of buildings by state into the three model code categories. Within SBCCI-controlled buildings, all buildings designed in or after 1992 may be considered exempt. For BOCA- and UBC-controlled buildings, identify those which are steel braced frame buildings. Steel braced frame buildings designed in or after 1991 for BOCA-controlled buildings and in or after 1989 for UBC-controlled buildings are exempt. Other BOCA-controlled buildings designed in or after 1988 are exempt. Other UBC-controlled buildings designed in or after 1977 are exempt.

g. pre-benchmark buildings which have been shown by evaluation to be life-safe in all four compliance categories

If a building has been evaluated for seismic safety prior to the adoption of Executive Order 12941 and found to provide adequate seismic safety, and if the owning agency feels that the previous evaluation adequately addressed nonstructural, geologic/site hazard, and adjacency issues in addition to structural concerns, then there is no need to re-evaluate the building.

However, if an agency reports these buildings as exempt, they will not be included in the sample of buildings evaluated by the agency. It is recommended that agencies consider <u>not</u> reporting these buildings as exempt but instead making a point to include them in the sample of evaluated buildings in order to receive "credit" for work already completed. For further details on reporting previously evaluated buildings see Section 3.1.3 of this Handbook.

For agencies which maintain a central list of buildings which have been evaluated and rehabilitated, identifying these buildings will be relatively easy. Other agencies should contact facility managers and ask them which, if any, buildings on their site have been previously evaluated for seismic safety.

h. buildings constructed for the Federal government whose detailed design was done after the date of the adoption of Executive Order 12699 (January 5, 1990) and that were designed and constructed in accordance with the ICSSC Guidelines and Procedures for Implementation of the Executive Order on Seismic Safety of New Building Construction

Executive Order 12699 requires that buildings newly designed and constructed <u>for the Federal</u>

government after Jan 5, 1990 use appropriate standards of seismic safety. Unless the agency has reason to believe that they have not followed this policy, all buildings newly built for the agency in 1990 or later may be exempted, regardless of structural system, occupancy, seismicity, or other concern.

i. leased buildings identified in Section 1.3.2 as exempt

Leased buildings are not to be included in the separate inventory database of owned buildings.

j. Federally permitted or regulated privately owned buildings on Federal land.

Only Federally owned buildings should be included in the inventory database of owned buildings. On the GSA database, some buildings are identified with the code letter "T". These buildings are held in trust by the Federal government on behalf of private owners. They need not be included in the owned-building inventory, and may be exempted under this provision.

Table 2-3 - RP4 Table 1: Advisory Benchmark Years

		Model Building Seismic Design Provisions				
FEMA 178[1]	BUILDING TYPE	BOCA	SBCCI	UBC	ANSI	NEHRP
1,2	Wood Frame, Wood Shear Panels	**	**	1949	**	**
3	Steel Moment Resisting Frame (MRF)	1987	1991	1976	1982	1985
4	Steel Braced Frame	1990	1991	1988	*	1991
5	Light Metal Frame	*	*	*	*	*
6	Steel Frame w/ Concrete Shear Walls	1987	1991	1976	1982	1985
8	Reinf. Conc. Moment Resisting Frame	1987	1991	1976	1982	1985
9	Reinf. Concrete Shear Walls w/o MRF	1987	1991	1976	1982	1985
10,7	Steel or Concrete Frame w/ URM Infill	*	*	*	*	*
11	Tilt-up Concrete	1987	1991	1973	1982	1985
12	Precast Concrete Frame	*	*	*	*	*
13,14	Reinforced Masonry	1987	1991	1976	1982	1985
15	Unreinforced Masonry (URM)	*	*	*	*	*

[1] The tabulated numbers refer to the 15 common building types as they are defined in FEMA 178.

* Indicates no benchmark year (no comprehensive seismic requirements for these buildings exist).
** Local provisions for wood construction need to be compared to 1949 UBC to determine benchmark year.

BOCA - Building Officials and Code Administrators, National Building Code. (BOCA adopted the NEHRP 1991 seismic provisions in a 1992 Addendum to their 1990 edition.)

SBCCI - Southern Building Code Congress, Standard Building Code. (SBCCI adopted the NEHRP 1991 seismic provisions in a 1992 Addendum to their 1991 edition.)

UBC - International Conference of Building Officials, Uniform Building Code.

ANSI - American National Standards Institute, A58.1, Minimum Design Loads for Buildings and Other Structures. (Currently called ASCE 7)

NEHRP - Federal Emergency Management Agency, NEHRP Recommended Provisions for the Development of Seismic Regulations for New Buildings.

2.3 Required Inventory Data

The results of the inventory/screening process are to be reported in the agency inventory database. Table 2-4 (reproduced from RP5) indicates the types of information that are to be reported for each of three categories of buildings: 1) exempt, 2) non-exempt and non-evaluated, and 3) non-exempt and evaluated. Section 3 of this Handbook offers suggestions on selecting buildings for evaluation and discusses evaluation procedures. The required format for the electronic database is described in detail in Section 5 of this Handbook.

2.3.1 Data Needed for All Buildings

Regardless of whether a building (or group of buildings) is exempt or not, the following basic information is required in the inventory database.

Agency Code: The agency code is the four digit numerical code used by the GSA Real Property Database to identify which agency owns a specific building(s). See Section 5 for a listing of these codes. (If your agency does not appear on the list of codes in Section 5 please contact the ICSSC Technical Secretariat for assistance.)

Unique Identifier: The unique identifier may be whatever alpha-numeric designation the agency uses to track its buildings in its own real property inventory. It may be an address, a coded number, or some other method of identifying a specific building in the database. If desired, agencies may use a coding system to preserve the anonymity of specific buildings within their inventory database. However, agencies must maintain a record linking each unique identifier to a specific building, should the need ever arise to identify a specific structure. Specific format/reporting requirements are given in Section 5.

Location: Location by state and county is to be reported for each building (or group of buildings). This information already exists in the GSA-required database. The seismic inventory will use the same state and county codes that are used in the GSA database. See Tables A-1 and A-2 in Appendix A of this Handbook for a complete listing of these codes.

Seismicity: Each building (or group of buildings) is to be assigned to one of three seismicity levels: Low, Moderate, or High. Seismicity levels are defined by the Map Areas given on Map 2 (A_v, county-by-county) in the 1994 *NEHRP Recommended Provisions* [BSSC, 1995].

Low seismicity	Map Areas 1 & 2
Moderate seismicity	Map Areas 3 & 4
High seismicity	Map Areas 5, 6, & 7

State and county codes may be used to rapidly assign each building (or group of buildings) to the proper seismicity. See Tables A-1 and A-2 in Appendix A of this Handbook for a tabulation of the appropriate seismicity level given by state and county.

Persons with moderate computer skills should be able to devise algorithms appropriate to software being used that would automate the process of assigning seismicity level based on state and county codes.

Agencies that wish to make finer distinctions of seismicity than is possible using county-by-county maps are encouraged to use the contour map for acceleration A_v (map number 4) from the 1994 *NEHRP Recommended Provisions for the Development of Seismic Regulations for New Buildings*. The following mapped accelerations are associated with each seismicity level:

Low seismicity	$A_v < 0.10g$
Moderate seismicity	$0.10g \leq A_v < 0.20g$
High seismicity	$0.20g \leq A_v$

If some other method of assigning buildings to seismicity ranges is used, the method is to be described in the supporting documentation.

Area (Size): The size of the building is to be reported in square meters. This includes the area of all stories of the building, not just the footprint area. Existing information on area that is reported in square feet can be converted to square meters by multiplying the entry by 0.0929. It should be possible to automate this conversion in all spreadsheet programs and some database and word processing programs.

2.3.2 Additional Data Needed for Exempt Buildings

For exempt buildings, in addition to agency code, unique identifier, location, seismicity, and area (size), the database is to indicate the reason for exemption. See Section 2.2.2 of this Handbook for suggested methods for identifying exempt buildings; see Section 5 for a list of codes to use in the database to describe the reason for exemption. Note that, for groups of buildings in the same state, county and seismicity with the same reason for exemption that are reported collectively, the number of buildings in the group must also be reported, and the reported area is to be the cumulative total area of all buildings in the group.

The information items tabulated in Table 2-4 for exempt buildings (agency code, unique identifier, location, seismicity, area (size), and reason for exemption) are the minimum amounts of information required to be reported. However, for many exempt buildings, additional information will have been collected during the screening process. Agencies are encouraged to report all the available information for each building or group of buildings, even though the information is not specifically required.

2.3.3 Additional Data Needed for Non-Exempt Buildings

Additional information required for all non-exempt buildings includes: occupancy class, whether building is considered essential, whether building is historic, date of construction,

model building type, and number of stories. Each of these types of information is described in more detail below.

Occupancy Classes are to be the same as those used in creating the real-property inventory for annual submission to GSA. The 12 occupancy classes are:

- offices
- hospitals
- prisons
- schools
- post offices
- other institutional
- housing
- storage
- industrial
- service
- research & development
- miscellaneous

GSA does not provide standard definitions for these occupancy classes. The GSA codes were used for this category in order to accommodate agencies which are already using these codes. Some agencies, including the defense agencies, have other code systems set up which identify additional buildings categories. The defense agencies have drafted a list of their codes and correlated them to the GSA codes for use with this database. This list is reproduced in Appendix B. Other agencies which need to correlate their existing classifications with the GSA codes can use this as a guide.

Essential buildings are those which, in the judgement of the owning agency, require a level of seismic resistance that is higher than life-safety. (Life-safety is the minimum level of protection required by RP4. After an earthquake, an RP4 "life-safe" building should not have caused any fatalities, but it may be so badly damaged that it is no longer functional or even salvageable.) Examples of buildings which may fall into the essential category are:

- hospitals, fire and police stations, communication and command centers and other buildings that must remain functional in order to respond to an earthquake emergency;
- buildings which must remain operational after an earthquake to maintain critical agency functions;
- buildings housing hazardous materials which, if released as a result of an earthquake, would create an unacceptable risk; and
- buildings housing vulnerable populations or extremely valuable contents.

Some agencies have already established agency-specific definitions of essential buildings. A few of these are published here to provide guidance for agencies which have not yet established their definitions.

a) The Air Force defines essential buildings as any building which must remain occupied and functional during an earthquake as well as any buildings which houses a function necessary for post-disaster recovery. This includes hospitals, fire stations, communications centers, disaster preparedness offices, weapons storage, petroleum storage, chemical storage and buildings housing other hazardous materials.

b) The Army defines essential buildings as the following:

- Hospitals and other medical facilities having surgery and emergency treatment areas.
- Fire and police stations.
- Tanks or other structures containing, housing, or supporting water or other fire-suppression materials or equipment required for the protection of essential or hazardous facilities, or special occupancy structures.
- Emergency vehicle and equipment shelters and garages.
- Structures and equipment in emergency preparedness centers.
- Stand-by power generating equipment for essential facilities.
- Structures and equipment in communication centers and other facilities required for emergency response.

Buildings which do not require greater than life-safety protection are to be categorized as "other". Section 5 gives details on the codes and format to use in the electronically reported database.

Historic buildings are those which are included on any local, regional, state, national, or other register of historic buildings. If a building is potentially qualified to be on a historic register, but has not been actually listed, it is not to be deemed historic in this inventory.

Date of Construction is not always the same as date of acquisition by the government. The latter is tracked in the GSA database. For non-exempt buildings, an effort should be made to identify, as nearly as possible, the actual year of construction. If the year of design is significantly earlier than the year of construction, the year of design should be the date reported.

Model Building Types reported in this inventory are to be the 15 types identified in FEMA 178, *NEHRP Handbook for the Seismic Evaluation of Existing Buildings* [BSSC, 1992]. Guidance on how to identify the 15 model building types is given in *Rapid Visual Screening* [ATC, 1988]. Wherever possible, it is recommended that a civil or structural engineer identify the structural type, because it has been shown that, even with *Rapid Visual Screening*-type training, non-engineers frequently mis-identify structural type. See Section 5 for codes to use in reporting model building type. The 15 model building types from FEMA 178 are reproduced below:

Building Type 1 - Wood, Light Frame: These buildings are typically single- or multiple-family dwellings of one or more stories. The essential structural character of this type is repetitive framing by wood joists on wood studs. Loads are light and spans are small. These buildings may have relatively heavy chimneys and may be partially or fully covered with veneer. Most of these buildings are not engineered; however, they usually have the components of a lateral-force-resisting system even though it may be incomplete. Lateral loads are transferred by diaphragms to shear walls. The diaphragms are roof panels and floors. Shear walls are exterior walls sheathed with plank siding, stucco, plywood, gypsum board, particle board, or fiberboard. Interior partitions are sheathed with plaster or gypsum board.

Building Type 2 - Wood, Commercial and Industrial: These buildings usually are commercial or industrial buildings with a floor area of 465 square meters (5,000 square feet) or more and with few, if any, interior walls. The essential structural character is framing by beams on columns. The beams may be glulam beams, steel beams or trusses. Lateral forces usually are resisted by wood diaphragms and exterior walls sheathed with plywood, stucco, plaster, or other paneling. The walls may have rod bracing. Large openings for stores and garages often require post-and-beam framing. Lateral force resistance on those lines can be achieved with rigid steel frames or diagonal bracing.

Building Type 3 - Steel Moment Frame: These buildings have a frame of steel columns and beams. In some cases, the beam-to-column connections have very small moment resisting capacity but, in other cases, some of the beams and columns are fully developed as moment frames to resist lateral forces. Usually the structure is concealed on the outside by exterior walls, which can be of almost any material (curtain walls, brick masonry, or precast concrete panels), and on the inside by ceilings and column furring. Lateral loads are transferred by diaphragms to moment resisting frames. The diaphragms can be of almost any material. The frames develop their stiffness by full or partial moments connections. The frames can be located almost anywhere in the building. Usually the columns have their strong directions oriented so that some columns act primarily in one direction while the others act in the other direction, and the frames consist of lines of strong columns and their intervening beams. Steel moment frame buildings are typically more flexible than shear wall buildings. This low stiffness can result in large interstory drifts that may lead to extensive nonstructural damage.

Building Type 4 - Steel Braced Frame: These buildings are similar to Type 3 buildings except that the vertical components of the lateral-force-resisting system are braced frames rather than moment frames.

Building Type 5 - Steel Light Frame: These buildings are pre-engineered and prefabricated with transverse rigid frames. The roof and walls consist of lightweight panels. The frames are designed for maximum efficiency, often with tapered beam and column sections built up of light plates. The frames are built in segments and assembled in the field with bolted joints. Lateral loads in the transverse direction are resisted by the rigid frames with loads distributed to them by shear elements. Loads in the longitudinal direction are resisted entirely by shear elements. The shear elements can be either the roof and wall sheathing panels, an independent system of tension-only rod bracing, or a combination of panels and bracing.

Building Type 6 - Steel Frame with Concrete Shear Walls: The shear walls in these buildings are cast-in-place concrete and may be bearing walls. The steel frame is designed for vertical loads only. Lateral loads are transferred by diaphragms of almost any material to the shear walls. The steel frame may provide a secondary lateral-force-resisting system depending on the stiffness of the frame and the moment capacity of the beam-column connections. In modern "dual" systems, the steel moment frames are designed to work together with the concrete shear walls in proportion to their relative rigidities. In this case, the walls would be evaluated under this building type and the frames would be evaluated under Type 3, Steel Moment Frames.

Building Type 7 - Steel Frame with Infill Shear Walls: This is one of the older types of building. The infill walls are offset from the exterior frames members, wrap around them, and present a smooth masonry exterior with no indication of the frame. Solidly infilled masonry panels act as a diagonal compression strut between the intersections of the moment frame. If the walls do not fully engage the frame members (i.e., lie in the same plane), the diagonal compression struts will not develop. The peak strength of the diagonal strut is determined by the tensile stress capacity of the masonry panel. The post-cracking strength is determined by an analysis of a moment frame that is partially restrained by the cracked infill. The analysis should be based on published research and should treat the system as a composite of a frame and an infill. An analysis that attempts to treat the system as a frame and shear wall is not capable of assuring compatibility.

Building Type 8 - Concrete Moment Frames: These buildings are similar to Type 3 buildings except that the frames are of concrete. Some older concrete frames may be proportioned and detailed such that brittle failure can occur. There is a large variety of frame systems. Buildings in zones of low seismicity or older buildings in zones of high seismicity can have frame beams that have broad shallow cross sections or are simply the column strips of flat-slabs. Modern frames in zones of high seismicity are detailed for ductile behavior and the beams and columns have definitely regulated proportions.

Building Type 9 - Concrete Shear Walls: The vertical components of the lateral-force-resisting system in these buildings are concrete shear walls that are usually bearing walls. In older buildings, the walls often quite extensive and the wall stresses are low but reinforcing is light. When remodeling calls for enlarging the windows, the strength of the modified walls becomes a critical concern. In newer buildings, the shear walls often are limited in extent, thus generating concerns about boundary members and overturning forces.

Building Type 10 - Concrete Frame with Infill Shear Walls: These buildings are similar to Type 7 buildings except that the frame is of reinforced concrete. The analysis of this building is similar to that recommended for Type 7 except that the shear strength of the concrete columns, after cracking of the infill, may limit the semiductile behavior of the system. Research that is specific to confinement of the infill by reinforced concrete frames should be used for the analysis.

Building Type 11 - Precast/Tilt-Up Concrete Walls with Lightweight Flexible Diaphragm: These buildings have a wood or metal deck roof diaphragm, which often is very large, that distributes lateral forces to precast concrete shear walls. The walls are thin but relatively heavy while the roofs are relatively light. Older buildings often have inadequate connections for anchorage of the walls to the roof for out-of-plane forces, and the panel connections often are brittle. Tilt-up buildings often have more than one story. Walls can have numerous openings for doors and windows of such size that the wall looks more like a frame than a shear wall.

Building Type 12 - Precast Concrete Frames with Concrete Shear Walls: These buildings contain floor and roof diaphragms typically composed of precast concrete elements with or without cast-in-place concrete topping slabs. The diaphragms are

supported by precast concrete girders and columns. The girders often bear on column corbels. Closure strips between precast floor elements and beam-column joints usually are cast-in-place concrete. Welded steel inserts often are used to interconnect precast elements. Lateral loads are resisted by precast or cast-in-place concrete shear walls. Buildings with precast frames and concrete shear walls should perform well if the details used to connect the structural elements have sufficient strength and displacement capacity; however, in some cases, the connection details between the precast elements have negligible ductility.

Building Type 13 - Reinforced Masonry Bearing Walls with Wood or Metal Deck Diaphragms: These buildings have perimeter bearing walls of reinforced brick or concrete-block masonry. These walls are the vertical elements in the lateral-force-resisting system. The floors and roofs are framed either with wood joists and beams with plywood or straight or diagonal sheathing or with steel beams with metal deck with or without a concrete fill. Wood floor framing is supported by interior wood posts or steel columns; steel beams are supported by steel columns.

Building Type 14 - Reinforced Masonry Bearing Walls with Precast Concrete Diaphragms: These buildings have bearing walls similar to those of Type 13 buildings, but the roof and floors are composed of precast concrete elements such as planks or tee-beams and the precast roof and floor elements are supported on interior beams and columns of steel or concrete (cast-in-place or precast). The precast horizontal elements often have a cast-in-place topping.

Building Type 15 - Unreinforced Masonry Bearing Wall Buildings: These buildings include structural elements that vary depending on the building's age and, to a lesser extent, its geographic location. In buildings built before 1900, the majority of floor and roof construction consists of wood sheathing supported by wood subframing. In large multistory buildings, the floors are cast-in-place concrete supported by wood subframing. In large multistory buildings, the floors are cast-in-place concrete supported by the unreinforced masonry walls and/or steel or concrete interior framing. In buildings built after 1950, unreinforced masonry buildings with wood floors usually have plywood rather than board sheathing. In regions of lower seismicity, buildings of this type constructed more recently can include floor and roof framing that consists of metal deck and concrete fill supported by steel framing elements. The perimeter walls, and possibly some interior walls, are unreinforced masonry. The walls may or may not be anchored to the diaphragms. Ties between the walls and diaphragms are more common for the bearing walls than for walls that are parallel to the floor framing. Roof ties usually are less common and more erratically spaced than those at the floor levels. Interior partitions that interconnect the floors and roof can have the effect of reducing diaphragm displacements.

Agencies should attempt to categorize each non-exempt building into one of these 15 model building types. If a building has a dual system which cannot be categorized as predominantly one model building type, or if a building system does not resemble in any way any of these model building types, the building can be entered in the electronic database with a model building type of "other" (see Table 5-4). A brief description of the building

construction should then be included in the "Comment" field of the database as well as in the supporting documentation.

Number of Stories to be reported is number of above ground stories, not including small penthouse stories such as those that house elevator equipment. For buildings with multiple levels, the number of stories in the highest level is the number to be reported.

Non-Exempt Evaluated Buildings

The Guidance (RP5) recommends that certain non-exempt buildings be selected for seismic evaluation in order to better estimate the potential cost of achieving adequate seismic safety in existing Federal buildings. Exempt buildings are those which clearly present a very low risk to life-safety in the event of an earthquake. This does not mean that non-exempt buildings automatically present a high risk. Some non-exempt buildings, upon evaluation, will be found to provide adequate seismic safety. At the present time, the ratio of adequate to deficient buildings is unknown. Some evaluations must be done in order to better estimate the percentage of non-exempt buildings which will provide adequate seismic safety without rehabilitation.

Section 3 of this Handbook offers guidance on selecting buildings for evaluation and on performing evaluations. Additional information to be reported for all buildings which are non-exempt and evaluated includes: whether the building is categorized as being an "exceptionally high risk"; the evaluation procedure used; soil type; foundation type; the outcome of the evaluation (OK or deficient); and, if deficient, then why deficient, the cost of rehabilitation, and the source of the cost estimate. Each of these types of information is described in more detail below.

Exceptionally High Risk or Other: RP5 directs agencies to identify all of their buildings which pose an "exceptionally high risk." Under the triggering requirements of RP4, which was adopted by the President in Executive Order 12941, these buildings must be evaluated for seismic safety. RP5 additionally directs agencies to evaluate a representative sample of their remaining non-exempt buildings. For reporting purposes, these two categories are to be distinguished in the inventory database.

Prior to seismic evaluation, the actual level of seismic risk in a building cannot be known with certainty, but reasonable estimates can be made to identify the buildings which are believed to pose the greatest risk. These are the buildings which are to be classified as exceptionally high risk. Exceptionally high risk buildings should not be confused with essential buildings. Essential buildings are those which require greater than life-safety performance in an earthquake. Some, but not all, of these buildings may be judged to pose an exceptionally high risk. Section 3 of this Handbook offers suggestions on how to identify exceptionally high risk buildings.

Evaluation Procedure Used: RP4 evaluation procedures represent a minimum acceptable level of investigation. Section 3.1.1 of this Handbook discusses situations in which other procedures are appropriate. Section 5 lists the codes to be used in the inventory database

to identify which evaluation procedure was used.

Soil Type: Soil types are to be categorized into one of the four soil categories identified in FEMA 178. These soil types are reproduced from FEMA 178 as follows:

Soil Profile Type	Profile with	Site Coefficient, S
S1	Rock of any characteristic, either shale-like or crystalline in nature. Such material may be characterized by a shear wave velocity greater than 2,500 feet per second or by any other appropriate means of classification. OR Stiff soil conditions where the soil depth is less than 200 feet and the soil types overlying rock are stable deposits of sands, gravels, or stiff clays.	1.0
S2	Deep cohesionless or stiff clay conditions including sites where the soil depth exceeds 200 feet and the soil types overlying rock are stable deposits of sands, gravels, or stiff clays.	1.2
S3	Soft- to medium-stiff clays and sands characterized by 30 feet or more of soft- to medium-stiff clays with or without intervening layers of sand or other cohesionless soils.	1.5
S4	More than 70 feet of soft clays or silts characterized by a shear wave velocity less than 400 feet per second.	2.0

Foundation Type: The foundation type is to be categorized into one of the following types:
shallow foundations - isolated or continuous spread footings or mats
deep foundations - piles or piers
other - intended for older foundation types which do not fall under one of the categories listed above and other non-typical systems

Outcome of Evaluation: OK or Deficient: The goal of the seismic evaluation is to determine whether the building provides adequate seismic safety as is (OK) or whether the building is deficient. Section 5 lists the codes to be used in the inventory database for reporting the outcome of the evaluation.

Non-Exempt Evaluated Buildings Found to be Deficient

For evaluated buildings found to be deficient, additional information, including an estimate of the cost of rehabilitation, must be collected or calculated and reported.

Why Deficient: According to the RP4 standard of seismic safety that is the minimum for use by Federal agencies, a building can fail the seismic evaluation because of structural or nonstructural deficiencies, site/geologic hazards, adjacency problems, or a combination of these. Agencies should take measures to ensure that the evaluating engineer reports the reason a building is found to be deficient in terms that can be readily related to the RP4 deficiencies. Section 5 lists the codes to be used in reporting the reason a building is found to be deficient in the inventory database.

Estimated Costs of Rehabilitation: Four different components of rehabilitation cost are to be separately reported. These include:

- structural (changes to the lateral force resisting system)
- nonstructural (changes to other parts of the building and to building equipment, systems, and contents)
- finishing (costs of removing and replacing finishes such as wallboard, paint, carpet, etc.)
- project costs (design, testing, and permit fees, cost of project management, etc.)

Costs of other upgrades triggered by the rehabilitation effort (such as handicapped access, asbestos removal, etc.) are not to be included. Details on what is and is not included in each of the cost components are given in Section 4 of this Handbook. Information on how the calculated costs are to be reported in the inventory database are given in Section 5.

Source of Cost Estimate: Acceptable cost estimation methods include the following:

1) Have the evaluating engineer develop a preliminary rehabilitation scheme appropriate for the specific structure and calculate the cost of the proposed fix. (Note, for this cost estimation method, the agency may use any nationally accepted seismic hazard map or available site-specific study as the source of ground motion acceleration. No specific map is mandated for use.)
2) Use agency-specific cost estimating procedures. Include detailed information on the procedure used in supporting information that is submitted.
3) Use default method: Follow cost estimating Option II in *Typical Costs for Seismic Rehabilitation, Volume I* (FEMA 156) [FEMA, 1994]. Use *Typical Costs for Seismic Rehabilitation of Existing Buildings, Volume II* (FEMA 157) [FEMA, 1995] to estimate nonstructural, etc. costs.
4) If, instead of being rehabilitated, the building would be replaced, a replacement cost should be reported instead of a rehabilitation cost, and so noted.
5) If, instead of being rehabilitated, the building would be abandoned and not replaced, the rehabilitation cost should be the cost of disposal. If no disposal cost is anticipated, the rehabilitation costs can be reported as zero.

The codes used to indicate which of these cost estimating methods was used are given in Section 5 of this Handbook.

Table 2-4 - Required Inventory Data for Owned Buildings

Characteristic	Exempt	Non-Exempt, Not Evaluated	Non-Exempt, Evaluated
Unique Identifier (2 fields)	X	X	X
Location - State & County (2 fields)	X	X	X
Seismicity - High, Moderate or Low	X	X	X
Area in Square Meters (2 fields)	X	X	X
Reason for Exemption	X	X	X
Occupancy Class (by GSA categories)		X	X
Essential or Other		X	X
Historic or Non-Historic		X	X
Date of Construction		X	X
Model Building Type		X	X
Number of Stories		X	X
Exceptionally High Risk or Other			X
Evaluation Procedure Used			X
Soil Type			X
Foundation Type			X
Outcome of Evaluation: OK or Deficient			X
For Deficient Only: Why Deficient (4 fields)			X
For Deficient Only: Estimated Costs of Rehab(4 fields)			X
For Deficient Only: Source of Cost Estimate			X

NOTE: Each of the characteristics are to be reported in a single field in the electronic database, unless otherwise noted above. Details of reporting (electronic format, codes for categories, field sizes, etc.) are contained in Section 5 of this Handbook.

3.0 EVALUATION PLAN

3.1 Selection of Buildings for Evaluation

The RP5 document states that agencies should evaluate buildings in two categories. First agencies should evaluate all of their exceptionally high risk buildings. Second, agencies should evaluate a representative sample of their remaining non-exempt buildings in high and moderate seismic areas. This means that once an agency has screened its inventory, identified all exempt buildings, and collected the additional information required for non-exempt buildings, the next step is to identify those buildings considered to be exceptionally high risk. All of these buildings should be evaluated. In addition, agencies should evaluate a representative sample of the non-exempt buildings which remain after the exceptionally high risk buildings are identified. The following sections give guidance for identifying the exceptionally high risk buildings and selecting the additional representative sample.

3.1.1 Evaluate All Exceptionally High Risk Buildings

Section 2.1 of RP4 gives conditions which require an agency to evaluate a building and mitigate any unacceptable seismic hazards found in that building. One of these "triggers" is if "the building is deemed by the agency to be an exceptionally high risk to occupants or the public at large." The purpose of this trigger is to identify those buildings which should be the highest priority in an agency's seismic mitigation program.

As part of the ICSSC recommended program, agencies should identify and evaluate all of their buildings perceived to pose an exceptionally high risk. In this way, the highest priority segment of the Federal inventory will be identified and an accurate cost estimate developed for the mitigation of unacceptable seismic risk in these facilities.

In assessing seismic risk, at least two factors must be considered: the probability of a damaging earthquake occurring at a specific location, and the potential consequences that such an earthquake would cause. For instance, a seismically deficient building poses a higher risk in a high seismic area than a similar building in a low seismic area due to the greater probability of an earthquake occurring in a high seismic area. However, a seismically deficient building which houses 2000 people and is located in a moderate seismic area poses a higher seismic risk than a seismically deficient building which stores paper supplies in a high seismic area because of the higher life-safety consequences.

There are several variables which can be used to determine the definition of an exceptionally high risk building, many of which will depend on the specific characteristics of an agency's inventory. The RP4 document does not give a definition of an exceptionally high risk building. This definition is left up to the individual agency in order to allow agency-appropriate definitions to be established. The following sections give guidance on how to identify exceptionally high risk buildings.

Identification of Exceptionally High Risk Buildings

Since seismic risk is a function of a combination of two separate variables, the probability of the occurrence of a damaging earthquake and the potential consequences of that earthquake, characteristics of an agency's inventory which relate to these two variables will be useful in this definition. The seismicity category identified in Section 2.3.1 is the best indicator of the chances of an earthquake occurring. A building which is located in a high seismicity area has a greater chance of having a damaging earthquake than a building located in a moderate seismicity area. Likewise, a building which is located in a moderate seismicity area has a greater chance of having a damaging earthquake than a building located in a low seismicity area. This does not mean that all exceptionally high risk buildings will be located in high seismic areas. It is possible that the consequences of having an earthquake in a moderate or low seismic area may be so unacceptable that this outweighs the difference in expected frequency or severity of an earthquake.

Indicators of the potential consequences that an earthquake may have on a building include whether the mission of the building is such that the building must survive an earthquake in order for the agency to use it immediately following an earthquake, how many people occupy the building and hence could be affected by damage to or collapse of the building, whether or not the structure of the building is a type historically shown to perform well or poorly in an earthquake, and whether there are hazardous contents stored in the building which could harm the occupants or the general public if the building were damaged or if it collapsed. These indicators can be summarized by using the occupancy class, the model building type, and a determination as to whether the building is mission essential.

The occupancy class, or usage category, of a building may be used to identify two risk characteristics. First, there are certain occupancies which must be functional after an earthquake occurs in order to be used in an emergency situation. These buildings include hospitals, fire stations, emergency operation centers, and some schools. Second, there are certain occupancies which are likely to hold large populations of people. These may include places of assembly, schools, production facilities, and some office buildings. Although the number of people in a building is not a required field in the inventory database, some agencies have this information for their buildings, or for certain buildings. Table 3-1 indicates an average occupancy for various types of buildings per 93 square meters (1000 sq. ft.) of floor area which can be used to estimate the relative number of occupants in various buildings.

Table 3-1 - Number of Occupants Per 93 Square Meters (1000 Sq Ft)

Residential	3.1
Office	4.0
Commercial	10.0
Industrial	2.5 - 5.0
Assembly	10.0

Numbers in this Table came from Table 4.12 of *Earthquake Damage Evaluation Data for California* (ATC-13) [ATC, 1985], and Table 6.4-3 of *Seismic Retrofitting Alternatives for San Francisco's Unreinforced Masonry Buildings: Estimates of Construction Cost & Seismic Damage* [Rutherford & Chekene].

The model building type can be an indicator of the expected behavior of the building in an earthquake. Certain building types have been shown to be more vulnerable than others during damaging earthquakes. These types include unreinforced masonry, non-ductile concrete moment frames, tilt-up concrete construction, and pre-cast concrete construction.

Finally, there are certain buildings, designated by the agency, which must remain functional after an earthquake to support mission objectives. These may include buildings which hold key agency personnel, buildings which hold hazardous materials, or buildings which hold expensive equipment. This designation is based on agency-specific reasons. Table 3-2 summarizes many of the indicators which can be used to determine exceptionally high seismic risk in a building.

Table 3-2 - Indicators of Potential for Higher Seismic Risk

Indicator of Higher Probability of Earthquake Occurrence:

Seismicity
High Seismic Areas (NEHRP Map Areas 5-7) Highest Probability
Moderate Seismic Areas (NEHRP Map Areas 3-4)
Low Seismic Areas (NEHRP Map Areas 1-2) Lowest Probability

Indicator of Higher Consequences of Earthquake Occurrence:

Occupancy Categories
Hospitals
Schools
Fire Stations
Emergency Operations Centers
Some Office Buildings
Places of Assembly

Vulnerable Model Building Types
Unreinforced Masonry
Tilt-Up Concrete Construction
Precast Construction
Non-Ductile Reinforced Concrete Frame

Agency Specific
Mission Essential Building
Buildings Which House Hazardous Materials
Buildings Which House Key Personnel
Buildings Which House Expensive Equipment

Agencies should use the combination of the indicators listed in Table 3-2 which is most appropriate for their particular inventory in order to identify exceptionally high risk buildings. For example, one appropriate way for an agency to approach their inventory would be as follows. First, the non-exempt inventory could be sorted into the three different seismicity areas, low, moderate and high. The group of buildings in the high seismicity area could be sorted into model building types. The buildings identified in the vulnerable model building types in Table 3-2 would be automatically included in the exceptionally high seismic risk category (it has been assumed that any building with no people in it has been previously exempted). The remaining model building types in the high seismicity group could be sorted into occupancy categories. Any building which is a hospital, fire station, emergency operations center or any otherwise mission essential building could be added to the exceptionally high risk category.

The group of buildings in the moderate seismicity area could be sorted into the model buildings types. These model building types could then each be sorted into occupancy categories. Any building which is one of the vulnerable building types discussed above and also houses an essential function, or also houses a large number of people (say over 300), could be added to the exceptionally high risk category.

The group of buildings in the low seismicity area could be sorted into the same categories as the moderate area. However, there probably will not be any buildings which jump out as definite exceptionally high risks as in the other two seismicity levels. This is because not as much information is available on seismic risks in low seismic areas. It is expected that a few buildings will fall in the exceptionally high risk category because they were not designed for seismic or wind effects and they house particularly important functions or large numbers of people. In examining the building population in the low seismic areas, agencies are urged to keep in mind that buildings which are designated as exceptionally high risk buildings will be the only buildings evaluated from the low seismic areas, since the RP5 guidance does not recommend that any buildings from low seismic areas be chosen for the representative sample. Therefore, agencies may wish to evaluate a few buildings in the low seismic area as part of their exceptionally high risk group to get a feel for the actual seismic risks in those areas. Because of this, an acceptable approach would be to select a few buildings which represent vulnerable model building types, which also house an essential function or a large number of people, and which in addition represent a type of building, such as an office, which is very common in the agency's inventory. This will give the agency some information on what risks may actually exist in this portion of their inventory.

The identification of the exceptionally high risk buildings does not mean that all remaining buildings have no seismic risk. It is meant only to indicate the first priority buildings with the most obvious high risk. If using the example selection procedure identifies too many buildings for the agency to evaluate, the agency could take a smaller subset of this risk group as their priority buildings. As a guideline, it is expected that five to ten percent of each agency's buildings in regions of high seismicity will fall into the exceptionally high risk category, along with one-half to one percent of the buildings in regions of moderate seismicity, and an extremely small percentage of the buildings in regions of low seismicity. Agencies with higher than average numbers of exemptions can expect to find their numbers of exceptionally high risk buildings to be at the low end of the range described.

As a further guide to identifying exceptionally high risk buildings, the following sections summarize two methodologies for prioritizing buildings prior to seismic evaluation. One was developed by the US Air Force and one by the US Department of Energy. Both are based on characteristics listed in Table 3-2. The Air Force approach also places emphasis on the building configuration. Agencies which do not want to develop their own prioritization method for identifying exceptionally high risk buildings can adopt one of these procedures or the example procedure.

Prioritization Process Used by the Air Force

The following prioritization process was developed by the Air Force to identify, for each base, the order in which buildings should be further evaluated and if necessary, have unacceptable hazards mitigated. This methodology introduces the variable of building configuration, which has not been previously discussed in this Handbook. The Air Force defines building configuration as either regular or irregular. Buildings with regular configurations have uniform proportions which retain a compact architectural form. Buildings with irregular configurations include abrupt changes in geometric shape (either plan or profile), are extremely large in plan, have excessive length-to-width proportions, or have a center of mass not coincident with the center of resistance. Large plan buildings, such as aircraft hangars, or warehousing, are considered irregular because the building will respond to earthquake shaking with different modes because of the long spans used in the construction. The more significant of the irregular configurations include the "soft story" (ground level story is less stiff than those above), discontinuous shear walls (location different between floors), and re-entrant corners (L-shape).

The first step of the Air Force process is to divide all buildings into Performance Objective Categories. The categories used by the Air Force are defined in Table 3-3. Within each Performance Objective Category, the Air Force then separates the buildings into the 15 model building types found in FEMA 178.

Buildings are next assigned a Risk Group. The Risk Groups are defined in Table 3-4. The order of evaluation then proceeds starting with the buildings in Risk Group A, Performance Objective Category I, Category III, Category IR, Category IV, Category IIIR, etc. The end result is a prioritization of buildings in the following order within the Risk Groups:

1. Risk Group A:

   Performance Category I - Buildings are in high seismic areas, buildings have an irregular configuration and buildings must remain functional during or be functional immediately following an earthquake.

   Performance Category III - Buildings are in high seismic areas, buildings have an irregular configuration and buildings contain a large number of people, or buildings house a service for a large number of other buildings, or buildings house high-value equipment.

Table 3-3 - Air Force Performance Objective Categories

IR	Immediate Occupancy, Regular Configuration - The building must remain occupied and functional during an earthquake and/or the building houses a function necessary for post-disaster recovery. This category includes hazardous buildings. Other examples are hospitals, fire stations, communications centers, disaster preparedness offices, weapons storage, petroleum storage, chemical storage, etc.
I	Immediate Occupancy, Irregular Configuration
IIIR	High Risk, Regular Configuration - This category includes buildings whose primary occupancy is the assembly of a large number of people or the confinement of people (prisons), buildings which house services for a large number of other buildings, or buildings which shelter high-value equipment. Examples of this category include theaters, dormitories, dining halls, aircraft hangars, central heat plants, water treatment plants, etc. This category does not include family housing unless there are more than two families within one building.
III	High Risk, Irregular Configuration
IVR	Other Buildings, Regular Configuration - Includes all buildings not included in the other categories.
IV	Other Buildings, Irregular Configuration
V	Other Hazards - This category includes buildings which are exempt from a detailed structural evaluation, but which may be subject to other hazards, such as nonstructural damage.

Table 3-4 - Air Force Risk Groups

Risk Group A: This is the highest priority group of buildings in the seismic risk inventory which may require seismic mitigation. This group contains all buildings in Performance Category I, IR, and III in high seismic areas (NEHRP Map Areas 5-7) and all buildings of the following model building types in high seismic areas: Precast/Tilt-Up Concrete Walls with Lightweight Flexible Diaphragms, Precast Concrete Frames with Concrete Shear Walls, Reinforced Masonry Bearing Walls with Wood or Metal Deck Diaphragms, Reinforced Masonry Bearing Walls with Precast Concrete Diaphragms, and Unreinforced Masonry Bearing Walls.

Risk Group B: This is the second highest priority group of buildings in the seismic risk inventory which may require seismic hazard mitigation. This group shall include any non-exempt buildings in NEHRP Map Areas 5-7 which are not in Risk Group A.

Risk Group C: This is the lowest priority group of buildings in the seismic risk inventory which may require seismic hazard mitigation. This Group includes all buildings in NEHRP Map Areas 4,3,2, and 1 and also includes all post-benchmark buildings which have not been evaluated for seismic hazards other than structural. This Group is further divided into Risk Group C_2 for buildings in moderate seismic areas (NEHRP Map Areas 3-4) and Risk Group C_1 for buildings in low seismic areas (NEHRP Map Areas 1-2).

Performance Category IR - Buildings are the same as listed above under Risk Group A, Performance Category I above but they are of regular configuration rather than irregular configuration.

Remaining Buildings - The remaining buildings in Risk Group A are buildings which are in high seismic areas, which are not in the three Performance Categories listed above but which are in the following model building types: Precast/Tilt-Up Concrete Walls with Lightweight Flexible Diaphragms, Precast Concrete Frames with Concrete Shear Walls, Reinforced Masonry Bearing Walls with Wood or Metal Deck Diaphragms, Reinforced Masonry Bearing Walls with Precast Concrete Diaphragms, and Unreinforced Masonry Bearing Walls.

2. Risk Group B:

Performance Category IV - Buildings are in high seismic areas, buildings have an irregular configuration and buildings represent standard life-safety occupancy.

Performance Category IIIR - Buildings are in high seismic areas, buildings have a regular configuration, and buildings contain a large number of people, or buildings house a service for a large number of other buildings, or buildings house high-value equipment.

Performance Category IVR - Buildings are in high seismic areas, buildings have a regular configuration and buildings represent a standard life-safety occupancy.

3. Risk Group C_2:

Performance Category I - Buildings are in moderate seismic areas, buildings have an irregular configuration and buildings must remain functional during or be functional immediately following an earthquake.

Performance Category III - Buildings are in moderate seismic areas, buildings have an irregular configuration and buildings contain a large number of people, or buildings house a service for a large number of other buildings, or buildings house high-value equipment.

Performance Category IR - Buildings are the same as listed above under Risk Group C_2, Performance Category I but they are of regular configuration rather than irregular configuration.

Performance Category IV - Buildings are in moderate seismic areas and buildings have an irregular configuration and buildings represent standard life-safety occupancy.

Performance Category IIIR - Buildings are in moderate seismic areas, buildings have a regular configuration, and buildings contain a large number of people, or buildings house a service for a large number of other buildings, or buildings house high-value equipment.

Performance Category IVR - Buildings are in moderate seismic areas, buildings have a regular configuration and buildings represent a standard life-safety occupancy.

4. Risk Group C_1:

These buildings proceed through evaluation in the same order as the Risk Group C_2 buildings except that they are in low seismic areas rather than moderate seismic areas.

Although Risk Group A is considered to be the highest priority for evaluation purposes, if buildings are discovered in Risk Group B which are considered to represent as high a seismic risk as the buildings in Risk Group A, these buildings can be moved up in the prioritization process.

For purposes of the Executive Order effort, the Air Force has defined their Exceptionally High Risk buildings as those buildings which fall into Risk Group A.

Prioritization Process Used by the Department of Energy

The following prioritization process was developed by the Department of Energy (DOE) to use on all of their buildings in order to screen out buildings of low seismic vulnerability and to direct initial detailed evaluation and mitigation efforts to the buildings which are at greatest potential seismic risk. The process defines two attributes for each building, assigns a numerical value to each attribute, and multiplies the attributes to produce a total score for the individual building. The buildings with the highest final score represent those with the highest seismic vulnerability and therefore those which need a detailed seismic evaluation.

Failure Consequence - The first attribute is the Failure Consequences attribute (FC). The analysis of this attribute considers existing information in the form of hazard category and building occupancy. Numerical scores are assigned for both the hazard category and the building occupancy. The higher of these two scores is used as the FC score. Table 3-5 shows how the numerical scores are assigned.

In the DOE complex, buildings are grouped into various hazard categories as part of the overall safety analysis assessment. These provide an indication of the significance of the failure consequences of the building given the building location and factors such as the on-site and off-site population density. As indicated by the definitions above, the more serious the hazard category, the higher the numerical score.

Table 3-5 - DOE Definition of Failure Consequences

FC = FAILURE CONSEQUENCES

Use the greater of the HC - Hazard Category or BO - Building Occupancy

HC	SCORE	BO	SCORE
HC1 OR HH	10	300+ PEOPLE	10
HC2 OR MH	3	51-300 PEOPLE	6
HC3,LH,EU	1	6-50 PEOPLE	3
All Others	0	< 6 PEOPLE	0

HC1 OR HH = usage with potential for significant offsite radiological or chemical hazard.
HC2 OR MH = usage with potential for significant onsite radiological or chemical hazard.
HC3,LH,EU = usage with potential for localized or minor radiological or chemical hazard; or a facility with essential services which must survive the seismic event (e.g. Fire Station).
All Others = general usage facility.

The divisions of occupancy for the Building Occupancy score are based on numbers used in model building codes to define occupancy categories. The higher the number of occupants in a building, the higher the numerical score. The use of 6 people as a lower bound cutoff is consistent with ICSSC RP3 [ICSSC]. A building which has a zero score for both the HC and the BO score would be effectively screened out by receiving a zero score for the FC attribute. This would represent a building with no radiological or chemical hazard, no essential use, and with an occupancy of fewer than 6 people.

Building Vulnerability - The second attribute is the Building Vulnerability (BV) attribute. This attribute is based on the condition of the building in relation to the anticipated seismic hazard at the site of the building. The ranking approach is based on assigning the condition of the building as good, fair, poor, or very poor. This qualification is based as much as possible on existing information. For the case where existing seismic structural analyses have been completed, the ranking is based on the ratio of the seismic capacity to the seismic demand of critical structural members (seismic capacity/demand ratio). The correlation between the seismic capacity/demand ratio and the numerical score is indicated in Table 3-6.

If there is insufficient existing seismic analysis, the condition of the building should be evaluated using data on building behavior from past earthquakes. This includes the use of benchmark years, and the identification of certain building types known to be vulnerable to earthquakes and no longer permitted by the building codes. Table 3-7 shows guidance given in the DOE documentation for determining the numerical score using this type of information. The procedure also allows the use of the preliminary evaluation checklists found in FEMA 178 to establish the condition of the building.

Table 3-6 - DOE Definition of Building Vulnerability

BV = BUILDING VULNERABILITY

SEISMIC CAP/DMD	CONDITION	SCORE
≥ 0.9	GOOD	0
$\geq 0.7 < 0.9$	FAIR	2
$\geq 0.5 < 0.7$	POOR	7
< 0.5	VERY POOR	10

Buildings whose seismic C/D ratios are .90 or higher, buildings which have been fully rehabilitated, buildings which show full adherence to adequate seismic codes or buildings which are exempt from seismic design by the model building codes and the NEHRP Provisions will be screened out by receiving a zero in the BV category.

Once the scores for the FC and the BV attributes have been determined, the next step is to compute the overall ranking of the building as follows: RK = (FC)x(BV). This score will range from a 0 for buildings which are screened out of the ranking process, to a maximum score of 100. The buildings which receive the high scores are the first priority buildings. The DOE has not yet defined a cutoff of the numerical score for which buildings would be determined to be the exceptionally high risk buildings. However, the scores have been assigned nonlinearly in order to cause the worst buildings to get relatively higher scores than the rest.

Although not specifically part of the attributes, the DOE prioritization document allows buildings to be given a higher score if their mission is unique such that the building must not be damaged. Also, buildings may not be exempted based upon a short remaining life unless a budget already exists to demolish or replace the building.

Table 3-7 - DOE Building Vulnerability Factor		
SEISMIC AREAS	**BUILDING DESCRIPTION**	**CONDITION**
UBC - All Zones NEHRP - All Map Areas	Any one-story building of steel light frame or wood construction with areas less than 280 sq. meters (3000 sq. ft.)	Good
UBC - All Zones NEHRP - All Map Areas	Any fully rehabilitated building whose mitigation scheme considered structural, nonstructural, adjacency and geologic/site hazards and was based on an acceptable national seismic code and DOE design criteria.	Good
UBC - All Zones NEHRP - All Map Zones	Post-benchmark buildings whose documentation shows adherence to the seismic design guidelines of accepted national codes and DOE design criteria.	Good
UBC - Zones 2B-4 NEHRP - Map Areas 5-7	Pre-Benchmark building of any construction not considered above.	Very Poor
UBC - Zones 1-2A NEHRP - Map Areas 3-4	Pre-Benchmark building of any construction not considered above.	Poor
UBC - Zones 2B-4 NEHRP - Map Areas 5-7	Masonry shear walls with no reinforcing steel or no verification of acceptable reinforcing steel. Reinforced concrete moment frames with no detailing for ductile behavior or no verification of acceptable detailing.	Very Poor
UBC - Zones 1-2A NEHRP - Map Areas 3-4	Masonry shear walls with no reinforcing steel or no verification of acceptable reinforcing steel. Reinforced concrete moment frames with no detailing for ductile behavior or no verification of acceptable detailing.	Poor
UBC - Zones 2B-4 NEHRP - Map Areas 5-7	Obvious deterioration of members of the structural system.	Very Poor
UBC - Zones 1-2A NEHRP - Map Areas 3-4	Obvious deterioration of members of the structural system.	Poor
UBC - Zones 2B-4 NEHRP - Map Areas 5-7	Potential for soil liquefaction or unknown soil conditions.	Poor
UBC - All Zones NEHRP - All Map Areas	Any remaining building not considered above.	Fair

Building should be given the lowest score from the applicable categories above.

3.1.2 Evaluate a Representative Sample of Remaining Non-Exempt Buildings

After identifying exceptionally high risk buildings for evaluation, agencies are also asked to identify for evaluation a representative sample of the remaining non-exempt buildings in regions of moderate and high seismicity. This means that an agency has taken its total inventory, it has identified its exempt buildings and set these aside for no further effort, it has then identified its exceptionally high risk buildings and set them aside for definite evaluation. The remaining group of buildings should then be divided into the three seismicity levels: high, moderate and low. The buildings in the low seismicity area can now be set aside since no further evaluation effort is required for these buildings. The buildings which are left are the remaining non-exempt buildings in high and moderate seismic areas. RP5 recommends that agencies evaluate a representative sample of this group of buildings. It is expected that evaluations of about one to two percent of the non-exempt buildings in the high and moderate areas will provide an adequately representative sample.

A representative sample is a group of buildings which are typical of the types of buildings found in an agency's inventory. In the development of a representative sample, an agency should examine its particular inventory and identify the dominant characteristics. These characteristics may be such things as seismicity, the occupancy categories of the buildings, the height and/or size of the buildings, and the dominant model building types. Agencies may select their representative sample from those buildings which represent the inventory's dominant characteristics (those categories which collectively represent over 85% of the remaining non-exempt inventory). By evaluating buildings in such categories, information will be developed on all non-unique building types in the Federal inventory and cost estimates will be available for buildings at several levels of seismic risk. Table 3-8 shows suggested building characteristics to be considered in establishing dominant characteristics.

The purpose of evaluating a representative sample is to gain information about the population of buildings remaining after those buildings which are exceptionally high risks have been identified. This remaining population still contains buildings with potentially high seismic risks, although these risks may be difficult to determine, as well as buildings with various lower levels of seismic risk. The information collected for the representative sample will be used to determine how many buildings in the population which was not evaluated are expected to be seismically deficient, and to estimate what the costs of fixing those buildings would be. This includes an estimate for the buildings in the low seismic areas.

There is not one correct way to choose a representative sample. The sample will depend on the specific inventory of an agency and the specific needs of an agency. However, it is important to note here the relationship between the buildings selected for evaluation and the development of cost estimates for buildings which are not evaluated. As mentioned previously, the information from the evaluations of the representative sample will be extrapolated to the remaining population of non-evaluated buildings to develop cost estimates for the seismic rehabilitation of these buildings. In Section 4.2 of RP5, there are requirements for reporting these cost estimates using the characteristics of essential designation, historic designation, and model building types. Therefore, these characteristics should be considered when an agency is developing their representative sample in order to make the extrapolation process easier.

Table 3-8 - Suggested Building Characteristics to be Used to Categorize Buildings				
Seismicity:	Occupancy:	Model Building Type:	Size:	Other:
High Moderate Low	Offices Post Offices Hospitals Prisons Schools Other Institutional Housing Storage Industrial Service Res. & Dev. Other (Misc)	Wood, Light Frame Wood, Commercial and Industrial Steel Moment Frame Steel Braced Frame Steel Light Frame Steel Frame/Concrete Shear Walls Steel Frame/Infill Shear Walls Concrete Moment Frame Concrete Shear Walls Concrete Frame/Infill Shear Walls Precast/Tilt-Up Concrete Walls Precast Concrete Frames/Concrete Shear Walls Reinforced Masonry Bearing Walls/Wood or Metal Deck Diaphragms Reinforced Masonry Bearing Walls/Precast Concrete Diaphragms Unreinforced Masonry Bearing Wall	< 4645 m^2 4645 - 9290 m^2 > 9290 m^2	Historic Mission Essential

Two different approaches to identifying the representative sample of buildings are illustrated in the following sections. One is a random sample approach, and one is a risk based approach. These are not required approaches, only suggested approaches. An agency may wish to identify their representative sample based on agency specific needs. The method used to identify the representative sample is to be described in the supporting documentation.

Option A: Selecting a Random Sample

One way to choose the buildings to be evaluated is to randomly select buildings from the dominant categories. In this way, the agency can focus on a sample which is largely representative of its entire population. The first step in this process would be to determine what dominant building characteristics exist within the inventory. For example, an agency could first divide the buildings into high and moderate seismicities. The buildings could then be divided into key occupancy categories, depending on the types of buildings owned by the agency. The categories may include hospitals, schools, offices, and all other buildings. Within these subsets the buildings could then be divided by model building type. If not all 15 model building types are well represented, a subset of the model building types can be used. For instance, an agency may own buildings which are mostly steel moment frames, concrete moment frames, concrete shear walls, concrete frame with infill shear walls, and reinforced masonry bearing walls with wood diaphragms.

Table 3-9 shows how this breakdown would look. Each of the smaller boxes in this table would contain a number of buildings. Buildings could be chosen for evaluation from the subsets that represent in total about 85% of the remaining non-exempt population. This

Table 3-9 - Sample Inventory Partitions for Use in Identifying Dominant Characteristics

	Hospitals	Schools	Offices	All Other
Moderate Seismic Areas	Steel Moment Frame	Steel Moment Frame	Steel Moment Frame	Steel Moment Frame
	Concrete Moment Frame	Concrete Moment Frame	Concrete Moment Frame	Concrete Moment Frame
	Concrete Shear Walls	Concrete Shear Walls	Concrete Shear Walls	Concrete Shear Walls
	Concrete Frame with Infill Shear Walls	Concrete Frame with Infill Shear Walls	Concrete Frame with Infill Shear Walls	Concrete Frame with Infill Shear Walls
	Reinforced Masonry Bearing Walls - Wood Diaphragms	Reinforced Masonry Bearing Walls - Wood Diaphragms	Reinforced Masonry Bearing Walls - Wood Diaphragms	Reinforced Masonry Bearing Walls - Wood Diaphragms
High Seismic Areas	Steel Moment Frame	Steel Moment Frame	Steel Moment Frame	Steel Moment Frame
	Concrete Moment Frame	Concrete Moment Frame	Concrete Moment Frame	Concrete Moment Frame
	Concrete Shear Walls	Concrete Shear Walls	Concrete Shear Walls	Concrete Shear Walls
	Concrete Frame with Infill Shear Walls	Concrete Frame with Infill Shear Walls	Concrete Frame with Infill Shear Walls	Concrete Frame with Infill Shear Walls
	Reinforced Masonry Bearing Walls - Wood Diaphragms	Reinforced Masonry Bearing Walls - Wood Diaphragms	Reinforced Masonry Bearing Walls - Wood Diaphragms	Reinforced Masonry Bearing Walls - Wood Diaphragms

means that every subset need not be included in the evaluation sample. If a subset contains only a few buildings, this subset is not representative of the population and can be ignored. The exact number of buildings chosen from each subset can be determined by the agency. More buildings should be chosen from the categories which contain more buildings. As stated before, the total number of buildings to be evaluated in the representative sample is expected to be about one to two percent of the non-exempt buildings in high and moderate areas, or, in other words, one to two percent of the total number of buildings in all of the boxes.

There is no one correct way for an agency to break down its inventory. Dividing the inventory is meant to be a tool to assist the agency in determining the dominant characteristics of its inventory. It is of no advantage to sub-divide the inventory into so many categories that the number of buildings in each category is too small to indicate any helpful information. Inventories should be subdivided only into a number of categories which shows where the majority of the buildings lie.

There are many agencies whose inventories contain buildings which for the most part have the same characteristics. These agencies will need a relatively small number of divisions to determine their inventory characteristics. For example, it is anticipated that many agencies will end up with an inventory of non-exempt buildings which are all relatively the same size, and are mainly office and storage buildings. These buildings can first be divided into areas of moderate and high seismicity. The buildings can then be divided by usage category, such as office, storage and other. Any further division of the buildings can be based on the fifteen model building types, or some smaller subset of these building types. For instance, the buildings may be mostly of concrete moment frame or concrete shear wall construction. Table 3-10 shows how a such a subdivision would look. The majority of the buildings would fall into the boxes which are not part of "other" categories. Therefore, the buildings to be evaluated would be selected from the eight boxes in Table 3-10 which are shaded. An agency need not evaluate every building in the box, only a representative sample.

Table 3-10 - Sample Inventory Breakdown

	Office	Storage	Other
Moderate Seismic Areas	Concrete Moment Frame	Concrete Moment Frame	Concrete Moment Frame
	Concrete Shear Walls	Concrete Shear Walls	Concrete Shear Walls
	Other	Other	Other
High Seismic Areas	Concrete Moment Frame	Concrete Moment Frame	Concrete Moment Frame
	Concrete Shear Walls	Concrete Shear Walls	Concrete Shear Walls
	Other	Other	Other

Option B: Selecting Buildings Based on Seismic Risk

Rather than randomly selecting buildings from dominant groups, an agency may instead choose to continue to emphasize the potentially higher risk buildings. In using this method, an agency should continue to define its highest risks using the same methods utilized in the identification of its exceptionally high risk buildings. The main building characteristics to

be used are listed in Table 3-2 and include the seismicity, the model building type, and the occupancy category of the building.

The specific buildings to be evaluated can also be determined using the approach of dividing the buildings into dominant characteristics as discussed in the previous section. However, instead of selecting randomly from each subset of buildings, an agency can choose to evaluate only buildings from those subsets of buildings which represent the highest potential seismic risk of the remaining non-exempt buildings in the moderate and high seismic areas.

Table 3-11 - Sample Inventory Breakdown for Risk Based Method

	Hospitals	Schools	Other Mission Essential	Offices	Other
Moderate Seismic Areas	Steel Moment Frame	Steel Moment Frame	Steel Moment Frame	Steel Moment Frame	Steel Moment Frame
	Concrete Moment Frame	Concrete Moment Frame	Concrete Moment Frame	Concrete Moment Frame	Concrete Moment Frame
	Concrete Shear Walls	Concrete Shear Walls	Concrete Shear Walls	Concrete Shear Walls	Concrete Shear Walls
	Unreinforced Masonry Bearing Walls	Unreinforced Masonry Bearing Walls	Unreinforced Masonry Bearing Walls	Unreinforced Masonry Bearing Walls	Unreinforced Masonry Bearing Walls
	Precast/Tilt-Up Concrete Walls	Precast/Tilt-Up Concrete Walls	Precast/Tilt-Up Concrete Walls	Precast/Tilt-Up Concrete Walls	Precast/Tilt-Up Concrete Walls
	Other	Other	Other	Other	Other
High Seismic Areas	Steel Moment Frame	Steel Moment Frame	Steel Moment Frame	Steel Moment Frame	Steel Moment Frame
	Concrete Moment Frame	Concrete Moment Frame	Concrete Moment Frame	Concrete Moment Frame	Concrete Moment Frame
	Concrete Shear Walls	Concrete Shear Walls	Concrete Shear Walls	Concrete Shear Walls	Concrete Shear Walls
	Unreinforced Masonry Bearing Walls	Unreinforced Masonry Bearing Walls	Unreinforced Masonry Bearing Walls	Unreinforced Masonry Bearing Walls	Unreinforced Masonry Bearing Walls
	Precast/Tilt-Up Concrete Walls	Precast/Tilt-Up Concrete Walls	Precast/Tilt-Up Concrete Walls	Precast/Tilt-Up Concrete Walls	Precast/Tilt-Up Concrete Walls
	Other	Other	Other	Other	Other

For example, one approach would be for an agency to divide its remaining non-exempt inventory into moderate, and high seismic areas. It could then divide each of these subsets into the following occupancy and/or mission groups: hospitals, schools, other mission essential buildings, offices, and other usage facilities. It could further divide these groups into the following model buildings types based on the characteristics of the inventory: Steel Moment Frame, Concrete Moment Frame, Concrete Shear Walls, Unreinforced Masonry Bearing Walls, Precast/Tilt-Up Concrete Walls and Other. After placing each building into these categories, the agency decides to evaluate a sample of, or all of, the buildings in the groups which represent the highest relative risk. This could include hospitals in high seismic areas, unreinforced masonry and concrete moment frames in the high seismic areas, as well as precast tilt-ups and mission essential buildings. The agency chooses these buildings because the agency feels that these represent their highest risks in this non-evaluated population. Table 3-11 shows what this inventory breakdown would look like. The agency will evaluate a sample of buildings from the shaded boxes.

Note that, if a risk-based methodology is used to select the representative sample, the results may not be easily extrapolated to the remaining non-evaluated population in order to estimate total costs. In a truly random sample, the ratio of deficient to acceptable buildings will be the same in the evaluated sample as in the population as a whole. For a risk-based sample, this will not be the case. If a risk-based sample is chosen, careful attention must be paid to the methodology used to estimate the vulnerability of the non-evaluated population for cost-estimating purposes, so that estimates are not unrealistically high.

Agencies with Very Small Inventories

There are a number of agencies which own fewer than 1000 non-exempt buildings. It will be difficult for these agencies to divide their inventory into a large number of dominant characteristics due to the small number of buildings. These agencies may still be able to divide their buildings into two or three main characteristics, such as just seismicity or seismicity and two or three key occupancies or model building types. Other agencies may be forced to leave all of their buildings in one group and simply evaluate a few of these buildings. It is not useful to divide the buildings into so many groups that there are only three or four buildings in each group. There may be no dominant characteristic of the buildings, therefore dividing them into groups does not make the effort of selecting representative buildings easier.

As an example of the methodology involved for an agency with few buildings, this discussion will focus on the imaginary inventory of the Department of Science. Assume that according to the 1993 GSA Real Property Database, the imaginary Department of Science owns 650 buildings within the United States and its territories. If the exempt buildings are subtracted from this number, there are 179 buildings remaining. Of these 179 buildings, 101 are in low seismic areas, 37 are in moderate seismic areas, and 41 are in high seismic areas. When the Department of Science identifies exceptionally high risk buildings, it identifies fifteen in the high seismic areas, 2 in the moderate seismic areas and 2 in the low seismic areas. Therefore, the Department evaluates these 19 buildings. (It is possible that a Department may have no buildings which they consider to represent an exceptionally high risk. The

number of buildings evaluated in this category would then be zero.)

Subtracting those 19 buildings from the Department of Science non-exempt inventory, and placing aside the buildings in the low seismic areas leaves 61 non-exempt buildings in the high and moderate seismic areas. If the Department of Science were to evaluate 1-2% of these buildings, they would evaluate only 1-2 additional buildings. All of these 61 buildings fall into approximately the same size group. Most of these buildings represent offices, research and development facilities, and storage facilities. A reasonable approach would be to evaluate one office and one research and development facility. An alternate approach would be to evaluate two buildings which are most important to the agency. It becomes obvious that the amount of time and effort spent dividing the sample into representative groups is not advantageous to agencies with small inventories of buildings.

3.1.3 Report Results From Previous Evaluations

A building which has already been evaluated for seismic safety will fall into one of the following situations:

1) A building has been previously evaluated to criteria substantially equivalent to the RP4 minimum evaluation procedure and has been found to be seismically adequate. According to RP4 exemption g, this building could be reported as exempt. However, it is recommended that the agency not report this building as exempt but instead make a point to include this building in its evaluated sample in order to "take credit" for work already completed. No further evaluation would be needed for this building. An evaluation outcome of "OK" would be reported for this building in the database and the results of this evaluation could possibly be extrapolated to other similar buildings.

2) A building has been previously evaluated to the acceptable criteria described above but has been found to be seismically inadequate. This building should be included in the evaluated sample. An evaluation outcome of "NG" would be reported. No further evaluation would be needed but a cost estimate would need to be developed.

3) A building has been previously evaluated to the acceptable criteria described above, has been found to be seismically inadequate, and has been rehabilitated to standards deemed appropriate by the agency. This building should be categorized as exempt.

4) A building has been previously evaluated to criteria substantially less stringent than the minimum evaluation requirements in RP4. This building should be considered a non-exempt, non-evaluated building which would need a new evaluation if it were chosen as part of the evaluated sample.

Many previously evaluated buildings are likely to be categorized as "exceptionally high risk". Agencies should report the information from those buildings as such. Agencies are encouraged to include previously evaluated buildings which are not "exceptionally high risk" buildings as part of their representative sample of remaining non-exempt buildings in order to utilize available data as much as possible.

3.2 Performing Evaluations on Selected Buildings

Upon reaching this point in the process, the agency will have identified the buildings which it intends to evaluate. If a building in this group has already been evaluated, it is not necessary to redo this process as long as the evaluation performed was sufficiently close to an RP4 evaluation. Otherwise, the evaluation of each building must be done by a civil/structural engineer. This evaluation will determine whether or not the building poses a seismic risk. If an evaluation is performed on a building and the evaluation shows that the building is seismically acceptable, no further work will be done on the building. If an evaluation is done and the evaluation shows the building to be seismically vulnerable, a cost estimate must be developed for achieving adequate seismic safety in that building. The cost estimate will show how much it will cost to mitigate the unacceptable risk, either through upgrading the building, or by abandoning, demolishing, replacing, or reducing the use of the building.

The minimum evaluation methodology which can be used for this effort is the preliminary evaluation procedure outlined in RP4, which in turn references FEMA 178. This evaluation is for a life-safety level only. The detailed evaluation may be used if the building fails the preliminary checklist in an attempt to more precisely differentiate between the potential hazards identified in the preliminary procedure and actual unacceptable risks. An agency may use an evaluation procedure for life-safety which is different from that in RP4 if it results in a similar level of safety. This evaluation procedure must be summarized in the written supporting documentation. If an agency is evaluating a building for a level higher than life-safety, that agency will have to use an alternate evaluation procedure because RP4 is for life-safety only. Such procedures should also be summarized in the written supporting documentation.

If the RP4 procedure is used, the expected ground acceleration determined from the maps cited in RP4 shall be considered the minimum allowable level for use in the evaluation. Acceleration values from other nationally accepted seismic hazard maps and codes may be used as long as they are not lower than the RP4 value. However, if a site specific value is used, this value may be lower than the RP4 value.

3.2.1 Goal of Evaluation

The goal of the evaluation is to determine whether the building is seismically acceptable or seismically deficient. If the building is acceptable, this should be reported in the database with an outcome of evaluation of "OK". If the building is seismically deficient in any way, it should be reported in the database with an outcome of evaluation of "NG". For buildings reported as "NG", a cost estimate for the seismic rehabilitation necessary to make the building seismically acceptable should be developed and reported in the database.

There are several reasons why a building may be found to be deficient. Causes of deficiency include:

- structural deficiency
- nonstructural deficiency
- geologic/site hazard

- adjacency problems
- combination of above reasons
- building is categorized as a DNR (See section 3.2.2 below)

Section 5 lists the codes to be used when reporting each of these causes of deficiency.

3.2.2 Definitely Needing Rehabilitation Buildings

There are some buildings which are so obviously in need of rehabilitation that they do not need an evaluation to determine that rehabilitation efforts are needed. These buildings are referred to as Definitely Needing Rehabilitation (DNR) Buildings. These buildings may be deemed deficient without any further evaluation. Agencies are cautioned that an overly liberal use of the DNR designation may result in an unrealistically high estimate of the cost of rehabilitating their buildings.

Once an agency has determined its group of exceptionally high risk buildings, this group of buildings can be examined for DNR buildings. If any DNR buildings are identified in this group, the DNR buildings would need no further evaluation. In most cases a building will be designated a DNR because of structural deficiency. Therefore, the reason for deficiency would be reported as such. A cost estimate must still be developed and submitted for each of these buildings.

Guidelines included in RP5 for which buildings can be designated as DNR buildings are as follows:

- unreinforced masonry buildings in areas of high seismicity
- concrete frame buildings without shear walls built before 1960 in areas of high seismicity
- pre-cast frame buildings in moderate and high seismic areas

Agencies may identify buildings with certain other characteristics which they deem to be DNR buildings. The rationale used to develop additional agency-specific DNR definitions must be based on documented performance of the structural system, in either laboratory tests or actual earthquakes. Any such definitions must be summarized in the written supporting documentation.

4.0 ESTIMATING COST OF REHABILITATION

4.1 Cost Estimates for Evaluated and Deficient Buildings

4.1.1 Cost Categories

For each evaluated building found to be deficient, the following categories of cost are to be calculated and separately reported in the inventory database:

- structural (changes to the lateral force resisting system)
- nonstructural (changes to other parts of the building and to building equipment, systems, and contents)
- finishing (costs of removing and replacing finishes such as wallboard, paint, carpet, etc.)
- project costs (design, testing, and permit fees, cost of project management, etc.)

The definitions of these categories of costs are to be the same as those used in *Typical Costs*, FEMA 156. These are described below.

Structural Costs are to include the cost of construction materials and labor (contractor overhead and profit included) for seismic structural rehabilitation of the building. These structural costs are the only components of the "typical" cost tabulated in *Typical Costs*, FEMA 156. This value should not include the cost of removing and replacing finishes; upgrading nonstructural portions of the building such as ceilings, interior partitions, mechanical, or electrical systems; or design, testing and management fees. This component of cost is of interest because it represents the cost of including a seismic upgrade concurrent with some other already planned renovation project. Any rehabilitation costs which are associated with adjacency issues or geologic/site issues should be reported in the database under structural costs as well.

Nonstructural Costs should include construction and materials costs associated with seismically upgrading the nonstructural architectural features of the building, such as cladding, exterior non-load-bearing facades, parapets, interior partitions, decorative elements; **and** building operating systems such as mechanical, electrical and plumbing systems.

Finishing Costs should include costs of removing and replacing architectural finishes such as floors, walls, and ceilings (wallboard, paint, wallpaper, carpeting, etc.). Removal and reinstallation of electrical and mechanical equipment and removal and replacement of roofing systems is also to be included in this category. Note that if the systems themselves are seismically upgraded, the cost should be included under Nonstructural Costs. If the system merely needs to be removed and replaced in order to gain access to the structural system, the cost is to be included in Finishing Costs.

Project Costs should include design fees, testing and permitting costs, and project management costs.

If an estimated cost is developed without the specific breakdowns identified above, an attempt should be made to either break down the cost into these areas, if it known that they were included in the estimate, or to estimate the amounts of the costs which were not included.

The following costs are **NOT** to be reported: other upgrades triggered by the rehabilitation effort (such as handicapped access, asbestos removal, etc.), repair of existing damage, relocation of occupants, business loss or interruption. Agencies interested in estimating these costs for their own use will find guidance in Volume II of *Typical Costs*, FEMA 157. Although none of these costs are to be reported for this effort, it is recognized that these can be costs encountered during seismic rehabilitation. The potential effects of these "triggered" and additional costs will be addressed in the final report written by FEMA.

Reported costs are to be total costs for the building, not costs per square meter. Section 5 of this Handbook provides formatting details.

4.1.2 Cost Estimation Methods

Acceptable cost estimation methods include the following:

1) Have the evaluating engineer develop a preliminary rehabilitation scheme appropriate for the specific structure, not less stringent than the RP4 life-safety criteria, and calculate the cost of the proposed fix. (Note, for this cost estimation method, the agency may use any nationally accepted seismic hazard map or available site-specific study as the source of ground acceleration values. No specific map is mandated for use.)
2) Use agency-specific cost estimating procedures. Include detailed information on the procedure used in the supporting information that is submitted.
3) Use the recommended default method: Follow cost estimating Option II in Volume I of *Typical Costs*, FEMA 156 to obtain structural (typical) costs. Use the guidance provided in Chapter 1 of Volume II of *Typical Costs*, FEMA 157 to estimate nonstructural, finishing, and project costs.
4) If, instead of being rehabilitated, the building would be replaced, a replacement cost should be reported instead of a rehabilitation cost, and so noted.
5) If, instead of being rehabilitated, the building would be abandoned and not replaced, the reported rehabilitation cost should be the cost of disposal. If no disposal cost is anticipated, the rehabilitation costs can be reported as zero.

Section 5 of this Handbook lists the codes to be used in reporting which cost estimation method was used.

4.2 Cost Estimates for Non-Evaluated Buildings

Agencies are to use the information gathered from the evaluations performed and the cost

estimates developed to estimate 1) how many of the non-exempt, non-evaluated buildings are expected to be seismically deficient; and 2) what would the cost of achieving seismic safety in these seismically deficient buildings be.

The development of these estimates will be highly dependent on the criteria used by the agency to identify its "exceptionally high risk buildings" and on the number and distribution of buildings selected for evaluation in the "representative sample." The following suggestions may be useful in developing an agency-specific cost estimate for non-evaluated buildings.

Random sampling - If the "representative sample" was chosen randomly, and if the sample was large enough, the results of the evaluations can be used to directly extrapolate back to the non-exempt population as a whole. In these situations, the percent of non-evaluated buildings that are expected to be deficient will be the same as the percent of the evaluated buildings that were found to be deficient. Note - do not combine the results of the evaluations of "exceptionally high risk buildings" with those in the representative (random) sample in calculating this percentage.

Prioritized sampling - If an agency chose to build its "representative sample" around high risk buildings, rather than using a random selection scheme, the estimate of the vulnerability of the non-evaluated buildings will have to be based on significant engineering judgement. For each of the sub-categories considered by the agency in their sample, an estimate must be made concerning how representative the sample was. Do the evaluated buildings include the vast majority of at-risk buildings in the category or do they represent only the very tip of an enormous iceberg of at-risk buildings? The assumptions made in estimating the total number of buildings that will require rehabilitation must be documented and reported in the supporting documentation.

Low seismicity - Buildings in regions of low seismicity need not be included in the representative sample. It is possible that the agency will not identify any "exceptionally high risk buildings" in the regions of low seismicity. Therefore, it is conceivable that an agency will have no information available about the potential seismic vulnerability of its buildings in regions of low seismicity. Nevertheless, the cost estimate should include the potential costs of any necessary seismic upgrades for buildings in these regions.

One possible way to consider the problem would be to compare some measure of deficiency in high seismicity regions to the same measure in moderate seismicity regions. An example of such a measure might be the ratio of deficient "exceptionally high risk" buildings to the total population in a region. It is expected that the ratio will be lower in regions of moderate seismicity than in regions of high seismicity. That trend could be extrapolated to regions of low seismicity to come up with an estimate of vulnerability of buildings in those areas.

Any procedures used for establishing the number of deficient buildings as well as the cost estimates for non-evaluated buildings in the various seismic areas should be described in the supporting documentation.

Agencies should also consider the following when developing their cost estimates for non-evaluated buildings:

- Existing studies (such as *Typical Costs*, FEMA 156) have shown that rehabilitation costs for essential buildings exceed costs for non-essential buildings. Similarly, rehabilitation costs for historic buildings typically exceed costs for non-historic buildings. Estimated rehabilitation costs for these subcategories of non-evaluated buildings (essential and historic) should be calculated separately from estimates for other building types.

- Cost estimates for non-evaluated buildings should be based on the 15 model building types (specified in Section 2.3) that represent at least 85 percent of the non-exempt, non-evaluated building stock in regions of moderate and high seismicity.

The cost estimate which is reported will not be a building-by-building cost. Instead, a cost estimate in each of the four cost categories should be calculated and reported for each of the groups of non-evaluated buildings sharing dominant characteristics by seismicity group. The RP5 guidance states that the dominant characteristics should be mission essential buildings, historic buildings, and all others. The "all others" category should be further divided into those model building types that represent at least 85% of the non-exempt, non-evaluated building stock in regions of high and moderate seismicity.

All required information is to be reported in tabular form in the supporting documentation. This table should indicate how many buildings in each of these dominant characteristic groups are expected to be deficient, the expected total area in square meters these building represent, and the estimated rehabilitation costs in each of the four cost categories in both costs per square meter and the total cost for the expected population. Table 4-1 illustrates this reporting format. In addition, a detailed explanation should be provided in the supporting documentation on any estimating methodology which was used.

Table 4-1 - Cost Reporting for Non-Evaluated Buildings

PART 1 - ESSENTIAL AND HISTORIC BUILDINGS

Seismicity Area	Essential Buildings				Historic Buildings			
	No. of Bldgs.	Total Square Meters	Estimated Costs*		No. of Bldgs.	Total Square Meters	Estimated Costs*	
			Cost Per* Square Meter	Total Cost*			Cost Per* Square Meter	Total Cost*
Low								
Medium								
High								

Note: All estimated costs should be reported as four separate costs: A. Structural Costs, B. Nonstructural Costs, C. Finishing Costs, and D. Project Costs.

Table 4-1 - Cost Reporting for Non-Evaluated Buildings (Continued)

PART 2 - ALL OTHER BUILDINGS

Bldg Type	Seismicity Area											
	Low				Moderate				High			
	No. of Bldgs	Total Sq. Meters	Estimated Costs*		No. of Bldgs	Total Sq. Meters	Estimated Costs*		No. of Bldgs	Total Sq. Meters	Estimated Costs*	
			Cost Per* Sq. Meter	Total Cost*			Cost Per* Sq. Meter	Total Cost*			Cost Per* Sq. Meter	Total Cost*
MB01												
MB02												
MB03												
MB04												
MB05												
MB06												
MB07												
MB08												
MB09												
MB10												
MB11												
MB12												
MB13												
MB14												
MB15												
MB16												

Notes: 1. All estimated costs should be reported as four separate costs: A. Structural Costs, B. Nonstructural Costs, C. Finishing Costs, and D. Project Costs.
2. Model Building Types and corresponding codes are given in Section 5 of this Handbook under Field 10.

5.0 REPORTING REQUIREMENTS

5.1 Contents and Format of the Submission

The final submission to FEMA is to consist of two electronic databases, one for owned buildings and one for leased buildings, and one volume of supporting documentation. The leased building data need only be information which the agency already has available; no new data collection need be undertaken for this project. The available information will, in many cases, be the information which is reported to GSA as part of the Real Property Inventory Database effort. The leased building information can be reported in any format. However, the information on owned buildings must be reported in the electronic database and the supporting documentation as outlined in this section in order to assure consistency and readability. If an agency submits information which does not conform to this format, it will be returned for corrections. (The ICSSC Technical Secretariat is available to assist agencies with the use of this format. Please call with any questions). Section 5.1.1 outlines the format for the database of owned buildings. The detailed fields described in that section are for owned buildings only. Section 5.1.2 describes the requirements for the supporting documentation.

Early submissions of portions of the owned building database are not required, but would be helpful to FEMA and the ICSSC. This may also be a useful exercise for the agency if they would like assistance in choosing which buildings to evaluate. Suggested milestones which are appropriate for early submission include:

1. Completion of screening for exempt/non-exempt status.
2. Completion of identification of "exceptionally high risk" buildings.
3. Completion of identification of representative sample of non-exempt buildings.
4. Completion of evaluations.

If an agency chooses to make partial submissions, the agency is asked to resubmit the entire database when it is complete (no later than Dec. 1, 1998).

5.1.1 Owned Building Database Information

Agencies may develop their databases on any software they currently have available. Many agencies already have some sort of electronic inventory database system. Agencies which have this may use this as a starting point and add any additional needed information to the system, as needed to fulfill the requirements of the Executive Order. Agencies which do not yet have any inventory database may use any database, spreadsheet, or word processing program. The choice of this software may depend on the size of the agency's inventory.

The database software to be used by FEMA and the ICSSC to tabulate all agencies' data has not yet been determined. It is anticipated that whatever database software is used by each agency, it will be possible to convert this information into a form which is readable by the FEMA/ICSSC database. As soon as detailed information on what software package will be used by FEMA/ICSSC is available, this information will be distributed to ICSSC members. In the meantime, agencies are encouraged to utilize whatever software package is most

convenient for their internal use. The ICSSC Technical Secretariat is available for further consultation on this issue. The Technical Secretariat will also be available to work with agencies to establish the easiest way to enter their information into the FEMA/ICSSC database when the time is appropriate.

In order to streamline the effort of entering all of the agencies' information into the FEMA/ICSSC database, all agencies must record each piece of required inventory data using the same format. The following sections and tables give the type of information and corresponding codes for each piece of inventory data. For a more detailed explanation of each category, refer to Section 2.3. Data for each owned building is to be reported in the order and format described below.

Data Needed for All Buildings

Field 1A. **Agency Code:** The name of the agency is to be identified using the four digit numerical codes used by the GSA Real Property Database. Table 5-1 lists the appropriate codes. If the code for your agency is not shown in this table, please contact the ICSSC Technical Secretariat for assistance.

Field 1B. **Unique Identifier:** A unique identifier is to be given for each building or group of buildings. This will be entered as an alpha-numeric string of any length. The identifier should contain as few blank spaces as possible.

Field 2A. **Location - State:** The **state code** (or territory code) is to be listed using the two digit code used by the GSA Real Property Database. Tables A-1 and A-2 in Appendix A list all state and territory codes.

Field 2B. **Location - County:** The **county code** is to be listed after the state code using the three digit code specified in the GSA Real Property database. Table A-1 in Appendix A lists all county codes by state. (If a building is located in a US territory with no county code, simply enter 00 for the county code.)

Field 3. **Seismicity:** The seismicity code is to be entered as the letter **L** (for Low), **M** (for Moderate), or **H** (for High). These designations correspond to the areas on Map 2 of the 1994 NEHRP Recommended Provisions and to acceleration levels as follows:

Low	Map Areas 1 & 2	$Av \leq 0.10g$
Moderate	Map Areas 3 & 4	$0.10g \leq Av < 0.20g$
High	Map Areas 5,6 & 7	$0.20g \leq Av$

Table A-1 in Appendix A gives the seismicity designation by county for each state.

Field 4A. **Area:** The size of each building is to be reported in square meters. This is to be reported as a whole number. There should be NO COMMAS used to separate thousands,

Table 5-1 - Agency Codes	
Code to be Entered	**Agency**
1200	Department of Agriculture
1300	Department of Commerce
1400	Department of the Interior
1407	U.S. Geological Survey
1423	Bureau of Reclamation
1500	Department of Justice
1519	Bureau of Prisons
1600	Department of Labor
1700	Department of the Navy
1800	U.S. Postal Service
1900	Department of State
2000	Treasury Department
2100	Department of the Army
3300	Smithsonian Institution
3600	Veterans Affairs
4700	General Services Administration
4900	National Science Foundation
5700	Department of the Air Force
5800	Federal Emergency Management Agency
6400	Tennessee Valley Authority
6800	Environmental Protection Agency
6900	Department of Transportation
7500	Department of Health and Human Services
8000	National Aeronautics and Space Administration
8600	Department of Housing and Urban Development
8900	Department of Energy
9100	Department of Education
9600	Corps of Engineers
9700	U.S. Information Agency

NOTE: If your agency code is not shown above, please contact the ICSSC Technical Secretariat for assistance.

millions etc. For buildings being reported in a group, only the total additive size of all the buildings in the group should be reported.

Field 4B. **Number of Buildings:** This field represents the number of buildings in the entry. For the majority of cases, this will be 1, and is to be entered as such. However, for buildings being reported in a group, the number of buildings in that group is to be recorded as that number.

Field 5. **Reason for Exemption:** If the building is exempt, the numerical code corresponding to the reason for exemption is to be entered according to Table 5-2. If a building is not exempt, the code (E0) is to be entered. If an agency identifies an agency specific reason for exemption (code E9), the agency is to give the justification for this exemption in the written supporting documentation.

Table 5-2 - Reasons for Exemptions

Code to be Entered	Exemption
E0	Building is not exempt.
E1	Building is classified for agricultural use, or intended only for incidental human occupancy, or occupied by persons for a total of less than 2 hours a day. (RP4 exemption a)
E2	Building is a detached one- or two- family dwelling located in an area having a governing acceleration coefficients less than 0.15. (RP4 exemption b)
E3	Building is a one-story building of steel light frame or wood construction with an area of less than 280 m^2 (3000 square feet). (RP4 exemption d)
E4	The building has been fully rehabilitated to comply with the RP4 seismic safety standards in all four compliance categories (structural, nonstructural, geologic/site hazards, and adjacency) (RP4 exemption e)
E5	The building is a post-benchmark building as defined in Table 1 of RP4 which also complies with the nonstructural, geologic/site, and adjacency categories. (RP4 exemption f)
E6	The building is a pre-benchmark building which has been shown by evaluation to be life-safe in all four compliance categories. (RP4 exemption g)
E7	The building was constructed for the Federal government and the detailed design was done after the date of the adoption of Executive Order 12699 (January 5, 1990) and the building was designed and constructed in accordance with the ICSSC Guidelines and Procedures for Implementation of the Executive Order on Seismic Safety of New Building Construction. (RP4 exemption h)
E8	The remaining useful life of the building has been identified as being less than five years.
E9	Other - describe briefly in Field 23 and in the supporting documentation.

Data Needed for Non-Exempt Buildings

Field 6. **Occupancy Class:** The occupancy class is to be entered as a numerical code corresponding to the occupancy classes used in the GSA Real Property Inventory. Table 5-3 lists the appropriate codes to be entered. These are the same codes used for GSA reporting purposes.

Table 5-3 - Occupancy Categories

Code to be Entered	Occupancy Classification
10	Office
14	Post Office
21	Hospital
22	Prison
23	School
29	Other Institutional
30	Housing
40	Storage
50	Industrial
60	Service
70	Research and Development
80	All Other

Field 7. **Essential Designation :** Essential buildings are to be identified with the alpha-numeric code of **Z1**. Any non-exempt building which is not designated as essential is to be designated as other and the numerical code **Z2** is to be entered.

Field 8. **Historic Designation :** Each building which is known to be designated as an historic building is to be identified with the alpha-numeric code **H1**. Any building which has not been designated as an historic building is to be identified with the alpha-numeric code **H2**.

Field 9. **Date of Construction :** The date of actual construction is to be reported for each building as the four digit numerical year i.e., **1984**. If the year of design is significantly earlier than the year of construction, then the year of design is to be entered instead.

Field 10. **Model Building Type :** The model building type is to be entered as an alpha-numerical code corresponding to the 15 types identified in FEMA 178 (See Section 2.3.3 for a detailed explanation of these building types). Table 5-4 lists the appropriate codes to be entered.

Table 5-4 - Model Building Types	
Code to be Entered	**Model Building Type**
MB01	Wood, Light Frame
MB02	Wood, Commercial and Industrial
MB03	Steel Moment Frame
MB04	Steel Braced Frame
MB05	Steel Light Frame
MB06	Steel Frame with Concrete Shear Walls
MB07	Steel Frame with Infill Shear Walls
MB08	Concrete Moment Frame
MB09	Concrete Shear Walls
MB10	Concrete Frame with Infill Shear Walls
MB11	Precast/Tilt-Up Concrete Walls with Lightweight Flexible Diaphragm
MB12	Precast Concrete Frames with Concrete Shear Walls
MB13	Reinforced Masonry Bearing Walls with Wood or Metal Deck Diaphragms
MB14	Reinforced Masonry Bearing Walls with Precast Concrete Diaphragms
MB15	Unreinforced Masonry Bearing Wall Buildings
MB16	Other - describe briefly in Field 23 and in the supporting documentation.

Field 11. **Number of Stories :** The number of above ground stories in the building is to be recorded as the letter N followed directly (without a space) by the two-digit numerical code representing that number. For example, if a building has two stories, the appropriate entry would be **N02.**

Data Needed for Non-Exempt Evaluated Buildings

Field 12. **Exceptionally High Risk Designation :** Exceptionally high risk buildings are to be identified with the alpha-numeric code **R1.** All non-exempt evaluated buildings not designated as exceptionally high risk are to be identified as Other with the code **R2.**

Field 13. **Evaluation Procedure Used :** The minimum acceptable level of evaluation is the procedures given in RP4. If a building is evaluated using RP4 the alpha-numeric code **P1** is to be entered for this field. If the engineer who evaluated the building used a procedure other than what is outlined in RP4, the alpha-numeric code **P2** is to be entered for this field. All P2 codes must be explained and justified in the written supporting documentation. If a building is designated as a DNR and therefore is determined to be deficient without an actual evaluation, the alpha-numeric code **P3** is to be entered for this field. A short statement of why the building is a DNR should be given in the Comments Field (Field 20).

Field 14. **Soil Type :** The soil type is to be entered as the code which identifies one of the four soil types in FEMA 178: **S1, S2, S3,** or **S4.**

Field 15. **Foundation Type :** The foundation type is to be entered as one of the following three codes:

FT1 = shallow foundations (isolated or continuous spread footings or mats)
FT2 = deep foundations (piles or piers)
FT3 = other

An explanation of the FT3 code should be given in the comment field as well as in the supporting documentation.

Field 16. **Outcome of Evaluation :** If the evaluation of a building indicates that the building provides an acceptable level of seismic safety and no rehabilitation is needed, the alpha-numeric code **OK** is to be entered for this category. If the evaluation indicates that the building is deficient, the alpha-numeric code **NG** is to be entered for this category. A building which has been designated as a DNR should be given a NG code for this field.

Non-Exempt Evaluated Buildings Found to be Deficient

Field 17. **Why Deficient :** The reason a building was found to be deficient is to be entered as four separate codes which correspond to the four compliance categories in RP4.

Field 17A. **Structural :** There are three possible codes for this field. **PS** if the building passes in this category, **FS** if the building failed in this category and **NCS** if the building was not checked in this category.

Field 17B. **Nonstructural :** There are three possible codes for this field. **PN** if the building passes in this category, **FN** if the building failed in this category and **NCN** if the building was not checked in this category.

Field 17C. **Geologic/Site Hazard :** There are three possible codes for this field. **PG** if the building passes in this category, **FG** if the building failed in this category and **NCG** if the building was not checked in this category. (Note that failure in this category refers to site issues such as landslides and liquefaction. If a building fails because the soil conditions amplify the motion past the point where the structure is adequate, this is a structural failure, not a geologic one.)

Field 17D. **Adjacency Problems :** There are three possible codes for this field. **PA** if the building passes in this category, **FA** if the building failed in this category and **NCA** if the building was not checked in this category.

Field 18. **Estimated Costs of Rehabilitation :**

The estimated cost of rehabilitation is to be reported as four separate costs. Each is to be a dollar amount, expressed in whole numbers and using NO COMMAS between any numbers.

Each entry is to be preceded by a dollar sign. For example, $10000 is the correct entry for a cost of ten thousand dollars. Costs of other upgrades triggered by the rehabilitation effort are NOT to be included. If a replacement cost, or disposal cost, is to be entered rather than a rehabilitation cost, it is to be entered as the structural cost entry. When a replacement cost or disposal cost is entered, this should be indicated in the "Comments" Field (Field 20).

Field 18A. **Structural Costs :** This cost is to be reported in the format described above. Field 18A is to be the Structural Costs for buildings to be rehabilitated as well as any costs associated with adjacency issues or geologic/site issues. Costs associated with the replacement or disposal cost are to be reported here for buildings which would not be rehabilitated.

Field 18B. **Nonstructural Costs:** This cost is to be reported in the same format as described above. Field 18B is to be the Nonstructural Costs only.

Field 18C. **Finishing Costs :** This cost is to be reported in the same format as described above. Field 18C is to be the Finishing Costs only.

Field 18D. **Project Costs :** This cost is to be reported in the same format as described above. Field 18D is to be the associated Project Costs only.

Field 19. **Source of Cost Estimate :** The method used to develop the cost estimate for a building is to be identified using a numerical code corresponding to the appropriate source. Table 5-5 shows the codes to be used.

Field 20. **Comments :** This field is for any brief comments necessary to explain designations made in the other fields. These comments are to be described in further detail in the written supporting documentation. This field is to be entered as an alpha-numeric string of any length and should not contain any commas or hard returns. The comment could simply repeat a code and give a short description i.e., MB16 mobile home.

Table 5-5 - Sources for Cost Estimates

Code to be Entered	Sources of Cost Estimates
C1	Engineer developed a preliminary rehabilitation scheme appropriate for the specific structure and calculated the cost of the proposed fix.
C2	An agency-specific cost estimating procedure was used to develop the cost estimate.
C3	The estimate was developed using cost estimate Option II in *Typical Costs*, FEMA 156 document. Volume II of *Typical Costs*, FEMA 157 was used to estimate nonstructural, etc. costs.
C4	Instead of being rehabilitated, the building would be replaced. Therefore, the cost reported is a replacement cost and not a rehabilitation cost.
C5	Instead of being rehabilitated, the building would be abandoned and not replaced. Therefore, the cost reported is the demolition cost.

Table 5-6 shows an example of data compiled for a small sample inventory. As stated at the beginning of this section, this kind of inventory can be developed using any database software. The first example entry shows a storage facility which was found to be exempt because it is intended for only incidental human occupancy. Because it is an exempt building, no information after the "Reason for Exemption Code" is required to be submitted in the inventory. The next example building entry shows an office building which is not exempt. Data was reported on this building up to the point where it was determined that this building would not be evaluated. No data was entered after this point.

The third example building entry shows a Laboratory which was chosen for evaluation but upon evaluation was shown to be seismically acceptable. Therefore there are no rehabilitation costs entered for this building. The next Laboratory building entry shows a building which was found to be seismically deficient. Therefore a code of NG was entered under Outcome of Evaluation. In the evaluation, the building was found to be both structurally and non-structurally deficient but it passed in the geologic and adjacency areas. The appropriate deficiency codes were therefore entered. Costs were then developed to rehabilitate the building. The four costs entered represent the structural cost, the nonstructural cost, the finishing cost and the project cost.

The final example building entry shows a Picnic Area which was found to exempt because it a wood frame building less than 280 m^2 (3000 sq. ft.). Even though this building is exempt, additional information was reported beyond what is required. This is because the agency happened to have additional information in a few categories and passed this information on in the inventory. Agencies are encouraged to report any information they have available since all information is useful to FEMA and the ICSSC.

This example illustrates that each building entry is a separate line containing each field for that building. Hard returns should only be used at the end of the last field for a particular building.

Table 5-6 - Example Inventory Using Codes

Agency Code	Unique Identifier	State (or Territory) Code	County Code	Seismicity	Area (m^2)	Number of Buildings	Reason For Exemption Code	Occupancy Class Code	Essential Building Code	Historic Building Code	Date of Construction	Model Building Type Code	Number of Stories Code	Exceptionally High Risk Code	Evaluation Procedure Code	Soil Type Code	Foundation Type Code
1100	WStorage	48	033	L	1208	1	E1										
1100	OfficeA	32	005	H	4181	1	E0	10	S2	H2	1975	MB08	N05				
1100	WestLab	36	021	M	3252	1	E0	70	S2	H2	1972	MB07	N02	R2	P1	S1	FT1
1100	EastLab	35	028	M	5110	1	E0	70	S1	H2	1948	MB08	N03	R1	P1	S2	FT1
1100	Picnic	08	010	L	232	1	E3	80		H2		MB01	N01	R2			

Table 5-6 - Example Inventory Using Codes (Continued)

Outcome of Evaluation Code	Deficiency Code One	Deficiency Code Two	Deficiency Code Three	Deficiency Code Four	Estimated Cost of Rehab 1	Estimated Cost of Rehab 2	Estimated Cost of Rehab 3	Estimated Cost of Rehab 4	Source of Cost Estimate Code	Comments
OK										
NG	FS	FN	PG	PA	$99000	$50000	$35000	$30000	C1	

5.1.2 Supporting Documentation

The written documentation to be submitted with the database information is intended to explain any agency-specific methodologies used and to justify any deviation from the category entries specified in Section 5.1.1.

The written documentation should be brief but will contain sufficient detail to clearly explain any agency-specific procedures. All agencies will submit some written documentation, although some will need to submit more information than others. The sections of the written documentation shall correspond with the sections given below. If an agency has no information which needs to be reported in a particular section, this will be stated under that section heading.

Section 1 - Agency Screening Process

Any assumptions made in the identification of exempt buildings which is specific to the agency and not outlined in this Handbook will be discussed in this Section of the written documentation. This Section will also describe any criteria used for exempting a building which is not listed in Table 5-2. This would pertain to any building which received an "E9" code for the Reason for Exemption. If more than one criteria was used for the "E9" code, each of these will be explained.

This Section will also describe and justify any benchmark years used which differ from those given in RP4, reproduced as Table 2-3, or in the simplified RP4 Table shown as Table 2-2.

Section 2 -Inventory Data

This section will describe any agency specific method of assigning buildings to seismicity categories (see Field 3).

This section will describe any building types which did not fit into the 15 model building types described in Field 10 (any building which received a MB16 code for Field 10.)

This section will explain any foundation type which was given a foundation code of "other" (any building which received a FT3 code for Field 15).

Section 3 - Selection of Buildings to be Evaluated

This Section will describe the criteria or methodology used to identify "exceptionally high risk" buildings. All agencies must report this information.

This Section will also describe procedures used to designate buildings for evaluation from the representative sample of non-exempt buildings. All agencies must report this information.

Section 4 - Evaluation Process

This Section will describe any evaluation procedure used which is different from those

evaluation procedures outlined in RP4. This applies to any building which received a "P2" code in the Evaluation Process Used category (Field 13). Any methodology used to evaluate buildings at a level higher than life-safety will also be described here since RP4 only outlines evaluation for life-safety.

This Section will describe any agency-specific definitions of buildings definitely needing rehabilitation (DNR), and the justifications for those definitions. The DNR categories given by this Handbook are in Section 3.2.2.

Section 5 - Cost-Estimating Process

This Section will report the costs of performing the seismic evaluations needed to fulfill the cost-estimating requirements. These costs can be reported in any form which is convenient for the agency. The costs can be separate for each evaluation, costs for a group of evaluations, or an average cost for all of the evaluations.

This Section will describe any agency-specific cost-estimating methods used to develop building-by-building rehabilitation cost estimates. This corresponds to any building which was assigned a "C2" for the Source of Cost-Estimate category in Table 5-5.

Section 6 - Costs of Rehabilitating Non-Evaluated Buildings

This Section will report the estimated cost, calculated by the agency, of achieving seismic safety in the non-evaluated buildings. This information will be given in a tabular format which divides the non-evaluated buildings expected to need seismic rehabilitation into the categories of essential buildings, historic buildings, and other buildings. The "other buildings" category will be further divided into the model building types which make up 85% of the non-evaluated building stock. Each category in the table should contain the estimated number of deficient buildings in that category, the estimated total area (in square meters) which these buildings represent, and an estimated cost reported in the four cost categories in both cost per square meter and total cost for the subgroup. See Section 4.2, Table 4-1, of this document for a sample table.

This Section will describe the methods which the agency used to estimate the costs of rehabilitating the buildings which were not evaluated.

Section 7 - Costs of Rehabilitating Leased Buildings

This Section will estimate the cost impact of reducing seismic risk in leased buildings. If a program other than that recommended in RP4 (allowing existing leases to expire without action, and not entering into new leases in inadequate space) will be used, the agency will describe the program. See Section 1.3 of this document for more detail.

Section 8 - Additional Information

This Section will report any additional information which the agency feels that FEMA and the ICSSC should know about its inventory, or any of the procedures used to develop the

information submitted. Discussion in this Section should be kept brief.

This Section will also report an estimated average annual attrition rate (rate at which existing owned buildings are removed from the inventory). The source or methodology used to develop the attrition rate will be included here.

5.2 Corrections to Submitted Databases

The ICSSC recommended program outlined in RP5 and in this Handbook leaves much flexibility for agencies to choose which and how many buildings will be evaluated. It also allows agencies to choose how they wish to develop cost estimates for these buildings if they are found to be seismically deficient. Because of this, FEMA and the ICSSC will not examine and find error with the procedures used by the agencies in these areas once the information is submitted.

However, the format outlined in Section 5 of this Handbook for the submission of electronic inventory data must be followed to best allow FEMA and the ICSSC to combine all of the data into one large Federal inventory database. Therefore, if your agency electronic database submissions do not follow the format outlined here, or if the data presented are unintelligible, the information will be returned to your agency for corrections to the format. When the electronic database is submitted, each agency should include the name, address, and phone number (an e-mail address would also be helpful) of the person who should be contacted by FEMA or the ICSSC if such corrections are necessary. This person should be someone who would be best able to correct the computer database format as well as verify the information which was submitted.

6.0 REFERENCES

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7.0 INDEX

APPENDIX A
STATE, COUNTY, AND TERRITORY CODES
SEISMICITY CODES

Table A-1 - Location and Seismicity Data					Page A-1
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**$A_v < 0.15$**
01	ALABAMA			ALL LOW	ALL YES
		001	Autauga	Low	Yes
		003	Baldwin	Low	Yes
		005	Barbour	Low	Yes
		007	Bibb	Low	Yes
		009	Blount	Low	Yes
		011	Bullock	Low	Yes
		013	Butler	Low	Yes
		015	Calhoun	Low	Yes
		017	Chambers	Low	Yes
		019	Cherokee	Low	Yes
		021	Chilton	Low	Yes
		023	Choctaw	Low	Yes
		025	Clarke	Low	Yes
		027	Clay	Low	Yes
		029	Cleburne	Low	Yes
		031	Coffee	Low	Yes
		033	Colbert	Low	Yes
		035	Conecuh	Low	Yes
		037	Coosa	Low	Yes
		039	Covington	Low	Yes
		041	Crenshaw	Low	Yes
		043	Cullman	Low	Yes
		045	Dale	Low	Yes
		047	Dallas	Low	Yes
		049	De Kalb	Low	Yes
		051	Elmore	Low	Yes
		053	Escambia	Low	Yes
		055	Etowah	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-2
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
01	Alabama	057	Fayette	Low	Yes
		059	Franklin	Low	Yes
		061	Geneva	Low	Yes
		063	Greene	Low	Yes
		065	Hale	Low	Yes
		067	Henry	Low	Yes
		069	Houston	Low	Yes
		071	Jackson	Low	Yes
		073	Jefferson	Low	Yes
		075	Lamar	Low	Yes
		077	Lauderdale	Low	Yes
		079	Lawrence	Low	Yes
		081	Lee	Low	Yes
		083	Limestone	Low	Yes
		085	Lowndes	Low	Yes
		087	Macon	Low	Yes
		089	Madison	Low	Yes
		091	Marengo	Low	Yes
		093	Marion	Low	Yes
		095	Marshall	Low	Yes
		097	Mobile	Low	Yes
		099	Monroe	Low	Yes
		101	Montgomery	Low	Yes
		103	Morgan	Low	Yes
		105	Perry	Low	Yes
		107	Pickens	Low	Yes
		109	Pike	Low	Yes
		111	Randolph	Low	Yes
		113	Russell	Low	Yes
		115	St Clair	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-3
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
01	Alabama	117	Shelby	Low	Yes
		119	Sumter	Low	Yes
		121	Talladega	Low	Yes
		123	Tallapoosa	Low	Yes
		125	Tuscaloosa	Low	Yes
		127	Walker	Low	Yes
		129	Washington	Low	Yes
		131	Wilcox	Low	Yes
		133	Winston	Low	Yes
02	ALASKA			MIXED	MIXED
		013	Aleutians East	High	No
		016	Aleutians West	High	No
		020	Anchorage	High	No
		050	Bethel	High	No
		060	Bristol Bay	High	No
		070	Dillingham	High	No
		090	Fairbanks North Star	High	No
		100	Haines	High	No
		110	Juneau	High	No
		122	Kenai Peninsula	High	No
		130	Ketchikan Gateway	High	No
		150	Kodiak Island	High	No
		164	Lake and Peninsula	High	No
		170	Matanuska-Susitna	High	No
		180	Nome	Low	Yes
		185	North Slope	Low	Yes
		188	Northwest Arctic	Low	Yes
		201	Prince of Wales-Outer Ketchikan	High	No

Table A-1 - Location and Seismicity Data					Page A-4
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
02	Alaska	220	Sitka	High	No
		232	Skagway-Yakutat-Angoon	High	No
		240	Southeast Fairbanks	High	No
		261	Valdez-Cordova	High	No
		270	Wade Hampton	Low	Yes
		280	Wrangell-Petersburg	High	No
		290	Yukon-Koyukuk	High	No
04	ARIZONA			MIXED	MIXED
		001	Apache	Low	Yes
		003	Cochise	Moderate	Yes
		005	Coconino	Low	Yes
		007	Gila	Low	Yes
		009	Graham	Moderate	Yes
		011	Greenlee	Moderate	Yes
		012	La Paz	High	No
		013	Maricopa	Moderate	No
		015	Mohave	Moderate	Yes
		017	Navajo	Low	Yes
		019	Pima	Moderate	No
		021	Pinal	Low	Yes
		023	Santa Cruz	Low	Yes
		025	Yavapai	Moderate	Yes
		027	Yuma	High	No
05	ARKANSAS			MIXED	MIXED
		001	Arkansas	Moderate	Yes
		003	Ashley	Low	Yes
		005	Baxter	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-5
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
05	Arkansas	007	Benton	Low	Yes
		009	Boone	Low	Yes
		011	Bradley	Low	Yes
		013	Calhoun	Low	Yes
		015	Carroll	Low	Yes
		017	Chicot	Low	Yes
		019	Clark	Low	Yes
		021	Clay	High	No
		023	Cleberne	Moderate	Yes
		025	Cleveland	Low	Yes
		027	Columbia	Low	Yes
		029	Conway	Low	Yes
		031	Craighead	High	No
		033	Crawford	Low	Yes
		035	Crittenden	High	No
		037	Cross	High	No
		039	Dallas	Low	Yes
		041	Desha	Moderate	Yes
		043	Drew	Low	Yes
		045	Faulkner	Moderate	Yes
		047	Franklin	Low	Yes
		049	Fulton	Moderate	No
		051	Garland	Low	Yes
		053	Grant	Low	Yes
		055	Greene	High	No
		057	Hempstead	Low	Yes
		059	Hot Spring	Low	Yes
		061	Howard	Low	Yes
		063	Independence	Moderate	No
		065	Izard	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-6
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
05	Arkansas	067	Jackson	High	No
		069	Jefferson	Low	Yes
		071	Johnson	Low	Yes
		073	Lafayette	Low	Yes
		075	Lawrence	High	No
		077	Lee	Moderate	No
		079	Lincoln	Low	Yes
		081	Little River	Low	Yes
		083	Logan	Low	Yes
		085	Lonoke	Moderate	Yes
		087	Madison	Low	Yes
		089	Marion	Low	Yes
		091	Miller	Low	Yes
		093	Mississippi	High	No
		095	Monroe	Moderate	No
		097	Montgomery	Low	Yes
		099	Nevada	Low	Yes
		101	Newton	Low	Yes
		103	Ouachita	Low	Yes
		105	Perry	Low	Yes
		107	Phillips	Moderate	No
		109	Pike	Low	Yes
		111	Poinsett	High	No
		113	Polk	Moderate	Yes
		115	Pope	Low	Yes
		117	Prairie	Moderate	No
		119	Pulaski	Low	Yes
		121	Randolph	High	No
		123	St Francis	High	No
		125	Saline	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-7
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
05	Arkansas	127	Scott	Low	Yes
		129	Searcy	Low	Yes
		131	Sebastian	Low	Yes
		133	Sevier	Low	Yes
		135	Sharp	Moderate	No
		137	Stone	Moderate	Yes
		139	Union	Low	Yes
		141	Van Buren	Low	Yes
		143	Washington	Low	Yes
		145	White	Moderate	No
		147	Woodruff	High	No
		149	Yell	Low	Yes
06	CALIFORNIA			MIXED	MIXED
		001	Alameda	High	No
		003	Alpine	High	No
		005	Amador	High	No
		007	Butte	High	No
		009	Calaveras	High	No
		011	Colusa	High	No
		013	Contra Costa	High	No
		015	Del Norte	High	No
		017	El Dorado	High	No
		019	Fresno	High	No
		021	Glenn	High	No
		023	Humboldt	High	No
		025	Imperial	High	No
		027	Inyo	High	No
		029	Kern	High	No

Table A-1 - Location and Seismicity Data					Page A-8
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
06	California	031	Kings	High	No
		033	Lake	High	No
		035	Lassen	High	No
		037	Los Angeles	High	No
		039	Madera	High	No
		041	Marin	High	No
		043	Mariposa	High	No
		045	Mendocino	High	No
		047	Merced	High	No
		049	Modoc	Moderate	Yes
		051	Mono	High	No
		053	Monterey	High	No
		055	Napa	High	No
		057	Nevada	High	No
		059	Orange	High	No
		061	Placer	High	No
		063	Plumas	High	No
		065	Riverside	High	No
		067	Sacramento	High	No
		069	San Benito	High	No
		071	San Bernardino	High	No
		073	San Diego	High	No
		075	San Francisco	High	No
		077	San Joaquin	High	No
		079	San Luis Obispo	High	No
		081	San Mateo	High	No
		083	Santa Barbara	High	No
		085	Santa Clara	High	No
		087	Santa Cruz	High	No
		089	Shasta	High	No

Table A-1 - Location and Seismicity Data					Page A-9
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
06	California	091	Sierra	High	No
		093	Siskiyou	Moderate	No
		095	Solano	High	No
		097	Sonoma	High	No
		099	Stanislaus	High	No
		101	Sutter	High	No
		103	Tehama	High	No
		105	Trinity	High	No
		107	Tulare	High	No
		109	Tuolumne	High	No
		111	Ventura	High	No
		113	Yolo	High	No
		115	Yuba	High	No
08	COLORADO			MIXED	ALL YES
		001	Adams	Low	Yes
		003	Alamosa	Low	Yes
		005	Arapahoe	Low	Yes
		007	Archuleta	Moderate	Yes
		009	Baca	Low	Yes
		011	Bent	Low	Yes
		013	Boulder	Low	Yes
		015	Chaffee	Low	Yes
		017	Cheyenne	Low	Yes
		019	Clear Creek	Low	Yes
		021	Conejos	Moderate	Yes
		023	Costilla	Low	Yes
		025	Crowley	Low	Yes
		027	Custer	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-10
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
08	Colorado	029	Delta	Low	Yes
		031	Denver	Low	Yes
		033	Dolores	Low	Yes
		035	Douglas	Low	Yes
		037	Eagle	Low	Yes
		039	Elbert	Low	Yes
		041	El Paso	Low	Yes
		043	Fremont	Low	Yes
		045	Garfield	Low	Yes
		047	Gilpin	Low	Yes
		049	Grand	Low	Yes
		051	Gunnison	Low	Yes
		053	Hinsdale	Moderate	Yes
		055	Huerfano	Low	Yes
		057	Jackson	Low	Yes
		059	Jefferson	Low	Yes
		061	Kiowa	Low	Yes
		063	Kit Carson	Low	Yes
		065	Lake	Low	Yes
		067	La Plata	Low	Yes
		069	Larimer	Low	Yes
		071	Las Animas	Low	Yes
		073	Lincoln	Low	Yes
		075	Logan	Low	Yes
		077	Mesa	Low	Yes
		079	Mineral	Moderate	Yes
		081	Moffat	Low	Yes
		083	Montezuma	Low	Yes
		085	Montrose	Low	Yes
		087	Morgan	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-11
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
08	Colorado	089	Otero	Low	Yes
		091	Ouray	Low	Yes
		093	Park	Low	Yes
		095	Phillips	Low	Yes
		097	Pitkin	Low	Yes
		099	Prowers	Low	Yes
		101	Pueblo	Low	Yes
		103	Rio Blanco	Low	Yes
		105	Rio Grande	Moderate	Yes
		107	Routt	Low	Yes
		109	Saguache	Moderate	Yes
		111	San Juan	Low	Yes
		113	San Miguel	Low	Yes
		115	Sedgwick	Low	Yes
		117	Summit	Low	Yes
		119	Teller	Low	Yes
		121	Washington	Low	Yes
		123	Weld	Low	Yes
		125	Yuma	Low	Yes
09	CONNECTICUT			ALL MOD	ALL YES
		001	Fairfield	Moderate	Yes
		003	Hartford	Moderate	Yes
		005	Litchfield	Moderate	Yes
		007	Middlesex	Moderate	Yes
		009	New Haven	Moderate	Yes
		011	New London	Moderate	Yes
		013	Tolland	Moderate	Yes
		015	Windham	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-12
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
10	DELAWARE			ALL LOW	ALL YES
		001	Kent	Low	Yes
		003	New Castle	Low	Yes
		005	Sussex	Low	Yes
11	DISTRICT OF COLUMBIA			Low	Yes
12	FLORIDA			ALL LOW	ALL YES
		001	Alachua	Low	Yes
		003	Baker	Low	Yes
		005	Bay	Low	Yes
		007	Bradford	Low	Yes
		009	Brevard	Low	Yes
		011	Broward	Low	Yes
		013	Calhoun	Low	Yes
		015	Charlotte	Low	Yes
		017	Citrus	Low	Yes
		019	Clay	Low	Yes
		021	Collier	Low	Yes
		023	Columbia	Low	Yes
		025	Dade	Low	Yes
		027	De Soto	Low	Yes
		029	Dixie	Low	Yes
		031	Duval	Low	Yes
		033	Escambia	Low	Yes
		035	Flagler	Low	Yes
		037	Franklin	Low	Yes
		039	Gadsden	Low	Yes
		041	Gilchrist	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-13
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
12	Florida	043	Glades	Low	Yes
		045	Gulf	Low	Yes
		047	Hamilton	Low	Yes
		049	Hardee	Low	Yes
		051	Hendry	Low	Yes
		053	Hernando	Low	Yes
		055	Highlands	Low	Yes
		057	Hillsborough	Low	Yes
		059	Holmes	Low	Yes
		061	Indian River	Low	Yes
		063	Jackson	Low	Yes
		065	Jefferson	Low	Yes
		067	Lafayette	Low	Yes
		069	Lake	Low	Yes
		071	Lee	Low	Yes
		073	Leon	Low	Yes
		075	Levy	Low	Yes
		077	Liberty	Low	Yes
		079	Madison	Low	Yes
		081	Manatee	Low	Yes
		083	Marion	Low	Yes
		085	Martin	Low	Yes
		087	Monroe	Low	Yes
		089	Nassau	Low	Yes
		091	Okaloosa	Low	Yes
		093	Okeechobee	Low	Yes
		095	Orange	Low	Yes
		097	Osceola	Low	Yes
		099	Palm Beach	Low	Yes
		101	Pasco	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-14
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
12	Florida	103	Pinellas	Low	Yes
		105	Polk	Low	Yes
		107	Putnam	Low	Yes
		109	St Johns	Low	Yes
		111	St Lucie	Low	Yes
		113	Santa Rosa	Low	Yes
		115	Sarasota	Low	Yes
		117	Seminole	Low	Yes
		119	Sumter	Low	Yes
		121	Suwannee	Low	Yes
		123	Taylor	Low	Yes
		125	Union	Low	Yes
		127	Volusia	Low	Yes
		129	Wakulla	Low	Yes
		131	Walton	Low	Yes
		133	Washington	Low	Yes
13	GEORGIA			MIXED	ALL YES
		001	Appling	Low	Yes
		003	Atkinson	Low	Yes
		005	Bacon	Low	Yes
		007	Baker	Low	Yes
		009	Baldwin	Low	Yes
		011	Banks	Moderate	Yes
		013	Barrow	Moderate	Yes
		015	Bartow	Moderate	Yes
		017	Ben Hill	Low	Yes
		019	Berrien	Low	Yes
		021	Bibb	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-15
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
13	Georgia	023	Bleckley	Low	Yes
		025	Brantley	Low	Yes
		027	Brooks	~~Low~~ Moderate	Yes
		029	Bryan	Moderate	Yes
		031	Bulloch	Moderate	Yes
		033	Burke	Moderate	Yes
		035	Butts	Low	Yes
		037	Calhoun	Low	Yes
		039	Camden	Low	Yes
		043	Candler	Moderate	Yes
		045	Carroll	Low	Yes
		047	Catoosa	Moderate	Yes
		049	Charlton	Low	Yes
		051	Chatham	Moderate	Yes
		053	Chattahoochee	Low	Yes
		055	Chattooga	Moderate	Yes
		057	Cherokee	Moderate	Yes
		059	Clarke	Moderate	Yes
		061	Clay	Low	Yes
		063	Clayton	Low	Yes
		065	Clinch	Low	Yes
		067	Cobb	Moderate	Yes
		069	Coffee	Low	Yes
		071	Colquitt	Low	Yes
		073	Columbia	Moderate	Yes
		075	Cook	Low	Yes
		077	Coweta	Low	Yes
		079	Crawford	Low	Yes
		081	Crisp	Low	Yes
		083	Cawson	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-16
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
13	Georgia	085	Dade	Moderate	Yes
		087	Decatur	Low	Yes
		089	De Kalb	Moderate	Yes
		091	Dodge	Low	Yes
		093	Dooly	Low	Yes
		095	Dougherty	Low	Yes
		097	Douglas	Low	Yes
		099	Early	Low	Yes
		101	Echols	Low	Yes
		103	Effingham	Moderate	Yes
		105	Elbert	Moderate	Yes
		107	Emanuel	Moderate	Yes
		109	Evans	Low	Yes
		111	Fannin	Moderate	Yes
		113	Fayette	Low	Yes
		115	Floyd	Moderate	Yes
		117	Forsyth	Moderate	Yes
		119	Franklin	Moderate	Yes
		121	Fulton	Moderate	Yes
		123	Gilmer	Moderate	Yes
		125	Glascock	Moderate	Yes
		127	Glynn	Low	Yes
		129	Gordon	Moderate	Yes
		131	Grady	Low	Yes
		133	Greene	Moderate	Yes
		135	Gwinnett	Moderate	Yes
		137	Habersham	Moderate	Yes
		139	Hall	Moderate	Yes
		141	Hancock	Moderate	Yes
		143	Haralson	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-17
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
13	Georgia	145	Harris	Low	Yes
		147	Hart	Moderate	Yes
		149	Heard	Low	Yes
		151	Henry	Low	Yes
		153	Houston	Low	Yes
		155	Irwin	Low	Yes
		157	Jackson	Moderate	Yes
		159	Jasper	Moderate	Yes
		161	Jeff Davis	Low	Yes
		163	Jefferson	Moderate	Yes
		165	Jenkins	Moderate	Yes
		167	Johnson	Moderate	Yes
		169	Jones	Low	Yes
		171	Lamar	Low	Yes
		173	Lanier	Low	Yes
		175	Laurens	Low	Yes
		177	Lee	Low	Yes
		179	Liberty	Low	Yes
		181	Lincoln	Moderate	Yes
		183	Long	Low	Yes
		185	Lowndes	Low	Yes
		187	Lumpkin	Moderate	Yes
		189	McDuffie	Moderate	Yes
		191	McIntosh	Low	Yes
		193	Macon	Low	Yes
		195	Madison	Moderate	Yes
		197	Marion	Low	Yes
		199	Meriwether	Low	Yes
		201	Miller	Low	Yes
		205	Mitchell	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-18
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
13	Georgia	207	Monroe	Low	Yes
		209	Montgomery	Low	Yes
		211	Morgan	Moderate	Yes
		213	Murray	Moderate	Yes
		215	Muscogee	Low	Yes
		217	Newton	Moderate	Yes
		219	Oconee	Moderate	Yes
		221	Oglethorpe	Moderate	Yes
		223	Paulding	Low	Yes
		225	Peach	Low	Yes
		227	Pickens	Moderate	Yes
		229	Pierce	Low	Yes
		231	Pike	Low	Yes
		233	Polk	Low	Yes
		235	Pulaski	Low	Yes
		237	Putnam	Moderate	Yes
		239	Quitman	Low	Yes
		241	Rabun	Moderate	Yes
		243	Randolph	Low	Yes
		245	Richmond	Moderate	Yes
		247	Rockdale	Moderate	Yes
		249	Schley	Low	Yes
		251	Screven	Moderate	Yes
		253	Seminole	Low	Yes
		255	Spalding	Low	Yes
		257	Stephens	Moderate	Yes
		259	Stewart	Low	Yes
		261	Sumter	Low	Yes
		263	Talbot	Low	Yes
		265	Taliaferro	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-19
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
13	Georgia	267	Tattnall	Low	Yes
		269	Taylor	Low	Yes
		271	Telfair	Low	Yes
		273	Terrell	Low	Yes
		275	Thomas	Low	Yes
		277	Tift	Low	Yes
		279	Toombs	Low	Yes
		281	Towns	Moderate	Yes
		283	Treutlen	Moderate	Yes
		285	Troup	Low	Yes
		287	Turner	Low	Yes
		289	Twiggs	Low	Yes
		291	Union	Moderate	Yes
		293	Upson	Low	Yes
		295	Walker	Moderate	Yes
		297	Waltoon	Moderate	Yes
		299	Ware	Low	Yes
		301	Warren	Moderate	Yes
		303	Washington	Moderate	Yes
		305	Wayne	Low	Yes
		307	Webster	Low	Yes
		309	Wheeler	Low	Yes
		311	White	Moderate	Yes
		313	Whitfield	Moderate	Yes
		315	Wilcox	Low	Yes
		317	Wilkes	Moderate	Yes
		319	Wilkinson	Low	Yes
		321	Worth	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-20
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
15	HAWAII			MIXED	MIXED
		001	Hawaii	High	No
		003	Honolulu	Moderate	Yes
		005	Kalawao	Moderate	No
		007	Kauai	Low	Yes
		009	Maui	Moderate	No
16	IDAHO			MIXED	MIXED
		001	Ada	Low	Yes
		003	Adams	Low	Yes
		005	Bannock	High	No
		007	Bear Lake	High	No
		009	Benewah	Low	Yes
		011	Bingham	High	No
		013	Blaine	Moderate	Yes
		015	Boise	Low	Yes
		017	Bonner	Low	Yes
		019	Bonneville	High	No
		021	Boundary	Low	Yes
		023	Butte	Moderate	No
		025	Camas	Low	Yes
		027	Canyon	Low	Yes
		029	Caribou	High	No
		031	Cassia	Moderate	No
		033	Clark	High	No
		035	Clearwater	Moderate	Yes
		037	Custer	Moderate	Yes
		039	Elmore	Low	Yes
		041	Franklin	High	No

Table A-1 - Location and Seismicity Data					Page A-21
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
16	Idaho	043	Fremont	High	No
		045	Gem	Low	Yes
		047	Gooding	Low	Yes
		049	Idaho	Moderate	Yes
		051	Jefferson	High	No
		053	Jerome	Low	Yes
		055	Kootenai	Low	Yes
		057	Latah	Low	Yes
		059	Lemhi	Moderate	No
		061	Lewis	Low	Yes
		063	Lincoln	Moderate	Yes
		065	Madison	High	No
		067	Minidoka	Moderate	Yes
		069	Nez Perce	Low	Yes
		071	Oneida	High	No
		073	Owyhee	Moderate	Yes
		075	Payette	Low	Yes
		077	Power	Moderate	No
		079	Shoshone	Moderate	Yes
		081	Teton	High	No
		083	Twin Falls	Moderate	Yes
		085	Valley	Moderate	Yes
		087	Washington	Low	Yes
17	ILLINOIS			MIXED	MIXED
		001	Adams	Low	Yes
		003	Alexander	High	No
		005	Bond	Moderate	Yes
		007	Boone	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-22
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
17	Illinois	009	Brown	Low	Yes
		011	Bureau	Low	Yes
		013	Calhoun	Low	Yes
		015	Carroll	Low	Yes
		017	Cass	Low	Yes
		019	Champaign	Low	Yes
		021	Christian	Moderate	Yes
		023	Clark	Moderate	Yes
		025	Clay	Moderate	Yes
		027	Clinton	Moderate	No
		029	Coles	Moderate	Yes
		031	Cook	Low	Yes
		033	Crawford	Moderate	Yes
		035	Cumberland	Moderate	Yes
		037	De Kalb	Low	Yes
		039	De Witt	Low	Yes
		041	Douglas	Moderate	Yes
		043	Du Page	Low	Yes
		045	Edgar	Moderate	Yes
		047	Edwards	Moderate	Yes
		049	Effingham	Moderate	Yes
		051	Fayette	Moderate	Yes
		053	Ford	Low	Yes
		055	Franklin	Moderate	No
		057	Fulton	Low	Yes
		059	Gallatin	Moderate	No
		061	Greene	Low	Yes
		063	Grundy	Low	Yes
		065	Hamilton	Moderate	No
		067	Hancock	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-23
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
17	Illinois	069	Hardin	Moderate	No
		071	Henderson	Low	Yes
		073	Henry	Low	Yes
		075	Iroquois	Low	Yes
		077	Jackson	Moderate	No
		079	Jasper	Moderate	Yes
		081	Jefferson	Moderate	No
		083	Jersey	Low	Yes
		085	Jo Daviess	Low	Yes
		087	Johnson	Moderate	No
		089	Kane	Low	Yes
		091	Kankakee	Low	Yes
		093	Kendall	Low	Yes
		095	Knox	Low	Yes
		097	Lake	Low	Yes
		099	La Salle	Low	Yes
		101	Lawrence	Moderate	Yes
		103	Lee	Low	Yes
		105	Livingston	Low	Yes
		107	Logan	Low	Yes
		109	McDonough	Low	Yes
		111	McHenry	Low	Yes
		113	McLean	Low	Yes
		115	Macon	Low	Yes
		117	Macoupin	Moderate	Yes
		119	Madison	Moderate	Yes
		121	Marion	Moderate	No
		123	Marshall	Low	Yes
		125	Mason	Low	Yes
		127	Massac	Moderate	No

Table A-1 - Location and Seismicity Data					Page A-24
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
17	Illinois	129	Menard	Low	Yes
		131	Mercer	Low	Yes
		133	Monroe	Moderate	No
		135	Montgomery	Moderate	Yes
		137	Morgan	Low	Yes
		139	Moultrie	Moderate	Yes
		141	Ogle	Low	Yes
		143	Peoria	Low	Yes
		145	Perry	Moderate	No
		147	Piatt	Low	Yes
		149	Pike	Low	Yes
		151	Pope	Moderate	No
		153	Pulaski	High	No
		155	Putnam	Low	Yes
		157	Randolph	Moderate	No
		159	Richland	Moderate	Yes
		161	Rock Island	Low	Yes
		163	St Clair	Moderate	No
		165	Saline	Moderate	No
		167	Sangamon	Low	Yes
		169	Schuyler	Low	Yes
		171	Scott	Low	Yes
		173	Shelby	Moderate	Yes
		175	Stark	Low	Yes
		177	Stephenson	Low	Yes
		179	Tazewell	Low	Yes
		181	Union	High	No
		183	Vermilion	Low	Yes
		185	Wabash	Moderate	Yes
		187	Warren	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-25
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
17	Illinois	189	Washington	Moderate	No
		191	Wayne	Moderate	No
		193	White	Moderate	No
		195	Whiteside	Low	Yes
		197	Will	Low	Yes
		199	Williamson	Moderate	No
		201	Winnebago	Low	Yes
		203	Woodford	Low	Yes
18	INDIANA			MIXED	ALL YES
		001	Adams	Low	Yes
		003	Allen	Low	Yes
		005	Bartholomew	Low	Yes
		007	Benton	Low	Yes
		009	Blackford	Low	Yes
		011	Boone	Low	Yes
		013	Brown	Low	Yes
		015	Carroll	Low	Yes
		017	Cass	Low	Yes
		019	Clark	Low	Yes
		021	Clay	Low	Yes
		023	Clinton	Low	Yes
		025	Crawford	Low	Yes
		027	Daviess	Low	Yes
		029	Dearborn	Low	Yes
		031	Decatur	Low	Yes
		033	De Kalb	Low	Yes
		035	Delaware	Low	Yes
		037	Dubois	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-26
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
18	Indiana	039	Elkhart	Low	Yes
		041	Fayette	Low	Yes
		043	Floyd	Low	Yes
		045	Fountain	Low	Yes
		047	Franklin	Low	Yes
		049	Fulton	Low	Yes
		051	Gibson	Moderate	Yes
		053	Grant	Low	Yes
		055	Greene	Low	Yes
		057	Hamilton	Low	Yes
		059	Hancock	Low	Yes
		061	Harrison	Low	Yes
		063	Hendricks	Low	Yes
		065	Henry	Low	Yes
		067	Howard	Low	Yes
		069	Huntington	Low	Yes
		071	Jackson	Low	Yes
		073	Jasper	Low	Yes
		075	Jay	Low	Yes
		077	Jefferson	Low	Yes
		079	Jennings	Low	Yes
		081	Johnson	Low	Yes
		083	Knox	Moderate	Yes
		085	Kosciusko	Low	Yes
		087	LaGrange	Low	Yes
		089	Lake	Low	Yes
		091	La Porte	Low	Yes
		093	Lawrence	Low	Yes
		095	Madison	Low	Yes
		097	Marion	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-27
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
18	Indiana	099	Marshall	Low	Yes
		101	Martin	Low	Yes
		103	Miami	Low	Yes
		105	Monroe	Low	Yes
		107	Montgomery	Low	Yes
		109	Morgan	Low	Yes
		111	Newton	Low	Yes
		113	Noble	Low	Yes
		115	Ohio	Low	Yes
		117	Orange	Low	Yes
		119	Owen	Low	Yes
		121	Parke	Low	Yes
		123	Perry	Low	Yes
		125	Pike	Low	Yes
		127	Porter	Low	Yes
		129	Posey	Moderate	Yes
		131	Pulaski	Low	Yes
		133	Putnam	Low	Yes
		135	Randolph	Low	Yes
		137	Ripley	Low	Yes
		139	Rush	Low	Yes
		141	St Joseph	Low	Yes
		143	Scott	Low	Yes
		145	Shelby	Low	Yes
		147	Spencer	Low	Yes
		149	Starke	Low	Yes
		151	Steuben	Low	Yes
		153	Sullivan	Moderate	Yes
		155	Switzerland	Low	Yes
		157	Tippecanoe	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-28
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
18	Indiana	159	Tipton	Low	Yes
		161	Union	Low	Yes
		163	Vanderburgh	Moderate	Yes
		165	Vermillion	Moderate	Yes
		167	Vigo	Moderate	Yes
		169	Wabash	Low	Yes
		171	Warren	Low	Yes
		173	Warrick	Low	Yes
		175	Washington	Low	Yes
		177	Wayne	Low	Yes
		179	Wells	Low	Yes
		181	White	Low	Yes
		183	Whitley	Low	Yes
19	IOWA			MIXED	ALL YES
		001	Adair	Low	Yes
		003	Adams	Low	Yes
		005	Allamakee	Low	Yes
		007	Appanoose	Low	Yes
		009	Audubon	Low	Yes
		011	Benton	Low	Yes
		013	Black Hawk	Low	Yes
		015	Boone	Low	Yes
		017	Bremer	Low	Yes
		019	Buchanan	Low	Yes
		021	Buena Vista	Low	Yes
		023	Butler	Low	Yes
		025	Calhoun	Low	Yes
		027	Carroll	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-29
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
19	Iowa	029	Cass	Low	Yes
		031	Cedar	Low	Yes
		033	Cerro Gordo	Low	Yes
		035	Cherokee	Low	Yes
		037	Chickasaw	Low	Yes
		039	Clarke	Low	Yes
		041	Clay	Low	Yes
		043	Clayton	Low	Yes
		045	Clinton	Low	Yes
		047	Crawford	Low	Yes
		049	Dallas	Low	Yes
		051	Davis	Low	Yes
		053	Decatur	Low	Yes
		055	Delaware	Low	Yes
		057	Des Moines	Low	Yes
		059	Dickinson	Low	Yes
		061	Dubuque	Low	Yes
		063	Emmet	Low	Yes
		065	Fayette	Low	Yes
		067	Floyd	Low	Yes
		069	Franklin	Low	Yes
		071	Fremont	Moderate	Yes
		073	Greene	Low	Yes
		075	Grundy	Low	Yes
		077	Guthrie	Low	Yes
		079	Hamilton	Low	Yes
		081	Hancock	Low	Yes
		083	Hardin	Low	Yes
		085	Harrison	Low	Yes
		087	Henry	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-30
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
19	Iowa	089	Howard	Low	Yes
		091	Humboldt	Low	Yes
		093	Ida	Low	Yes
		095	Iowa	Low	Yes
		097	Jackson	Low	Yes
		099	Jasper	Low	Yes
		101	Jefferson	Low	Yes
		103	Johnson	Low	Yes
		105	Jones	Low	Yes
		107	Keokuk	Low	Yes
		109	Kossuth	Low	Yes
		111	Lee	Low	Yes
		113	Linn	Low	Yes
		115	Louisa	Low	Yes
		117	Lucas	Low	Yes
		119	Lyon	Low	Yes
		121	Madison	Low	Yes
		123	Mahaska	Low	Yes
		125	Marion	Low	Yes
		127	Marshall	Low	Yes
		129	Mills	Moderate	Yes
		131	Mitchell	Low	Yes
		133	Monona	Low	Yes
		135	Monroe	Low	Yes
		137	Montgomery	Low	Yes
		139	Muscatine	Low	Yes
		141	O Brien	Low	Yes
		143	Osceola	Low	Yes
		145	Page	Moderate	Yes
		147	Palo Alto	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-31
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
19	Iowa	149	Plymouth	Low	Yes
		151	Pocahontas	Low	Yes
		153	Polk	Low	Yes
		155	Pottawattamie	Low	Yes
		157	Poweshiek	Low	Yes
		159	Ringgold	Low	Yes
		161	Sac	Low	Yes
		163	Scott	Low	Yes
		165	Shelby	Low	Yes
		167	Sioux	Low	Yes
		169	Story	Low	Yes
		171	Tama	Low	Yes
		173	Taylor	Low	Yes
		175	Union	Low	Yes
		177	Van Buren	Low	Yes
		179	Wapello	Low	Yes
		181	Warren	Low	Yes
		183	Washington	Low	Yes
		185	Wayne	Low	Yes
		187	Webster	Low	Yes
		189	Winnebago	Low	Yes
		191	Winneshiek	Low	Yes
		193	Woodbury	Low	Yes
		195	Worth	Low	Yes
		197	Wright	Low	Yes
20	KANSAS			MIXED	ALL YES
		001	Allen	Low	Yes
		003	Anderson	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-32
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
20	Kansas	005	Atchison	Moderate	Yes
		007	Barber	Low	Yes
		009	Barton	Low	Yes
		011	Bourbon	Low	Yes
		013	Brown	Moderate	Yes
		015	Butler	Low	Yes
		017	Chase	Low	Yes
		019	Chautauqua	Low	Yes
		021	Cherokee	Low	Yes
		023	Cheyenne	Low	Yes
		025	Clark	Low	Yes
		027	Clay	Low	Yes
		029	Cloud	Low	Yes
		031	Coffey	Moderate	Yes
		033	Comanche	Low	Yes
		035	Cowley	Low	Yes
		037	Crawford	Low	Yes
		039	Decatur	Low	Yes
		041	Dickinson	Low	Yes
		043	Doniphan	Moderate	Yes
		045	Douglas	Moderate	Yes
		047	Edwards	Low	Yes
		049	Elk	Low	Yes
		051	Ellis	Low	Yes
		053	Ellsworth	Low	Yes
		055	Finney	Low	Yes
		057	Ford	Low	Yes
		059	Franklin	Moderate	Yes
		061	Geary	Moderate	Yes
		063	Gove	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-33
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
20	Kansas	065	Graham	Low	Yes
		067	Grant	Low	Yes
		069	Gray	Low	Yes
		071	Greeley	Low	Yes
		073	Greenwood	Low	Yes
		075	Hamilton	Low	Yes
		077	Harper	Low	Yes
		079	Harvey	Low	Yes
		081	Haskell	Low	Yes
		083	Hodgeman	Low	Yes
		085	Jackson	Moderate	Yes
		087	Jefferson	Moderate	Yes
		089	Jewell	Low	Yes
		091	Johnson	Moderate	Yes
		093	Kearny	Low	Yes
		095	Kingman	Low	Yes
		097	Kiowa	Low	Yes
		099	Labette	Low	Yes
		101	Lane	Low	Yes
		103	Leavenworth	Moderate	Yes
		105	Lincoln	Low	Yes
		107	Linn	Moderate	Yes
		109	Logan	Low	Yes
		111	Lyon	Moderate	Yes
		113	McPherson	Low	Yes
		115	Marion	Low	Yes
		117	Marshall	Moderate	Yes
		119	Meade	Low	Yes
		121	Miami	Moderate	Yes
		123	Mitchell	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-34
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
20	Kansas	125	Montgomery	Low	Yes
		127	Morris	Moderate	Yes
		129	Morton	Low	Yes
		131	Nemaha	Moderate	Yes
		133	Neosho	Low	Yes
		135	Ness	Low	Yes
		137	Norton	Low	Yes
		139	Osage	Moderate	Yes
		141	Osborne	Low	Yes
		143	Ottawa	Low	Yes
		145	Pawnee	Low	Yes
		147	Phillips	Low	Yes
		149	Pottawatomie	Moderate	Yes
		151	Pratt	Low	Yes
		153	Rawlins	Low	Yes
		155	Reno	Low	Yes
		157	Republic	Low	Yes
		159	Rice	Low	Yes
		161	Riley	Moderate	Yes
		163	Rooks	Low	Yes
		165	Rush	Low	Yes
		167	Russell	Low	Yes
		169	Saline	Low	Yes
		171	Scott	Low	Yes
		173	Sedgwick	Low	Yes
		175	Seward	Low	Yes
		177	Shawnee	Moderate	Yes
		179	Sheridan	Low	Yes
		181	Sherman	Low	Yes
		183	Smith	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-35
State Code	State	County Code	County Name	Seismicity	A_v < 0.15
20	Kansas	185	Stafford	Low	Yes
		187	Stanton	Low	Yes
		189	Stevens	Low	Yes
		191	Sumner	Low	Yes
		193	Thomas	Low	Yes
		195	Trego	Low	Yes
		197	Wabaunsee	Moderate	Yes
		199	Wallace	Low	Yes
		201	Washington	Moderate	Yes
		203	Wichita	Low	Yes
		205	Wilson	Low	Yes
		207	Woodson	Low	Yes
		209	Wyandotte	Moderate	Yes
21	KENTUCKY			MIXED	MIXED
		001	Adair	Low	Yes
		003	Allen	Low	Yes
		005	Anderson	Low	Yes
		007	Ballard	High	No
		009	Barren	Low	Yes
		011	Bath	Low	Yes
		013	Bell	Moderate	Yes
		015	Boone	Low	Yes
		017	Bourbon	Low	Yes
		019	Boyd	Low	Yes
		021	Boyle	Low	Yes
		023	Bracken	Low	Yes
		025	Breathitt	Low	Yes
		027	Breckinridge	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-36
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
21	Kentucky	029	Bullitt	Low	Yes
		031	Butler	Low	Yes
		033	Caldwell	Moderate	Yes
		035	Calloway	Moderate	Yes
		037	Campbell	Low	Yes
		039	Carlisle	High	No
		041	Carroll	Low	Yes
		043	Carter	Low	Yes
		045	Casey	Low	Yes
		047	Christian	Low	Yes
		049	Clark	Low	Yes
		051	Clay	Low	Yes
		053	Clinton	Low	Yes
		055	Crittenden	Moderate	Yes
		057	Cumberland	Low	Yes
		059	Daviess	Low	Yes
		061	Edmonson	Low	Yes
		063	Elliott	Low	Yes
		065	Estill	Low	Yes
		067	Fayette	Low	Yes
		069	Fleming	Low	Yes
		071	Floyd	Low	Yes
		073	Franklin	Low	Yes
		075	Fulton	High	No
		077	Gallatin	Low	Yes
		079	Garrard	Low	Yes
		081	Grant	Low	Yes
		083	Graves	Moderate	No
		085	Grayson	Low	Yes
		087	Green	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-37
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
21	Kentucky	089	Greenup	Low	Yes
		091	Hancock	Low	Yes
		093	Hardin	Low	Yes
		095	Harlan	Moderate	Yes
		097	Harrison	Low	Yes
		099	Hart	Low	Yes
		101	Henderson	Moderate	Yes
		103	Henry	Low	Yes
		105	Hickman	High	No
		107	Hopkins	Moderate	Yes
		109	Jackson	Low	Yes
		111	Jefferson	Low	Yes
		113	Jessamine	Low	Yes
		115	Johnson	Low	Yes
		117	Kenton	Low	Yes
		119	Knott	Low	Yes
		121	Knox	Low	Yes
		123	Larue	Low	Yes
		125	Laurel	Low	Yes
		127	Lawrence	Low	Yes
		129	Lee	Low	Yes
		131	Leslie	Low	Yes
		133	Letcher	Moderate	Yes
		135	Lewis	Low	Yes
		137	Lincoln	Low	Yes
		139	Livingston	Moderate	No
		141	Logan	Low	Yes
		143	Lyon	Moderate	Yes
		145	McCracken	Moderate	No
		147	McCreary	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-38
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
21	Kentucky	149	McLean	Low	Yes
		151	Madison	Low	Yes
		153	Magoffin	Low	Yes
		155	Marion	Low	Yes
		157	Marshall	Moderate	No
		159	Martin	Low	Yes
		161	Mason	Low	Yes
		163	Meade	Low	Yes
		165	Menifee	Low	Yes
		167	Mercer	Low	Yes
		169	Metcalfe	Low	Yes
		171	Monroe	Low	Yes
		173	Montgomery	Low	Yes
		175	Morgan	Low	Yes
		177	Muhlenberg	Low	Yes
		179	Nelson	Low	Yes
		181	Nicholas	Low	Yes
		183	Ohio	Low	Yes
		185	Oldham	Low	Yes
		187	Owen	Low	Yes
		189	Owsley	Low	Yes
		191	Pendleton	Low	Yes
		193	Perry	Low	Yes
		195	Pike	Low	Yes
		197	Powell	Low	Yes
		199	Pulaski	Low	Yes
		201	Robertson	Low	Yes
		203	Rockcastle	Low	Yes
		205	Rowan	Low	Yes
		207	Russell	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-39
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
21	Kentucky	209	Scott	Low	Yes
		211	Shelby	Low	Yes
		213	Simpson	Low	Yes
		215	Spencer	Low	Yes
		217	Taylor	Low	Yes
		219	Todd	Low	Yes
		221	Trigg	Moderate	Yes
		223	Trimble	Low	Yes
		225	Union	Moderate	Yes
		227	Warren	Low	Yes
		229	Washington	Low	Yes
		231	Wayne	Low	Yes
		233	Webster	Moderate	Yes
		235	Whitley	Low	Yes
		237	Wolfe	Low	Yes
		239	Woodford	Low	Yes
22	LOUISIANA			ALL LOW	ALL YES
		001	Acadia	Low	Yes
		003	Allen	Low	Yes
		005	Ascension	Low	Yes
		007	Assumption	Low	Yes
		009	Avoyelles	Low	Yes
		011	Beauregard	Low	Yes
		013	Bienville	Low	Yes
		015	Bossier	Low	Yes
		017	Caddo	Low	Yes
		019	Calcasieu	Low	Yes
		021	Caldwell	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-40
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
22	Louisiana	023	Cameron	Low	Yes
		025	Catahoula	Low	Yes
		027	Claiborne	Low	Yes
		029	Concordia	Low	Yes
		031	De Soto	Low	Yes
		033	East Baton Rouge	Low	Yes
		035	East Carroll	Low	Yes
		037	East Feliciana	Low	Yes
		039	Evangeline	Low	Yes
		041	Franklin	Low	Yes
		043	Grant	Low	Yes
		045	Iberia	Low	Yes
		047	Iberville	Low	Yes
		049	Jackson	Low	Yes
		051	Jefferson	Low	Yes
		053	Jefferson Davis	Low	Yes
		055	Lafayette	Low	Yes
		057	LaFourche	Low	Yes
		059	La Salle	Low	Yes
		061	Lincoln	Low	Yes
		063	Livingston	Low	Yes
		065	Madison	Low	Yes
		067	Morehouse	Low	Yes
		069	Natchitoches	Low	Yes
		071	Orleans	Low	Yes
		073	Ouachita	Low	Yes
		075	Plaquemines	Low	Yes
		077	Pointe Coupee	Low	Yes
		079	Rapides	Low	Yes
		081	Red River	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-41
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
22	Louisiana	083	Richland	Low	Yes
		085	Sabine	Low	Yes
		087	St Bernard	Low	Yes
		089	St Charles	Low	Yes
		091	St Helena	Low	Yes
		093	St James	Low	Yes
		095	St John the Baptist	Low	Yes
		097	St Landry	Low	Yes
		099	St Martin	Low	Yes
		101	St Mary	Low	Yes
		103	St Tammany	Low	Yes
		105	Tangipahoa	Low	Yes
		107	Tensas	Low	Yes
		109	Terrebonne	Low	Yes
		111	Union	Low	Yes
		113	Vermilion	Low	Yes
		115	Vernon	Low	Yes
		117	Washington	Low	Yes
		119	Webster	Low	Yes
		121	West Baton Rouge	Low	Yes
		123	West Carroll	Low	Yes
		125	West Feliciana	Low	Yes
		127	Winn	Low	Yes
23	MAINE			ALL MOD	ALL YES
		001	Androscoggin	Moderate	Yes
		003	Aroostook	Moderate	Yes
		005	Cumberland	Moderate	Yes
		007	Franklin	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-42
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
23	Maine	009	Hancock	Moderate	Yes
		011	Kennebec	Moderate	Yes
		013	Knox	Moderate	Yes
		015	Lincoln	Moderate	Yes
		017	Oxford	Moderate	Yes
		019	Penobscot	Moderate	Yes
		021	Piscataquis	Moderate	Yes
		023	Sagadahoc	Moderate	Yes
		025	Somerset	Moderate	Yes
		027	Waldo	Moderate	Yes
		029	Washington	Moderate	Yes
		031	York	Moderate	Yes
24	MARYLAND			ALL LOW	ALL YES
		001	Allegany	Low	Yes
		003	Anne Arundel	Low	Yes
		005	Baltimore	Low	Yes
		009	Calvert	Low	Yes
		011	Caroline	Low	Yes
		013	Carroll	Low	Yes
		015	Cecil	Low	Yes
		017	Charles	Low	Yes
		019	Dorchester	Low	Yes
		021	Frederick	Low	Yes
		023	Garrett	Low	Yes
		025	Harford	Low	Yes
		027	Howard	Low	Yes
		029	Kent	Low	Yes
		031	Montgomery	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-43
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
24	Maryland	033	Prince George's	Low	Yes
		035	Queen Anne's	Low	Yes
		037	St. Mary's	Low	Yes
		039	Somerset	Low	Yes
		041	Talbot	Low	Yes
		043	Washington	Low	Yes
		045	Wicomico	Low	Yes
		047	Worcester	Low	Yes
		510	City of Baltimore	Low	Yes
25	MASSACHUSETTS			ALL MOD	ALL YES
		001	Barnstable	Moderate	Yes
		003	Berkshire	Moderate	Yes
		005	Bristol	Moderate	Yes
		007	Dukes	Moderate	Yes
		009	Essex	Moderate	Yes
		011	Franklin	Moderate	Yes
		013	Hampden	Moderate	Yes
		015	Hampshire	Moderate	Yes
		017	Middlesex	Moderate	Yes
		019	Nantucket	Moderate	Yes
		021	Norfolk	Moderate	Yes
		023	Plymouth	Moderate	Yes
		025	Suffolk	Moderate	Yes
		027	Worchester	Moderate	Yes
26	MICHIGAN			ALL LOW	ALL YES
		001	Alcona	Low	Yes
		003	Alger	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-44
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
26	Michigan	005	Allegan	Low	Yes
		007	Alpena	Low	Yes
		009	Antrim	Low	Yes
		011	Arenac	Low	Yes
		013	Baraga	Low	Yes
		015	Barry	Low	Yes
		017	Bay	Low	Yes
		019	Benzie	Low	Yes
		021	Berrien	Low	Yes
		023	Branch	Low	Yes
		025	Calhoun	Low	Yes
		027	Cass	Low	Yes
		029	Charlevoix	Low	Yes
		031	Cheboygan	Low	Yes
		033	Chippewa	Low	Yes
		035	Clare	Low	Yes
		037	Clinton	Low	Yes
		039	Crawford	Low	Yes
		041	Delta	Low	Yes
		043	Dickinson	Low	Yes
		045	Eaton	Low	Yes
		047	Emmet	Low	Yes
		049	Genesee	Low	Yes
		051	Gladwin	Low	Yes
		053	Gogebic	Low	Yes
		055	Grand Traverse	Low	Yes
		057	Gratiot	Low	Yes
		059	Hillsdale	Low	Yes
		061	Houghton	Low	Yes
		063	Huron	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-45
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
26	Michigan	065	Ingham	Low	Yes
		067	Ionia	Low	Yes
		069	Iosco	Low	Yes
		071	Iron	Low	Yes
		073	Isabella	Low	Yes
		075	Jackson	Low	Yes
		077	Kalamazoo	Low	Yes
		079	Kalkaska	Low	Yes
		081	Kent	Low	Yes
		083	Keweenaw	Low	Yes
		085	Lake	Low	Yes
		087	Lapeer	Low	Yes
		089	Leelanau	Low	Yes
		091	Lenawee	Low	Yes
		093	Livingston	Low	Yes
		095	Luce	Low	Yes
		097	Mackinac	Low	Yes
		099	Macomb	Low	Yes
		101	Manistee	Low	Yes
		103	Marquette	Low	Yes
		105	Mason	Low	Yes
		107	Mecosta	Low	Yes
		109	Menominee	Low	Yes
		111	Midland	Low	Yes
		113	Missaukee	Low	Yes
		115	Monroe	Low	Yes
		117	Montcalm	Low	Yes
		119	Montmorency	Low	Yes
		121	Muskegon	Low	Yes
		123	Newaygo	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-46
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
26	Michigan	125	Oakland	Low	Yes
		127	Oceana	Low	Yes
		129	Ogemaw	Low	Yes
		131	Ontonagon	Low	Yes
		133	Osceola	Low	Yes
		135	Oscoda	Low	Yes
		137	Otsego	Low	Yes
		139	Ottawa	Low	Yes
		141	Presque Isle	Low	Yes
		143	Roscommon	Low	Yes
		145	Saginaw	Low	Yes
		147	St Clair	Low	Yes
		149	St Joseph	Low	Yes
		151	Sanilac	Low	Yes
		153	Schoolcraft	Low	Yes
		155	Shiawassee	Low	Yes
		157	Tuscola	Low	Yes
		159	Van Buren	Low	Yes
		161	Washtenaw	Low	Yes
		163	Wayne	Low	Yes
		165	Wexford	Low	Yes
27	MINNESOTA			ALL LOW	ALL YES
		001	Aitkin	Low	Yes
		003	Anoka	Low	Yes
		005	Becker	Low	Yes
		007	Beltrami	Low	Yes
		009	Benton	Low	Yes
		011	Big Stone	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-47
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**$A_v < 0.15$**
27	Minnesota	013	Blue Earth	Low	Yes
		015	Brown	Low	Yes
		017	Carlton	Low	Yes
		019	Carver	Low	Yes
		021	Cass	Low	Yes
		023	Chippewa	Low	Yes
		025	Chisago	Low	Yes
		027	Clay	Low	Yes
		029	Clearwater	Low	Yes
		031	Cook	Low	Yes
		033	Cottonwood	Low	Yes
		035	Crow Wing	Low	Yes
		037	Dakota	Low	Yes
		039	Dodge	Low	Yes
		041	Douglas	Low	Yes
		043	Fairbault	Low	Yes
		045	Fillmore	Low	Yes
		047	Freeborn	Low	Yes
		049	Goodhue	Low	Yes
		051	Grant	Low	Yes
		053	Hennepin	Low	Yes
		055	Houston	Low	Yes
		057	Hubbard	Low	Yes
		059	Isanti	Low	Yes
		061	Itasca	Low	Yes
		063	Jackson	Low	Yes
		065	Kanabec	Low	Yes
		067	Kandiyohi	Low	Yes
		069	Kittson	Low	Yes
		071	Koochiching	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-48
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
27	Minnesota	073	Lac Qui Parle	Low	Yes
		075	Lake	Low	Yes
		077	Lake of the Woods	Low	Yes
		079	Le Sueur	Low	Yes
		081	Lincoln	Low	Yes
		083	Lyon	Low	Yes
		085	McLeod	Low	Yes
		087	Mahnomen	Low	Yes
		089	Marshall	Low	Yes
		091	Martin	Low	Yes
		093	Meeker	Low	Yes
		095	Mille Lacs	Low	Yes
		097	Morrison	Low	Yes
		099	Mower	Low	Yes
		101	Murray	Low	Yes
		103	Nicollet	Low	Yes
		105	Nobles	Low	Yes
		107	Norman	Low	Yes
		109	Olmsted	Low	Yes
		111	Otter Tail	Low	Yes
		113	Pennington	Low	Yes
		115	Pine	Low	Yes
		117	Pipestone	Low	Yes
		119	Polk	Low	Yes
		121	Pope	Low	Yes
		123	Ramsey	Low	Yes
		125	Red Lake	Low	Yes
		127	Redwood	Low	Yes
		129	Renville	Low	Yes
		131	Rice	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-49
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
27	Minnesota	133	Rock	Low	Yes
		135	Roseau	Low	Yes
		137	St Louis	Low	Yes
		139	Scott	Low	Yes
		141	Sherburne	Low	Yes
		143	Sibley	Low	Yes
		145	Stearns	Low	Yes
		147	Steele	Low	Yes
		149	Stevens	Low	Yes
		151	Swift	Low	Yes
		153	Todd	Low	Yes
		155	Traverse	Low	Yes
		157	Wabasha	Low	Yes
		159	Wadena	Low	Yes
		161	Waseca	Low	Yes
		163	Washington	Low	Yes
		165	Watonwan	Low	Yes
		167	Wilkin	Low	Yes
		169	Winona	Low	Yes
		171	Wright	Low	Yes
		173	Yellow Medicine	Low	Yes
28	MISSISSIPPI			MIXED	MIXED
		001	Adams	Low	Yes
		003	Alcorn	Low	Yes
		005	Amite	Low	Yes
		007	Attala	Low	Yes
		009	Benton	Moderate	Yes
		011	Bolivar	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-50
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
28	Mississippi	013	Calhoun	Low	Yes
		015	Carroll	Low	Yes
		017	Chicksaw	Low	Yes
		019	Choctaw	Low	Yes
		021	Claiborne	Low	Yes
		023	Clarke	Low	Yes
		025	Clay	Low	Yes
		027	Coahoma	Moderate	Yes
		029	Copiah	Low	Yes
		031	Covington	Low	Yes
		033	De Soto	Moderate	No
		035	Forrest	Low	Yes
		037	Franklin	Low	Yes
		039	George	Low	Yes
		041	Greene	Low	Yes
		043	Grenada	Low	Yes
		045	Hancock	Low	Yes
		047	Harrison	Low	Yes
		049	Hinds	Low	Yes
		051	Holmes	Low	Yes
		053	Humphreys	Low	Yes
		055	Issaquena	Low	Yes
		057	Itawamba	Low	Yes
		059	Jackson	Low	Yes
		061	Jasper	Low	Yes
		063	Jefferson	Low	Yes
		065	Jefferson Davis	Low	Yes
		067	Jones	Low	Yes
		069	Kemper	Low	Yes
		071	Lafayette	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-51
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
28	Mississippi	073	Lamar	Low	Yes
		075	Lauderdale	Low	Yes
		077	Lawrence	Low	Yes
		079	Leake	Low	Yes
		081	Lee	Low	Yes
		083	Leflore	Low	Yes
		085	Lincoln	Low	Yes
		087	Lowndes	Low	Yes
		089	Madison	Low	Yes
		091	Marion	Low	Yes
		093	Marshall	Moderate	No
		095	Monroe	Low	Yes
		097	Montgomery	Low	Yes
		099	Neshoba	Low	Yes
		101	Newton	Low	Yes
		103	Noxubee	Low	Yes
		105	Oktibbeha	Low	Yes
		107	Panola	Moderate	Yes
		109	Pearl River	Low	Yes
		111	Perry	Low	Yes
		113	Pike	Low	Yes
		115	Pontotoc	Low	Yes
		117	Prentiss	Low	Yes
		119	Quitman	Moderate	Yes
		121	Rankin	Low	Yes
		123	Scott	Low	Yes
		125	Sharkey	Low	Yes
		127	Simpson	Low	Yes
		129	Smith	Low	Yes
		131	Stone	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-52
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
28	Mississippi	133	Sunflower	Low	Yes
		135	Tallahatchie	Low	Yes
		137	Tate	Moderate	No
		139	Tippah	Moderate	Yes
		143	Tunica	Moderate	No
		145	Union	Moderate	Yes
		147	Walthall	Low	Yes
		149	Warren	Low	Yes
		151	Washington	Low	Yes
		153	Wayne	Low	Yes
		155	Webster	Low	Yes
		157	Wilkinson	Low	Yes
		159	Winston	Low	Yes
		161	Yalobusha	Low	Yes
		163	Yazoo	Low	Yes
29	MISSOURI			MIXED	MIXED
		001	Adair	Low	Yes
		003	Andrew	Moderate	Yes
		005	Atchison	Moderate	Yes
		007	Audrain	Low	Yes
		009	Barry	Low	Yes
		011	Barton	Low	Yes
		013	Bates	Low	Yes
		015	Benton	Low	Yes
		017	Bollinger	High	No
		019	Boone	Low	Yes
		021	Buchanan	Moderate	Yes
		023	Butler	High	No

Table A-1 - Location and Seismicity Data					Page A-53
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
29	Missouri	025	Caldwell	Low	Yes
		027	Callaway	Low	Yes
		029	Camden	Low	Yes
		031	Cape Girardeau	High	No
		033	Carroll	Low	Yes
		035	Carter	Moderate	No
		037	Cass	Moderate	Yes
		039	Cedar	Low	Yes
		041	Chariton	Low	Yes
		043	Christian	Low	Yes
		045	Clark	Low	Yes
		047	Clay	Moderate	Yes
		049	Clinton	Moderate	Yes
		051	Cole	Low	Yes
		053	Cooper	Low	Yes
		055	Crawford	Moderate	Yes
		057	Dade	Low	Yes
		059	Dallas	Low	Yes
		061	Daviess	Low	Yes
		063	De Kalb	Low	Yes
		065	Dent	Moderate	Yes
		067	Douglas	Moderate	Yes
		069	Dunklin	High	No
		071	Franklin	Moderate	Yes
		073	Gasconade	Low	Yes
		075	Gentry	Low	Yes
		077	Greene	Low	Yes
		079	Grundy	Low	Yes
		081	Harrison	Low	Yes
		083	Henry	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-54
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
29	Missouri	085	Hickory	Low	Yes
		087	Holt	Moderate	Yes
		089	Howard	Low	Yes
		091	Howell	Moderate	Yes
		093	Iron	Moderate	No
		095	Jackson	Moderate	Yes
		097	Jasper	Low	Yes
		099	Jefferson	Moderate	Yes
		101	Johnson	Low	Yes
		103	Knox	Low	Yes
		105	Laclede	Low	Yes
		107	Lafayette	Low	Yes
		109	Lawrence	Low	Yes
		111	Lewis	Low	Yes
		113	Lincoln	Low	Yes
		115	Linn	Low	Yes
		117	Livingston	Low	Yes
		119	McDonald	Low	Yes
		121	Macon	Low	Yes
		123	Madison	High	No
		125	Maries	Low	Yes
		127	Marion	Low	Yes
		129	Mercer	Low	Yes
		131	Miller	Low	Yes
		133	Mississippi	High	No
		135	Moniteau	Low	Yes
		137	Monroe	Low	Yes
		139	Montgomery	Low	Yes
		141	Morgan	Low	Yes
		143	New Madrid	High	No

Table A-1 - Location and Seismicity Data					Page A-55
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
29	Missouri	145	Newton	Low	Yes
		147	Nodaway	Moderate	Yes
		149	Oregon	Moderate	No
		151	Osage	Low	Yes
		153	Ozark	Moderate	Yes
		155	Pemiscot	High	No
		157	Perry	Moderate	No
		159	Pettis	Low	Yes
		161	Phelps	Low	Yes
		163	Pike	Low	Yes
		165	Platte	Moderate	Yes
		167	Polk	Low	Yes
		169	Pulaski	Low	Yes
		171	Putnam	Low	Yes
		173	Ralls	Low	Yes
		175	Randolph	Low	Yes
		177	Ray	Low	Yes
		179	Reynolds	Moderate	No
		181	Ripley	High	No
		183	St Charles	Moderate	Yes
		185	St Clair	Low	Yes
		186	Ste Genevieve	Moderate	No
		187	St Francois	Moderate	No
		189	St Louis	Moderate	Yes
		510	St Louis City	Moderate	Yes
		195	Saline	Low	Yes
		197	Schuyler	Low	Yes
		199	Scotland	Low	Yes
		201	Scott	High	No
		203	Shannon	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-56
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
29	Missouri	205	Shelby	Low	Yes
		207	Stoddard	High	No
		209	Stone	Low	Yes
		211	Sullivan	Low	Yes
		213	Taney	Low	Yes
		215	Texas	Moderate	Yes
		217	Vernon	Low	Yes
		219	Warren	Low	Yes
		221	Washington	Moderate	Yes
		223	Wayne	High	No
		225	Webster	Moderate	Yes
		227	Worth	Moderate	Yes
		229	Wright	Moderate	Yes
30	MONTANA			MIXED	MIXED
		001	Beaverhead	High	No
		003	Big Horn	Moderate	Yes
		005	Blaine	Low	Yes
		007	Broadwater	High	No
		009	Carbon	Moderate	No
		011	Carter	Low	Yes
		013	Cascade	Moderate	Yes
		015	Chouteau	Low	Yes
		017	Custer	Low	Yes
		019	Daniels	Low	Yes
		021	Dawson	Low	Yes
		023	Deer Lodge	Moderate	No
		025	Fallon	Low	Yes
		027	Fergus	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-57
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
30	Montana	029	Flathead	Moderate	Yes
		031	Gallatin	High	No
		033	Garfield	Low	Yes
		035	Glacier	Low	Yes
		037	Golden Valley	Moderate	Yes
		039	Granite	Moderate	No
		041	Hill	Low	Yes
		043	Jefferson	High	No
		045	Judith Basin	Moderate	Yes
		047	Lake	Moderate	Yes
		049	Lewis and Clark	Moderate	No
		051	Liberty	Low	Yes
		053	Lincoln	Low	Yes
		055	McCone	Low	Yes
		057	Madison	High	No
		059	Meagher	Moderate	No
		061	Mineral	Moderate	Yes
		063	Missoula	Moderate	No
		065	Musselshell	Moderate	Yes
		067	Park	High	No
		069	Petroleum	Low	Yes
		071	Phillips	Low	Yes
		073	Pondera	Moderate	Yes
		075	Powder River	Low	Yes
		077	Powell	Moderate	No
		079	Prairie	Low	Yes
		081	Ravalli	Moderate	No
		083	Richland	Low	Yes
		085	Roosevelt	Low	Yes
		087	Rosebud	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-58
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
30	Montana	089	Sanders	Moderate	Yes
		091	Sheridan	Low	Yes
		093	Silver Bow	High	No
		095	Stillwater	High	No
		097	Sweet Grass	High	No
		099	Teton	Moderate	Yes
		101	Toole	Low	Yes
		103	Treasure	Low	Yes
		105	Valley	Low	Yes
		107	Wheatland	Moderate	No
		109	Wibaux	Low	Yes
		111	Yellowstone	Moderate	Yes
		113	Yellowstone National Park	High	No
31	NEBRASKA			MIXED	ALL YES
		001	Adams	Low	Yes
		003	Antelope	Low	Yes
		005	Arthur	Low	Yes
		007	Banner	Low	Yes
		009	Blaine	Low	Yes
		011	Boone	Low	Yes
		013	Box Butte	Low	Yes
		015	Boyd	Low	Yes
		017	Brown	Low	Yes
		019	Buffalo	Low	Yes
		021	Burt	Low	Yes
		023	Butler	Low	Yes
		025	Cass	Moderate	Yes
		027	Cedar	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-59
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
31	Nebraska	029	Chase	Low	Yes
		031	Cherry	Low	Yes
		033	Cheyenne	Low	Yes
		035	Clay	Low	Yes
		037	Colfax	Low	Yes
		039	Cuming	Low	Yes
		041	Custer	Low	Yes
		043	Dakota	Low	Yes
		045	Dawes	Low	Yes
		047	Dawson	Low	Yes
		049	Deuel	Low	Yes
		051	Dixon	Low	Yes
		053	Dodge	Low	Yes
		055	Douglas	Low	Yes
		057	Dundy	Low	Yes
		059	Fillmore	Low	Yes
		061	Franklin	Low	Yes
		063	Frontier	Low	Yes
		065	Furnas	Low	Yes
		067	Gage	Moderate	Yes
		069	Garden	Low	Yes
		071	Garfield	Low	Yes
		073	Gosper	Low	Yes
		075	Grant	Low	Yes
		077	Greeley	Low	Yes
		079	Hall	Low	Yes
		081	Hamilton	Low	Yes
		083	Harlan	Low	Yes
		085	Hayes	Low	Yes
		087	Hitchcock	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-60
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
31	Nebraska	089	Holt	Low	Yes
		091	Hooker	Low	Yes
		093	Howard	Low	Yes
		095	Jefferson	Moderate	Yes
		097	Johnson	Moderate	Yes
		099	Kearney	Low	Yes
		101	Keith	Low	Yes
		103	Keya Paha	Low	Yes
		105	Kimball	Low	Yes
		107	Knox	Low	Yes
		109	Lancaster	Moderate	Yes
		111	Lincoln	Low	Yes
		113	Logan	Low	Yes
		115	Loup	Low	Yes
		117	McPherson	Low	Yes
		119	Madison	Low	Yes
		121	Merrick	Low	Yes
		123	Morrill	Low	Yes
		125	Nance	Low	Yes
		127	Nemaha	Moderate	Yes
		129	Nuckolls	Low	Yes
		131	Otoe	Moderate	Yes
		133	Pawnee	Moderate	Yes
		135	Perkins	Low	Yes
		137	Phelps	Low	Yes
		139	Pierce	Low	Yes
		141	Platte	Low	Yes
		143	Polk	Low	Yes
		145	Red Willow	Low	Yes
		147	Richardson	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-61
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
31	Nebraska	149	Rock	Low	Yes
		151	Saline	Low	Yes
		153	Sarpy	Moderate	Yes
		155	Saunders	Low	Yes
		157	Scotts Bluff	Low	Yes
		159	Seward	Low	Yes
		161	Sheridan	Low	Yes
		163	Sherman	Low	Yes
		165	Sioux	Low	Yes
		167	Stanton	Low	Yes
		169	Thayer	Low	Yes
		171	Thomas	Low	Yes
		173	Thurston	Low	Yes
		175	Valley	Low	Yes
		177	Washington	Low	Yes
		179	Wayne	Low	Yes
		181	Webster	Low	Yes
		183	Wheeler	Low	Yes
		185	York	Low	Yes
32	NEVADA			MIXED	ALL NO
		510	Carson City	High	No
		001	Churchill	High	No
		003	Clark	Moderate	No
		005	Douglas	High	No
		007	Elko	High	No
		009	Esmeralda	High	No
		011	Eureka	High	No
		013	Humboldt	High	No

32	Nevada	015	Lander	High	No
		017	Lincoln	Moderate	No
		019	Lyon	High	No
		021	Mineral	High	No
		023	Nye	High	No
		025	Ormsby	High	No
		027	Pershing	High	No
		029	Storey	High	No
		031	Washoe	High	No
		033	White Pine	Moderate	No
33	NEW HAMPSHIRE			ALL MOD	ALL YES
		001	Belknap	Moderate	Yes
		003	Carroll	Moderate	Yes
		005	Cheshire	Moderate	Yes
		007	Coos	Moderate	Yes
		009	Grafton	Moderate	Yes
		011	Hillsborough	Moderate	Yes
		013	Merrimack	Moderate	Yes
		015	Rockingham	Moderate	Yes
		017	Strafford	Moderate	Yes
		019	Sullivan	Moderate	Yes
34	NEW JERSEY			MIXED	ALL YES
		001	Atlantic	Low	Yes
		003	Bergen	Moderate	Yes
		005	Burlington	Low	Yes
		007	Camden	Low	Yes
		009	Cape May	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-63
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
34	New Jersey	011	Cumberland	Low	Yes
		013	Essex	Moderate	Yes
		015	Gloucester	Low	Yes
		017	Hudson	Moderate	Yes
		019	Hunterdon	Moderate	Yes
		021	Mercer	Moderate	Yes
		023	Middlesex	Moderate	Yes
		025	Monmouth	Moderate	Yes
		027	Morris	Moderate	Yes
		029	Ocean	Low	Yes
		031	Passaic	Moderate	Yes
		033	Salem	Low	Yes
		035	Somerset	Moderate	Yes
		037	Sussex	Moderate	Yes
		039	Union	Moderate	Yes
		041	Warren	Moderate	Yes
35	NEW MEXICO			MIXED	ALL YES
		001	Bernalillo	Moderate	Yes
		003	Catron	Moderate	Yes
		005	Chaves	Low	Yes
		006	Cibola	Moderate	Yes
		007	Colfax	Low	Yes
		009	Curry	Low	Yes
		011	De Baca	Low	Yes
		013	Dona Ana	Low	Yes
		015	Eddy	Low	Yes
		017	Grant	Moderate	Yes
		019	Guadalupe	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-64
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
35	New Mexico	021	Harding	Low	Yes
		023	Hidalgo	Moderate	Yes
		025	Lea	Low	Yes
		027	Lincoln	Low	Yes
		028	Los Alamos	Moderate	Yes
		029	Luna	Low	Yes
		031	McKinley	Low	Yes
		033	Mora	Low	Yes
		035	Otero	Low	Yes
		037	Quay	Low	Yes
		039	Rio Arriba	Moderate	Yes
		041	Roosevelt	Low	Yes
		043	Sandoval	Moderate	Yes
		045	San Juan	Low	Yes
		047	San Miguel	Low	Yes
		049	Santa Fe	Moderate	Yes
		051	Sierra	Moderate	Yes
		053	Socorro	Moderate	Yes
		055	Taos	Moderate	Yes
		057	Torrance	Moderate	Yes
		059	Union	Low	Yes
		061	Valencia	Moderate	Yes
36	NEW YORK			MIXED	ALL YES
		001	Albany	Moderate	Yes
		003	Allegany	Low	Yes
		005	Bronx	Moderate	Yes
		007	Broome	Low	Yes
		009	Cattaraugus	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-65
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
36	New York	011	Cayuga	Low	Yes
		013	Chautauqua	Moderate	Yes
		015	Chemung	Low	Yes
		017	Chenango	Low	Yes
		019	Clinton	Moderate	Yes
		021	Columbia	Moderate	Yes
		023	Cortland	Low	Yes
		025	Delaware	Moderate	Yes
		027	Dutchess	Moderate	Yes
		029	Erie	Moderate	Yes
		031	Essex	Moderate	Yes
		033	Franklin	Moderate	Yes
		035	Fulton	Moderate	Yes
		037	Genesee	Moderate	Yes
		039	Greene	Moderate	Yes
		041	Hamilton	Moderate	Yes
		043	Herkimer	Moderate	Yes
		045	Jefferson	Moderate	Yes
		047	Kings	Moderate	Yes
		049	Lewis	Moderate	Yes
		051	Livingston	Low	Yes
		053	Madison	Low	Yes
		055	Monroe	Low	Yes
		057	Montgomery	Moderate	Yes
		059	Nassau	Moderate	Yes
		061	New York	Moderate	Yes
		063	Niagara	Moderate	Yes
		065	Oneida	Moderate	Yes
		067	Onondaga	Low	Yes
		069	Ontario	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-66
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
36	New York	071	Orange	Moderate	Yes
		073	Orleans	Moderate	Yes
		075	Oswego	Low	Yes
		077	Otsego	Moderate	Yes
		079	Putnam	Moderate	Yes
		081	Queens	Moderate	Yes
		083	Rensselaer	Moderate	Yes
		085	Richmond	Moderate	Yes
		087	Rockland	Moderate	Yes
		089	St Lawrence	Moderate	Yes
		091	Saratoga	Moderate	Yes
		093	Schenectady	Moderate	Yes
		095	Schoharie	Moderate	Yes
		097	Schuyler	Low	Yes
		099	Seneca	Low	Yes
		101	Steuben	Low	Yes
		103	Suffolk	Moderate	Yes
		105	Sullivan	Moderate	Yes
		107	Tioga	Low	Yes
		109	Tompkins	Low	Yes
		111	Ulster	Moderate	Yes
		113	Warren	Moderate	Yes
		115	Washington	Moderate	Yes
		117	Wayne	Low	Yes
		119	Westchester	Moderate	Yes
		121	Wyoming	Moderate	Yes
		123	Yates	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-67
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
37	NORTH CAROLINA			MIXED	ALL YES
		001	Alamance	Low	Yes
		003	Alexander	Moderate	Yes
		005	Alleghany	Moderate	Yes
		007	Anson	Moderate	Yes
		009	Ashe	Moderate	Yes
		011	Avery	Moderate	Yes
		013	Beaufort	Low	Yes
		015	Bertie	Low	Yes
		017	Bladen	Low	Yes
		019	Brunswick	Low	Yes
		021	Buncombe	Moderate	Yes
		023	Burke	Moderate	Yes
		025	Cabarrus	Moderate	Yes
		027	Caldwell	Moderate	Yes
		029	Camden	Low	Yes
		031	Carteret	Low	Yes
		033	Caswell	Low	Yes
		035	Catawba	Moderate	Yes
		037	Chatham	Low	Yes
		039	Cherokee	Moderate	Yes
		041	Chowan	Low	Yes
		043	Clay	Moderate	Yes
		045	Cleveland	Moderate	Yes
		047	Columbus	Low	Yes
		049	Craven	Low	Yes
		051	Cumberland	Low	Yes
		053	Currituck	Low	Yes
		055	Dare	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-68
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
37	North Carolina	057	Davidson	Low	Yes
		059	Davie	Low	Yes
		061	Duplin	Low	Yes
		063	Durham	Low	Yes
		065	Edgecombe	Low	Yes
		067	Forsyth	Low	Yes
		069	Franklin	Low	Yes
		071	Gaston	Moderate	Yes
		073	Gates	Low	Yes
		075	Graham	Moderate	Yes
		077	Granville	Low	Yes
		079	Greene	Low	Yes
		081	Guilford	Low	Yes
		083	Halifax	Low	Yes
		085	Harnett	Low	Yes
		087	Haywood	Moderate	Yes
		089	Henderson	Moderate	Yes
		091	Hertford	Low	Yes
		093	Hoke	Low	Yes
		095	Hyde	Low	Yes
		097	Iredell	Moderate	Yes
		099	Jackson	Moderate	Yes
		101	Johnston	Low	Yes
		103	Jones	Low	Yes
		105	Lee	Low	Yes
		107	Lenoir	Low	Yes
		109	Lincoln	Moderate	Yes
		111	McDowell	Moderate	Yes
		113	Macon	Moderate	Yes
		115	Madison	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-69
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
37	North Carolina	117	Martin	Low	Yes
		119	Mecklenburg	Moderate	Yes
		121	Mitchell	Moderate	Yes
		123	Montgomery	Low	Yes
		125	Moore	Low	Yes
		127	Nash	Low	Yes
		129	New Hanover	Low	Yes
		131	Northampton	Low	Yes
		133	Onslow	Low	Yes
		135	Orange	Low	Yes
		137	Pamlico	Low	Yes
		139	Pasquotank	Low	Yes
		141	Pender	Low	Yes
		143	Perquimans	Low	Yes
		145	Person	Low	Yes
		147	Pitt	Low	Yes
		149	Polk	Moderate	Yes
		151	Randolph	Low	Yes
		153	Richmond	Moderate	Yes
		155	Robeson	Low	Yes
		157	Rockingham	Low	Yes
		159	Rowan	Moderate	Yes
		161	Rutherford	Moderate	Yes
		163	Sampson	Low	Yes
		165	Scotland	Low	Yes
		167	Stanly	Moderate	Yes
		169	Stokes	Low	Yes
		171	Surry	Moderate	Yes
		173	Swain	Moderate	Yes
		175	Transylvania	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-70
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
37	North Carolina	177	Tyrrell	Low	Yes
		179	Union	Moderate	Yes
		181	Vance	Low	Yes
		183	Wake	Low	Yes
		185	Warren	Low	Yes
		187	Washington	Low	Yes
		189	Watauga	Moderate	Yes
		191	Wayne	Low	Yes
		193	Wilkes	Moderate	Yes
		195	Wilson	Low	Yes
		197	Yadkin	Low	Yes
		199	Yancey	Moderate	Yes
38	NORTH DAKOTA			ALL LOW	ALL YES
		001	Adams	Low	Yes
		003	Barnes	Low	Yes
		005	Benson	Low	Yes
		007	Billings	Low	Yes
		009	Bottineau	Low	Yes
		011	Bowman	Low	Yes
		013	Burke	Low	Yes
		015	Burleigh	Low	Yes
		017	Cass	Low	Yes
		019	Cavalier	Low	Yes
		021	Dickey	Low	Yes
		023	Divide	Low	Yes
		025	Dunn	Low	Yes
		027	Eddy	Low	Yes
		029	Emmons	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-71
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
38	North Dakota	031	Foster	Low	Yes
		033	Golden Valley	Low	Yes
		035	Grand Forks	Low	Yes
		037	Grant	Low	Yes
		039	Griggs	Low	Yes
		041	Hettinger	Low	Yes
		043	Kidder	Low	Yes
		045	La Moure	Low	Yes
		047	Logan	Low	Yes
		049	McHenry	Low	Yes
		051	McIntosh	Low	Yes
		053	McKenzie	Low	Yes
		055	McLean	Low	Yes
		057	Mercer	Low	Yes
		059	Morton	Low	Yes
		061	Mountrail	Low	Yes
		063	Nelson	Low	Yes
		065	Oliver	Low	Yes
		067	Pembina	Low	Yes
		069	Pierce	Low	Yes
		071	Ramsey	Low	Yes
		073	Ransom	Low	Yes
		075	Renville	Low	Yes
		077	Richland	Low	Yes
		079	Rolette	Low	Yes
		081	Sargent	Low	Yes
		083	Sheridan	Low	Yes
		085	Sioux	Low	Yes
		087	Slope	Low	Yes
		089	Stark	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-72
State Code	State	County Code	County Name	Seismicity	A_v < 0.15
38	North Dakota	091	Steele	Low	Yes
		093	Stutsman	Low	Yes
		095	Towner	Low	Yes
		097	Traill	Low	Yes
		099	Walsh	Low	Yes
		101	Ward	Low	Yes
		103	Wells	Low	Yes
		105	Williams	Low	Yes
39	OHIO			ALL LOW	ALL YES
		001	Adams	Low	Yes
		003	Allen	Low	Yes
		005	Ashland	Low	Yes
		007	Ashtabuka	Low	Yes
		009	Athens	Low	Yes
		011	Auglaize	Low	Yes
		013	Belmont	Low	Yes
		015	Brown	Low	Yes
		017	Butler	Low	Yes
		019	Carroll	Low	Yes
		021	Champaign	Low	Yes
		023	Clark	Low	Yes
		025	Clermont	Low	Yes
		027	Clinton	Low	Yes
		029	Columbiana	Low	Yes
		031	Coshocton	Low	Yes
		033	Crawford	Low	Yes
		035	Cuyahoga	Low	Yes
		037	Darke	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-73
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
39	Ohio	039	Defiance	Low	Yes
		041	Delaware	Low	Yes
		043	Erie	Low	Yes
		045	Fairfield	Low	Yes
		047	Fayette	Low	Yes
		049	Franklin	Low	Yes
		051	Fulton	Low	Yes
		053	Gallia	Low	Yes
		055	Geauga	Low	Yes
		057	Greene	Low	Yes
		059	Guernsey	Low	Yes
		061	Hamilton	Low	Yes
		063	Hancock	Low	Yes
		065	Hardin	Low	Yes
		067	Harrison	Low	Yes
		069	Henry	Low	Yes
		071	Highland	Low	Yes
		073	Hocking	Low	Yes
		075	Holmes	Low	Yes
		077	Huron	Low	Yes
		079	Jackson	Low	Yes
		081	Jefferson	Low	Yes
		083	Knox	Low	Yes
		085	Lake	Low	Yes
		087	Lawrence	Low	Yes
		089	Licking	Low	Yes
		091	Logan	Low	Yes
		093	Lorain	Low	Yes
		095	Lucas	Low	Yes
		097	Madison	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-74
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
39	Ohio	099	Mahoning	Low	Yes
		101	Marion	Low	Yes
		103	Medina	Low	Yes
		105	Meigs	Low	Yes
		107	Mercer	Low	Yes
		109	Miami	Low	Yes
		111	Monroe	Low	Yes
		113	Montgomery	Low	Yes
		115	Morgan	Low	Yes
		117	Morrow	Low	Yes
		119	Muskingum	Low	Yes
		121	Noble	Low	Yes
		123	Ottawa	Low	Yes
		125	Paulding	Low	Yes
		127	Perry	Low	Yes
		129	Pickaway	Low	Yes
		131	Pike	Low	Yes
		133	Portage	Low	Yes
		135	Preble	Low	Yes
		137	Putnam	Low	Yes
		139	Richland	Low	Yes
		141	Ross	Low	Yes
		143	Sandusky	Low	Yes
		145	Scioto	Low	Yes
		147	Seneca	Low	Yes
		149	Shelby	Low	Yes
		151	Stark	Low	Yes
		153	Summit	Low	Yes
		155	Trumbull	Low	Yes
		157	Tuscarawas	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-75
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
39	Ohio	159	Union	Low	Yes
		161	Van Wert	Low	Yes
		163	Vinton	Low	Yes
		165	Warren	Low	Yes
		167	Washington	Low	Yes
		169	Wayne	Low	Yes
		171	Williams	Low	Yes
		173	Wood	Low	Yes
		175	Wyandot	Low	Yes
40	OKLAHOMA			MIXED	ALL YES
		001	Adair	Low	Yes
		003	Alfalfa	Low	Yes
		005	Atoka	Moderate	Yes
		007	Beaver	Low	Yes
		009	Beckham	Low	Yes
		011	Blaine	Low	Yes
		013	Bryan	Moderate	Yes
		015	Caddo	Low	Yes
		017	Canadian	Low	Yes
		019	Carter	Moderate	Yes
		021	Cherokee	Low	Yes
		023	Choctaw	Moderate	Yes
		025	Cimarron	Low	Yes
		027	Cleveland	Moderate	Yes
		029	Coal	Moderate	Yes
		031	Comanche	Low	Yes
		033	Cotton	Low	Yes
		035	Craig	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-76
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
40	Oklahoma	037	Creek	Moderate	Yes
		039	Custer	Low	Yes
		041	Delaware	Low	Yes
		043	Dewey	Low	Yes
		045	Ellis	Low	Yes
		047	Garfield	Low	Yes
		049	Garvin	Moderate	Yes
		051	Grady	Moderate	Yes
		053	Grant	Low	Yes
		055	Greer	Low	Yes
		057	Harmon	Low	Yes
		059	Harper	Low	Yes
		061	Haskell	Moderate	Yes
		063	Hughes	Moderate	Yes
		065	Jackson	Low	Yes
		067	Jefferson	Low	Yes
		069	Johnston	Moderate	Yes
		071	Kay	Low	Yes
		073	Kingfisher	Low	Yes
		075	Kiowa	Low	Yes
		077	Latimer	Moderate	Yes
		079	Le Flore	Moderate	Yes
		081	Lincoln	Moderate	Yes
		083	Logan	Low	Yes
		085	Love	Low	Yes
		087	McClain	Moderate	Yes
		089	McCurtain	Moderate	Yes
		091	McIntosh	Moderate	Yes
		093	Major	Low	Yes
		095	Marshall	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-77
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
40	Oklahoma	097	Mayes	Low	Yes
		099	Murray	Moderate	Yes
		101	Muskogee	Moderate	Yes
		103	Noble	Low	Yes
		105	Nowata	Low	Yes
		107	Okfuskee	Moderate	Yes
		109	Oklahoma	Moderate	Yes
		111	Okmulgee	Moderate	Yes
		113	Osage	Low	Yes
		115	Ottawa	Low	Yes
		117	Pawnee	Low	Yes
		119	Payne	Low	Yes
		121	Pittsburg	Moderate	Yes
		123	Pontotoc	Moderate	Yes
		125	Pottawatomie	Moderate	Yes
		127	Pushmataha	Moderate	Yes
		129	Roger Mills	Low	Yes
		131	Rogers	Low	Yes
		133	Seminole	Moderate	Yes
		135	Sequoyah	Low	Yes
		137	Stephens	Moderate	Yes
		139	Texas	Low	
		141	Tillman	Low	Yes
		143	Tulsa	Moderate	Yes
		145	Wagoner	Low	Yes
		147	Washington	Low	Yes
		149	Washita	Low	Yes
		151	Woods	Low	Yes
		153	Woodward	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-78
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
41	OREGON			MIXED	MIXED
		001	Baker	Low	Yes
		003	Benton	Low	Yes
		005	Clackamas	Low	Yes
		007	Clatsop	Low	Yes
		009	Columbia	Low	Yes
		011	Coos	Moderate	Yes
		013	Crook	Low	Yes
		015	Curry	Moderate	No
		017	Deschutes	Low	Yes
		019	Douglas	Low	Yes
		021	Gilliam	Low	Yes
		023	Grant	Low	Yes
		025	Harney	Low	Yes
		027	Hood River	Low	Yes
		029	Jackson	Moderate	Yes
		031	Jefferson	Low	Yes
		033	Josephine	Moderate	Yes
		035	Klamath	Low	Yes
		037	Lake	Low	Yes
		039	Lane	Low	Yes
		041	Lincoln	Low	Yes
		043	Linn	Low	Yes
		045	Malheur	Moderate	Yes
		047	Marion	Low	Yes
		049	Morrow	Low	Yes
		051	Multnomah	Low	Yes
		053	Polk	Low	Yes
		055	Sherman	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-79
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
41	Oregon	057	Tillamook	Low	Yes
		059	Umatilla	Low	Yes
		061	Union	Low	Yes
		063	Wallowa	Low	Yes
		065	Wasco	Low	Yes
		067	Washington	Low	Yes
		069	Wheeler	Low	Yes
		071	Yamhill	Low	Yes
42	PENNSYLVANIA			MIXED	ALL YES
		001	Adams	Low	Yes
		003	Allegheny	Low	Yes
		005	Armstrong	Low	Yes
		007	Beaver	Low	Yes
		009	Bedford	Low	Yes
		011	Berks	Moderate	Yes
		013	Blair	Low	Yes
		015	Bradford	Low	Yes
		017	Bucks	Moderate	Yes
		019	Butler	Low	Yes
		021	Cambria	Low	Yes
		023	Cameron	Low	Yes
		025	Carbon	Moderate	Yes
		027	Centre	Low	Yes
		029	Chester	Moderate	Yes
		031	Clarion	Low	Yes
		033	Clearfield	Low	Yes
		035	Clinton	Low	Yes
		037	Columbia	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-80
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
42	Pennsylvania	039	Crawford	Low	Yes
		041	Cumberland	Low	Yes
		043	Dauphin	Low	Yes
		045	Delaware	Moderate	Yes
		047	Elk	Low	Yes
		049	Erie	Low	Yes
		051	Fayette	Low	Yes
		053	Forest	Low	Yes
		055	Franklin	Low	Yes
		057	Fulton	Low	Yes
		059	Greene	Low	Yes
		061	Huntingdon	Low	Yes
		063	Indiana	Low	Yes
		065	Jefferson	Low	Yes
		067	Juniata	Low	Yes
		069	Lackawanna	Moderate	Yes
		071	Lancaster	Moderate	Yes
		073	Lawrence	Low	Yes
		075	Lebanon	Moderate	Yes
		077	Lehigh	Moderate	Yes
		079	Luzerne	Moderate	Yes
		081	Lycoming	Low	Yes
		083	McKean	Low	Yes
		085	Mercer	Low	Yes
		087	Mifflin	Low	Yes
		089	Monroe	Moderate	Yes
		091	Montgomery	Moderate	Yes
		093	Montour	Low	Yes
		095	Northhampton	Moderate	Yes
		097	Northumberland	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-81
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
42	Pennsylvania	099	Perry	Low	Yes
		101	Philadelphia	Moderate	Yes
		103	Pike	Moderate	Yes
		105	Potter	Low	Yes
		107	Schuylkill	Moderate	Yes
		109	Snyder	Low	Yes
		111	Somerset	Low	Yes
		113	Sullivan	Low	Yes
		115	Susquehanna	Moderate	Yes
		117	Tioga	Low	Yes
		119	Union	Low	Yes
		121	Venango	Low	Yes
		123	Warren	Low	Yes
		125	Washington	Low	Yes
		127	Wayne	Moderate	Yes
		129	Westmoreland	Low	Yes
		131	Wyoming	Moderate	Yes
		133	York	Low	Yes
44	RHODE ISLAND			ALL MOD	ALL YES
		001	Bristol	Moderate	Yes
		003	Kent	Moderate	Yes
		005	Newport	Moderate	Yes
		007	Providence	Moderate	Yes
		009	Washington	Moderate	Yes
45	SOUTH CAROLINA			ALL MOD	ALL YES
		001	Abbeville	Moderate	Yes
		003	Aiken	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-82
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
45	South Carolina	005	Allendale	Moderate	Yes
		007	Anderson	Moderate	Yes
		009	Bamberg	Moderate	Yes
		011	Barnwell	Moderate	Yes
		013	Beaufort	Moderate	Yes
		015	Berkeley	Moderate	Yes
		017	Calhoun	Moderate	Yes
		019	Charleston	Moderate	Yes
		021	Cherokee	Moderate	Yes
		023	Chester	Moderate	Yes
		025	Chesterfield	Moderate	Yes
		027	Clarendon	Moderate	Yes
		029	Colleton	Moderate	Yes
		031	Darlington	Moderate	Yes
		033	Dillon	Moderate	Yes
		035	Dorchester	Moderate	Yes
		037	Edgefield	Moderate	Yes
		039	Fairfield	Moderate	Yes
		041	Florence	Moderate	Yes
		043	Georgetown	Moderate	Yes
		045	Greenville	Moderate	Yes
		047	Greenwood	Moderate	Yes
		049	Hampton	Moderate	Yes
		051	Horry	Moderate	Yes
		053	Jasper	Moderate	Yes
		055	Kershaw	Moderate	Yes
		057	Lancaster	Moderate	Yes
		059	Laurens	Moderate	Yes
		061	Lee	Moderate	Yes
		063	Lexington	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-83
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
45	South Carolina	065	McCormick	Moderate	Yes
		067	Marion	Moderate	Yes
		069	Marlboro	Moderate	Yes
		071	Newberry	Moderate	Yes
		073	Oconee	Moderate	Yes
		075	Orangeburg	Moderate	Yes
		077	Pickens	Moderate	Yes
		079	Richland	Moderate	Yes
		081	Saluda	Moderate	Yes
		083	Spartanburg	Moderate	Yes
		085	Sumter	Moderate	Yes
		087	Union	Moderate	Yes
		089	Williamsburg	Moderate	Yes
		091	York	Moderate	Yes
46	SOUTH DAKOTA			ALL LOW	ALL YES
		003	Aurora	Low	Yes
		005	Beadle	Low	Yes
		007	Bennett	Low	Yes
		009	Bon Homme	Low	Yes
		011	Brookings	Low	Yes
		013	Brown	Low	Yes
		015	Brule	Low	Yes
		017	Buffalo	Low	Yes
		019	Butte	Low	Yes
		021	Campbell	Low	Yes
		023	Charles Mix	Low	Yes
		025	Clark	Low	Yes
		027	Clay	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-84
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
46	South Dakota	029	Codington	Low	Yes
		031	Corson	Low	Yes
		033	Custer	Low	Yes
		035	Davison	Low	Yes
		037	Day	Low	Yes
		039	Deuel	Low	Yes
		041	Dewey	Low	Yes
		043	Douglas	Low	Yes
		045	Edmunds	Low	Yes
		047	Fall River	Low	Yes
		049	Faulk	Low	Yes
		051	Grant	Low	Yes
		053	Gregory	Low	Yes
		055	Haakon	Low	Yes
		057	Hamlin	Low	Yes
		059	Hand	Low	Yes
		061	Hanson	Low	Yes
		063	Harding	Low	Yes
		065	Hughes	Low	Yes
		067	Hutchinson	Low	Yes
		069	Hyde	Low	Yes
		071	Jackson	Low	Yes
		073	Jerauld	Low	Yes
		075	Jones	Low	Yes
		077	Kingsbury	Low	Yes
		079	Lake	Low	Yes
		081	Lawrence	Low	Yes
		083	Lincoln	Low	Yes
		085	Lyman	Low	Yes
		087	McCook	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-85
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
46	South Dakota	089	McPherson	Low	Yes
		091	Marshall	Low	Yes
		093	Meade	Low	Yes
		095	Mellette	Low	Yes
		097	Miner	Low	Yes
		099	Minnehaha	Low	Yes
		101	Moody	Low	Yes
		103	Pennington	Low	Yes
		105	Perkins	Low	Yes
		107	Potter	Low	Yes
		109	Roberts	Low	Yes
		111	Sanborn	Low	Yes
		113	Shannon	Low	Yes
		115	Spink	Low	Yes
		117	Stanley	Low	Yes
		119	Sully	Low	Yes
		121	Todd	Low	Yes
		123	Tripp	Low	Yes
		125	Turner	Low	Yes
		127	Union	Low	Yes
		129	Walworth	Low	Yes
		135	Yankton	Low	Yes
		137	Ziebach	Low	Yes
		130	Washabaugh	Low	Yes
47	TENNESSEE			MIXED	MIXED
		001	Anderson	Moderate	Yes
		003	Bedford	Low	Yes
		005	Benton	Moderate	Yes
		007	Bledsoe	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-86
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
47	Tennessee	009	Blount	Moderate	Yes
		011	Bradley	Moderate	Yes
		013	Campbell	Moderate	Yes
		015	Cannon	Low	Yes
		017	Carroll	Moderate	Yes
		019	Carter	Moderate	Yes
		021	Cheatham	Low	Yes
		023	Chester	Moderate	Yes
		025	Claiborne	Moderate	Yes
		027	Clay	Low	Yes
		029	Cocke	Moderate	Yes
		031	Coffee	Low	Yes
		033	Crockett	Moderate	No
		035	Cumberland	Moderate	Yes
		037	Davidson	Low	Yes
		039	Decatur	Low	Yes
		041	De Kalb	Low	Yes
		043	Dickson	Low	Yes
		045	Dyer	High	No
		047	Fayette	Moderate	No
		049	Fentress	Low	Yes
		051	Franklin	Low	Yes
		053	Gibson	Moderate	No
		055	Giles	Low	Yes
		057	Grainger	Moderate	Yes
		059	Greene	Moderate	Yes
		061	Grundy	Low	Yes
		063	Hamblen	Moderate	Yes
		065	Hamilton	Moderate	Yes
		067	Hancock	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-87
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
47	Tennessee	069	Hardeman	Moderate	Yes
		071	Hardin	Low	Yes
		073	Hawkins	Moderate	Yes
		075	Haywood	Moderate	No
		077	Herderson	Moderate	Yes
		079	Henry	Moderate	Yes
		081	Hickman	Low	Yes
		083	Houston	Low	Yes
		085	Humphreys	Low	Yes
		087	Jackson	Low	Yes
		089	Jefferson	Moderate	Yes
		091	Johnson	Moderate	Yes
		093	Knox	Moderate	Yes
		095	Lake	High	No
		097	Lauderdale	High	No
		099	Lawrence	Low	Yes
		101	Lewis	Low	Yes
		103	Lincoln	Low	Yes
		105	Loudon	Moderate	Yes
		107	McMinn	Moderate	Yes
		109	McNairy	Moderate	Yes
		111	Macon	Low	Yes
		113	Madison	Moderate	No
		115	Marion	Low	Yes
		117	Marshall	Low	Yes
		119	Maury	Low	Yes
		121	Meigs	Moderate	Yes
		123	Monroe	Moderate	Yes
		125	Montgomery	Low	Yes
		127	Moore	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-88
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
47	Tennessee	129	Morgan	Moderate	Yes
		131	Obion	High	No
		133	Overton	Low	Yes
		135	Perry	Low	Yes
		137	Pickett	Low	Yes
		139	Polk	Moderate	Yes
		141	Putnam	Low	Yes
		143	Rhea	Moderate	Yes
		145	Roane	Moderate	Yes
		147	Robertson	Low	Yes
		149	Rutherford	Low	Yes
		151	Scott	Moderate	Yes
		153	Sequatchie	Moderate	Yes
		155	Sevier	Moderate	Yes
		157	Shelby	High	No
		159	Smith	Low	Yes
		161	Stewart	Moderate	Yes
		163	Sullivan	Moderate	Yes
		165	Sumner	Low	Yes
		167	Tipton	High	No
		169	Trousdale	Low	Yes
		171	Unicoi	Moderate	Yes
		173	Union	Moderate	Yes
		175	Van Buren	Low	Yes
		177	Warren	Low	Yes
		179	Washington	Moderate	Yes
		181	Wayne	Low	Yes
		183	Weakley	Moderate	No
		185	White	Low	Yes
		187	Williamson	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-89
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
47	Tennessee	189	Wilson	Low	Yes
48	TEXAS			ALL LOW	ALL YES
		001	Anderson	Low	Yes
		003	Andrews	Low	Yes
		005	Angelina	Low	Yes
		007	Aransas	Low	Yes
		009	Archer	Low	Yes
		011	Armstrong	Low	Yes
		013	Atascosa	Low	Yes
		015	Austin	Low	Yes
		017	Bailey	Low	Yes
		019	Bandera	Low	Yes
		021	Bastrop	Low	Yes
		023	Baylor	Low	Yes
		025	Bee	Low	Yes
		027	Bell	Low	Yes
		029	Bexar	Low	Yes
		031	Blanco	Low	Yes
		033	Borden	Low	Yes
		035	Bosque	Low	Yes
		037	Bowie	Low	Yes
		039	Brazoria	Low	Yes
		041	Brazos	Low	Yes
		043	Brewster	Low	Yes
		045	Briscoe	Low	Yes
		047	Brooks	Low	Yes
		049	Brown	Low	Yes
		051	Burleson	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-90
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
48	Texas	053	Burnet	Low	Yes
		055	Caldwell	Low	Yes
		057	Calhoun	Low	Yes
		059	Callahan	Low	Yes
		061	Cameron	Low	Yes
		063	Camp	Low	Yes
		065	Carson	Low	Yes
		067	Cass	Low	Yes
		069	Castro	Low	Yes
		071	Chambers	Low	Yes
		073	Cherokee	Low	Yes
		075	Childress	Low	Yes
		077	Clay	Low	Yes
		079	Cochran	Low	Yes
		081	Coke	Low	Yes
		083	Coleman	Low	Yes
		085	Collin	Low	Yes
		087	Collingsworth	Low	Yes
		089	Colorado	Low	Yes
		091	Comal	Low	Yes
		093	Comanche	Low	Yes
		095	Concho	Low	Yes
		097	Cooke	Low	Yes
		099	Coryell	Low	Yes
		101	Cottle	Low	Yes
		103	Crane	Low	Yes
		105	Crockett	Low	Yes
		107	Crosby	Low	Yes
		109	Culberson	Low	Yes
		111	Dallam	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-91
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
48	Texas	113	Dallas	Low	Yes
		115	Dawson	Low	Yes
		117	Deaf Smith	Low	Yes
		119	Delta	Low	Yes
		121	Denton	Low	Yes
		123	De Witt	Low	Yes
		125	Dickens	Low	Yes
		127	Dimmit	Low	Yes
		129	Donley	Low	Yes
		131	Duval	Low	Yes
		133	Eastland	Low	Yes
		135	Ector	Low	Yes
		137	Edwards	Low	Yes
		139	Ellis	Low	Yes
		141	El Paso	Low	Yes
		143	Erath	Low	Yes
		145	Falls	Low	Yes
		147	Fannin	Low	Yes
		149	Fayette	Low	Yes
		151	Fisher	Low	Yes
		153	Floyd	Low	Yes
		155	Foard	Low	Yes
		157	Fort Bend	Low	Yes
		159	Franklin	Low	Yes
		161	Freestone	Low	Yes
		163	Frio	Low	Yes
		165	Gaines	Low	Yes
		167	Galveston	Low	Yes
		169	Garza	Low	Yes
		171	Gillespie	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-92
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
48	Texas	173	Glasscock	Low	Yes
		175	Goliad	Low	Yes
		177	Gonzales	Low	Yes
		179	Gray	Low	Yes
		181	Grayson	Low	Yes
		183	Gregg	Low	Yes
		185	Grimes	Low	Yes
		187	Guadalupe	Low	Yes
		189	Hale	Low	Yes
		191	Hall	Low	Yes
		193	Hamilton	Low	Yes
		195	Hansford	Low	Yes
		197	Hardeman	Low	Yes
		199	Hardin	Low	Yes
		201	Harris	Low	Yes
		203	Harrison	Low	Yes
		205	Hartley	Low	Yes
		207	Haskell	Low	Yes
		209	Hays	Low	Yes
		211	Hemphill	Low	Yes
		213	Henderson	Low	Yes
		215	Hidalgo	Low	Yes
		217	Hill	Low	Yes
		219	Hockley	Low	Yes
		221	Hood	Low	Yes
		223	Hopkins	Low	Yes
		225	Houston	Low	Yes
		227	Howard	Low	Yes
		229	Hudspeth	Low	Yes
		231	Hunt	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-93
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
48	Texas	233	Hutchinson	Low	Yes
		235	Irion	Low	Yes
		237	Jack	Low	Yes
		239	Jackson	Low	Yes
		241	Jasper	Low	Yes
		243	Jeff Davis	Low	Yes
		245	Jefferson	Low	Yes
		247	Jim Hogg	Low	Yes
		249	Jim Wells	Low	Yes
		251	Johnson	Low	Yes
		253	Jones	Low	Yes
		255	Karnes	Low	Yes
		257	Kaufman	Low	Yes
		259	Kendall	Low	Yes
		261	Kenedy	Low	Yes
		263	Kent	Low	Yes
		265	Kerr	Low	Yes
		267	Kimble	Low	Yes
		269	King	Low	Yes
		271	Kinney	Low	Yes
		273	Kleberg	Low	Yes
		275	Knox	Low	Yes
		277	Lamar	Low	Yes
		279	Lamb	Low	Yes
		281	Lampasas	Low	Yes
		283	La Salle	Low	Yes
		285	Lavaca	Low	Yes
		287	Lee	Low	Yes
		289	Leon	Low	Yes
		291	Liberty	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-94
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
48	Texas	293	Limestone	Low	Yes
		295	Lipscomb	Low	Yes
		297	Live Oak	Low	Yes
		299	Llano	Low	Yes
		301	Loving	Low	Yes
		303	Lubbock	Low	Yes
		305	Lynn	Low	Yes
		307	McCulloch	Low	Yes
		309	McClennan	Low	Yes
		311	McMullen	Low	Yes
		313	Madison	Low	Yes
		315	Marion	Low	Yes
		317	Martin	Low	Yes
		319	Mason	Low	Yes
		321	Matagorda	Low	Yes
		323	Maverick	Low	Yes
		325	Medina	Low	Yes
		327	Menard	Low	Yes
		329	Midland	Low	Yes
		331	Milam	Low	Yes
		333	Mills	Low	Yes
		335	Mitchell	Low	Yes
		337	Montague	Low	Yes
		339	Montgomery	Low	Yes
		341	Moore	Low	Yes
		343	Morris	Low	Yes
		345	Motley	Low	Yes
		347	Nacogdoches	Low	Yes
		349	Navarro	Low	Yes
		351	Newton	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-95
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
48	Texas	353	Nolan	Low	Yes
		355	Nueces	Low	Yes
		357	Ochiltree	Low	Yes
		359	Oldham	Low	Yes
		361	Orange	Low	Yes
		363	Palo Pinto	Low	Yes
		365	Panola	Low	Yes
		367	Parker	Low	Yes
		369	Parmer	Low	Yes
		371	Pecos	Low	Yes
		373	Polk	Low	Yes
		375	Potter	Low	Yes
		377	Presidio	Low	Yes
		379	Rains	Low	Yes
		381	Randall	Low	Yes
		383	Reagan	Low	Yes
		385	Real	Low	Yes
		387	Red River	Low	Yes
		389	Reeves	Low	Yes
		391	Refugio	Low	Yes
		393	Roberts	Low	Yes
		395	Robertson	Low	Yes
		397	Rockwall	Low	Yes
		399	Runnels	Low	Yes
		401	Rusk	Low	Yes
		403	Sabine	Low	Yes
		405	San Augustine	Low	Yes
		407	San Jacinto	Low	Yes
		409	San Patricio	Low	Yes
		411	San Saba	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-96
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
48	Texas	413	Schleicher	Low	Yes
		415	Scurry	Low	Yes
		417	Shackelford	Low	Yes
		419	Shelby	Low	Yes
		421	Sherman	Low	Yes
		423	Smith	Low	Yes
		425	Somervell	Low	Yes
		427	Starr	Low	Yes
		429	Stephens	Low	Yes
		431	Sterling	Low	Yes
		433	Stonewall	Low	Yes
		435	Sutton	Low	Yes
		437	Swisher	Low	Yes
		439	Tarrant	Low	Yes
		441	Taylor	Low	Yes
		443	Terrell	Low	Yes
		445	Terry	Low	Yes
		447	Throckmorton	Low	Yes
		449	Titus	Low	Yes
		451	Tom Green	Low	Yes
		453	Travis	Low	Yes
		455	Trinity	Low	Yes
		457	Tyler	Low	Yes
		459	Upshur	Low	Yes
		461	Upton	Low	Yes
		463	Uvalde	Low	Yes
		465	Val Verde	Low	Yes
		467	Van Zandt	Low	Yes
		469	Victoria	Low	Yes
		471	Walker	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-97
State Code	State	County Code	County Name	Seismicity	A_v < 0.15
48	Texas	473	Waller	Low	Yes
		475	Ward	Low	Yes
		477	Washington	Low	Yes
		479	Webb	Low	Yes
		481	Wharton	Low	Yes
		483	Wheeler	Low	Yes
		485	Wichita	Low	Yes
		487	Wilbarger	Low	Yes
		489	Willacy	Low	Yes
		491	Williamson	Low	Yes
		493	Wilson	Low	Yes
		495	Winkler	Low	Yes
		497	Wise	Low	Yes
		499	Wood	Low	Yes
		501	Yoakum	Low	Yes
		503	Young	Low	Yes
		505	Zapata	Low	Yes
		507	Zavala	Low	Yes
49	UTAH			MIXED	MIXED
		001	Beaver	High	No
		003	Box Elder	High	No
		005	Cache	High	No
		007	Carbon	Moderate	No
		009	Daggett	Moderate	Yes
		011	Davis	High	No
		013	Duchesne	Moderate	No
		015	Emery	Moderate	No
		017	Garfield	Moderate	No

Table A-1 - Location and Seismicity Data					Page A-98
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
49	Utah	019	Grand	Low	Yes
		021	Iron	Moderate	No
		023	Juab	High	No
		025	Kane	Moderate	Yes
		027	Millard	High	No
		029	Morgan	High	No
		031	Piute	High	No
		033	Rich	High	No
		035	Salt Lake	High	No
		037	San Juan	Low	Yes
		039	Sanpete	High	No
		041	Sevier	High	No
		043	Summit	High	No
		045	Tooele	High	No
		047	Uintah	Low	Yes
		049	Utah	High	No
		051	Wasatch	High	No
		053	Washington	Moderate	No
		055	Wayne	Moderate	No
		057	Weber	High	No
50	VERMONT			ALL MOD	ALL YES
		001	Addison	Moderate	Yes
		003	Bennington	Moderate	Yes
		005	Caledonia	Moderate	Yes
		007	Chittenden	Moderate	Yes
		009	Essex	Moderate	Yes
		011	Franklin	Moderate	Yes
		013	Grand Isle	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-99
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
50	Vermont	015	Lamoille	Moderate	Yes
		017	Orange	Moderate	Yes
		019	Orleans	Moderate	Yes
		021	Rutland	Moderate	Yes
		023	Washington	Moderate	Yes
		025	Windham	Moderate	Yes
		027	Windsor	Moderate	Yes
51	VIRGINIA			MIXED	ALL YES
		001	Accomack	Low	Yes
		003	Albemarle	Low	Yes
		510	Alexandria City	Low	Yes
		005	Alleghany	Low	Yes
		007	Amelia	Low	Yes
		009	Amherst	Low	Yes
		011	Appomattox	Low	Yes
		013	Arlington	Low	Yes
		015	Augusta	Low	Yes
		017	Bath	Low	Yes
		019	Bedford	Low	Yes
		515	Bedford City	Low	Yes
		021	Bland	Moderate	Yes
		023	Botetourt	Low	Yes
		520	Bristol City	Moderate	Yes
		025	Brunswick	Low	Yes
		027	Buchanan	Moderate	Yes
		029	Buckingham	Low	Yes
		530	Buena Vista City	Low	Yes
		031	Campbell	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-100
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
51	Virginia	033	Caroline	Low	Yes
		035	Carroll	Moderate	Yes
		036	Charles City	Low	Yes
		037	Charlotte	Low	Yes
		540	Charlottesville City	Low	Yes
		550	Chesapeake City	Low	Yes
		041	Chesterfield	Low	Yes
		043	Clarke	Low	Yes
		560	Clifton Forge City	Moderate	Yes
		570	Colonial Heights City	Low	Yes
		580	Covington City	Moderate	Yes
		045	Craig	Moderate	Yes
		047	Culpeper	Low	Yes
		049	Cumberland	Low	Yes
		590	Danville City	Low	Yes
		051	Dickenson	Moderate	Yes
		053	Dinwiddie	Low	Yes
		595	Emporia City	Low	Yes
		057	Essex	Low	Yes
		059	Fairfax	Low	Yes
		600	Fairfax City	Low	Yes
		610	Falls Church City	Low	Yes
		061	Fauquier	Low	Yes
		063	Floyd	Low	Yes
		065	Fluvanna	Moderate	Yes
		067	Franklin	Low	Yes
		620	Franklin City	Low	Yes
		069	Frederick	Low	Yes
		630	Fredericksburg City	Low	Yes
		640	Galax City	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-101
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
51	Virginia	071	Giles	Moderate	Yes
		073	Gloucester	Low	Yes
		075	Goochland	Low	Yes
		077	Grayson	Moderate	Yes
		079	Greene	Low	Yes
		081	Greensville	Low	Yes
		083	Halifax	Low	Yes
		650	Hampton City	Low	Yes
		085	Hanover	Low	Yes
		660	Harrisonburg City	Low	Yes
		087	Henrico	Low	Yes
		089	Henry	Low	Yes
		091	Highland	Low	Yes
		670	Hopewell City	Low	Yes
		093	Isle of Wight	Low	Yes
		095	James City	Low	Yes
		097	King and Queen	Low	Yes
		099	King George	Low	Yes
		101	King William	Low	Yes
		103	Lancaster	Low	Yes
		105	Lee	Moderate	Yes
		678	Lexington City	Low	Yes
		107	Loudoun	Low	Yes
		109	Louisa	Low	Yes
		111	Lunenburg	Low	Yes
		680	Lynchburg City	Low	Yes
		113	Madison	Low	Yes
		683	Manassas City	Low	Yes
		685	Manassas Park City	Low	Yes
		690	Martinsville City	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-102
State Code	State	County Code	County Name	Seismicity	A_v < 0.15
		122	Nansemond	Low	Yes
51	Virginia	115	Mathews	Low	Yes
		117	Mecklenburg	Low	Yes
		119	Middlesex	Low	Yes
		121	Montgomery	Moderate	Yes
		125	Nelson	Low	Yes
		127	New Kent	Low	Yes
		700	Newport News City	Low	Yes
		710	Norfolk City	Low	Yes
		131	Northampton	Low	Yes
		133	Northumberland	Low	Yes
		720	Norton	Low	Yes
		135	Nottoway	Low	Yes
		137	Orange	Low	Yes
		139	Page	Low	Yes
		141	Patrick	Low	Yes
		730	Petersburg City	Low	Yes
		143	Pittsylvania	Low	Yes
		735	Poquoson City	Low	Yes
		740	Portsmouth City	Low	Yes
		145	Powhatan	Low	Yes
		147	Prince Edward	Low	Yes
		149	Prince George	Low	Yes
		153	Prince William	Low	Yes
		155	Pulaski	Low	Yes
		750	Radford City	Moderate	Yes
		157	Rappahannock	Low	Yes
		159	Richmond	Low	Yes
		760	Richmond City	Low	Yes
		161	Roanoke	Moderate	Yes
		770	Roanoke City	Moderate	Yes
		151	Princess Anne	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-103
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
51	Virginia	163	Rockbridge	Low	Yes
		165	Rockingham	Low	Yes
		167	Russell	Moderate	Yes
		775	Salem City	Moderate	Yes
		169	Scott	Moderate	Yes
		171	Shenandoah	Low	Yes
		173	Smyth	Moderate	Yes
		175	Southampton	Low	Yes
		780	South Boston City	Low	Yes
		177	Spotsylvania	Low	Yes
		179	Stafford	Low	Yes
		790	Staunton City	Low	Yes
		800	Suffolk City	Low	Yes
		181	Surry	Low	Yes
		183	Sussex	Low	Yes
		185	Tazewell	Moderate	Yes
		810	Virginia Beach City	Low	Yes
		187	Warren	Low	Yes
		191	Washington	Moderate	Yes
		820	Waynesboro City	Low	Yes
		193	Westmoreland	Low	Yes
		830	Williamsburg City	Low	Yes
		840	Winchester City	Low	Yes
		195	Wise	Moderate	Yes
		197	Wythe	Moderate	Yes
		199	York	Low	Yes
53	WASHINGTON			MIXED	MIXED
		001	Adams	Moderate	Yes

Table A-1 - Location and Seismicity Data					Page A-104
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
53	Washington	003	Asotin	Low	Yes
		005	Benton	Low	Yes
		007	Chelan	High	No
		009	Clallam	High	No
		011	Clark	Moderate	Yes
		013	Columbia	Low	Yes
		015	Cowlitz	Moderate	Yes
		017	Douglas	Moderate	No
		019	Ferry	Moderate	No
		021	Franklin	Low	Yes
		023	Garfield	Low	Yes
		025	Grant	Moderate	Yes
		027	Grays Harbour	Moderate	No
		029	Island	High	No
		031	Jefferson	High	No
		033	King	High	No
		035	Kitsap	High	No
		037	Kittitas	High	No
		039	Klickitat	Low	Yes
		041	Lewis	Moderate	No
		043	Lincoln	Moderate	Yes
		045	Mason	High	No
		047	Okanogan	High	No
		049	Pacific	Moderate	Yes
		051	Pend Oreille	Low	Yes
		053	Pierce	High	No
		055	San Juan	High	No
		057	Skagit	High	No
		059	Skamania	Moderate	Yes
		061	Snohomish	High	No

Table A-1 - Location and Seismicity Data					Page A-105
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
53	Washington	063	Spokane	Low	Yes
		065	Stevens	Moderate	Yes
		067	Thurston	High	No
		069	Wahkiakum	Moderate	Yes
		071	Walla Walla	Low	Yes
		073	Whatcom	High	No
		075	Whitman	Low	Yes
		077	Yakima	Moderate	No
54	WEST VIRGINIA			MIXED	ALL YES
		001	Barbour	Low	Yes
		003	Berkeley	Low	Yes
		005	Boone	Low	Yes
		007	Braxton	Low	Yes
		009	Brooke	Low	Yes
		011	Cabell	Low	Yes
		013	Calhoun	Low	Yes
		015	Clay	Low	Yes
		017	Doddridge	Low	Yes
		019	Fayette	Low	Yes
		021	Gilmer	Low	Yes
		023	Grant	Low	Yes
		025	Greenbrier	Low	Yes
		027	Hampshire	Low	Yes
		029	Hancock	Low	Yes
		031	Hardy	Low	Yes
		033	Harrison	Low	Yes
		035	Jackson	Low	Yes
		037	Jefferson	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-106
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
54	West Virginia	039	Kanawha	Low	Yes
		041	Lewis	Low	Yes
		043	Lincoln	Low	Yes
		045	Logan	Low	Yes
		047	McDowell	Moderate	Yes
		049	Marion	Low	Yes
		051	Marshall	Low	Yes
		053	Mason	Low	Yes
		055	Mercer	Moderate	Yes
		057	Mineral	Low	Yes
		059	Mingo	Low	Yes
		061	Monongalia	Low	Yes
		063	Monroe	Moderate	Yes
		065	Morgan	Low	Yes
		067	Nicholas	Low	Yes
		069	Ohio	Low	Yes
		071	Pendleton	Low	Yes
		073	Pleasants	Low	Yes
		075	Pocahontas	Low	Yes
		077	Preston	Low	Yes
		079	Putnam	Low	Yes
		081	Raleigh	Low	Yes
		083	Randolph	Low	Yes
		085	Ritchie	Low	Yes
		087	Roane	Low	Yes
		089	Summers	Moderate	Yes
		091	Taylor	Low	Yes
		093	Tucker	Low	Yes
		095	Tyler	Low	Yes
		097	Upshur	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-107
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
54	West Virginia	099	Wayne	Low	Yes
		101	Webster	Low	Yes
		103	Wetzel	Low	Yes
		105	Wirt	Low	Yes
		107	Wood	Low	Yes
		109	Wyoming	Low	Yes
55	WISCONSIN			ALL LOW	ALL YES
		001	Adams	Low	Yes
		003	Ashland	Low	Yes
		005	Barron	Low	Yes
		007	Bayfield	Low	Yes
		009	Brown	Low	Yes
		011	Buffalo	Low	Yes
		013	Burnett	Low	Yes
		015	Calumet	Low	Yes
		017	Chippewa	Low	Yes
		019	Clark	Low	Yes
		021	Columbia	Low	Yes
		023	Crawford	Low	Yes
		025	Dane	Low	Yes
		027	Dodge	Low	Yes
		029	Door	Low	Yes
		031	Douglas	Low	Yes
		033	Dunn	Low	Yes
		035	Eau Claire	Low	Yes
		037	Florence	Low	Yes
		039	Fond Du Lac	Low	Yes
		041	Forest	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-108
State Code	State	County Code	County Name	Seismicity	$A_v < 0.15$
55	Wisconsin	043	Grant	Low	Yes
		045	Green	Low	Yes
		047	Green Lake	Low	Yes
		049	Iowa	Low	Yes
		051	Iron	Low	Yes
		053	Jackson	Low	Yes
		055	Jefferson	Low	Yes
		057	Juneau	Low	Yes
		059	Kenosha	Low	Yes
		061	Kewaunee	Low	Yes
		063	La Crosse	Low	Yes
		065	Lafayette	Low	Yes
		067	Langlade	Low	Yes
		069	Lincoln	Low	Yes
		071	Manitowoc	Low	Yes
		073	Marathon	Low	Yes
		075	Marinette	Low	Yes
		077	Marquette	Low	Yes
		078	Menominee	Low	Yes
		079	Milwaukee	Low	Yes
		081	Monroe	Low	Yes
		083	Oconto	Low	Yes
		085	Oneida	Low	Yes
		087	Outagamie	Low	Yes
		089	Ozaukee	Low	Yes
		091	Pepin	Low	Yes
		093	Pierce	Low	Yes
		095	Polk	Low	Yes
		097	Portage	Low	Yes
		099	Price	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-109
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
55	Wisconsin	101	Racine	Low	Yes
		103	Richland	Low	Yes
		105	Rock	Low	Yes
		107	Rusk	Low	Yes
		109	St Croix	Low	Yes
		111	Sauk	Low	Yes
		113	Sawyer	Low	Yes
		115	Shawano	Low	Yes
		117	Sheboygan	Low	Yes
		119	Taylor	Low	Yes
		121	Trempealeau	Low	Yes
		123	Vernon	Low	Yes
		125	Vilas	Low	Yes
		127	Walworth	Low	Yes
		129	Washburn	Low	Yes
		131	Washington	Low	Yes
		133	Waukesha	Low	Yes
		135	Waupaca	Low	Yes
		137	Waushara	Low	Yes
		139	Winnebago	Low	Yes
		141	Wood	Low	Yes
56	WYOMING			MIXED	MIXED
		001	Albany	Low	Yes
		003	Big Horn	Moderate	Yes
		005	Campbell	Low	Yes
		007	Carbon	Low	Yes
		009	Converse	Low	Yes
		011	Crook	Low	Yes

Table A-1 - Location and Seismicity Data					Page A-110
State Code	**State**	**County Code**	**County Name**	**Seismicity**	**A_v < 0.15**
56	Wyoming	013	Fremont	High	No
		015	Goshen	Low	Yes
		017	Hot Springs	Moderate	Yes
		019	Johnson	Low	Yes
		021	Laramie	Low	Yes
		023	Lincoln	High	No
		025	Natrona	Low	Yes
		027	Niobrara	Low	Yes
		029	Park	High	No
		031	Platte	Low	Yes
		033	Sheridan	Low	Yes
		035	Sublette	High	No
		037	Sweetwater	Moderate	Yes
		039	Teton	High	No
		041	Uinta	Moderate	No
		043	Washakie	Moderate	Yes
		045	Weston	Low	Yes
		047	Yellowstone National Park	High	No

Table A-2 - Location and Seismicity Data for U.S. Territories and Possessions			Page A-111
Territory Code	**Territory or Possession**	**Seismicity**	**$A_v < 0.15$**
81	American Samoa	High	No
86	Guam	High	No
92	Puerto Rico	High	No
93	Virgin Islands	High	No

If you have buildings in a US territory or possession which is not listed here, please contact the ICSSC Technical Secretariat to establish a code number.

APPENDIX B
OCCUPANCY CATEGORIES

OCCUPANCY CATEGORIES

One of the fields which agencies are to report in their electronic database of owned buildings is Occupancy Class. The codes to be used for this reporting are contained in Section 5 of this Handbook in Table 5-3 and are reproduced in that table as follows:

Table 5-3 - Occupancy Categories

Code to be Entered	Occupancy Classification
10	Office
14	Post Office
21	Hospital
22	Prison
23	School
29	Other Institutional
30	Housing
40	Storage
50	Industrial
60	Service
70	Research and Development
80	All Other

These occupancy classes are the same as those used in creating the real-property inventory for annual submission to the General Services Administration (GSA). They have been chosen because many agencies who report regularly to the GSA database already have their buildings classified according to these codes. However, other agencies, including the agencies under the Department of Defense, have their building occupancies classified by different codes which include more than twelve categories.

This Appendix contains a list of Real Property Category codes that are classified as buildings by the Department of Defense in the AR 415-28. These category codes have been grouped under the twelve occupancy codes required for the electronic database reporting effort. This list should serve as a guide for agencies who need to group previously existing building occupancies under the twelve codes listed in Table 5-3.

OFFICE OCCUPANCY CLASSIFICATION (10)

14110	AIRFIELD OPERATIONS BUILDING
14112	AVIATION UNIT OPERATIONS BUILDING
14113	ACCESS CONTROL BUILDING
14114	CIDC FIELD OPERATIONS BUILDING
14132	READY BUILDING
14161	EMERGENCY OPERATIONS CENTER (EOC)
14162	SPECIAL COMPARTMENTED INFORMATION FACILITY (SCIF)
14166	DISPATCH BUILDING
14182	BRIGADE HEADQUARTERS BUILDING
14183	BATTALION HEADQUARTERS BUILDING
14185	COMPANY HEADQUARTERS BUILDING
14310	SHIP OPERATIONS BUILDING
15610	CARGO HANDLING OFFICE BUILDING
17140	ARMY RESERVE CENTER BUILDING
17141	ARMED FORCES RESERVE CENTER BUILDING
17142	NATIONAL GUARD/RESERVE CENTER BUILDING
61050	ADMINISTRATIVE FACILITY, GENERAL PURPOSE
61055	WAITING AREA
61075	COURTROOM
62010	UNDERGROUND ADMINISTRATIVE FACILITY
74006	BANK
74023	CREDIT UNION
74033	ARMY COMMUNITY SERVICES CENTER

POST OFFICE OCCUPANCY CLASSIFICATION (14)

73072	POST OFFICE BRANCH
73073	POST OFFICE, MAIN

HOSPITAL OCCUPANCY CLASSIFICATION (21)

51010	MEDICAL CENTER/HOSPITAL
53020	LABORATORY
53030	MORGUE
53040	VETERINARY FACILITY
53060	MEDICAL WAREHOUSE
53071	AMBULANCE GARAGE
54010	DENTAL CLINIC
55010	TROOP DISPENSARY/HEALTH CLINIC
55050	PHARMACY
61070	RED CROSS BUILDING

PRISON OCCUPANCY CLASSIFICATION (22)

73015	CONFINEMENT FACILITY

SCHOOL OCCUPANCY CLASSIFICATION (23)

14129	TRAINING AIDS CENTER
17112	SIMULATOR BUILDING
17115	BAND TRAINING BUILDING
17119	ORGANIZATIONAL CLASSROOM
17120	GENERAL INSTRUCTION BUILDING
17131	COMPACT ITEM REPAIR INSTRUCTIONAL BUILDING
17132	GENERAL ITEM REPAIR INSTRUCTIONAL BUILDING
17133	VEHICLE MAINTENANCE INSTRUCTIONAL BUILDING
17134	AIRCRAFT MAINTENANCE INSTRUCTIONAL BUILDING
17135	LABORATORY INSTRUCTIONAL BUILDING
17136	AUTOMATION-AIDED INSTRUCTIONAL BUILDING
17137	MATERIAL HANDLING INSTRUCTIONAL BUILDING
17138	LIMITED USE INSTRUCTIONAL BUILDING
17182	MOVING TARGET SIMULATOR BUILDING
61065	TECHNICAL LIBRARY
61080	BATTLE LAB
73018	RELIGIOUS EDUCATION FACILITY
73046	DEPENDENT SCHOOL
74014	CHILD DEVELOPMENT CENTER
74025	ARMY CONTINUING EDUCATION SYSTEM FACILITY
74040	LIBRARY BRANCH
74041	LIBRARY MAIN

OTHER INSTITUTIONAL OCCUPANCY CLASSIFICATION (29)

13115	INFORMATION SYSTEMS FACILITY
13120	COMMUNICATIONS CENTER
13125	MILITARY AFFILIATE RADIO SYSTEM STATION
13160	TRANSMITTER BUILDING
13170	RECEIVER BUILDING
13175	TELEVIDEO CENTER
13181	TERMINAL EQUIPMENT FACILITY
13310	FLIGHT CONTROL TOWER
13320	NAVIGATION BUILDING, AIR
13710	LIGHTHOUSE
14115	WEATHER STATION
14126	WORKING ANIMAL BUILDING
14133	SHIPPING AND RECEIVING BUILDING
14178	EMPLOYEE CHANGING BUILDING

14180	SCALE HOUSE
14181	SAFETY SHELTER
17121	INDOOR FIRING RANGE
17122	RANGE OR TARGET HOUSE
17123	RANGE SUPPORT FACILITY
17170	GAS CHAMBER
17180	NATIONAL GUARD ARMORY
21922	ENTOMOLOGY FACILITY

HOUSING OCCUPANCY CLASSIFICATION (30)

71111	FAMILY HOUSING, GENERAL OFFICER
71112	FAMILY HOUSING, COLONEL
71113	FAMILY HOUSING, LT COLONEL AND MAJOR
71114	FAMILY HOUSING, COMPANY GRADE AND WARRANT OFFICER
71115	FAMILY HOUSING, SENIOR NCO
71116	FAMILY HOUSING, JUNIOR NCO/ENLISTED
72111	ENLISTED UNACCOMPANIED PERSONNEL HOUSING
72114	ENLISTED BARRACKS, ANNUAL TRAINING
72115	ENLISTED BARRACKS, MOBILIZATION
72120	TRANSIENT UNACCOMPANIED PERSONNEL HOUSING
72170	UNACCOMPANIED PERSONNEL HOUSING, SENIOR NCO
72181	TRAINEE BARRACKS
72360	DAY ROOM, DETACHED
72410	UNACCOMPANIED OFFICERS QUARTERS, MILITARY
72411	UNACCOMPANIED OFFICERS QUARTERS, MILITARY TRANSIENT
72510	HUTMENT
74032	GUEST HOUSE
74036	RECREATIONAL BILLETS

STORAGE OCCUPANCY CLASSIFICATION (40)

14220	HELIUM STORAGE BUILDING
21113	AIRCRAFT PARTS STORAGE
21445	TANK/AUTOMOTIVE PARTS STORAGE, DEPOT LEVEL
21470	OIL STORAGE BUILDING, NON-DOL/DEH/DPW
21865	OIL STORAGE BUILDING, DOL/DEH/DPW
21870	MAINTENANCE STORAGE, DOL/DEH/DPW
42104	EXPLOSIVE TRANSFER DEPOT LEVEL
42107	STRADLEY, NONATOMIC BLAST RESISTANT, DEPOT LEVEL
42110	FUSE AND DETONATOR MAGAZINE, DEPOT LEVEL
42120	HIGH EXPLOSIVE MAGAZINE, DEPOT LEVEL
42150	SMOKELESS POWDER MAGAZINE, DEPOT LEVEL
42160	SPECIAL WEAPONS MAGAZINE, DEPOT LEVEL
42170	GUIDED MISSILE MAGAZINE, DEPOT LEVEL

42180	IGLOO STORAGE, DEPOT LEVEL
42181	AMMUNITION STOREHOUSE, DEPOT LEVEL
42182	SMALL ARMS AMMUNITION MAGAZINE, DEPOT LEVEL
42183	GENERAL PURPOSE MAGAZINE, DEPOT LEVEL
42184	AMMUNITION HUT, DEPOT LEVEL
42210	FUSE AND DETONATOR MAGAZINE, INSTALLATION
42215	HIGH EXPLOSIVE MAGAZINE, INSTALLATION
42225	SMOKEDRUM STOREHOUSE, INSTALLATION
42230	SMALL ARMS AMMUNITION AND PYROTECHNICS MAGAZINE, INSTALLATION
42231	AMMUNITION STOREHOUSE, INSTALLATION
42235	READY MAGAZINE, INSTALLATION
42240	FIXED AMMUNITION MAGAZINE, INSTALLATION
42250	SPECIAL WEAPONS MAGAZINE, INSTALLATION
42260	GUIDED MISSILE MAGAZINE, INSTALLATION
42280	IGLOO STORAGE, INSTALLATION
42281	AMMUNITION HUT, INSTALLATION
42283	GENERAL PURPOSE MAGAZINE, INSTALLATION
42285	UNIT SMALL ARMS AMMUNITION STORAGE, INSTALLATION
42310	LIQUID PROPELLANT STORAGE, AMMUNITION, BUILDING
42410	BATTERY COLD STORAGE BUILDING
43110	COLD STORAGE FACILITY, DEPOT LEVEL
43211	COLD STORAGE FACILITY, INSTALLATION
43220	MEAT CUTTING PLANT, INSTALLATION
44110	STORAGE FACILITY, GENERAL PURPOSE, DEPOT LEVEL
44130	CONTROLLED HUMIDITY WAREHOUSE, DEPOT LEVEL
44135	HAZARDOUS MATERIAL STORAGE, DEPOT LEVEL
44150	FLAMMABLE MATERIAL STOREHOUSE, DEPOT LEVEL
44160	RADIOACTIVE STORAGE WAREHOUSE, DEPOT LEVEL
44170	UNDERGROUND STORAGE FACILITY, DEPOT LEVEL
44182	VEHICLE STORAGE BUILDING, DEPOT LEVEL
44210	AIRCRAFT PRODUCTION PARTS STORAGE, INSTALLATION
44220	STORAGE FACILITY, GENERAL PURPOSE, INSTALLATION
44223	ARMS BUILDING FOR BATTALION AND ABOVE
44224	DEPLOYMENT STORAGE BUILDING
44228	HAZARDOUS MATERIAL STORAGE BUILDING, INSTALLATION
44230	CONTROLLED HUMIDITY WAREHOUSE, INSTALLATION
44240	FLAMMABLE MATERIAL STOREHOUSE, INSTALLATION
44250	UNDERGROUND STORAGE FACILITY, INSTALLATION
44271	CONSOLIDATED HOUSING FURNITURE STORAGE
71410	GARAGE, FAMILY HOUSING, DETACHED
71420	DETACHED STORAGE BUILDING, FAMILY HOUSING
72350	GARAGE, UPH, DETACHED
74055	EXCHANGE WAREHOUSE

INDUSTRIAL OCCUPANCY CLASSIFICATION (50)

13185	PRINT PLANT BUILDING
14121	MISSILE LAUNCHER AND STORAGE BUILDING
14140	CARE AND PRESERVATION SHOP
14150	BOX AND CRATE SHOP
14160	BLOCKING AND BANDING FACILITY
14163	CENTRALIZED WASH BUILDING
14165	FUELING/POL SUPPORT BUILDING
14177	DECONTAMINATION BUILDING
21110	AIRCRAFT MAINTENANCE HANGAR
21114	AIRCRAFT MAINTENANCE BAY
21116	HANGAR SHOP SPACE
21117	AVIONICS MAINTENANCE SHOP, INSTALLATION
21120	AIRCRAFT COMPONENT MAINTENANCE SHOP
21130	AIRCRAFT PAINT SHOP
21140	AIRCRAFT ENGINE TEST FACILITY
21210	GUIDED MISSILE MAINTENANCE FACILITY, DEPOT LEVEL
21220	GUIDED MISSILE LAUNCHER EQUIPMENT SHOP, DEPOT LEVEL
21330	SHIP REPAIR SHOP
21335	SHIP REPAIR FACILITY
21407	NATIONAL GUARD VEHICLE MAINTENANCE SHOP
21408	COMPONENT CLEANING FACILITY
21409	ARMY RESERVE VEHICLE MAINTENANCE SHOP
21410	VEHICLE MAINTENANCE SHOP
21411	REPAIR BAYS, NON-DOL/DEH/DPW
21412	MAINTENANCE STORAGE, NON-DOL/DEH/DPW
21413	ADMINISTRATION AND SHOP CONTROL, NON-DOL/DEH/DPW
21414	GENERAL ITEM REPAIR SHOP, NON-DOL/DEH/DPW
21415	COMPACT ITEM REPAIR SHOP, NON-DOL/DEH/DPW
21416	MISSILE MAINTENANCE FACILITY
21417	VEHICLE PAINT AND PREP SHOP, NON-DOL/DEH/DPW
21435	MAJOR END ITEM REBUILD SHOP, DEPOT LEVEL
21440	COMPONENT REBUILD SHOP, DEPOT LEVEL
21458	STEAM CLEANING BUILDING, DEPOT LEVEL
21465	DRUM RECONDITIONING PLANT, DEPOT LEVEL
21510	SMALL ARMS REPAIR SHOP, DEPOT LEVEL
21512	WEAPON DEMILITARIZATION SHOP, DEPOT LEVEL
21520	LIGHT GUN SHOP, DEPOT LEVEL
21522	WEAPON QUALITY ASSURANCE/CALIBRATION FACILITY, DEPOT LEVEL
21530	HEAVY GUN SHOP, DEPOT LEVEL
21540	SPECIAL WEAPONS SHOP, DEPOT LEVEL
21610	AMMUNITION RENOVATION SHOP, DEPOT LEVEL
21612	AMMUNITION SURVEILLANCE SHOP, DEPOT LEVEL
21620	ROCKET OVERHAUL SHOP, DEPOT LEVEL
21622	EXPLOSIVES RECEIVING/SERVICE FACILITY, DEPOT LEVEL

21630 AMMUNITION DEMOLITION SHOP, DEPOT LEVEL
21640 DUNNAGE BUILDING, DEPOT LEVEL
21642 COMPONENT CLEANING SHOP, DEPOT LEVEL
21650 AMMUNITION QUALITY ASSURANCE/CALIBRATION FACILITY, DEPOT LEVEL
21710 ELECTRONICS MAINTENANCE SHOP, DEPOT LEVEL
21712 COMMO/ELECTRONICS QUALITY ASSURANCE/CALIBRATION FACILITY, DEPOT LEVEL
21722 COMMUNICATIONS/ELECTRONICS COMPONENT CLEANING SHOP, DEPOT LEVEL
21730 RADAR MAINTENANCE SHOP, DEPOT LEVEL
21740 AVIONICS MAINTENANCE SHOP, DEPOT LEVEL
21835 REPAIR BAYS, DOL/DEH/DPW
21840 RAILROAD EQUIPMENT/ENGINE MAINTENANCE SHOP
21845 ADMINISTRATION AND SHOP CONTROL, DOL/DEH/DPW
21850 BATTERY SHOP
21855 VEHICLE PAINT AND PREP SHOP, DOL/DEH/DPW
21872 QUALITY ASSURANCE/CALIBRATION FACILITY, GENERAL PURPOSE, INSTALLATION
21881 AIRBORNE EQUIPMENT/PARACHUTE REPAIR SHOP
21882 GENERAL ITEM REPAIR SHOP, DOL/DEH/DPW
21885 MAINTENANCE SHOP, GENERAL PURPOSE
21887 COMPACT ITEM REPAIR SHOP, DOL/DEH/DPW
21910 ENGINEERING/HOUSING MAINTENANCE SHOP
21925 ENGINEER MAINTENANCE FACILITY
22110 AIRCRAFT ENGINE ASSEMBLY PLANT
22120 AIRFRAME ASSEMBLY PLANT
22122 AIRCRAFT QUALITY ASSURANCE/CALIBRATION FACILITY
22210 GUIDED MISSILE ASSEMBLY PLANT
22220 GUIDED MISSILE HANDLING AND LAUNCHER PLANT
22228 GUIDED MISSILE QUALITY ASSURANCE/CALIBRATION FACILITY
22410 COMBAT VEHICLE ASSEMBLY PLANT
22412 ENGINE TEST FACILITY
22416 HEAT TREATING SHOP
22422 PLATING SHOP
22430 MACHINE SHOP
22434 TANK/AUTOMOTIVE QUALITY ASSURANCE/CALIBRATION FACILITY
22510 SMALL ARMS PLANT
22520 LIGHT GUN PLANT
22525 FORGE SHOP
22530 HEAVY GUN PLANT
22532 FOUNDRY
22535 WELDING SHOP
22537 MACHINE SHOP, WEAPONS
22548 WEAPONS QUALITY ASSURANCE/CALIBRATION FACILITY, PRODUCTION
22610 BAG CHARGE FILLING PLANT

22612 ACID MANUFACTURING PLANT
22614 LEAD AZIDE MANUFACTURING PLANT
22616 EXPLOSIVE MANUFACTURING PLANT
22618 CHEMICAL, BIOLOGICAL, RADIOLOGICAL PLANT
22620 CASE OVERHAUL AND TANK FACILITY
22622 PYROTECHNIC PRODUCTION
22624 METAL PARTS PRODUCTION
22625 SMALL CALIBER LOADING PLANT (UNDER 40MM)
22626 BOMB HIGH EXPLOSIVES FILLING PLANT
22628 METAL PARTS LOADING PLANT
22630 MINOR CALIBER LOADING PLANT (40-75MM)
22632 AMMUNITION FOUNDRY
22635 MEDIUM CALIBER LOADING PLANT (76mm-120mm)
22638 AMMUNITION QUALITY ASSURANCE/CALIBRATION FACILITY, PRODUCTION
22640 MAJOR CALIBER LOADING PLANT (OVER 120MM)
22645 LARGE CALIBER ROCKET MOTOR LOADING PLANT
22650 MEDIUM CALIBER ROCKET MOTOR LOADING PLANT
22655 CAST HIGH EXPLOSIVE FILLING PLANT
22660 SPECIAL WEAPONS PLANT
22665 AMMUNITION WASHOUT FACILITY
22670 CASE FILLING PLANT
22680 PROPELLANT PLANT
22810 LEATHER/TEXTILE/CLOTHING PLANT
22960 ICE PLANT
89111 POWER PLANT BUILDING
89112 ACETYLENE PLANT
89113 POWER SUBSTATION/SWITCHING STATION BUILDING
89115 ENVIRONMENTAL TEST LABORATORY
89117 INERT GAS FACILITY
89120 PLANT/UTILITIES BUILDING
89121 HEATING PLANT BUILDING
89123 COMPRESSED AIR PLANT
89126 REFRIGERATION/AIR-CONDITIONING BUILDING
89130 HAZARDOUS BUILDING
89131 SEWAGE/WASTE TREATMENT BUILDING
89132 OXYGEN PLANT
89133 REFUSE AND GARBAGE BUILDING
89141 WATER SUPPLY/TREATMENT BUILDING, POTABLE
89144 WATER SUPPLY BUILDING, NONPOTABLE
89148 WATER STORAGE BUILDING
89150 SHREDDER FACILITY

SERVICE OCCUPANCY CLASSIFICATION (60)

71450 TRAILER PARK SERVICE BUILDING

72210 DINING FACILITY
73010 FIRE STATION
73013 BUS STATION
73016 POLICE/MP STATION
73021 GARRISON BREAD AND PASTRY KITCHEN
73022 MILK PROCESSING PLANT
73028 DRUG AND ALCOHOL ABUSE CENTER
73030 LAUNDRY/DRY CLEANING FACILITY
73032 LAUNDRY/DRY CLEANING PICK-UP POINT
74012 CAFETERIA
74013 CANTEEN
74020 MILITARY CLOTHING SALES STORE
74021 COMMISSARY
74046 CONSOLIDATED OPEN DINING FACILITY
74047 ENLISTED OPEN DINING FACILITY
74048 OFFICER OPEN DINING FACILITY
74050 EXCHANGE BRANCH
74051 EXCHANGE CAFETERIA
74053 EXCHANGE MAIN RETAIL STORE
74056 EXCHANGE SERVICE OUTLET
74058 EXCHANGE CONCESSION
74060 BREAK/LUNCH ROOM
74062 FAST FOOD/SNACK BAR
74064 POST (INSTALLATION) RESTAURANT

RESEARCH AND DEVELOPMENT OCCUPANCY CLASSIFICATION (70)

13131 INFORMATION PROCESSING CENTER
13135 PHOTO LAB
13140 INFORMATION SYSTEMS PROCESSING CENTER
14116 FORENSIC LAB
31010 CHEMISTRY LAB
31015 GREENHOUSE, R&D
31020 METALLURGY LAB
31030 NUCLEAR PHYSICS AND CHEMICAL LAB
31040 PHYSICS LAB
31050 HUMAN ENGINEERING LAB
31060 MEDICAL RESEARCH LAB
31110 AIRCRAFT AND FLIGHT EQUIPMENT BUILDING
31210 ASTRONAUTICAL AND GEOPHYSICAL BUILDING
31220 GUIDED MISSILE BUILDING
31410 GROUND TRANSPORT EQUIPMENT BUILDING
31510 ORDNANCE BUILDING
31610 CHEMICAL EQUIPMENT AND MATERIAL BUILDING
31620 AMMUNITION/EXPLOSIVES/TOXICS BUILDING
31710 COMMUNICATION EQUIPMENT BUILDING

31720 DETECTION EQUIPMENT BUILDING
31730 ELECTRICAL EQUIPMENT BUILDING
31740 ELECTRONIC EQUIPMENT BUILDING
31820 PROPULSION SYSTEMS BUILDING
31910 NONMETALLIC MATERIAL FACILITY
31920 LAB AND TEST BUILDING, GENERAL PURPOSE
31930 VIBRATION TEST LAB
32110 PRECISION MACHINE SHOP
37110 RANGE BUILDINGS

ALL OTHER OCCUPANCY CLASSIFICATION (80)

73017 CHAPEL
73019 FAMILY LIFE CENTER
73050 AIR RAID/FALLOUT SHELTER
73056 SMOKING SHELTER
73074 PRIVATELY OWNED VEHICLE INSPECTION
73075 SEPARATE TOILET/SHOWER FACILITY
73080 CEREMONIAL HALL
74003 AUDIO/PHOTO CLUB FACILITY
74009 BOAT HOUSE
74010 AUDITORIUM, GENERAL PURPOSE
74011 BOWLING CENTER
74022 SKILL DEVELOPMENT CENTER, NON-AUTOMOTIVE
74024 AUTOMOTIVE SKILLS CENTER
74028 PHYSICAL FITNESS CENTER
74029 GREENHOUSE
74030 GOLF CLUB HOUSE
74031 GOLF COURSE MAINTENANCE FACILITY
74049 RIDING STABLE
74052 EXCHANGE AUTOMOTIVE SERVICE STATION
74054 EXCHANGE MAINTENANCE SHOP
74065 RECREATIONAL EQUIPMENT CHECKOUT
74066 YOUTH CENTER
74068 RECREATION CENTER
74070 INDOOR ROLLER SKATING RINK
74072 INDOOR SWIMMING POOL
74075 RECREATIONAL SUPPORT FACILITY
74078 THRIFT SHOP
74082 INDOOR ICE SKATING RINK
74085 PRIVATE/ORGANIZATIONAL CLUB FACILITY
74087 RECREATION PARK SERVICE BUILDING
74089 OUTDOOR POOL SERVICE BUILDING
76010 MUSEUM