1.1 What is the purpose of this chapter? This chapter describes our Seismic Safety Program policy. We put the policy in place to:

A. Preserve the life and safety of our employees and the public during a major earthquake.

B. Protect the Federal investment in buildings and human resources.

C. Fulfill the requirements of Executive Order 12941, which requires us to identify Service-owned buildings that do not meet standards for minimum life safety during a major earthquake, and take steps to mitigate unacceptable risks in those buildings.

1.2 What are the authorities of the Seismic Safety Program?

A. Executive Order 12941, Seismic Safety of Existing Federally Owned or Leased Buildings (1994).

B. Executive Order 12699, Seismic Safety of Federal and Federally Assisted or Regulated New Building Construction (1990).

C. Public Law 101-614, National Earthquake Hazards Reduction Program (NEHRP) Reauthorization Act (1990).

D. Earthquake Hazards Reduction Act of 1977 (42 U.S.C. 7701).

1.3 Who is responsible for the Seismic Safety Program?

A. The Department of the Interior (DOI) Seismic Safety Program Coordinator is responsible for:

(1) Overall coordination of the Interior Seismic Safety Program Team, which is comprised of Seismic Safety Coordinators from the bureaus.

(2) Reporting on the program to the Federal Emergency Management Agency (FEMA).

B. The Chief, Division of Engineering is responsible for:

(1) Overall policy for and administration of the program for the Service.

(2) Appointing a National Seismic Safety Coordinator for the Service.

C. The National Seismic Safety Coordinator is responsible for:

(1) Following the Implementation Plan and reporting requirements of DOI's Seismic Safety Program in carrying out the requirements of Executive Order 12941.

(2) Managing the program's national building inventory database, which includes the screening, classification, and evaluation of Service-owned buildings and mitigation of any unacceptable risks identified in those buildings.

(3) Tracking the progress of all seismic mitigation activity for the Service and reporting to DOI.

(4) Providing program information, assistance, and training to Regional Offices and the California/Nevada Operations Office (CNO).

D. Regional Directors/CNO Manager are responsible for program compliance in each Region/CNO, which includes the mitigation of risks in Exceptionally High Risk (EHR) buildings located in high, moderate, and low seismic zones.

E. Regional/CNO Engineers are responsible for:

(1) Rehabilitation of EHR buildings, including additional structural evaluation and rehabilitation design through A/E contractors, for buildings located in high, moderate and low seismic zones.

(2) Seismic Safety Program compliance within their respective Regions/CNO.

(3) Appointing a Seismic Safety Regional/CNO Coordinator to assist our National Seismic Safety Coordinator.

F. Regional/CNO Seismic Safety Coordinators are responsible for:

(1) Performing Rapid Visual Screening inspections within their respective Regions/CNO.

(2) Obtaining accurate field station input on Seismic Safety Questionnaires, which we use for collecting information on Service-owned buildings.

(3) Reporting building occupancy and use changes to our National Seismic Safety Coordinator in accordance with the triggers described in Section 1.14, which could result in the reevaluation of building seismic classifications.

(4) Reporting seismic mitigation actions to our National Seismic Safety Coordinator.

G. Field stations are responsible for:

(1) Notifying their Regional/CNO Seismic Safety Coordinator if any of the triggers identified in section 1.14 occur. Field stations complete a new or updated Seismic Safety Questionnaire if the Regional/CNO Seismic Safety Coordinator asks them to do so. If they need to make several changes, field stations will be granted access and edit rights to the Seismic Safety Program database on the Engineering Facilities Management Information System (EFMIS).

(2) Identifying one seismic safety contact person per field station with edit rights and access to the Seismic Safety Program database on EFMIS.

1.4 What terms do I need to know to understand this chapter?

A. Collapse prevention: Seismic performance level of a building that includes damage to both structural and nonstructural components during a design earthquake, such that the building barely remains standing and would be a total economic loss, although occupants would still be able to exit the building with some difficulty.

B. Design Earthquake. The theoretical seismic event used by engineers to determine the magnitude of

earthquake induced forces that a building is designed and constructed to resist.

C. Essential. Designation given to buildings that must remain functional after an earthquake in order to maintain critical operations. We typically evaluate essential buildings to the "Immediate Occupancy" seismic performance level, instead of "Life Safety" seismic performance level.

D. Exemption criteria. Used by the Seismic Safety Program to screen and classify buildings as follows:

(1) "Exempt classification" is given to a building that has met at least one of the program's exemption criteria and is exempt from any further program requirements.

(2) "Non-Exempt classification" is given to a building that did not meet any of the program's exemption criteria and prompts further action to look for seismic risk.

E. Geotechnical site hazard deficiencies. Local site conditions outside or under a building that can lead to structural damage and threaten life safety during an earthquake such as: surface fault rupture, soil liquefaction, differential compaction, landslide, and flooding. Large foundation settlement or lateral spreading beneath buildings due to soil liquefaction can severely damage structures.

F. Immediate Occupancy. Seismic performance level of a building that includes damage to both structural and nonstructural components during a design earthquake, to the extent that:

(1) Damage is not life-threatening, so as to permit people to re-enter to live and/or work in the building after a design earthquake.

(2) The damage is repairable while the building is occupied.

G. Life safety. Seismic performance level of a building that includes damage to both structural and nonstructural components during a design earthquake, to the extent that:

(1) Partial or total structural collapse does not occur.

(2) Damage to nonstructural components is not life-threatening.

H. Liquefaction. A process in which loose, granular soils below the ground water table temporarily lose shear strength and act as a fluid during strong earthquake shaking. When subjected to strong ground motion, unconsolidated and saturated sandy deposits can liquefy, causing excessive settlement and/or building collapse.

I. Mitigation. An action taken in response to seismic deficiencies or findings to ensure public safety, health, and welfare. Examples of mitigation actions are rehabilitation, building replacement, changing the use of a building, reducing the number of occupants, demolition, or abandonment.

J. Nonstructural deficiencies. Seismic problems with the nonstructural elements of a building, such as its architectural, mechanical, electrical, and plumbing components that can fall and harm occupants during an earthquake. Nonstructural seismic deficiencies generally consist of unsecured bookcases or gas water heaters that can pose hazards to life safety under certain circumstances.

K. Operational. Seismic performance level of a building that includes negligible damage to both the structural and nonstructural components during a design earthquake, to the extent that:

(1) The building will retain nearly all of its pre-earthquake strength.

(2) All mechanical, electrical, plumbing, and other systems necessary for the normal operation of the building are expected to be functional.

(3) If repairs to the building are required, they can be completed at the convenience of the occupants.

L. Seismic classification. A determination from screening and categorization of Service-owned buildings that they are either "Exempt" or "Non-Exempt." (Refer to Section 1.4D above for more information.)

M. Seismic deficiency. A finding of inadequacy as a result of a seismic evaluation by a professional engineer. Deficiencies can be structural, nonstructural, or geotechnical site hazards.

N. Seismic performance level. The degree to which a building is able to withstand earthquake induced forces. In order from highest to lowest, the levels are:

(1) Operational,

(2) Immediate Occupancy,

(3) Life Safety, and

(4) Collapse Prevention.

O. Seismic Safety Questionnaire. A one-page question and answer form on Service-owned buildings used to collect information and screen buildings. We use the answers to place buildings into seismic classification categories. Questionnaires are available on the Seismic Safety module of EFMIS.

P. Seismic zone. A region on a map for which a common areal rate of seismicity was once used to calculate probabilistic ground motions. However, we now use new ground motion and soil maps that are more accurate for specific building locations. These new maps make the term "seismic zone" obsolete when designing for rehabilitation.

Q. Structural deficiencies. Seismic problems with structural elements of a building, such as its lateral force resisting system, structural framing, floor and roof diaphragm construction, basement, or foundation system.

1.5 On which buildings does the Seismic Safety Program focus? The program focuses on existing, Service-owned buildings that may not be built to conform to seismic provisions of current building codes. If we own a building but lease it to others, we are still responsible for seismic safety of that building.

1.6 Do buildings the Service leases require compliance with seismic regulations and standards? We should not enter into new leases or renew leases without checking for seismic safety compliance using the RP6 *Standards of Seismic Safety for Existing Federally Owned or Leased Buildings and Commentary*.

A. Seismic compliance, which includes a certification of seismic safety by the building owner, is required for building leases that meet either of these criteria:

(1) Leased space less than (<) 10,000 square feet (S.F.) and located in high seismic zones, or

(2) Leased space greater than (>) 10,000 S.F. and located in any seismic zone (low, moderate, or high).

B. The RP6 requirement does not apply to leased buildings in the following circumstances:

(1) The leased space is less than 10,000 S.F. (930 square meters), and

(2) It is located in NEHRP map areas 1 - 4 (low and moderate seismic zones).

1.7 Is the Seismic Safety Program action required for recently constructed buildings? Buildings designed after 1/5/90, are exempt from further Seismic Safety Program action because we assume they were designed using seismic building code provisions.

1.8 What are the Service's reporting requirements for the Seismic Safety Program? We provide annual updates on our program to DOI; DOI issues annual reports on the Departmentwide Seismic Safety Program's activities to FEMA.

1.9 How does the Seismic Safety Program work? We follow FEMA program guidelines, in conjunction with standards developed by the Interagency Committee on Seismic Safety in Construction. The program identifies Service-owned buildings with seismic deficiencies that we must mitigate as required by Executive Order 12941. We screen, classify, and inspect existing buildings to determine if further seismic evaluation is required.

1.10 Does this program require annual seismic inspections? No. Annual inspections of existing buildings are not required because only certain buildings undergo Rapid Visual Screening (RVS) inspections (see Section 1.16 for information on RVS inspections). If there are no changes in the use or occupancy of a building, then there is no need to reevaluate or inspect it. If there are changes that affect the seismic classification of a building, further evaluation and inspection may be necessary.

1.11 How was the building inventory for the program developed? We began building the inventory using data on Service-owned buildings from the Real Property Database, Division of Realty. We added other fields to the database to meet FEMA reporting requirements.

1.12 How are buildings screened in the program? The Regional/CNO Seismic Safety Coordinators sent Seismic Safety Questionnaire forms to field stations to collect information on buildings. We used questionnaire answers to screen each building according to FEMA program guidelines. Seismic screening determines further program actions based on a building's classification into "Exempt" or "Non-Exempt" categories. You can find a list of the program's exemption criteria on the Seismic Safety website.

1.13 Can a building's seismic classification change? Yes, a change in building occupancy or use may change its seismic classification. We base building classification on answers from the Seismic Safety Questionnaire, so changes to those answers may affect its seismic classification. The Regional/CNO Seismic Safety Coordinators must report such changes on the Seismic Safety Program's electronic database.

1.14 When does a building need to be reclassified? There are four reasons or "triggers" for reevaluating seismic risks that would cause a building to be reclassified or screened again. The Regional/CNO Seismic Safety Coordinators must report any of the four changes identified below to the Service's National Seismic Safety Coordinator:

A. A change in the building's function occurs that results in a significant increase in the building's level of use, importance, or occupancy.

B. A project is planned that will significantly extend the building's useful life through alterations or repairs that total more than 50 percent of the replacement value of the facility.

C. Fire, wind, earthquake, or other causes have significantly damaged the building or part of the building (structural degradation of the building's vertical or lateral load-carrying systems has occurred).

D. We add the building to the Federal inventory through purchase or donation.

1.15 What happens after the initial screening process?

A. We drop "Exempt" buildings, which have met at least one of the Seismic Safety Program's exemption criteria, from further program consideration.

B. "Non-Exempt" buildings require further program action to look for seismic risk. We give each Non-Exempt building a RVS inspection that may lead to further structural engineering evaluation and mitigation.

1.16 What is an RVS inspection? An RVS inspection is a quick and easy, one-page form that uses numeric scores to indicate the probability of the building sustaining life-threatening damage should a severe earthquake occur. A high RVS score indicates that the building is at low seismic risk based on its structural system, age, condition, and other building modifiers that impact structural performance during earthquakes. A low score means that a building requires additional study by a professional engineer experienced in seismic design to determine if seismic risk exists. Trained RVS inspectors perform these inspections, including engineers from Regional/CNO Engineering Offices.

1.17 Are buildings assigned seismic condition scores?

A. Yes, we base our descriptions of seismic conditions on RVS inspection scores for buildings. These descriptions are similar to condition descriptions used in our Maintenance Management System. "Non-Exempt" buildings with RVS scores greater than 4.0 are "Good Condition," scores between 4.0 and 2.6 are "Fair Condition," and scores less than 2.6 are "Poor Condition." We describe "Exempt" buildings as "Good Condition."

B. Further structural evaluation is required on all "Fair" and "Poor" seismic condition descriptions to identify specific seismic deficiencies and to determine mitigation strategies.

1.18 What are "Exceptionally High Risk (EHR)" buildings? We use RVS inspection scores that are less than 4.0 to designate buildings located in high and moderate seismic zones as "Exceptionally High Risk" buildings. These buildings are prime candidates for further structural evaluation. We have not yet determined how we will designate EHR for buildings located in low seismic zones, but we will probably define them in a similar fashion.

1.19 What is a structural evaluation? A structural evaluation is a preliminary study conducted by a professional engineer to identify structural, nonstructural, and geotechnical site hazard deficiencies. The purpose of the study is to determine if a building has any seismic deficiencies. It is not meant to be used as a final rehabilitation design. We use ASCE 31-03, *Seismic Evaluation of Existing Buildings*, for structural evaluations.

1.20 What are the Service's obligations to correct seismic deficiencies?

A. Once we identify seismic deficiencies, Executive Order 12941 requires us to mitigate unacceptable seismic risks. Unacceptable seismic risks are those buildings identified as at "Exceptionally High Risk."

B. We address structural and nonstructural deficiencies as described below:

(1) We address structural deficiencies through a seismic rehabilitation program.

(2) We address nonstructural deficiencies, which typically consist of low cost corrections such as securing bookcases and gas water heaters to walls, using our maintenance staff when possible.

1.21 How does the Service fund rehabilitation projects? We fund seismic rehabilitation projects located in high, moderate, and low seismic zones through either our Construction Appropriation or various Deferred Maintenance accounts, as directed by the Division of Engineering.

1.22 How does the Service determine the priority of EHR buildings requiring mitigation?

A. The DOI ranks EHR buildings so that all bureaus are consistent when developing seismic rehabilitation rankings. The DOI's ranking methodology uses annualized-loss-of-life risk assessment tools and innovative building earthquake behavior prediction techniques. We use the DOI ranking to determine the priority of our EHR buildings.

B. In general, we select rehabilitation projects from these rankings in order of priority. Maintenance projects or other building improvements may also prompt seismic rehabilitation selections.

(1) We have identified the rehabilitation priority rankings of EHR buildings located in high seismic zones. The rankings can be found on the Seismic Safety Program's electronic database.

(2) We have identified the rehabilitation priority rankings of EHR buildings located in moderate seismic zones. The rankings can be found on the Seismic Safety Program's electronic database.

(3) We have not issued rehabilitation priority rankings for buildings located in low seismic zones.

1.23 Are there any choices for seismic mitigation other than rehabilitation? Yes, rehabilitation is only one of several mitigation options available to the Service. Mitigation choices for buildings with seismic deficiencies include: abandon, demolish, rehabilitate, change the use of the building, or reduce the number of occupants. We must consider many factors before making this decision:

A. The age, life expectancy, condition, and historical significance of the building;

B. The cost of the seismic mitigation along with the cost of other, nonseismic building improvements;

C. The impact on occupants or building functions; and

D. Long-term plans for the building. When the cost of rehabilitation approaches half the cost of replacement, it *may* be time to consider a new building.

1.24 What if rehabilitating an older building is not cost effective? If the mitigation solution is for building replacement instead of rehabilitation, the design and construction of the new building is the responsibility of the Regional/CNO Engineering Office. This applies to buildings located in any seismic zone.

1.25 If the Service chooses to rehabilitate a building, which design guideline must we follow? Seismic rehabilitation designs will follow the FEMA 356, *Pre-standard and Commentary for the Seismic Rehabilitation of Buildings*, 2000.

1.26 What is the most commonly used level of building strength when designing for building rehabilitation?

A. The level of building strength for rehabilitation design is called its seismic performance level. The most common seismic performance level is for "Life Safety." The "Life Safety" performance level assumes that people will be able to exit safely after a major earthquake, but the building may be left in an unrepairable state.

B. We may use performance levels greater than "Life Safety" when a building has been designated as either "essential" or "historic."

C. We should make performance level choices at the start of a rehabilitation design.

1.27 What are the time frames for mitigating "Exceptionally High Risk" buildings?

A. FEMA's Report to Congress has proposed a target date of 2030 to complete the mitigation.

B. We have already started seismic mitigation activities on buildings located in high seismic zones. Buildings located in moderate seismic zones will be next, followed by those in low seismic zones.

1.28 Are there contractors working under indefinite quantity contracts who are available to do seismic evaluations and rehabilitation designs? Yes, there are structural engineering firms with offices around the country that are available for seismic evaluations and rehabilitation designs. These firms are familiar with both the ASCE 31-03 and FEMA 356 guidelines and have extensive seismic mitigation experience. Contact the appropriate Regional/CNO Engineering Office for more information.

1.29 What are the requirements for seismic design of new buildings? We will design new buildings to conform to the seismic requirements found in the most current version of the International Building Code (IBC).

1.30 Where can I find out more about the program and Service-owned buildings? The National Seismic Safety Coordinator maintains a nationwide electronic database that is available to certain Regional/CNO and field station users of the Engineering Facilities Management Information System (EFMIS). Building records and useful program information is easily accessible on the Seismic Safety Program's electronic database.

A. Regional/CNO and field station database users have edit rights to update Seismic Safety Questionnaires, add buildings to their inventory, or ask for building reevaluations because of use or occupancy changes.

B. Regional/CNO Seismic Safety Coordinators have edit rights to enter RVS inspection scores.

C. Other Service employees have read-only rights.

Acting
DIRECTOR

Date: DEC 2 0 2005