[CCC Grain Price Support Regs. 1970 and Subsequent Crops, Grain Sorghum Supp., Amdt. 1]

PART 1421—GRAINS AND SIMILARLY HANDLED COMMODITIES

Subpart—1970 and Subsequent Crops Grain Sorghum Loan and Purchase Program

ELIGIBLE GRAIN SORGHUM

The regulations issued by the Commodity Credit Corporation (CCC) published in the FEDERAL REGISTER at 35 FR 10745, containing provisions for price support loans and purchases applicable to the 1970 and subsequent crops of grain sorghum are further amended as follows:

Section 1421.211 is amended to specify that grain sorghum to be eligible for price support must not contain molds that produce toxins that are poisonous to man or animals.

§ 1421.211 Eligible grain sorghum.

(a) *General.* To be eligible for a loan or purchase, the grain sorghum must be merchantable for food or feed or for other uses, as determined by CCC, and must not contain mercurial compounds, toxin producing molds, or other substances poisonous to man or animals.

* * * * *

Since loans are now being made on the 1973 crop and the provisions of this amendment are needed to carry out the loan program more effectively, compliance with the notice of proposed rulemaking would be impracticable and contrary to public interest; therefore, this amendment is issued without compliance with such procedure.

(Sec. 4, 62 Stat. 1070, as amended, 15 U.S.C. 714b. Interpret or apply sec. 5, 62 Stat. 1072, secs. 105, 401, 63 Stat. 1051, as amended; 15 U.S.C. 714c, 7 U.S.C. 1421, 1441.)

Effective November 13, 1973.

Signed at Washington, D.C., November 5, 1973.

GLEN A. WEIR,
Acting Executive Vice President, Commodity Credit Corporation.

[FR Doc.73-24106 Filed 11-12-73;8:45 am]

[CCC Grain Price Support Regs., 1970 and Subsequent Crops, Oat Supp., Amdt. 2]

PART 1421—GRAINS AND SIMILARLY HANDLED COMMODITIES

Subpart—1970 and Subsequent Crops Oat Loan and Purchase Program

ELIGIBLE OATS

The regulations issued by the Commodity Credit Corporation (CCC) published in the FEDERAL REGISTER at 35 FR 8340, as amended, containing provisions for price support loans and purchases applicable to the 1970 and subsequent crops of oats are further amended as follows:

Section 1421.247 is amended to specify that oats to be eligible for price support must not contain molds that produce toxins that are poisonous to man or animals.

§ 1421.247 Eligible oats.

(a) *General.* In order to be eligible for loans or purchases, oats must be merchantable for food or feed or other uses, as determined by CCC, and must not contain mercurial compounds, toxin producing molds, or other substances poisonous to man or animals.

* * * * *

Since loans are now being made on the 1973 crop and the provisions of this amendment are needed to carry out the loan program more effectively, compliance with the notice of proposed rulemaking would be impracticable and contrary to public interest; therefore, this amendment is issued without compliance with such procedure.

(Sec. 4, 62 Stat. 1070, as amended, 15 U.S.C. 714b. Interpret or apply sec. 5, 62 Stat. 1072, secs. 105, 401, 63 Stat. 1051, as amended; 15 U.S.C. 714c, 7 U.S.C. 1421, 1441.)

Effective ———.

Signed at Washington, D.C., November 5, 1973.

GLENN A. WEIR,
Acting Executive Vice President, Commodity Credit Corporation.

[FR Doc.73-24107 Filed 11-12-73;8:45 am]

[CCC Grain Price Support Reg., 1970 and Subsequent Crops, Rice Supp., Amdt. 4]

PART 1421—GRAINS AND SIMILARLY HANDLED COMMODITIES

Subpart—1970 and Subsequent Crops Rice Loan and Purchase Program

ELIGIBLE RICE

The regulations issued by the Commodity Credit Corporation (CCC) published in the FEDERAL REGISTER at 35 FR 8443 and 8873, as amended, containing provisions for price support loans and purchases applicable to the 1970 and subsequent crops of rice are further amended as follows:

Section 1421.302, paragraph (a) (3) is amended to specify that rice to be eligible for price support must not contain molds that produce toxins that are poisonous to man or animals.

§ 1421.302 Eligible rice.

(a) *General* * * *

(3) *Contamination and poisonous substances.* Rice must not be contaminated by rodents, birds, insects, or other vermin or contain mercurial, compounds, toxin producing molds, or other substances poisonous to man or animals.

* * * * *

Since loans are now being made on the 1973 crop and the provisions of this amendment are needed to carry out the loan program more effectively, compliance with the notice of proposed rulemaking would be impracticable and contrary to public interest; therefore, this amendment is issued without compliance with such procedure.

(Sec. 4, 62 Stat. 1070, as amended, 15 U.S.C. 714b. Interpret or apply secs. 5, 62 Stat. 1072, sec. 101, 401, 63 Stat. 1051, as amended; 1054 sec. 302, 72 Stat. 988; 15 U.S.C. 714c, 7 U.S.C. 1421, 1441.)

Effective November 13, 1973.

Signed at Washington, D.C., November 5, 1973.

GLENN A. WEIR,
Acting Executive Vice President, Commodity Credit Corporation.

[FR Doc.73-24101 Filed 11-12-73;8:45 am]

[CCC Grain Price Support Reg., 1970 and Subsequent Crops, Rye, Supp., Amdt. 2]

PART 1421—GRAINS AND SIMILARLY HANDLED COMMODITIES

Subpart—1970 and Subsequent Crops Rye Loan and Purchase Program

ELIGIBLE RYE

The regulations issued by the Commodity Credit Corporation (CCC) published in the FEDERAL REGISTER at 35 FR 10355, as amended, containing provisions for price support loans and purchases applicable to the 1970 and subsequent corps of rye are further amended as follows:

Section 1421.337 is amended to specify that rye to be eligible for price support must not contain molds that produce toxins that are poisonous to man or animals.

§ 1421.337 Eligible rye.

(a) General. In order to be eligible for price support, the rye must be merchantable for food or feed or other uses, as determined by CCC, and must not contain mercurial compounds, toxin producing molds, or other substances poisonous to man or animals.

* * * * *

Since loans are now being made on the 1973 crop and the provisions of this amendment are needed to carry out the loan program more effectively, compliance with the notice of proposed rulemaking would be impracticable and contrary to public interest; therefore, this amendment is issued without compliance with such procedure.

(Sec. 4, 62 Stat. 1070, as amended, 15 U.S.C. 714b. Interpret or apply sec. 5, 62 Stat. 1072, secs. 105, 401, 63 Stat. 1051, as amended; 15 U.S.C. 714c, 7 U.S.C. 1421, 1441.)

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Signed at Washington, D.C., November 5, 1973.

GLENN A. WEIR,
Acting Executive Vice President, Commodity Credit Corporation.

[FR Doc. 73-24104 Filed 11-12-73;8:45 am]

[CCC Grain Price Support Regs., 1970 and Subsequent Corps, Soybean Supp., Amdt. 2]

PART 1421—GRAINS AND SIMILARLY HANDLED COMMODITIES

Subpart—1970 and Subsequent Crops Soybean Loan and Purchase Program

ELIGIBLE SOYBEANS

The regulations issued by the Commodity Credit Corporation (CCC) published in the FEDERAL REGISTER at 35 FR

13971 and 14501, as amended, containing provisions for price support loans and purchases applicable to the 1970 and subsequent corps of soybeans are further amended as follows:

Section 1421.367 is amended to specify that soybeans to be eligible for price support must not contain molds that produce toxins that are poisonous to man or animals.

§ 1421.367 Eligible soybeans.

(a) *General.* To be eligible for a loan or a purchase, the soybeans may be of any class but must be merchantable for food, feed, or other uses, as determined by CCC, and must not contain mercurial compounds, toxin producing molds, or other substances poisonous to man or animals.

* * * * *

Since loans are now being made on the 1973 crop, and the provisions of this amendment are needed to carry out the loan program more effectively, compliance with the notice of proposed rulemaking would be impracticable and contrary to public interest; therefore, this amendment is issued without compliance with such procedure.

(Sec. 4, 62 Stat. 1070, as amended, 15 U.S.C. 714b. Interpret or apply sec. 5, 62 Stat. 1072, sec. 203, 301, 401, 63 Stat. 1054, as amended; 7 U.S.C. 1421, 1446(d), 1447.)

Effective November 13, 1973.

Signed at Washington, D.C., November 5, 1973.

GLENN A. WEIR,
Acting Executive Vice President, Commodity Credit Corporation.

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Title 10—Atomic Energy

CHAPTER I—ATOMIC ENERGY COMMISSION

PART 50—LICENSING OF PRODUCTION AND UTILIZATION FACILITIES

PART 100—REACTOR SITE CRITERIA

Seismic and Geologic Siting Criteria

On November 25, 1971, the Atomic Energy Commission published in the FEDERAL REGISTER (36 FR 22601) for public comment proposed amendments to 10 CFR Part 100, "Reactor Site Criteria," which would add an Appendix A, "Seismic and Geologic Siting Criteria for Nuclear Power Plants". The purpose of the criteria is to set forth the principal seismic and geologic considerations which guide the Commission in its evaluation of the suitability of proposed sites for nuclear power plants and the suitability of the plant design bases established in consideration of the seismic and geologic characteristics of the proposed sites in order to provide reasonable assurance that the nuclear power plant can be constructed and operated at a proposed site without undue risk to the health and safety of the public.

All interested persons were invited to submit comments or suggestions in connection with the proposed amendments within 60 days after publication of the notice of proposed rule making in the FEDERAL REGISTER. After consideration of the comments received in response to the notice of proposed rulemaking the Commission has decided to adopt the amendments in the form set out below. The amendments as adopted reflect the suggestions in a number of the comments. Major differences in Appendix A from the amendments published for comment are:

1. The Safe Shutdown Earthquake and the Operating Basis Earthquake have been defined in terms of geology and seismology.

The proposed rule defined the Safe Shutdown Earthquake and the Operating Basis Earthquake in terms of the effect of these earthquakes on structures, systems and components of the plant. This concept has been retained in these amendments, so that effects on plant structure as well as geologic and seismic considerations are required to adequately define each earthquake.

2. Advances in the state of the art of geologic investigations have been taken into account by giving more credit to three-dimensional investigations, such as those obtained from offshore geologic surveys, in determining the extent of the zone requiring detailed faulting investigations.

3. The selection of an Operating Basis Earthquake has been made mandatory and has been applied to those features of the plant that are safety related.

The proposed rule required that the Operating Basis Earthquake selected be related to the operability of those structures, systems and components necessary for power generation. Many of the comments questioned the legality of imposing safety requirements on portions of the plant which were not safety related. As a result of these comments, the definition of the Operating Basis Earthquake was made more restrictive.

Other significant changes which relate to specific sections of Appendix A are as follows:

1. Section I of Appendix A, entitled "Purpose," has been revised to reference General Design Criterion 2 of Appendix A to 10 CFR Part 50 which requires that nuclear power plant structures, systems, and components important to safety be designed to withstand the effects of natural phenomena without loss of capability to perform their safety function.

2. Section II of Appendix A, entitled "Scope," has been revised to:

a. Clarify the Commission's intent that the investigations described in Appendix A of 10 CFR Part 100 are considered to fall within the scope of § 50.10(c)(1) of 10 CFR Part 50.

b. Define in more precise terms when additional investigations or more conservative determinations or both are required.

c. State that the criteria do not address investigations of possible volcanism required for sites located in areas of volcanic activity and that investigations of the volcanic aspects of such sites will be determined on a case-by-case basis.

3. A number of definitions included in section III of Appendix A have been revises to define more frecisely the terms used in this appendix with respect to geology and seismicity, and their relationship to safety related structures, systems and components of a nuclear power plant.

The specific changes made to the definitions of section III are as follows:

a. Paragraph (c) of section III has been revised so that the Safe Shutdown Earthquake is that earthquake which i based upon an evaluation of the maximum earthquake potential considering the regional and local geology and seismology and the specific characteristics of local subsurface material.

b. In paragraph (d) of section III the definition of the Operating Basis earthquake has been revised by substituting for the definition of the earthquake which produces the vibratory ground motion for which those structures, systems and components necessary for power generation are designed to remain operable, the earthquake which produces vibrating ground motion for which those features of the nuclear power plant necessary for continued operation without undue risk to the health and safety of the public are designed to remain functional, and considering the regional and local geology and seismology and specific characteristics of local subsurface material, which could reasonably be expected to affect earthquake vibratory motion at the plant site during the operating life of the plant.

c. The term "active" fault has been replaced by the term "capable" fault throughout the appendix to eliminate the confusion which has existed between the Appendix A definition of an "active" fault and the other definitions of an active fault widely used by geologists. As used in the Appendix, a capable fault is a fault whose geologic history is taken into account in evaluating the fault's potential for causing vibratory ground motion and which is capable of causing surface faulting. An additional change has been made to paragraph III(g) in that the regional restriction concerning instrumentally determined macro-seismicity has been deleted from paragraph (g)(2) of section III. The definition now includes only the characteristics of macro-seismicity instrumentally determined with records of sufficient precision to demonstrate a direct relationship with the fault.

d. The definition of "zone requiring detailed faulting investigation" in paragraph (j) of section III has been revised to state more clearly the scope and types of investigations in the zone needed to demonstrate that the need to design for surface faulting does not exist, or that the design basis for surface has been properly determined.

4. Section IV, entitled "Required Investigations," has been revised as follows:

a. A statement has been added in paragraph (a) of section IV that the investigations for vibratory ground motion produced by the Safe Shutdown Earthquake are considered to provide an adequate basis for selection of an Operating Basis Earthquake.

b. Paragraph (a)(2) of section IV has been modified to require that investigations for vibratory ground motion and surface faulting include consideration of the possible effects of man's activities on the tectonic structures underlying the site and the region surrounding the site.

c. A new paragraph (b)(2) has been added to section IV to clarify that an evaluation of tectonic structures underlying the site with regard to their potential for causing surface displacement at or near the site is required and that such evaluation shall include consideration of the effects of man's activities on the tectonic structures underlying the site and the region surrounding the site.

d. A footnote has been added to paragraphs (a)(7) and (b)(7) of section IV to clearly state that in the absence of absolute dating, evidence of recency of movement of a fault may be obtained by applying relative dating techniques to rupture, offset warped or otherwise structurally disturbed surface or near surface material or geomorphic features.

e. A footnote has been added to paragraph (a)(7) and (b)(7) of Section IV to clarify that the applicant is to evaluate whether a fault is a capable fault with respect to the defined characteristics stated in paragraph IIIg by conducting a reasonable investigation using suitable geologic and geophysical techniques.

5. The following changes have been made to Section V, entitled "Seismic and Geologic Design Bases:"

a. Paragraph V(a) has been expanded to provide for determination of the design basis for the expected vibratory ground motion as well as the design basis for maximum vibratory ground motion.

b. A requirement has been added to paragraph (a)(1)(iv) of section V that, in the case where a causative fault is near the site, the effect of proximity of an earthquake on the spectral characteristics of the Safe Shutdown Earthquake shall be taken into account.

c. Paragraph (a)(2) of section V has been changed to require the applicant to specify the Operating Basis Earthquake. A requirement which reflects the seismic design bases for plants recently evaluated for construction permits that the maximum vibratory ground acceleration of the Operating Basis Earthquake shall be at least one-half the maximum vibratory ground acceleration of the Safe Shutdown Earthquake has been added.

d. Paragraph (b)(1) of section V has been revised to specify that more detailed three dimensional information such as that obtained from precise investigative techniques may justify the use of a narrower zone requiring detailed faulting investigations. This change has been made to give greater recognition to advances in the state of the art of geologic investigations. Examples of certain types of faults which may require an increase in the width of the zone also are given.

e. Paragraph (d)(1) of section V has been modified to include consideration of the loading effects of dams or reservoirs in the determination of soil stability.

f. Paragraph (d)(4) of section V requires that those structures which are not located in the immediate vicinity of the site, but which are safety related, be designed to withstand the effects of the Safe Shutdown Earthquake and the design basis for surface faulting, determined on a basis comparable to that of the nuclear power plant.

6. The following significant changes were made to section VI, entitled "Application to Engineering Design:"

a. Paragraphs (a)(1) and (a)(2) of section VI have been revised to permit the use of a suitable qualification test to demonstrate that structures, systems and components can withstand the seismic and other concurrent loads.

b. Paragraph VI(a)(1) has been changed to eliminate the requirement that safety related structures, systems, and components also be designed to withstand the effects of vibratory motion of at least fifty percent of the Safe Shutdown Earthquake in combination with other appropriate loads well within elastic limits. This requirement is now included as part of the determination of the Operating Basis Earthquake in paragraph (a)(2) of section V.

c. Paragraph (a)(2) of section VI has been modified to reflect the change made to the Operating Basis Earthquake definition and to define more precisely the stress and deformation limits within which all structures, systems, and components of the nuclear power plant necessary for continued operation without undue risk to the health and safety of the public shall be designed to remain functional.

d. A footnote has been added to the end of paragraph (a)(3) of section VI that the criteria do not address the need for instrumentation that would automatically shut down a nuclear power plant when an earthquake occurs which exceeds a predetermined intensity.

e. A footnote has been added to § 50.36 (c)(2) of 10 CFR Part 50 to assure that each power reactor licensee is aware of the limiting condition of operation which is imposed under these criteria. This limitation requires that if vibratory ground motion exceeding that of the Operating Basis Earthquake occurs, shut down of the nuclear power plant will be required. Prior to resuming operations, the licensee will be required to demonstrate to the Commission that no functional damage has occurred to those features necessary for continued operation without undue risk to the health and safety of the public.

The criteria describe the seismic and geologic investigations required to obtain information needed to determine the design basis for earthquake-produced vibratory ground motion and for seismically induced floods and water waves. They also describe investigations required to obtain information to determine whether and to what extent the nuclear power plant need be designed to withstand the effects of surface faulting.

The design basis for the maximum vibratory ground motion is determined, as described in the criteria, through evaluation of the seismology and geology and the geologic and seismic history of the site and the surrounding region. The most severe earthquakes associated with tectonic structures or tectonic provinces in the region surrounding the site are identified by considering those historically reported earthquakes that can be associated with these structures or provinces. If faults in the region surrounding the site are capable faults, the most severe expected earthquakes associated with these faults are determined by also considering their geologic history. Because of the limited historical data, the most severe earthquakes associated with these tectonic structures or tectonic provinces are determined in a conservative manner and are usually larger than the maximum earthquake historically recorded. The design basis for vibratory ground motion at the site is then determined by assuming that the epicenters or locations of highest intensity of the earthquakes are situated at the point on the tectonic structures or tectonic provinces nearest the site.

The criteria require the evaluation of other design considerations which are affected by the design basis for vibratory ground motion, including soil stability, slope stability, and cooling water supply.

In determining whether and to what extent a nuclear power plant need be designed to withstand the effects of surface faulting, the criteria require that the location of the site with respect to capable faults be considered. Procedures are provided for determining whether the site is within a zone requiring detailed faulting investigation based on its location with respect to capable faults. Where a site is within a zone requiring detailed faulting investigation, the criteria require that the regional and local geologic and seismic characteristics of the site be investigated in considerable detail. The adequacy of the detailed investigation will be determined by the Commission on an individual case basis, taking into account the specific site characteristics. Where the detailed investigation indicates that surface faulting need not be taken into account in the design of the nuclear power plant, the criteria require that sufficient data to clearly justify the proposed design basis be presented in the license application.

The criteria also provide general guidance for the design of a nuclear power plant to withstand earthquake-caused effects, pending the development of more detailed criteria.

The amendments were prepared in cooperation with the U.S. Geological Survey and the National Oceanic and Atmospheric Administration. The amendments reflected the experience accumulated by these agencies and the Atomic Energy Commission in evaluating seismic

and geologic characteristics of sites for the location of nuclear power plants.

Discussions have been held with various interested groups to assure clarity of the criteria.

A determination has been made that an Environmental Impact Statement is not required. The considerations factored into this determination are included in a memorandum on file at the Commission's Public Document Room at 1717 H Street NW., Washington, D.C.

The seismic and geologic siting criteria in this appendix supplement 10 CFR Part 100 by specifying the seismic and geologic investigations and analyses necessary to determine the acceptability of a proposed site as required by § 100.10. The existing provisions in § 100.10(c)(1) stating that the design of a facility should conform to accepted building codes or standards and that no facility should be located closer than one-fourth mile from the surface location of a known active earthquake fault will be superseded by these criteria.

The criteria will also assist license applicants in complying with § 50.34(a)(1) of 10 CFR Part 50 which requires that the preliminary safety analysis report include a description and safety assessment of the site on which a production or utilization facility is to be located, with appropriate attention to features affecting facility design.

Pursuant to the Atomic Energy Act of 1954, as amended, and sections 552 and 553 of title 5 of the United States Code, the following amendments to Title 10, Chapter I, Code of Federal Regulations, Parts 50 and 100 are published as a document subject to codification.

§ 50.36 [Amended]

1. A footnote is added at the end of § 50.36(c)(2) to read as follows:

[3] See paragraph V(a)(2) of Appendix A of Part 100 of this chapter.

2. In § 100.10, paragraph (c)(1) is revised to read as follows:

§ 100.10 Factors to be considered when evaluating sites.

Factors considered in the evaluation of sites include those relating both to the proposed reactor design and the characteristics peculiar to the site. It is expected that reactors will reflect through their design, construction and operation an extremely low probability for accidents that could result in release of significant quantities of radioactive fission products. In addition, the site location and the engineered features included as safeguards against the hazardous consequences of an accident, should one occur, should insure a low risk of public exposure. In particular, the Commission will take the following factors into consideration in determining the acceptability of a site for a power or testing reactor:

* * * * *

(c) Physical characteristics of the site, including seismology, meteorology, geology, and hydrology.

(1) Appendix A, "Seismic and Geologic Siting Criteria for Nuclear Power Plants," describes the nature of investigations required to obtain the geologic and seismic data necessary to determine site suitability and to provide reasonable assurance that a nuclear power plant can be constructed and operated at a proposed site without undue risk to the health and safety of the public. It describes procedures for determining the quantitative vibratory ground motion design basis at a site due to earthquakes and describes information needed to determine whether and to what extent a nuclear power plant need be designed to withstand the effects of surface faulting.

* * * * *

3. A new Appendix A is added to 10 CFR Part 100 to read as follows:

APPENDIX A.—SEISMIC AND GEOLOGIC SITING CRITERIA FOR NUCLEAR POWER PLANTS

I. PURPOSE

General Design Criterion 2 of Appendix A to Part 50 of this chapter requires that nuclear power plant structures, systems, and components important to safety be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without loss of capability to perform their safety functions. It is the purpose of these criteria to set forth the principal seismic and geologic considerations which guide the Commission in its evaluation of the suitability of proposed sites for nuclear power plants and the suitability of the plant design bases established in consideration of the seismic and geologic characteristics of the proposed sites.

These criteria are based on the limited geophysical and geological information available to date concerning faults and earthquake occurrence and effect. They will be revised as necessary when more complete information becomes available.

II. SCOPE

These criteria, which apply to nuclear power plants, describe the nature of the investigations required to obtain the geologic and seismic data necessary to determine site suitability and provide reasonable assurance that a nuclear power plant can be constructed and operated at a proposed site without undue risk to the health and safety of the public. They describe procedures for determining the quantitative vibratory ground motion design basis at a site due to earthquakes and describe information needed to determine whether and to what extent a nuclear power plant need be designed to withstand the effects of surface faulting. Other geologic and seismic factors required to be taken into account in the siting and design of nuclear power plants are identified.

The investigations described in this appendix are within the scope of investigations permitted by § 50.10(c)(1) of this chapter.

Each applicant for a construction permit shall investigate all seismic and geologic factors that may affect the design and operation of the proposed nuclear power plant irrespective of whether such factors are explicitly included in these criteria. Additional investigations and/or more conservative determinations than those included in these criteria may be required for sites located in areas having complex geology or in areas of high seismicity. If an applicant believes that the particular seismology and geology of a site indicate that some of these criteria, or portions thereof, need not be satisfied, the specific sections of these criteria should be identified in the license application, and supporting data to justify clearly such departures should be presented.

These criteria do not address investigations of volcanic phenomena required for sites located in areas of volcanic activity. Investigations of the volcanic aspects of such sites will be determined on a case-by-case basis.

III. DEFINITIONS

As used in these criteria:

(a) The "magnitude" of an earthquake is a measure of the size of an earthquake and is related to the energy released in the form of seismic waves. "Magnitude" means the numerical value on a Richter scale.

(b) The "intensity" of an earthquake is a measure of its effects on man, on man-built structures, and on the earth's surface at a particular location. "Intensity" means the numerical value on the Modified Mercalli scale.

(c) The "Safe Shutdown Earthquake"[1] is that earthquake which is based upon an evaluation of the maximum earthquake potential considering the regional and local geology and seismology and specific characteristics of local subsurface material. It is that earthquake which produces the maximum vibratory ground motion for which certain structures, systems, and components are designed to remain functional. These structures, systems, and components are those necessary to assure:

(1) The integrity of the reactor coolant pressure boundary,

(2) The capability to shut down the reactor and maintain it in a safe shutdown condition, or

(3) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the guideline exposures of this part.

(d) The "Operating Basis Earthquake" is that earthquake which, considering the regional and local geology and seismology and specific characteristics of local subsurface material, could reasonably be expected to affect the plant site during the operating life of the plant; it is that earthquake which produces the vibratory growth motion for which those features of the nuclear power plant necessary for continued operation without undue risk to the health and safety of the public are designed to remain functional.

(e) A "fault" is a tectonic structure along which differential slippage of the adjacent earth materials has occurred parallel to the fracture plane. It is distinct from other types of ground disruptions such as landslides, fissures, and craters. A fault may have gouge or breccia between its two walls and includes any associated monoclinal flexure or other similar geologic structural feature.

(f) "Surface faulting" is differential ground displacement at or near the surface caused directly by fault movement and is distinct from nontectonic types of ground disruptions, such as landslides, fissures, and craters.

(g) A "capable fault" is a fault which has exhibited one or more of the following characteristics:

(1) Movement at or near the ground surface at least once within the past 35,000

[1] The "Safe Shutdown Earthquake" defines that earthquake which has commonly been referred to as the "Design Basis Earthquake."

years or movement of a recurring nature within the past 500,000 years.

(2) Macro-seismicity instrumentally determined with records of sufficient precision to demonstrate a direct relationship with the fault.

(3) A structural relationship to a capable fault according to characteristics (1) or (2) of this paragraph such that movement on one could be reasonably expected to be accompanied by movement on the other.

In some cases, the geologic evidence of past activity at or near the ground surface along a particular fault may be obscured at a particular site. This might occur, for example, at a site having a deep overburden. For these cases, evidence may exist elsewhere along the fault from which an evaluation of its characteristics in the vicinity of the site can be reasonably based. Such evidence shall be used in determining whether the fault is a capable fault within this definition.

Notwithstanding the foregoing paragraphs III(g)(1), (2) and (3), structural association of a fault with geologic structural features which are geologically old (at least pre-Quaternary) such as many of those found in the Eastern region of the United States shall, in the absence of conflicting evidence, demonstrate that the fault is not a capable fault within this definition.

(h) A "tectonic province" is a region of the North American continent characterized by a relative consistency of the geologic structural features contained therein.

(i) A "tectonic structure" is a large scale dislocation or distortion within the earth's crust. Its extent is measured in miles.

(j) A "zone requiring detailed faulting investigation" is a zone within which a nuclear power reactor may not be located unless a detailed investigation of the regional and local geologic and seismic characteristics of the site demonstrates that the need to design for surface faulting has been properly determined.

(k) The "control width" of a fault is the maximum width of the zone containing mapped fault traces, including all faults which can be reasonably inferred to have experienced differential movement during Quaternary times and which join or can reasonably be inferred to join the main fault trace, measured within 10 miles along the fault's trend in both directions from the point of nearest approach to the site. (See Figure 1 of this appendix.)

(l) A "response spectrum" is a plot of the maximum responses (acceleration, velocity or displacement) of a family of idealized single-degree-of-freedom damped oscillators against natural frequencies (or periods) of the oscillators to a specified vibratory motion input at their supports.

IV. Required Investigations

The geologic, seismic and engineering characteristics of a site and its environs shall be investigated in sufficient scope and detail to provide reasonable assurance that they are sufficiently well understood to permit an adequate evaluation of the proposed site, and to provide sufficient information to support the determinations required by these criteria and to permit adequate engineering solutions to actual or potential geologic and seismic effects at the proposed site. The size of the region to be investigated and the type of data pertinent to the investigations shall be determined by the nature of the region surrounding the proposed site. The investigations shall be carried out by a review of the pertinent literature and field investigations and shall include the steps outlined in paragraphs (a) through (c) of this section.

(a) *Required Investigation for Vibratory Ground Motion.* The purpose of the investigations required by this paragraph is to obtain information needed to describe the vibratory ground motion produced by the Safe Shutdown Earthquake. All of the steps in paragraphs (a)(5) through (a)(8) of this section need not be carried out if the Safe Shutdown Earthquake can be clearly established by investigations and determinations of a lesser scope. The investigations required by this paragraph provide an adequate basis for selection of an Operating Basis Earthquake. The investigations shall include the following:

(1) Determination of the lithologic, stratigraphic, hydrologic, and structural geologic conditions of the site and the region surrounding the site, including its geologic history;

(2) Identification and evaluation of tectonic structures underlying the site and the region surrounding the site, whether buried or expressed at the surface. The evaluation should consider the possible effects caused by man's activities such as withdrawal of fluid from or addition of fluid to the subsurface, extraction of minerals, or the loading effects of dams or reservoirs;

(3) Evaluation of physical evidence concerning the behavior during prior earthquakes of the surficial geologic materials and the substrata underlying the site from the lithologic, stratigraphic, and structural geologic studies;

(4) Determination of the static and dynamic engineering properties of the materials underlying the site. Included should be properties needed to determine the behavior of the underlying material during earthquakes and the characteristics of the underlying material in transmitting earthquake-induced motions to the foundations of the plant, such as seismic wave velocities, density, water content, porosity, and strength;

(5) Listing of all historically reported earthquakes which have affected or which could reasonably be expected to have affected the site, including the date of occurrence and the following measured or estimated data: magnitude or highest intensity, and a plot of the epicenter or location of highest intensity. Where historically reported earthquakes could have caused a maximum ground acceleration of at least one-tenth the acceleration of gravity (0.1g) at the foundations of the proposed nuclear power plant structures, the acceleration or intensity and duration of ground shaking at these foundations shall also be estimated. Since earthquakes have been reported in terms of various parameters such as magnitude, intensity at a given location, and effect on ground, structures, and people at a specific location, some of these data may have to be estimated by use of appropriate empirical relationships. The comparative characteristics of the material underlying the epicentral location or region of highest intensity and of the material underlying the site in transmitting earthquake vibratory motion shall be considered;

(6) Correlation of epicenters or locations of highest intensity of historically reported earthquakes, where possible, with tectonic structures any part of which is located within 200 miles of the site. Epicenters or locations of highest intensity which cannot be reasonably correlated with tectonic structures shall be identified with tectonic provinces any part of which is located within 200 miles of the site;

(7) For faults, any part of which is within 200 miles[2] of the site and which may be of significance in establishing the Safe Shutdown Earthquake, determination of whether these faults are to be considered as capable faults.[3,4] This determination is required in order to permit appropriate consideration of the geologic history of such faults in establishing the Safe Shutdown Earthquake. For guidance in determining which faults may be of significance in determining the Safe Shutdown Earthquake, Table 1 of this appendix presents the minimum length of fault to be considered versus distance from site. Capable faults of lesser length than those indicated in Table 1 and faults which are not capable faults need not be considered in determining the Safe Shutdown Earthquake, except where unusual circumstances indicate such consideration is appropriate;

TABLE 1

Distance from the site (miles):	*Minimum length*[1]
0 to 20	1
Greater than 20 to 50	5
Greater than 50 to 100	10
Greater than 100 to 150	20
Grater than 150 to 200	40

[1] Minimum length of fault (miles) which shall be considered in establishing Safe Shutdown Earthquake.

(8) For capable faults, any part of which is within 200 miles[2] of the site and which may be of significance in establishing the Safe Shutdown Earthquake, determination of:

(i) The length of the fault;

(ii) The relationship of the fault to regional tectonic structures; and

(iii) The nature, amount, and geologic history of displacements along the fault, including particularly the estimated amount of the maximum Quaternary displacement related to any one earthquake along the fault.

(b) *Required Investigation for Surface Faulting.* The purpose of the investigations required by this paragraph is to obtain information to determine whether and to what extent the nuclear power plant need be designed for surface faulting. If the design basis for surface faulting can be clearly established by investigations of a lesser scope, not all of the steps in paragraphs (b)(4) through (b)(7) of this section need be carried out. The investigations shall include the following:

(1) Determination of the lithologic, stratigraphic, hydrologic, and structural geologic conditions of the site and the area surrounding the site, including its geologic history;

(2) Evaluation of tectonic structures underlying the site, whether buried or expressed at the surface, with regard to their potential for causing surface displacement at or near the site. The evaluation shall consider the possible effects caused by man's activities such as withdrawal of fluid from or addition of fluid to the subsurface, extraction of minerals, or the loading effects of dams or reservoirs;

(3) Determination of geologic evidence of fault offset at or near the ground surface at or near the site;

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[2] If the Safe Shutdown Earthquake can be associated with a fault closer than 200 miles to the site, the procedures of paragraphs (a)(7) and (a)(8) of this section need not be carried out for successively more remote faults.

[3] In the absence of absolute dating, evidence of recency of movement may be obtained by applying relative dating technique to ruptured, offset, warped or otherwise structurally disturbed surface or near surface materials or geomorphic features.

[4] The applicant shall evaluate whether or not a fault is a capable fault with respect to the characteristics outlined in paragraphs III(g)(1), (2), and (3) by conducting a reasonable investigation using suitable geologic and geophysical techniques.

(4) For faults greater than 1000 feet long, any part of which is within 5 miles[3] of the site, determination of whether these faults are to be considered as capable faults; [6 7]

(5) Listing of all historically reported earthquakes which can reasonably be associated with capable faults greater than 1000 feet long, any part of which is within 5 miles[3] of the site, including the date of occurrence and the following measured or estimated data: magnitude or highest intensity, and a plot of the epicenter or region of highest intensity;

(6) Correlation of epicenters or locations of highest intensity of historically reported earthquakes with capable faults greater than 1000 feet long, any part of which is located within 5 miles[3] of the site;

(7) For capable faults greater than 1000 feet long, any part of which is within 5 miles[3] of the site, determination of:

(i) The length of the fault;

(ii) The relationship of the fault to regional tectonic structures;

(iii) The nature, amount, and geologic history of displacements along the fault, including particularly the estimated amount of the maximum Quaternary displacement related to any one earthquake along the fault; and

(iv) The outer limits of the fault established by mapping Quaternary fault traces for 10 miles along its trend in both directions from the point of its nearest approach to the site.

(c) *Required Investigation for Seismically Induced Floods and Water Waves.* (1) For coastal sites, the investigations shall include the determination of:

(i) Information regarding distantly and locally generated waves or tsunami which have affected or could have affected the site. Available evidence regarding the runup and drawdown associated with historic tsunami in the same coastal region as the site shall also be included;

(ii) Local features of coastal topography which might tend to modify tsunami runup or drawdown. Appropriate available evidence regarding historic local modifications in tsunami runup or drawdown at coastal locations having topography similar to that of the site shall also be obtained; and

(iii) Appropriate geologic and seismic evidence to provide information for establishing the design basis for seismically induced floods or water waves from a local offshore earthquake, from local offshore effects of an onshore earthquake, or from coastal subsidence. This evidence shall be determined, to the extent practical, by a procedure similar to that required in paragraphs (a) and (b) of this section. The probable slip characteristics of offshore faults shall also be considered as well as the potential for offshore slides in submarine material.

(2) For sites located near lakes and rivers, investigations similar to those required in paragraph (c)(1) of this section shall be carried out, as appropriate, to determine the potential for the nuclear power plant to be exposed to seismically induced floods and water waves as, for example, from the failure during an earthquake of an upstream dam or from slides of earth or debris into a nearby lake.

V. SEISMIC AND GEOLOGIC DESIGN BASES

(a) *Determination of Design Basis for Vibratory Ground Motion.* The design of each nuclear power plant shall take into account the potential effects of vibratory ground motion caused by earthquakes. The design basis for the maximum vibratory ground motion and the expected vibratory ground motion should be determined through evaluation of the seismology, geology, and the seismic and geologic history of the site and the surrounding region. The most severe earthquakes associated with tectonic structures or tectonic provinces in the region surrounding the site should be identified, considering those historically reported earthquakes that can be associated with these structures or provinces and other relevant factors. If faults in the region surrounding the site are capable faults, the most severe earthquakes associated with these faults should be determined by also considering their geologic history. The vibratory ground motion at the site should be then determined by assuming that the epicenters or locations of highest intensity of the earthquakes are situated at the point on the tectonic structures or tectonic provinces nearest to the site. The earthquake which could cause the maximum vibratory ground motion at the site should be designated the Safe Shutdown Earthquake. The specific procedures for determining the design basis for vibratory ground motion are given in the following paragraphs.

(1) *Determination of Safe Shutdown Earthquake.* The Safe Shutdown Earthquake shall be identified through evaluation of seismic and geologic information developed pursuant to the requirements of paragraph IV(a), as follows:

(i) The historic earthquakes of greatest magnitude or intensity which have been correlated with tectonic structures pursuant to the requirements of paragraph (a)(6) of Section IV shall be determined. In addition, for capable faults, the information required by paragraph (a)(8) of Section IV shall also be taken into account in determining the earthquakes of greatest magnitude related to the faults. The magnitude or intensity of earthquakes based on geologic evidence may be larger than that of the maximum earthquakes historically recorded. The accelerations at the site shall be determined assuming that the epicenters of the earthquakes of greatest magnitude or the locations of highest intensity related to the tectonic structures are situated at the point on the structures closest to the site;

(ii) Where epicenters or locations of highest intensity of historically reported earthquakes cannot be reasonably related to tectonic structures but are identified pursuant to the requirements of paragraph (a)(6) of Section IV with tectonic provinces in which the site is located, the accelerations at the site shall be determined assuming that these earthquakes occur at the site.

(iii) Where epicenters or locations of the highest intensity of historically reported earthquakes cannot be reasonably related to tectonic structures but are identified pursuant to the requirements of paragraph (a)(6) of Section IV with tectonic provinces in which the site is not located, the accelerations at the site shall be determined assuming that the epicenters or locations of highest intensity of these earthquakes are at the closest point to the site on the boundary of the tectonic province;

(iv) The earthquake producing the maximum vibratory acceleration at the site, as determined from paragraph (a)(1)(i) through (iii) of this section shall be designated the Safe Shutdown Earthquake for vibratory ground motion, except as noted in paragraph (a)(1)(v) of this section. The characteristics of the Safe Shutdown Earthquake shall be derived from more than one earthquake determined from paragraph (a)(1)(i) through (iii) of this section, where necessary to assure that the maximum vibratory acceleration at the site throughout the frequency range of interest is included. In the case where a causative fault is near the site, the effect of proximity of an earthquake on the spectral characteristics of the Safe Shutdown Earthquake shall be taken into account. In order to compensate for the limited data, the procedures in paragraphs (a)(1)(i) through (iii) of this section shall be applied in a conservative manner. The maximum vibratory accelerations of the Safe Shutdown Earthquake at each of the various foundation locations of the nuclear power plant structures at a given site shall be determined taking into account the characteristics of the underlying soil material in transmitting the earthquake-induced motions, obtained pursuant to paragraphs (a)(1), (3), and (4) of section IV. The Safe Shutdown Earthquake shall be defined by response spectra corresponding to the maximum vibratory accelerations as outlined in paragraph (a) of section VI; and

(v) Where the maximum vibratory accelerations of the Safe Shutdown Earthquake at the foundations of the nuclear power plant structures are determined to be less than one-tenth the acceleration of gravity (0.1 g) as a result of the steps required in paragraphs (a)(1)(i) through (iv) of this section, it shall be assumed that the maximum vibratory accelerations of the Safe Shutdown Earthquake at these foundations are at least 0.1 g.

(2) *Determination of Operating Basis Earthquake.* The Operating Basis Earthquake shall be specified by the applicant after considering the seismology and geology of the region surrounding the site. If vibratory ground motion exceeding that of the Operating Basis Earthquake occurs, shutdown of the nuclear power plant will be required. Prior to resuming operations, the licensee will be required to demonstrate to the Commission that no functional damage has occurred to those features necessary for continued operation without undue risk to the health and safety of the public. The maximum vibratory ground acceleration of the Operating Basis Earthquake shall be at least one-half the maximum vibratory ground acceleration of the Safe Shutdown Earthquake.

(b) *Determination of Need to Design for Surface Faulting.* In order to determine whether a nuclear power plant is required to be designed to withstand the effects of surface faulting, the location of the nuclear power plant with respect to capable faults shall be considered. The area over which each of these faults has caused surface faulting in the past is identified by mapping its fault traces in the vicinity of the site. The fault traces are mapped along the trend of the fault for 10 miles in both directions from the point of its nearest approach to the nuclear power plant because, for example, traces may be obscured along portions of the fault. The maximum width of the mapped fault traces, called the control width, is then determined from this map. Because surface faulting has sometimes occurred beyond the limit of mapped fault traces or where fault traces have not been previously recognized, the control width of the fault is increased by a factor which is dependent upon the largest potential earthquake related to the fault.

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[3] If the design basis for surface faulting can be determined from a fault closer than 5 miles to the site, the procedures of paragraphs (b)(4) through (b)(7) of this section need not be carried out for successively more remote faults.

[6] In the absence of absolute dating, evidence of recency of movement may be obtained by applying relative dating techniques to ruptured, offset, warped or otherwise structurally disturbed surface of near-surface materials or geomorphic features.

[7] The applicant shall evaluate whether or not a fault is a capable fault with respect to the characteristics outlined in paragraphs III(g)(1), (2), and (3) by conducting a reasonable investigation using suitable geologic and geophysical techniques.

This larger width delineates a zone, called the zone requiring detailed faulting investigation, in which the possibility of surface faulting is to be determined. The following paragraphs outline the specific procedures for determining the zone requiring detailed faulting investigation for a capable fault.

(1) *Determination of Zone Requiring Detailed Faulting Investigation.* The zone requiring detailed faulting investigation for a capable fault which was investigated pursuant to the requirement of paragraph (b)(7) of Section IV shall be determined through use of the following table:

TABLE 2

Determination of Zone Requiring Detailed Faulting Investigation

Magnitude of earthquake:	*Width of zone requiring detailed faulting investigation (See fig. 1)*
Less than 5.5	1 x control width
5.5–6.4	2 x control width
6.5–7.5	3 x control width
Greater than 7.5	4 x control width

The largest magnitude earthquake related to the fault shall be used in Table 2. This earthquake shall be determined from the information developed pursuant to the requirements of paragraph (b) of Section IV for the fault, taking into account the information required by paragraph (b)(7)(iv) of Section IV. The control width used in Table 2 is determined by mapping the outer limits of the fault traces from information developed pursuant to paragraph (b)(7)(iv) of section IV. The control width shall be used in Table 2 unless the characteristics of the fault are obscured for a significant portion of the 10 miles on either side of the point of nearest approach to the nuclear power plant. In this event, the use in Table 2 of the width of mapped fault traces more than 10 miles from the point of nearest approach to the nuclear power plant may be appropriate.

The zone requiring detailed faulting investigation, as determined from Table 2, shall be used for the fault except where:

(i) The zone requiring detailed faulting investigation from Table 2 is less than one-half mile in width. In this case the zone shall be at least one-half mile in width; or

(ii) Definitive evidence concerning the regional and local characteristics of the fault justifies use of a different value. For example, thrust or bedding-plane faults may require an increase in width of the zone to account for the projected dip of the fault plane; or

(iii) More detailed three-dimensional information, such as that obtained from precise investigative techniques, may justify the use of a narrower zone. Possible examples of such techniques are the use of accurate records from closely spaced drill holes or from closely spaced, high-resolution offshore geophysical surveys.

In delineating the zone requiring detailed faulting investigation for a fault, the center of the zone shall coincide with the center of the fault at the point of nearest approach of the fault to the nuclear power plant as illustrated in Figure 1.

(c) *Determination of Design Bases for Seismically Induced Floods and Water Waves.* The size of seismically induced floods and water waves which could affect a site from either locally or distantly generated seismic activity shall be determined, taking into consideration the results of the investigation required by paragraph (c) of section IV. Local topographic characteristics which might tend to modify the possible runup and drawdown at the site shall be considered. Adverse tide conditions shall also be taken into account in determining the effect of the floods and waves on the site. The characteristics of the earthquake to be used in evaluating the offshore effects of local earthquakes shall be determined by a procedure similar to that used to determine the characteristics of the Safe Shutdown Earthquake in paragraph V(a).

(d) *Determination of Other Design Conditions.*—(1) *Soil Stability.* Vibratory ground motion associated with the Safe Shutdown Earthquake can cause soil instability due to ground disruption such as fissuring, differential consolidation, liquefaction, and cratering which is not directly related to surface faulting. The following geologic features which could affect the foundations of the proposed nuclear power plant structures shall be evaluated, taking into account the information concerning the physical properties of materials underlying the site developed pursuant to paragraphs (a)(1), (3), and (4) of Section IV and the effects of the Safe Shutdown Earthquake:

(i) Areas of actual or potential surface or subsurface subsidence, uplift, or collapse resulting from:

(a) Natural features such as tectonic depressions and cavernous or karst terrains, particularly those underlain by calcareous or other soluble deposits;

(b) Man's activities such as withdrawal of fluid from or addition of fluid to the subsurface, extraction of minerals, or the loading effects of dams or reservoirs; and

(c) Regional deformation.

(ii) Deformational zones such as shears, joints, fractures, folds, or combinations of these features.

(iii) Zones of alteration or irregular weathering profiles and zones of structural weakness composed of crushed or disturbed materials.

(iv) Unrelieved residual stresses in bedrock.

(v) Rocks or soils that might be unstable because of their mineralogy, lack of consolidation, water content, or potentially undesirable response to seismic or other events. Seismic response characteristics to be considered shall include liquefaction, thixotropy, differential consolidation, cratering, and fissuring.

(2) *Slope stability.* Stability of all slopes, both natural and artificial, the failure of which could adversely affect the nuclear power plant, shall be considered. An assessment shall be made of the potential effects of erosion or deposition and of combinations of erosion or deposition with seismic activity, taking into account information concerning the physical property of the materials underlying the site developed pursuant to paragraph (a)(1), (3), and (4) of Section IV and the effects of the Safe Shutdown Earthquake.

(3) *Cooling Water Supply.* Assurance of adequate cooling water supply for emergency and long-term shutdown decay heat removal shall be considered in the design of the nuclear power plant, taking into account information concerning the physical properties of the materials underlying the site developed pursuant to paragraphs (a)(1), (3), and (4) of section IV and the effects of the Safe Shutdown Earthquake and the design basis for surface faulting. Consideration of river blockage or diversion or other failures which may block the flow of cooling water, coastal uplift or subsidence, or tsunami runup and drawdown, and failure of dams and intake structures shall be included in the evaluation, where appropriate.

(4) *Distant Structures.* Those structures which are not located in the immediate vicinity of the site but which are safety related shall be designed to withstand the effect of the Safe Shutdown Earthquake and the design basis for surface faulting determined on a comparable basis to that of the nuclear power plant, taking into account the material underlying the structures and the different location with respect to that of the site.

VI. APPLICATION TO ENGINEERING DESIGN

(a) *Vibratory Ground Motion.*—(1) *Safe Shutdown Earthquake.* The vibratory ground motion produced by the Safe Shutdown Earthquake shall be defined by response spectra corresponding to the maximum vibratory accelerations at the elevations of the foundations of the nuclear power plant structures determine pursuant to paragraph (a)(1) of Section V. The response spectra shall relate the response of the foundations of the nuclear power plant structures to the vibratory ground motion, considering such foundations to be single-degree-of-freedom damped oscillators and neglecting soil-structure interaction effects. In view of the limited data available on vibratory ground motions of strong earthquakes, it usually will be appropriate that the response spectra be smoothed design spectra developed from a series of response spectra related to the vibratory motions caused by more than one earthquake.

The nuclear power plant shall be designed so that, if the Safe Shutdown Earthquake occurs, certain structures, systems, and components will remain functional. These structures, systems, and components are those necessary to assure (i) the integrity of the reactor coolant pressure boundary, (ii) the capability to shut down the reactor and maintain it in a safe condition, or (iii) the capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the guideline exposures of this part. In addition to seismic loads, including aftershocks, applicable concurrent functional and accident-induced loads shall be taken into account in the design of these safety-related structures, systems, and components. The design of the nuclear power plant shall also take into account the possible effects of the Safe Shutdown Earthquake on the facility foundations by ground disruption, such as fissuring, differential consolidation, cratering, liquefaction, and landsliding, as required in paragraph (d) of section V.

The engineering method used to ensure that the required safety functions are maintained during and after the vibratory ground motion associated with the Safe Shutdown Earthquake shall involve the use of either a suitable dynamic analysis or a suitable qualification test to demonstrate that structures, systems and components can withstand the seismic and other concurrent loads, except where it can be demonstrated that the use of an equivalent static load method provides adequate conservatism.

The analysis or test shall take into account soil-structure interaction effects and the expected duration of vibratory motion. It is permissible to design for strain limits in excess of yield strain in some of these safety-related structures, systems, and components during the Safe Shutdown Earthquake and under the postulated concurrent conditions, provided that the necessary safety functions are maintained.

(2) *Operating Basis Earthquake.* The Operating Basis Earthquake shall be defined by response spectra. All structures, systems, and components of the nuclear power plant necessary for continued operation without undue risk to the health and safety of the public shall be designed to remain functional and within applicable stress and deformation limits when subjected to the effects of the vibratory motion of the Operating Basis Earthquake in combination with normal operating loads. The engineering method used

to ensure that these structures, systems, and components are capable of withstanding the effects of the Operating Basis Earthquake shall involve the use of either a suitable dynamic analysis or a suitable qualification test to demonstrate that the structures, systems and components can withstand the seismic and other concurrent loads, except where it can be demonstrated that the use of an equivalent static load method provides adequate conservatism. The analysis or test shall take into account soil-structure interaction effects and the expected duration of vibratory motion.

(3) *Required Seismic Instrumentation.* Suitable instrumentation shall be provided so that the seismic response of nuclear power plant features important to safety can be determined promptly to permit comparison of such response with that used as the design basis. Such a comparison is needed to decide whether the plant can continue to be operated safely and to permit such timely action as may be appropriate.

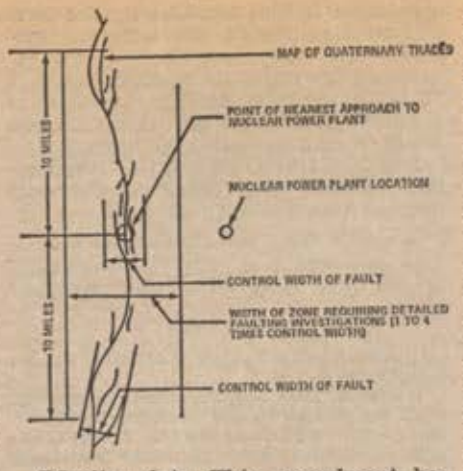
These criteria do not address the need for instrumentation that would automatically shut down a nuclear power plant when an earthquake occurs which exceeds a predetermined intensity. The need for such instrumentation is under consideration.

(b) *Surface Faulting.* (1) If the nuclear power plant is to be located within the zone requiring detailed faulting investigation, a detailed investigation of the regional and local geologic and seismic characteristics of the site shall be carried out to determine the need to take into account surface faulting in the design of the nuclear power plant. Where it is determined that surface faulting need not be taken into account, sufficient data to clearly justify the determination shall be presented in the license application.

(2) Where it is determined that surface faulting must be taken into account, the applicant shall, in establishing the design basis for surface faulting on a site take into account evidence concerning the regional and local geologic and seismic characteristics of the site and from any other relevant data.

(3) The design basis for surface faulting shall be taken into account in the design of the nuclear power plant by providing reasonable assurance that in the event of such displacement during faulting certain structures, systems, and components will remain functional. These structures, systems, and components are those necessary to assure (i) the integrity of the reactor coolant pressure boundary, (ii) the capability to shut down the reactor and maintain it in a safe shutdown condition, or (iii) the capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the guideline exposures of this part. In addition to seismic loads, including aftershocks, applicable concurrent functional and accident-induced loads shall be taken into account in the design of such safety features. The design provisions shall be based on an assumption that the design basis for surface faulting can occur in any direction and azimuth and under any part of the nuclear power plant, unless evidence indicates this assumption is not appropriate, and shall take into account the estimated rate at which the surface faulting may occur.

(c) *Seismically Induced Floods and Water Waves and Other Design Conditions.* The design basis for seismically induced floods and water waves from either locally or distantly generated seismic activity and other design conditions determined pursuant to paragraphs (c) and (d) of Section V, shall be taken into account in the design of the nuclear power plant so as to prevent undue risk to the health and safety of the public.



Effective date. This amendment becomes effective on December 13, 1973.

(Sec. 161, Pub. Law 83-703, 68 Stat. 948 (42 U.S.C. 2201)).

Dated at Germantown, Md. this 5th day of November 1973.

For the Atomic Energy Commission.

PAUL C. BENDER,
Secretary of the Commission.

[FR Doc.73-23876 Filed 11-8-73;8:45 am]

Title 12—Banks and Banking

CHAPTER V—FEDERAL HOME LOAN BANK BOARD

SUBCHAPTER C—FEDERAL SAVINGS AND LOAN SYSTEM

[No. 73-1609]

PART 545—OPERATIONS

Private Mortgage Insurance for 90–95 Percent Loans

OCTOBER 29, 1973.

The Federal Home Loan Bank Board, by Resolution No. 73-955, dated July 11, 1973, proposed to amend Part 545 of the Rules and Regulations for the Federal Savings and Loan System (12 CFR Part 545) in order to require that a loan in excess of 90 percent of value secured by a single family dwelling must be insured by a private mortgage insurer qualified by the Federal Home Loan Mortgage Corporation on the unpaid balance of the loan which exceeds 80 percent of value, and that such coverage must remain in effect until the loan is reduced to 90 percent of value. Notice of such proposed rulemaking was duly published in the FEDERAL REGISTER on July 20, 1973 (38 FR 19416), and allowed until August 20, 1973, for interested persons to submit written comments. On the basis of its consideration of all relevant material presented by interested persons and otherwise available, the Board considers it advisable to amend said Part 545 as set forth in said proposal.

Revised § 545.6-1(a)(5)(iv)(*a*) raises the amount of qualified private mortgage insurance which is required to be carried on single family loans exceeding 90 percent of value to that portion of the unpaid balance of the loan which exceeds 80 percent of value. The previous requirement called for such insurance to be placed on that portion of the loan which exceeded 90 percent of value. The requirement that the insurance be maintained so long as the unpaid balance of the loan exceeds 90 percent of value remains unchanged. The Board considers the increase in the amount of mortgage insurance to be desirable in order to more accurately reflect prudent investment procedures and to bring the regulatory requirement into conformity with practices among qualified mortgage insurers.

Revised § 545.6-1(a)(5)(iv)(*a*) also changes the previously-used phrase "value of the real estate" to read "value or purchase price of the real estate security, whichever is less, determined at the time the loan was made". This addition conforms to the corresponding phrase in § 545.6-1(a)(5)(iv)(*b*) relating to the "specific reserve" which Federal associations may elect to establish in lieu of private mortgage insurance, and it serves to clarify which dollar figure may be used and when it must be established.

Accordingly, the Board hereby amends Part 545 of the Rules and Regulations for the Federal Savings and Loan System by revising § 545.6-1(a)(5)(iv)(*a*) to read as set forth below, effective December 13, 1973.

§ 545.6-1 Lending powers under sections 13 and 14 of Charter K.

Any Federal association which has Charter K may, under sections 13 and 14 thereof, make the following types of loans on the security of first liens on improved real estate and the use by such an association of loan plans, practices, and procedures which comply with the applicable provisions of §§ 545.6 to 545.6-13, are hereby approved by the Board:

(a) *Homes or combination of homes and business property*—(1) *Monthly installment loans.* Subject to the limitations of § 545.6-7, installment loans may be made on homes or combination of homes and business property for an amount not in excess of 75 percent of the value thereof, repayable monthly within 30 years or, if an insured or guaranteed loan, within the period acceptable to the insuring or guaranteeing agency: *Provided,* That, when the members of such an association have authorized loans to be made for an amount exceeding 75 percent of the value, such loans may be made up to the percentage of value authorized by the members but not in excess of:

(i) 80 percent of the value, if the loan is not an insured or guaranteed loan;

(ii) The maximum percentage of the value acceptable to the insuring agency, if an insured loan;

(iii) 80 percent of the value, plus the amount guaranteed if a guaranteed loan.

* * * * *

(5) *Loans in excess of 90 percent of value.* The limitation of 80 percent set forth in subdivision (i) of subparagraph (1) of this paragraph shall be 95

percent in the case of any loan with respect to which the requirements set forth in paragraph (a)(5) (i), (iii), (iv), (v), (vi), and (viii) of this section are met with respect to which the following additional requirements are met:

* * * * *

(iv) Either—

(*a*) That as long as the unpaid balance of such a loan is in excess of an amount equal to 90 percent of the value or purchase price of the real estate security, whichever is less, determined at the time the loan was made, that portion of the unpaid balance of such loan which is in excess of an amount equal to 80 percent of such value or purchase price of the real estate security is guaranteed or insured by a mortgage insurance company which has been determined to be a "qualified private insurer" by the Federal Home Loan Mortgage Corporation; or

(*b*) The association establishes and maintains a specific reserve with respect to such loan equal to one percent of the unpaid principal balance thereof until the unpaid principal balance has been reduced to an amount not in excess of 90 percent of the value or purchase price of the real estate security, whichever is less, determined at the time the loan was made.

* * * * *

(Sec. 5, 48 Stat. 132, as amended; 12 U.S.C. 1464. Reorg. Plan No. 3 of 1947, 12 F.R. 4981, 3 CFR, 1943–48 Comp., p. 1071.)

By the Federal Home Loan Bank Board.

[SEAL] EUGENE M. HERRIN,
Assistant Secretary.

[FR Doc.73-24119 Filed 11-12-73;8:45 am]

Title 14—Aeronautics and Space

CHAPTER I—FEDERAL AVIATION ADMINISTRATION, DEPARTMENT OF TRANSPORTATION

[Airspace Docket No. 73-WA-3]

PART 71—DESIGNATION OF FEDERAL AIRWAYS, AREA LOW ROUTES, CONTROLLED AIRSPACE, AND REPORTING POINTS

Designation of Terminal Control Area at Houston, Texas

On July 12, 1973, a notice of proposed rulemaking (NPRM) was published in the FEDERAL REGISTER (38 FR 18563), stating that the Federal Aviation Administration (FAA) was considering an amendment to Part 71 of the Federal Aviation Regulations that would designate a Group II Terminal Control Area (TCA) for Houston, Tex.

Interested persons were afforded an opportunity to participate in the proposed rulemaking through the submission of comments. Two comments were received in response to this proposal, one endorsing the proposal and the other having no specific objection.

An assessment of the potential environmental impacts caused by establishing the TCA has been made. The conclusion is that establishing the TCA will not significantly affect the environment.

In consideration of the foregoing, Part 71 of the Federal Aviation Regulations is amended, effective 0901 G.m.t., March 28, 1974, as hereinafter set forth.

In § 71.401(b) (38 FR 622), the following Houston, Tex., Group II Terminal Control Area is added:

HOUSTON, TEX., TERMINAL CONTROL AREA

Primary Airport. Houston Intercontinental Airport. (Lat. 29°59'08" N., Long. 95°20'46" W.)

BOUNDARIES

Humble VORTAC (IAH) (Lat. 29°57'24" N., Long. 95°20'44" W.).

1. Area A. That airspace extending upward from the surface to and including 7,000 feet MSL, within 8 miles of the IAH VORTAC excluding that airspace within and underlying Area D, hereinafter described.

2. Area B. That airspace extending upward from 1,800 feet MSL to and including 7,000 feet MSL, within a 15-mile radius of the IAH VORTAC, excluding Area A, previously described, that airspace within and underlying Areas C and D described hereinafter and that airspace south of an east-west line extending from the IAH VORTAC 125° radial 20-mile DME point to the IAH VORTAC 233° radial 20-mile DME point.

3. Area C. That airspace northwest of IAH extending from 3,000 feet MSL to and including 7,000 feet MSL, bounded on the northeast by the IAH VORTAC 313° radial, on the east by the 8-mile DME arc of the IAH VORTAC, on the south by a line 2 miles north of and parallel to the IAH Runway 8L centerline extended, and on the west by the 15-mile DME arc of the IAH VORTAC.

4. Area D. That airspace extending upward from 4,000 feet MSL to and including 7,000 feet MSL between the 15- and 20-mile radii of the IAH VORTAC and that airspace southwest of the IAH VORTAC bounded on the east by the 7-mile DME arc of the IAH VORTAC, on the southeast by the 215° radial of the IAH VORTAC, on the west by the 15-mile DME arc of the IAH VORTAC, and on the north by the 258° radial of the IAH VORTAC. Excluding that airspace within a 2-mile radius of Lakeside Airport (Lat. 29°49'02" N., Long. 95°40'29" W.) and that air space south of an east-west line extending from the IAH VORTAC 125° radial 20-mile DME point to the IAH VORTAC 233° radial 20-mile DME point.

(Sec. 307(a) of the Federal Aviation Act of 1958 (49 U.S.C. 1348(a)) and Sec. 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).)

Issued in Washington, D.C., on November 6, 1973.

CHARLES H. NEWPOL,
Acting Chief, Airspace and Air Traffic Rules Division.

[FR Doc.73-24074 Filed 11-12-73;8:45 am]

[Airspace Docket No. 73-WA-8]

PART 71—DESIGNATION OF FEDERAL AIRWAYS, AREA LOW ROUTES, CONTROLLED AIRSPACE, AND REPORTING POINTS

Designation of Terminal Control Area at St. Louis, Missouri

On June 21, 1973, a notice of proposed rulemaking (NPRM) was published in the FEDERAL REGISTER (38 FR 16239), stating that the Federal Aviation Administration (FAA) was considering an amendment to Part 71 of the Federal Aviation Regulations that would designate a Group II Terminal Control Area (TCA) for St. Louis, Mo.

Interested persons were afforded an opportunity to participate in the proposed rulemaking through the submission of comments. Eleven comments were received in response to the NPRM, and due consideration was given to all relevant matter presented.

Some of the objections received opposed the establishment of a Group II TCA at St. Louis as not being justified. The issue concerning the establishment of a Group II TCA at St. Louis was contained in Notice 69-41, published in the Federal Register on September 30, 1969 (34 FR 15252), and Notice 69-41B, published in the FEDERAL REGISTER on March 13, 1970 (35 F.R. 4519), which delineated the locations of the 22 hub areas where Group I and Group II TCAs were proposed. The FAA has maintained a monitor of the activities at the proposed TCA areas and has determined that St. Louis still warrants the establishment of a Group II TCA. It may be noted, as an example, that as a result of monitoring the activity at the 22 hub locations, Cincinnati has been deleted as a proposed Group II TCA location.

Concern was expressed that general aviation was being forced out of the St. Louis area because of transponder requirements and the possible future use of 25 kHz radio channel spacing. The transponder requirements were recently studied in a separate rulemaking procedure. The safety and air traffic control efficiency benefits gained by the required transponder equipment far outweigh the costs on the affected users. The cost of compliance should decrease as manufacturers respond to the need for the new equipment. As for the 25 kHz radio channel spacing, while the FAA has long-range plans to someday require this equipment in order to provide additional communication channels, there are no current plans or need to install these frequencies in the St. Louis Terminal Area.

Comments about the TCA configuration included statements that the TCA should make more allowances for aircraft using other than the primary airport; the TCA will cause a restriction to private aircraft, concentrating their activity to the outskirts of the TCA and rural fringes of the metropolitan area; there is too much airspace being designated with too little consideration of what is actually needed, and that more consideration should be given to all users in the area; a ceiling of 8,000 feet is an unnecessary restriction to non-IFR traffic; suggestions for higher floor altitudes over the airports located beneath Area B, over Weiss Airport, and to provide additional airspace for glider and acrobatic flights from the St. Charles Airport.

Any airspace program designed to bring more control to the random flying VFR environment will result in some im-

pact, not only on the airspace users, but on the air traffic control system. Every effort has been made to minimize this impact and to provide for as equitable use of the airspace as possible. Ingress/egress airspace has been provided to all airports underlying the TCA. The floor altitudes and lateral limits have been tailored specifically to fit the actual arrival/departure airspace needed at St. Louis International Airport, and to allow the maximum freedom of operations for satellite airports. TCA ceilings are normally designated at or near 7,000 feet above the primary airport elevation. This altitude was selected as a result of the FAA's 1968 Near Mid-Air Collision Study which found that most of the terminal area incidents occurred within this altitude range.

Due to the proximity of the Creve Coeur and Arrowhead Airports, the Creve Coeur Airport traffic patterns have been established requiring patterns east of the airport for runways 16/34, and north of the airport for runways 7/25. Users of the Creve Coeur Airport believe the 1.5-mile radius cutout of Area A, as proposed in the Notice, does not provide sufficient airspace to operate safely and have requested additional airspace be provided. The request has merit, and after careful review of the airspace requirements and ATC procedures used for aircraft landing runway 6 and departing runway 24 at St. Louis International Airport, the exclusion to Area A is revised to a 2-mile radius of the Creve Coeur Airport.

An alternate airspace configuration was submitted which provided TCA airspace only for runways 12/30 operations, and provision was not allowed for the procedures necessary for runways 6/24 operations. It is the FAA policy in designing TCA's to designate sufficient airspace to contain all existing terminal IFR procedures. Another commenter submitted a four-spoke-corridor plan aligned to each runway. Although a narrow corridor configuration has previously been shown to provide the desired degree of safety, the TCA configuration is necessary to provide, in addition to the desired safety, efficient use of the airspace and air traffic control flexibility, and also have the least impact on all the airspace users. Therefore, these suggestions could not be incorporated.

Several statements were made that a TCA would not improve safety. Contrary to this opinion, where TCA's have previously been established, the dramatic reduction of near midair collisions is clear evidence of the increase in safety. It will also provide a more effective method by which the mix of VFR and IFR flights can be handled with a greater degree of safety.

Comments were made suggesting St. Louis and Maryland Heights VORTAC's be relocated, outside the TCA boundary, to accommodate VFR navigation around the TCA; and that the TCA ignores the fact the Mississippi and Missouri River valleys are major flyways. To relocate these VORTAC's solely for the purpose of VFR navigation is not considered practical. These VORTAC's are a part of the terminal IFR system providing approach guidance and cross radial information on IFR approaches to several area airports. For local area and en route flights, adequate visual and NAVAID capability exists to avoid the TCA, if so desired. Also, as long as equipment and operating rules for flight within the TCA are met, and when traffic conditions permit, pilots should be able to expect any necessary approval to transit the TCA.

A suggestion was made to have the TCA effective only between 7 and 9 a.m., Monday through Saturday, and 4 and 7 p.m., Sunday through Friday. The activity within the terminal area is continuous with variable high and low periods. The benefits derived from such a designation, weighed against the complexity of the procedures involved, does not make a part-time designation practicable.

In consideration of the foregoing, Part 71 of the Federal Aviation Regulations is amended, effective 0901 g.m.t., January 1, 1974, as hereinafter set forth.

In § 71.401 (38 FR 622), the St. Louis, Mo., Terminal Control Area is added:

(b) Group II Terminal Control Areas.

ST. LOUIS, MO., TERMINAL CONTROL AREA

PRIMARY AIRPORT

St. Louis International Airport (Lat. 38°44'54" N., Long. 90°21'47" W.).

BOUNDARIES

1. Area A. That airspace extending upward from the surface to and including 8,000 feet MSL within a 6-mile radius of the St. Louis International Airport ASR Antenna (Lat. 38°44'25" N., Long. 90°22'14" W.), excluding that airspace within a 2-mile radius of the Creve Coeur Airport (Lat. 38°43'35" N., Long. 90°30'35" W.).

2. Area B. That airspace extending upward from 2,000 feet MSL to and including 8,000 feet MSL within a 10-mile radius of the St. Louis International Airport ASR Antenna excluding Area A previously described.

3. Area C. That airspace extending upward from 3,000 feet MSL to and including 8,000 feet MSL within a 15-mile radius of the St. Louis International Airport ASR Antenna excluding Areas A and B previously described and the area within and underlying Area E hereinafter described.

4. Area D. That airspace extending upward from 4,500 feet MSL to and including 8,000 feet MSL within a 20-mile radius of the St. Louis International Airport ASR Antenna excluding Areas A, B, and C previously described and Area E described hereinafter.

5. Area E. That airspace extending upward from 3,600 feet MSL to and including 8,000 feet MSL within a 15-mile radius of the St. Louis International Airport ASR antenna, bounded on the northwest by the Troy VORTAC 233° radial, and on the west by a line extending from Lat. 38°35'00" N., Long. 90°12'00" W. to Lat. 38°10'00" N., Long. 90°07'00" W.

(Sec. 307(a) of the Federal Aviation Act of 1958 (49 U.S.C. 1348(a)) and Sec. 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).)

Issued in Washington, D.C., on October 18, 1973.

CHARLES H. NEWPOL,
Acting Chief, Airspace and Air Traffic Rules Division.

[FR Doc.73-24075 Filed 11-12-73;8:45 am]

[Airspace Docket No. 73-EA-97]

PART 71—DESIGNATION OF FEDERAL AIRWAYS, AREA LOW ROUTES, CONTROLLED AIRSPACE, AND REPORTING POINTS

Designation of Reporting Points

The purpose of this amendment to Part 71 of the Federal Aviation Regulations is to designate the Cod DME Reporting Point and the Haddock DME Reporting Point.

The Cod LF Reporting Point is designated at the INT of the Nantucket, Mass., RBN 089° bearing and W boundary of the New York Oceanic Control Area. The Cod VHF Reporting Point is designated at the INT of the Nantucket, Mass., 089° radial and W boundary of New York Oceanic Control Area. The Haddock LF Reporting Point is designated at the INT of a rhumb line from Nantucket, Mass., RBN to Kindley AFB, Bermuda RBN, and the W boundary of New York Oceanic Control Area. The Haddock VHF Reporting Point is designated at the INT of Nantucket, Mass., 157° radial and the W boundary of New York Oceanic Control Area. Designation of DME reporting points at these same locations is required to ensure that DME equipped aircraft report when passing over Cod and Haddock. Such action is taken herein.

Since designation of reporting points is a minor matter upon which the public would not have particular reason to comment, notice and public procedure thereon are unnecessary.

In consideration of the foregoing, Part 71 of the Federal Aviation Regulations is amended effective 0901 G.m.t., January 3, 1974, as hereinafter set forth.

Section 71.209 (38 FR 616, 23514), is amended by adding the following:

1. Cod DME INT: INT Nantucket, Mass., VORTAC 089° radial, 92 NM from Nantucket VORTAC.

2. Haddock DME INT: INT Nantucket, Mass., VORTAC 157° radial, 94 NM from Nantucket VORTAC.

(Sec. 307(a) of the Federal Aviation Act of 1958 (49 U.S.C. 1348(a)) and Sec. 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).)

Issued in Washington, D.C., on November 5, 1973.

CHARLES H. NEWPOL,
Acting Chief, Airspace and Air Traffic Rules Division.

[FR Doc.73-24079 Filed 11-12-73;8:45 am]

[Airspace Docket No. 73-SW-33]

PART 71—DESIGNATION OF FEDERAL AIRWAYS, AREA LOW ROUTES, CONTROLLED AIRSPACE, AND REPORTING POINTS

PART 73—SPECIAL USE AIRSPACE

Alteration of Restricted Areas and Controlled Airspace

On July 31, 1973, a notice of proposed rulemaking (NPRM) was published in the FEDERAL REGISTER (38 FR 20348), stating that the Federal Aviation Administration (FAA) was considering amendments to Parts 71 and 73 of the Federal aviation regulations that would