

SEP 22 1978

MEMORANDUM FOR: Chase R. Stephens
Docketing and Service Branch
Office of the Secretary

FROM: Robert B. Minogue, Director
Office of Standards Development

SUBJECT: REGULATORY GUIDE

Enclosed is a notice of issuance of Regulatory Guide 1.29,
Revision 3, which should be published in the notice section of the
Federal Register.

Original signed by:
ROBERT B. MINOGUE

Robert B. Minogue, Director
Office of Standards Development

Enclosures:

1. Federal Register Notice
2. Summary Statement
3. Regulatory Guide 1.29,
Revision 3
4. Value Impact Statement for
Regulatory Guide 1.29,
Revision 3

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SD Task No. EM 709-4

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NUCLEAR REGULATORY COMMISSION

REGULATORY GUIDE

Notice of Issuance and Availability

The Nuclear Regulatory Commission has issued a guide in its Regulatory Guide Series. This series has been developed to describe and make available to the public methods acceptable to the NRC staff of implementing specific parts of the Commission's regulations and, in some cases, to delineate techniques used by the staff in evaluating specific problems or postulated accidents and to provide guidance to applicants concerning certain of the information needed by the staff in its review of applications for permits and licenses.

Regulatory Guide 1.29, Revision 3, "Seismic Design Classification," describes a method acceptable to the NRC staff for identifying and classifying those features of light-water-cooled nuclear power plants that should be designed to withstand the effects of the Safe Shutdown Earthquake and remain functional. This guide was revised as the result of public comments and additional staff review.

Comments and suggestions in connection with (1) items for inclusion in guides currently being developed or (2) improvements in all published

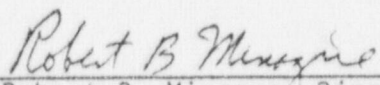
guides are encouraged at any time. Comments should be sent to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Docketing and Service Branch.

Regulatory guides are available for inspection at the Commission's Public Document Room, 1717 H Street NW., Washington, D.C. Requests for single copies of issued guides (which may be reproduced) or for placement on an automatic distribution list for single copies of future guides in specific divisions should be made in writing to the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director, Division of Technical Information and Document Control. Telephone requests cannot be accommodated. Regulatory guides are not copyrighted, and Commission approval is not required to reproduce them.

(5 U.S.C. 552(a))

Dated at Rockville, Maryland this 20th day of September 1970.

FOR THE NUCLEAR REGULATORY COMMISSION.



Robert B. Minogue, Director
Office of Standards Development

SUMMARY STATEMENT

Notice

Regulatory Guides - The Nuclear Regulatory Commission has issued a guide in Division 1, "Power Reactors," of the Regulatory Guide Series. The guide is:

Regulatory Guide 1.29, Revision 3 - Seismic Design Classification

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REGULATORY GUIDE

OFFICE OF STANDARDS DEVELOPMENT

REGULATORY GUIDE 1.29

SEISMIC DESIGN CLASSIFICATION

A. INTRODUCTION

General Design Criterion 2, "Design Bases for Protection Against Natural Phenomena," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," requires that nuclear power plant structures, systems, and components important to safety be designed to withstand the effects of earthquakes without loss of capability to perform their safety functions.

Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50 establishes quality assurance requirements for the design, construction, and operation of nuclear power plant structures, systems, and components that prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public. The pertinent requirements of Appendix B apply to all activities affecting the safety-related functions of those structures, systems, and components.

Appendix A, "Seismic and Geologic Siting Criteria for Nuclear Power Plants," to 10 CFR Part 100, "Reactor Site Criteria," requires that all nuclear power plants be designed so that, if the Safe Shutdown Earthquake (SSE) occurs, certain structures, systems, and components remain functional. These plant features are those necessary to ensure (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 that could result in potential offsite exposures comparable to the guideline exposures of 10 CFR Part 100.

This guide describes a method acceptable to the NRC staff for identifying and classifying those fea-

tures of light-water-cooled nuclear power plants that should be designed to withstand the effects of the SSE. The Advisory Committee on Reactor Safeguards has been consulted regarding this guide and has concurred in the regulatory position.

B. DISCUSSION

After reviewing a number of applications for construction permits and operating licenses for boiling and pressurized water nuclear power plants, the NRC staff has developed a seismic design classification system for identifying those plant features that should be designed to withstand the effects of the SSE. Those structures, systems, and components that should be designed to remain functional if the SSE occurs have been designated as Seismic Category I.

C. REGULATORY POSITION

1. The following structures, systems, and components of a nuclear power plant, including their foundations and supports, are designated as Seismic Category I and should be designed to withstand the effects of the SSE and remain functional. The pertinent quality assurance requirements of Appendix B to 10 CFR Part 50 should be applied to all activities affecting the safety-related functions of these structures, systems, and components.

- a. The reactor coolant pressure boundary.
- b. The reactor core and reactor vessel internals.
- c. Systems¹ or portions of systems that are required for (1) emergency core cooling, (2) postacc-

* Lines indicate substantive changes from previous issue.

¹ The system boundary includes those portions of the system required to accomplish the specified safety function and connected piping up to and including the first valve (including a safety or relief valve) that is either normally closed or capable of automatic closure when the safety function is required.

USNRC REGULATORY GUIDES

Regulatory Guides are issued to describe and make available to the public methods acceptable to the NRC staff of implementing specific parts of the Commission's regulations, to delineate techniques used by the staff in evaluating specific problems or postulated accidents, or to provide guidance to applicants. Regulatory Guides are not substitutes for regulations, and compliance with them is not required. Methods and solutions different from those set out in the guides will be acceptable if they provide a basis for the findings requisite to the issuance or continuance of a permit or license by the Commission.

Comments and suggestions for improvements in these guides are encouraged at all times, and guides will be revised, as appropriate, to accommodate comments and to reflect new information or experience. This guide was revised as a result of substantive comments received from the public and additional staff review.

Comments should be sent to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Docketing and Service Branch.

The guides are issued in the following ten broad divisions:

- | | |
|-----------------------------------|-----------------------------------|
| 1. Power Reactors | 5. Products |
| 2. Research and Test Reactors | 7. Transportation |
| 3. Fuels and Materials Facilities | 8. Occupational Health |
| 4. Environmental and Siting | 9. Antitrust and Financial Review |
| 5. Materials and Plant Protection | 10. General |

Requests for single copies of issued guides (which may be reproduced) or for placement on an automatic distribution list for single copies of future guides in specific divisions should be made in writing to the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director, Division of Technical Information and Document Control.

dent containment heat removal, or (3) postaccident containment atmosphere cleanup (e.g., hydrogen removal system).

d. Systems¹ or portions of systems that are required for (1) reactor shutdown, (2) residual heat removal, or (3) cooling the spent fuel storage pool.

e. Those portions of the steam systems of boiling water reactors extending from the outermost containment isolation valve up to but not including the turbine stop valve, and connected piping of 2½ inches or larger nominal pipe size up to and including the first valve that is either normally closed or capable of automatic closure during all modes of normal reactor operation. The turbine stop valve should be designed to withstand the SSE and maintain its integrity.

f. Those portions of the steam and feedwater systems of pressurized water reactors extending from and including the secondary side of steam generators up to and including the outermost containment isolation valves, and connected piping of 2½ inches or larger nominal pipe size up to and including the first valve (including a safety or relief valve) that is either normally closed or capable of automatic closure during all modes of normal reactor operation.

g. Cooling water, component cooling, and auxiliary feedwater systems¹ or portions of these systems, including the intake structures, that are required for (1) emergency core cooling, (2) postaccident containment heat removal, (3) postaccident containment atmosphere cleanup, (4) residual heat removal from the reactor, or (5) cooling the spent fuel storage pool.

h. Cooling water and seal water systems¹ or portions of these systems that are required for functioning of reactor coolant system components important to safety, such as reactor coolant pumps.

i. Systems¹ or portions of systems that are required to supply fuel for emergency equipment.

j. All electric and mechanical devices and circuitry between the process and the input terminals of the actuator systems involved in generating signals that initiate protective action.

k. Systems¹ or portions of systems that are required for (1) monitoring of systems important to safety and (2) actuation of systems important to safety.

l. The spent fuel storage pool structure, including the fuel racks.

m. The reactivity control systems, e.g., control rods, control rod drives and boron injection system.

n. The control room, including its associated equipment and all equipment needed to maintain the control room within safe habitability limits for personnel and safe environmental limits for vital equipment.

o. Primary and secondary reactor containment.

p. Systems,¹ other than radioactive waste management systems,² not covered by items 1.a through 1.o above that contain or may contain radioactive material and whose postulated failure would result in conservatively calculated potential offsite doses (using meteorology as recommended in Regulatory Guide 1.3, "Assumptions Used for Evaluating the Potential Radiological Consequences of a Loss of Coolant Accident for Boiling Water Reactors," and Regulatory Guide 1.4, "Assumptions Used for Evaluating the Potential Radiological Consequences of a Loss of Coolant Accident for Pressurized Water Reactors") that are more than 0.5 rem to the whole body or its equivalent to any part of the body.

q. The Class 1E electric systems, including the auxiliary systems for the onsite electric power supplies, that provide the emergency electric power needed for functioning of plant features included in items 1.a through 1.p above.

2. Those portions of structures, systems, or components whose continued function is not required but whose failure could reduce the functioning of any plant feature included in items 1.a through 1.q above to an unacceptable safety level or could result in incapacitating injury to occupants of the control room should be designed and constructed so that the SSE would not cause such failure.³

3. Seismic Category I design requirements should extend to the first seismic restraint beyond the defined boundaries. Those portions of structures, systems, or components that form interfaces between Seismic Category I and non-Seismic Category I features should be designed to Seismic Category I requirements.

4. The pertinent quality assurance requirements of Appendix B to 10 CFR Part 50 should be applied to all activities affecting the safety-related functions of those portions of structures, systems, and components covered under Regulatory Positions 2 and 3 above.

² Specific guidance on seismic requirements for radioactive waste management systems is under development.

³ Wherever practical, structures and equipment whose failure could possibly cause such injuries should be relocated or separated to the extent required to eliminate this possibility.

D. IMPLEMENTATION

The purpose of this section is to provide information to applicants regarding the NRC staff's plans for using this regulatory guide.

This guide reflects current NRC staff practice. Therefore, except in those cases in which the appli-

cant proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, the method described herein is being and will continue to be used in the evaluation of submittals for operating license or construction permit applications until this guide is revised as a result of suggestions from the public or additional staff review.

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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Value/Impact Statement on Seismic
Design Classification for Nuclear Power Plants
RG 1.29 (Rev.3)

I. The Proposed Action

A. Description

Guidance has been developed which describes an acceptable method for identifying and classifying those features of LWRs that should be designed to withstand the effects of the Safe Shutdown Earthquake (SSE). This guidance is provided in Regulatory Guide 1.29, "Seismic Design Classification." Revision 2 of the guide was issued for public comment February, 1976. The proposed action is to revise and update this guidance in response to public comment.

B. Need for the Proposed Action

Comments from four organizations were received during the public comment period following issuance of Revision 2 of Regulatory Guide 1.29. These comments indicate the need for several minor changes in the guidance provided.

C. Value/Impact of the Proposed Action

1. NRC

The proposed revisions in general will not constitute a major change in staff position in the area of seismic design classification and no increase in staff effort in reviewing license applications is anticipated. One comment deals with the requirement that all features whose failure could result in incapacitating injury to the occupants of the control room be designed to withstand the effects of the SSE and remain functional. The proposed revision would replace this requirement with the requirement that any feature whose functioning is not required to maintain an adequate level of safety need not remain functional following the SSE, but should be designed to assure failure of these plant features cannot result in injury to control room occupants. We believe this revision does not constitute a change in staff practice and follows the intent of the original guide and of General Design Criteria 2 of Appendix A to 10 CFR Part 50 and Appendix A to 10 CFR Part 100.

2. Other Government Agencies

Not applicable.

3. Industry

Applicants may accrue some savings in design and construction costs stemming from the change described under Item C.1.

4. Public

No major value to, or impact on, the public associated with the proposed revisions is anticipated.

D. Decision on the Proposed Action

Regulatory Guide 1.29 should be revised to incorporate changes identified during the public comment period.

II. Technical Approach

Not applicable.

III. Procedural Approach

Revise Regulatory Guide 1.29.

IV. Statutory Considerations

This guide falls under the authority and safety requirements of the Atomic Energy Act. In particular, General Design Criterion 2, "Design Bases for Protection Against Natural Phenomena," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Licensing of Production and Utilization Facilities," requires that nuclear power plant structures, systems, and components important to safety be designed to withstand the effects of earthquakes without loss of capability to perform their safety functions.

Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50 establishes quality assurance requirements for the design, construction, and operation of nuclear power plant structures, systems, and components that prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public. The pertinent requirements of Appendix B apply to all activities affecting the safety-related functions of those structures, systems, and components.

Appendix A, "Seismic and Geologic Site Criteria for Nuclear Power Plants," to 10 CFR Part 100, "Reactor Site Criteria," requires that all nuclear power plants be designed so that, if the Safe Shutdown Earthquake occurs, certain structures, systems, and components remain functional. These plant features are those necessary to ensure (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 that could result in potential offsite exposures comparable to the guideline exposures of 10 CFR Part 100.

B. Need for NEPA Statement

The proposed action is not a major action as defined by 10 CFR 51.5(a)(10), and does not require an environmental impact statement.

V. Relationship to Other Existing or Proposed Regulations or Policies

Not applicable.

VI. Summary and Conclusions

Regulatory Guide 1.29, Revision 2 should be revised to incorporate public comments.

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