U.S. NUCLEAR REGULATORY COMMISSION
STANDARD REVIEW PLAN
OFFICE OF NUCLEAR REACTOR REGULATION

SECTION 3.2.1 SEISMIC CLASSIFICATION

REVIEW RESPONSIBILITIES

Primary - Reactor Systems Branch (RSB)

Secondary - Containment Systems Branch (CSB)
Auxiliary and Power Conversion Systems Branch (APCSB)
Effluent Treatment Systems Branch (ETSB)

I. AREAS OF REVIEW

Nuclear power plant structures, systems, and components important to safety should be designed to withstand the effects of earthquakes without loss of capability to perform necessary safety functions. Information presented by the applicant identifying those structures, systems, and components (including their foundations and supports) which are important to safety and are designed to withstand, without loss of function, the effect of a safe shutdown earthquake (SSE) is reviewed. The SSE is based upon an evaluation of the maximum earthquake potential and is that earthquake which produces the maximum vibratory ground motion for which structures, systems, and components important to safety are designed to remain functional. Those structures, systems, and components that are designed to remain functional if the SSE occurs are designated seismic Category 1.

The RSB reviews the classification of those plant features (excluding electrical features) specified as seismic Category I by the applicant in his safety analysis report (SAR). Where required, specific information or assistance may be obtained from the EICSB to review classification of electrical and instrumentation systems. This review is done for both construction permit (CP) and operating license (OL) applications.

The applicant's proposed classifications may be presented in the form of a table which identifies structures and fluid systems that are seismic Category I. Where portions of structures and fluid systems are seismic Category I they also must be clearly identified For fluid systems important to safety, the classification tables in the application should identify system components such as pressure vessels, heat exchangers, storage tanks, pumps, piping, and valves, have suitable footnotes defining interfaces, and be in sufficient detail so that there is a clear understanding of the extent of those portions of the system that are classified as seismic Category I.

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Alternately, such information may be presented in suitable piping and instrumentation diagrams, or may be combined with the information presented in SAR Section 3.2.2, in which case it may be cross-referenced rather than repeated here.

The CSB reviews, in SAR Section 6.2.5, the detailed system design of seismic Category I fluid systems that are provided for the control of combustible gas concentrations in containment following a loss-of-coolant accident.

The APCSB reviews, in SAR Sections 9 and 10, the detailed system design of auxiliary fluid systems important to safety that are designated seismic Category I.

The ETSB reviews, in SAR Sections 11.2 and 11.3, the detailed system design of seismic Category I liquid, gaseous, and solid radioactive waste systems that are provided to reduce the radioactivity to levels which will not be in excess of the appropriate limits.

In the event a branch that has secondary review responsibility identifies other plant features important to safety that have not been previously identified by the RSB, this information should be transmitted to the RSB.

II. ACCEPTANCE CRITERIA

1. 10 CFR Part 50, Appendix A, General Design Criterion 2. This criterion requires that structures, systems, and components important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes without loss of capability to perform necessary safety functions.

2. Regulatory Guide 1.29, "Seismic Design Classification." This Regulatory Guide describes an acceptable method of identifying and classifying those plant features that should be designed to withstand the effects of the SSE.

III. REVIEW PROCEDURES

Selection and emphasis of various aspects of the areas covered by this review plan will be made by the reviewer on each case. The judgement on the areas to be given attention during the review is to be based on an inspection of the material presented, the similarity of the material to that recently reviewed on other plants, and whether items of special safety significance are involved.

Regulatory Guide 1.29, which identifies structures, systems, and components of light-water-cooled reactors on a functional basis, is the principal document used for identifying those plant features important to safety which, as a minimum, should be designed to seismic Category I requirements.

The staff review should establish whether the applicant has indicated compliance with Regulatory Guide 1.29 in the SAR. Where there are differences with respect to the Guide, these differences should be identified.

The information supplied by the applicant identifying seismic Category I structures, systems, and components is reviewed for completeness and to assure there is sufficient detail to permit identification of specific equipment. Where portions of a system are

classified seismic Category I, the boundary limits of that portion of the system designed to Category I requirements should be identified on the piping and instrumentation diagrams. In addition, where portions of a structure are classified seismic Category I, those portions of the building foundations and supports designed to Category I requirements should be identified on the plant arrangement drawings. The interfaces between components and associated support structures designed to seismic Category I requirements are then checked to assure compatability.

For systems which are partially seismic Category I, the Category I portion of the system should extend to the first seismic restraint beyond the isolation valves which isolate that part which is Category I from the non-seismic portion of the system.

In the event an applicant intends to take exception to Regulatory Guide 1.29 and has not provided an adequate justification for his proposed seismic classification, questions are prepared by the staff which may require additional documentation or analysis to establish an acceptable basis for his proposed seismic classification. Staff comments may also be prepared requesting clarification in order to assure a clear understanding of the seismic classification assigned to a system by the applicant.

If the staff's questions are not resolved in a satisfactory manner, a staff position is taken requiring conformance to Regulatory Guide 1.29.

IV. EVALUATION FINDINGS

The staff's review should verify that adequate and sufficient information is contained in the SAR and amendments to arrive at conclusions of the following type, which are to be included in the staff's safety evaluation report:

"Structures, systems, and components important to safety that are required to withstand the effects of a safe shutdown earthquake and remain functional have been properly classified as seismic Category I items. These plant features 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, and (3) the capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the guideline exposures of 10 CFR Part 100.

"All other structures, systems, and components that may be required for operation of the facility are designed to other than seismic Category I requirements. Included in this classification are those portions of Category I systems which are not required to perform a safety function. Structures, systems, and components important to safety that are designed to withstand the effects of a safe shutdown earthquake and remain functional have been identified in an acceptable manner in Tables 3.X.X and 3.X.X, and on system piping and instrumentations diagrams.

"The basis for acceptance in the staff's review has been conformance of the applicant's designs, design criteria and design bases for structures, systems and components important to safety with the Commission's regulations as set forth in General Design Criterion 2, and to Regulatory Guide 1.29, staff technical positions, and industry standards."

V. REFERENCES

1. 10 CFR Part 50, Appendix A, General Design Criterion 2, "Design Bases for Protection Against Natural Phenomena."

2. 10 CFR Part 100, Appendix A, "Seismic and Geologic Siting Criteria for Nuclear Power Plants."

3. Regulatory Guide 1.29, "Seismic Design Classification."

4. ANSI N18.2a-1975, Revision and Addenda to ANSI N18.2, "Nuclear Safety Criteria for the Design of Stationary Pressurized Water Reactor Plants," American National Standards Institute (1973).

5. ANS N212, "Nuclear Safety Criteria for the Design of Stationary Boiling Water Reactor Plants," Draft No. 4, Rev. 2, April 1974, ANS Standard Issued for Trial Use and Comment, American Nuclear Society (1974).

6. ANS N213, "Nuclear Safety Criteria for the Design of Stationary Gas Cooled Reactor Plants," Draft No. 9, Rev. 2, January 1974, ANS Standard Issued for Comment, American Nuclear Society (1974).

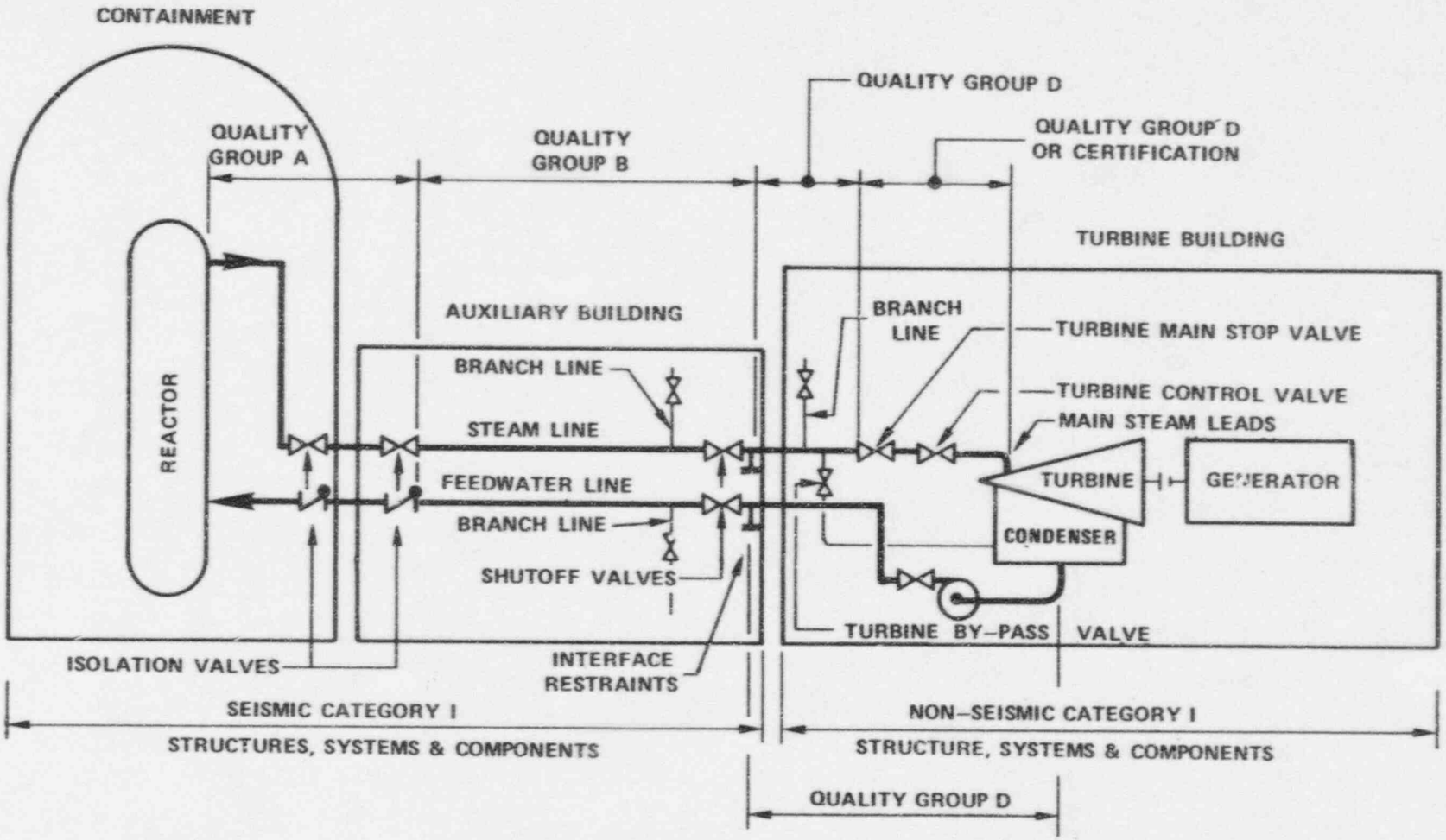

Figure 3-2.1 AEC Quality Group and Seismic Category Classifications Applicable to Power Conversion System Components in BWR/6 Plants.

SRP 3.3.1