



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

50. IWE

AC 93-1

PDR

MAY 26 1988

MEMORANDUM FOR: Victor Stello, Jr.
Executive Director for Operations

FROM: Eric S. Beckjord, Director
Office of Nuclear Regulatory Research

SUBJECT: INITIATION OF RULEMAKING--AMENDMENT TO 10 CFR PART 50

Based on our review of the RES sponsored rulemaking to amend 10 CFR 50.55a, Codes and Standards, RES recommends that NRC incorporate by reference Subsection IWE, "Requirements for Class MC and Metallic Liners of Class CC Components of Light-Water Cooled Power Plants", of Section XI, Division 1, of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code). This recommendation has been coordinated with NRR.

The basis for our recommendation is as follows:

- ° In order to provide a consistent set of rules with appropriate examination details for containment structures, the industry has participated in developing Subsection IWE of Section XI, Division 1, of the ASME Code.
- ° If the NRC does not take action to include the Subsection IWE rules by reference, the NRC position on the methods for inservice inspection would have to be established on a case-by-case basis and improved methods for inservice inspection might not be implemented.
- ° Age-related degradation of containments has occurred. Many containments were not designed with corrosion allowances. Erosion of the metal drywell shell at one plant was found to be occurring at the rate of 20 mils/year. Additional and potentially more serious degradation mechanisms can be anticipated as nuclear power plants age. An inservice inspection program can provide a basis for assuring the continued operational integrity of these containments.

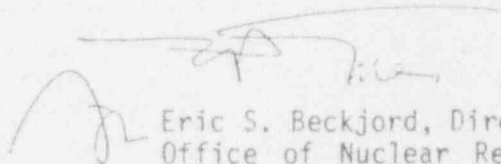
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This recommendation is supported by the response to the EDO review items provided in the Enclosure.

A handwritten signature in dark ink, appearing to read "Eric S. Beckjord", is written over a horizontal line.

Eric S. Beckjord, Director
Office of Nuclear Regulatory Research

Enclosure: Considerations for Initiating,
Planning and Developing
Amendment To 10 CFR Part 50

Regulatory Agenda Entry for
Proposed Amendment to 10 CFR 50.55a

TITLE:

Codes and Standards for Nuclear Power Plants (ASME Code, Section XI, Division 1, Subsection IWE)

CFR CITATION:

10 CFR 50

ABSTRACT:

The proposed rule would incorporate by reference Subsection IWE, "Requirements for Class MC Components of Light-Water Cooled Power Plants", of Section XI (Division 1) of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code). Subsection IWE provides the rules and requirements for inservice inspection, repair, and replacement of Class MC pressure retaining components and their integral attachments, and of metallic shell and penetration liners of Class CC pressure retaining components and their integral attachments in light-water cooled power plants.

Incorporating by reference Subsection IWE will provide systematic examination rules for containment structures for meeting Criterion 53 of the General Design Criteria (Appendix A of 10 CFR Part 50) and Appendix J of 10 CFR Part 50. Age-related degradation of containments has occurred, and additional and potentially more serious degradation mechanisms can be anticipated as nuclear power plants age.

If the NRC did not take action to endorse the Subsection IWE rules, the NRC position on examination practices for containment structures would have to be established on a case-by-case basis and improved examination practices for steel containment structures might not be implemented. The other alternatives of incorporating these detailed examination requirements into the American National Standard ANSI/ANS 56.8-1981 or into Appendix J are not feasible.

Incorporating by reference the latest edition and addenda of Subsection IWE will save applicants/licensees and the NRC staff both time and effort by providing uniform detailed criteria against which the staff can review any single submission. Adoption of the proposed amendment would permit the use of improved methods for containment inservice inspection.

TIMETABLE:

Proposed Action for Division Review	7/29/88
Office Concurrence on Proposed Action Completed	11/14/88
Proposed Action to EDO	3/15/89
Proposed Action Published	4/28/89
Final Action Published	4/15/90

LEGAL AUTHORITY:

42 USC 2201; 42 USC 5841

CONSIDERATIONS FOR INITIATING, PLANNING AND DEVELOPING AMENDMENT

TO 10 CFR PART 50

This recommendation to proceed with rulemaking is supported by the response to the following 7 EDO review items (a - g) which are identified in the RES "Procedures for Task Leaders and Reviewers in Conducting Reviews of Rulemaking" (April 1984) and the 9 NRR items (which were incorporated into the 7 EDO items and are identified in the parentheses following the appropriate item) identified in the NRR Memorandum "Development of Rules Pertaining to Reactors".

a. Issue to be addressed.

Criterion 53 of the General Design Criteria (Appendix A of 10 CFR Part 50) requires that the reactor containment be designed to permit: 1) appropriate periodic inspection of all important areas, such as penetrations, 2) an appropriate surveillance program, and 3) periodic testing at containment design pressure of the leak-tightness of penetrations which have resilient seals and expansion bellows. Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors", of 10 CFR 50, contains specific rules for leak testing of containments and in Paragraph V.A requires that a general inspection of the accessible interior and exterior surfaces of the containment structures and components be performed prior to any Type A test¹ to uncover any evidence of structural deterioration which may affect either the containment structural integrity or leak tightness. Details for this general inspection, such as what parts of the containment structure must be accessible for inspection and personnel qualification requirements for examiners, are not specified. Presently, even though some states have adopted the Subsection IWE requirements, the rules are not being enforced because the NRC has not yet adopted Subsection IWE.

This amendment will incorporate by reference into 10 CFR Part 50 the ASME Code, Section XI, Division 1, Subsection IWE, rules for containment inservice inspection and thereby provide systematic examination rules for containment structures for meeting Criterion 53 of the General Design Criteria.

- b. The necessity and urgency for addressing the issue (includes preliminary assessment of the expected value to be achieved in terms of risk reduction or other benefits as a result of the rule's enactment).

¹Type A test means tests intended to measure the primary reactor containment overall integrated leak rate 1) after the containment has been completed and is ready for operation, and 2) at periodic intervals thereafter.

The industry has participated in developing Subsection IWE to Section XI, Division 1, of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code to provide a consistent set of rules with more explicit details for containment structures. The purpose of this amendment is to incorporate by reference this Subsection IWE into the NRC Regulations.

This Subsection was developed through the consensus process, which ensures that the various technical interests (e.g., utility, manufacturers, regulatory) are represented on the standards writing committees and that their viewpoints are considered in the standard writing process. Endorsement of the Subsection IWE rules by the NRC provides a method of improving containment examination practices by incorporating rules into the regulatory process that are acceptable to the NRC and have received industry participation in their development.

Age-related degradation of containments has occurred. Two BWR plants have experienced corrosion of the drywell steel shell at the floor to shell interface. Many containments (liners) were not designed with corrosion allowances. Erosion of the metal drywell shell at one plant was found to be occurring at the rate of 20 mils/year. Additional and potentially more serious degradation mechanisms can be anticipated as nuclear power plants age. An adequate inservice inspection program can provide a basis for assuring the continued operational integrity of these containments.

The proposed rule cannot be proven quantitatively to provide a substantial increase in overall protection of the public health and safety or of the common defense and security. However, the direct and indirect costs of implementation are justified due to referencing of uniform rules for meeting certain General Design Criteria, the Standard Technical Specifications and for the potential of providing for earlier detection of problems with containment structures, thus increasing the reliability of the containment structure to mitigate off-site radiation release in case of an accident.

NUREG/CR-4731, EGG-2469, Volume 1, "Residual Life Assessment of Major Light Water Reactor Components - Overview", came to the conclusion that "Establishment of inspection procedures to cover critical areas where adverse environmental conditions such as high temperature, humidity, and/or radiation, and locations subjected to an acidic environment, will be a necessary measure to determine the extent of degradation."

If the NRC did not take action to endorse the Subsection IWE rules, the NRC position on examination practices for containment structures would have to be established on a case-by-case basis and improved examination practices for steel containment structures might not be implemented.

c. Alternative to rulemaking.

One alternative to referencing Subsection IWE would be to take no

action which will result in containment examinations being performed to the present Appendix J rule. This is not desirable since Appendix J is primarily concerned with containment leakage testing and does not provide details for weld and component examinations.

Another alternative would be to incorporate detailed examination requirements into the NRC Regulations, either directly or into American National Standard ANSI/ANS 56.8-1981. This standard, which is referenced in Appendix J, provides guidance for conducting Type A tests. Placing the examination requirements directly into the Regulations is not practical because of the volume of Subsection IWE; also, this would be out of character with the other Regulation examination requirements which are imposed by reference of the ASME Code. Possibly ANSI/ANS 56.8-1981 could be updated to include examination requirements. This would not be effective from a time or cost standpoint since the ANS standards writing committee would be adding entirely new scope beyond the containment leak testing methodology presently covered. Also, the ANS committee does not have the broad scope of different working groups that result in rules that complement one another in the different subsections of Section XI. Changes in the ASME Code to reflect improved inservice inspection (ISI) technology are published annually. Improvements would take longer in the ANSI/ANS standard; the time from the first issue to the first revision was six years.

- d. How the issue will be addressed through rulemaking (includes description of rulemaking activities, a schedule, and a description of the desired end result; the interaction and interfaces between the subject rule and other existing or planned activities; and an evaluation of the potential to combine and integrate rulemaking with other generic activities, including current or planned industry initiatives).

This amendment will incorporate by reference Subsection IWE into § 50.55a. Future amendments to § 50.55a will update the Subsection IWE reference to later editions and addenda that the staff has reviewed and found acceptable and not inconsistent with regulatory criteria.

In those cases where significant differences exist between Subsection IWE and staff position, exceptions to specific items in Subsection IWE will be specified, or supplementary criteria will be provided. Exceptions in the regulations to the ASME Code rules will be avoided to the extent that the NRC staff on ASME Code committees can influence the development of Subsection IWE to account for NRC concerns on specific issues.

Timetable:

Proposed Action for Division Review	6/30/88
Office Concurrence on Proposed Action Completed	9/23/88
Proposed Action to EDO	1/15/89
Proposed Action Published	3/15/89
Final Action Published	2/15/90

The records which are generated by the utility are used by the licensees, inspectors, insurance companies, and the NRC in the review of a variety of activities, many of which affect safety. The records are generally historical in nature and provide data on which future activities can be based. NRC personnel can spot check the records required by the ASME Code to determine, for example, if proper inservice examination methods were utilized. Therefore, we do not anticipate the need for regulatory guides, policies, licensing and inspection guidance, etc. to supplement this rulemaking.

The effort associated with the rulemaking falls into two categories. That associated with technical review of Subsection IWE and that associated with developing the amendment and the regulatory analysis, and carrying the rule forward through the various reviews.

The review of Subsection IWE is done item-by-item during Code development by the NRC staff participating on various levels of ASME Code committees and the NRC staff in appropriate technical branches. Detailed technical input is often provided by the staff at the task group, working group, subgroup and subcommittee levels through NRC staff committee members. A formal ballot on each item is taken by the Boiler and Pressure Vessel Committee which has oversight of the Section XI items. NRC has staff participation on the Boiler and Pressure Vessel Committee and also on the Board on Nuclear Codes and Standards which has the final review authority on all ASME Code items.

Future amendments to § 50.55a will be done at the same time as the ongoing periodic amendments referencing new editions and addenda which will eliminate the need for a separate rulemaking.

- e. How the public, industry, and the NRC will be affected as a result of rulemaking (includes preliminary estimate of the anticipated costs to NRC offices and industry of developing, imposing, implementation, and verifying implementation of the rule).

Incorporating by reference the latest edition and addenda of Subsection IWE will save applicants/licensees and the NRC staff both time and effort by providing uniform detailed criteria against which the staff can review any single submission. Adoption of the proposed amendment would permit the use of improved methods for containment inservice inspection.

From information received from utility inservice inspection specialists, implementing the Subsection IWE requirements is estimated to be \$61,000 per year per plant.

- ° For the First 10-Year ISI Interval:
 - 3,300 Hours Engineering Time to Prepare and Maintain ISI Plan
 - 8,000 Hours Technician Time for Performing Examinations (Including Site Coordination and Health Physics)

- ° For Successive 10-Year ISI Intervals:
 - 1,800 Hours Engineering for Plan Updates
 - 8,000 Hours Technician Time for Performing Examinations
- ° Total Time for Thirty Years (Assuming Average of Three 10-Year Intervals Per Plant - Most Plants Are Presently in Their First Interval)
 - 30,600 Hours (1,020 Hours Per Year Per Plant)
- ° Cost:
 - 1,020 Hours at \$60 Per Hour = \$61,200 Per Year Per Plant.

Other costs and another estimation of the ISI plan preparation is presented below:

- ° Drawing Update - Includes Preparation of ISI Drawings for the Containment Structure, Numbering ISI Components (Welds, Penetrations, Supports etc.) and Performing Field As-Built As Required (9 Person-Months for Draftsman).....\$90,000
 - ° Computer Database Preparation - Entering Components into the ISI Computer Database Program for Tracking Purposes (1 Person-Month for Clerk)\$5,000
 - ° Video Mapping Drywell Containment - For Job Planning Purposes. Based on Returned Cost for Recent Plant Work Including All Piping Systems within Containment.....\$54,000
 - ° Inspection Plan Preparation - Preparation of the Inspection Plan, Review of As-Built Data, Update the ISI Program, Prepare Code Exemption/Relief Requests, Review Construction Data, Etc. (6 Person-Months for Engineer).....\$48,000
 - ° Clerical Assistance - To Assist Engineer for Review of Construction Records, Typing, Archival Search, Preparation of ISI Program Updates, Etc. (3 Person-Months for Clerk).....\$15,000
- TOTAL.....\$212,000

This total does not include engineer or consultant work and it has been estimated that the actual total will be no less than \$250,000.

- f. NRC resources and scheduling needed for the rulemaking (includes points in the rulemaking schedule at which NRR/RES formal interaction and concurrence should take place).

No significant resource burden on the NRC is anticipated since review of the implementation of Subsection IWE requirements can be included in the presently scheduled NRC audits of the ISI programs. The staff effort to develop and review the proposed rule and regulatory analysis, resolve interoffice and public comments, and generally move the rule through its various stages is estimated to be 200 person-hours.

In the proposed rule schedule, there are three times where NRR/RES interaction will occur: At the task initiation phase, the division

review and at office concurrence.

g. The priority of the rulemaking.

This rule is considered to be an A priority because of its importance to ensuring containment integrity.