



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

AC 93-1

PDR

JUL 7 1988

MEMORANDUM FOR: J. G. Partlow, Director, OSP
L. C. Shao, Director, DEST, NRR
F. P. Gillespie, Director, PMAS, NRR
B. K. Grimes, Acting Director, DRIS, NRR
T. M. Novak, Director, DSP, AEOD
D. H. Grimsley, Director, DRR, ARM
R. S. Scott, Director, DISS, ARM
S. A. Treby, Asst. General Counsel, OGC

FROM: R. J. Bosnak, Deputy Director
Division of Engineering
Office of Nuclear Regulatory Research

SUBJECT: INTEROFFICE REVIEW OF PROPOSED RULE FOR 10 CFR 50.55a TO
INCORPORATE BY REFERENCE SUBSECTION IWE OF SECTION XI,
DIVISION 1, OF THE ASME BOILER AND PRESSURE VESSEL CODE

Please review the enclosed proposed rule (Enclosure 1), including regulatory analysis (Enclosure 2), and provide written comments to the RES task leader before the requested completion date.

1. Title: Section 50.55a (10 CFR 50), "Codes and standards"
2. RES Task Leader: W. E. Norris, DE:SSEB, X23938
3. RES Task No.: MS 801-1
4. Cognizant Individual: C. Y. Cheng, NRR
5. Requested Action: Review, comment and make recommendations
6. Requested Completion Date: August 8, 1988
7. Background: The proposed rule would incorporate by reference the 1986 Edition with Addenda up through the 1987 Addenda of 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). (In a separate but parallel action, a proposed rule is under development to amend §50.55a to incorporate by reference the 1986 Edition with Addenda through the 1987 Addenda of Section III, Division 1, and Section XI, Division 1.) 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.

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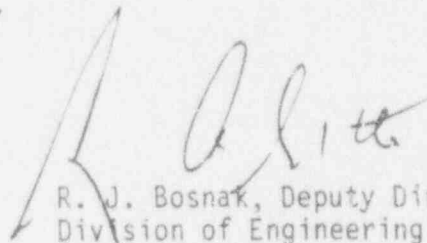
Incorporating by reference Subsection IWE will provide systematic examination rules for containment structures for meeting Criterion 53 of the General Design Criteria (Appendix A of 10 CFR Part 50) and Appendix J of 10 CFR Part 50. Age-related degradation of containments has occurred, and additional 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.

I would particularly appreciate comments on the implementation paragraph in the rule, (g)(4)(iii) on page 9. The current proposed language would on the average give a facility between 4 to 5 years to implement the provisions of Subsection IWE.

The 1986 Edition with Addenda up through the 1987 Addenda of Subsection IWE is enclosed for your information.



R. J. Bosnak, Deputy Director
Division of Engineering
Office of Nuclear Regulatory Research

Enclosures:

1. Proposed Rule
2. Regulatory Analysis
3. Subsection IWE

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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.

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15/ R A Arlotto (for)
R. J. Bosnak, Deputy Director
Division of Engineering
Office of Nuclear Regulatory Research

Enclosures:

1. Proposed Rule
2. Regulatory Analysis
3. Subsection IWE

Distribution

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see previous concurrence *****

SSEB	SSEB	SSEB:DE:C	MEB:DE	MEB:DE:C	DRA:D	DD/DE REG
WNorris:sp	GArdnt	AMurphy	GMillman	MBagins	BMorris	RBosnak

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Current Proposed Amendment to 10 CFR 50.55a

NUCLEAR REGULATORY COMMISSION

10 CFR PART 50

Codes and Standards for Nuclear Power Plants

AGENCY: Nuclear Regulatory Commission.

ACTION: Proposed Rule.

SUMMARY: The Commission proposes to amend its regulations to incorporate by reference Subsection IWE, "Requirements for Class MC and Metallic Liners of Class CC Components of Light-Water Cooled Power Plants", of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. This subsection of the ASME Code 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. Adoption of this amendment would provide details to address the periodic inspection and surveillance program required by Criterion 53 of the General Design Criteria, and for the general inspection required by Appendix J of 10 CFR Part 50.

DATES: Comment period expires _____.*
Comments received after this date will be considered if it is practical to do so, but assurance of consideration cannot be given except as to comments received on or before this date.

*A date will be inserted allowing 60 days for public comment.

ADDRESSES: Written comments or suggestions may be submitted to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Docketing and Service Branch. Copies of comments received may be examined in the Commission's Public Document Room at 1717 H Street NW, Washington, D.C.

FOR FURTHER INFORMATION CONTACT: Mr. W. E. Norris, Division of Engineering, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, telephone (301)492-3938.

SUPPLEMENTARY INFORMATION: In 1977, the NRC requested that the ASME initiate work to establish rules for containment inspection in response to as-built containment deficiencies that had been identified. A working group was established and in 1978 approved the first draft on containment inspection with the prime objective to issue repair rules with the emphasis on Mark I containment modifications. This working group was elevated to subgroup status in 1979. The charter for the Subgroup on Containment gave them the responsibility for developing and maintaining the rules in Subsection IWE for Class MC containments. The Subgroup published Subsection IWE in Section XI in 1981. The Subgroup has been updating Subsection IWE as experience applying these rules accumulates. With this experience accumulated and in light of age-related degradation occurring in containments, the NRC proposes to endorse Subsection IWE in 10 CFR Part 50. This subsection was developed to provide minimum requirements with more appropriate examination details for the inservice inspection of metal containments (including metal liners in concrete containments). The proposed rule would incorporate by reference the 1986 Edition with Addenda up through the 1987 Addenda of Subsection IWE.

Implementing Subsection IWE will satisfy requirements specified in certain General Design Criteria, the Standard Technical Specifications and Appendix J of 10 CFR 50.

Criterion 1 of the General Design Criteria (Appendix A of 10 CFR Part 50) requires, among other things, that structures and components important to safety be tested to quality standards commensurate with the importance of the safety functions to be performed. It further states that where generally recognized codes and standards are used, they shall be supplemented or modified as necessary to assure a quality product in keeping with the required safety function. Subsection IWE will ensure that certain pressure retaining components important to safety which are the last barrier to releases to the environment will be inspected. The ASME Code (in which Subsection IWE is contained) is the standard that will be used to assure the quality product referred to in Criterion 1.

Criterion 16 of the General Design Criteria requires that reactor containment and associated systems be provided to establish an essentially leaktight barrier against the uncontrolled release of radioactivity to the environment and to assure that the containment design conditions important to safety are not exceeded for as long as postulated accident conditions require. The containment inspection objective is to assure the pressure-retaining integrity of the containment throughout the plant lifetime.

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 appropri-

ate surveillance program, and 3) periodic testing at containment design pressure of the leak-tightness of penetrations which have resilient seals and expansion bellows. Subsection IWE sets forth requirements and/or details for accomplishing the above three items.

Appendix J of 10 CFR Part 50, Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors, contains specific rules for leakage testing of containments. Paragraph V.A of Appendix J 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 test^{*} 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. Subsection IWE provides these details.

In the Standard Technical Specifications in Section 4 (Surveillance Requirements), the subsection titled Containment Surfaces requires that the structural integrity of the exposed interior and exterior surfaces of the containment, including the liner plate, be determined during the shutdown for each Type A containment leakage rate test by a visual inspection of these surfaces. The intent of this inspection is to verify that there are no apparent changes in appearance or other abnormal degradation of these surfaces. This is

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

an important consideration as many liners have very small design allowances for corrosion. Subsection IWE gives acceptance criteria for this visual inspection.

Section 6 of Standard Technical Specifications requires a periodic inservice surveillance program to ensure the functional capability of the containment and associated structures, systems, and components. Subsection IWE sets forth requirements for this periodic surveillance program.

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 so that they meet the General Design Criteria, the Standard Technical Specifications, and Appendix J.

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.

REGULATORY ANALYSIS

The Commission has prepared a draft regulatory analysis on this proposed regulation. The analysis examines the costs and benefits of the alternatives considered by the Commission. The draft analysis is available for inspection in the NRC Public Document Room, 1717 H Street NW, Washington, D.C. Single copies of the analysis may be obtained from Mr. W. E. Norris, Division of Engi-

neering, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, telephone (301)492-3938.

The Commission requests public comment on the draft regulatory analysis. Comments on the draft analysis may be submitted to the NRC as indicated under the ADDRESSES heading.

PAPERWORK REDUCTION ACT STATEMENT

This proposed rule amends information collection requirements that are subject to the Paperwork Reduction Act of 1980 (44 U.S.C 3501 et seq). This rule has been submitted to the Office of Management and Budget for review and approval of the paperwork requirements.

REGULATORY FLEXIBILITY CERTIFICATION

In accordance with the Regulatory Flexibility Act of 1980, 5 U.S.C. 605(b), the Commission hereby certifies that this rule will not, if promulgated, have a significant economic impact on a substantial number of small entities. This proposed rule affects only the licensing and operation of nuclear power plants. The companies that own these plants do not fall within the scope of the definition of "small entities" set forth in the Regulatory Flexibility Act or the Small Business Size Standards set out in regulations issued by the Small Business Administration at 13 CFR Part 121. Since these companies are dominant in their service areas, this proposed rule does not fall within the purview of the Act.

LIST OF SUBJECTS IN 10 CFR PART 50

Antitrust, Classified information, Fire prevention, Incorporation by reference, Intergovernmental relations, Nuclear power plants and reactors, Penalty, Radiation protection, Reactor siting criteria, Reporting and recordkeeping requirements.

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, and 5 U.S.C. 533, the NRC is proposing to adopt the following amendments to 10 CFR Part 50.

PART 50 - DOMESTIC LICENSING OF PRODUCTION AND UTILIZATION FACILITIES

1. The authority citation for Part 50 reads as follows AUTHORITY: Secs. 103, 104, 161, 182, 183, 186, 189, 68 Stat. 936, 937, 948, 953, 954, 955, 956, as amended, sec. 234, 83 Stat. 1244, as amended (42 U.S.C. 2133, 2134, 2201, 2232, 2233, 2236, 2239, 2282); secs. 201, 202, 206, 88 Stat. 1242, 1244, 1246, as amended (42 U.S.C. 5841, 5842, 5846), unless otherwise noted.

Section 50.7 also issued under Pub. L. 95-601, sec. 10, 92 Stat. 2951 (42 U.S.C. 5851). Sections 50.57(d) 50.58, 50.91 and 50.92 also issued under Pub. L. 97-415, 96 Stat. 2071, 2073 (42 U.S.C. 2133, 2239). Section 50.78 also issued under sec. 122, 68 Stat. 939 (42 U.S.C. 2152). Sections 50.80-81 also issued under sec. 184, 68 Stat. 954, as amended (42 U.S.C. 2234). Sections 50.100-50.102 also issued under sec. 186, 68 Stat. 955 (42 U.S.C. 2236).

For the purposes of sec. 223, 68 Stat. 958, as amended (42 U.S.C. 2273),

§§ 50.10(a), (b), and (c), 50.44, 50.46, 50.48, 50.54, and 50.80(a) are issued under sec. 161b, 68 Stat. 948, as amended (42 U.S.C. 2201(b)); §§ 50.10(b) and (c) and 50.54 are issued under sec. 161i, 68 Stat. 949, as amended (42 U.S.C. 2201(i)); and §§ 50.55(e), 50.59(b), 50.70, 50.71, 50.72; 50.73 and 50.78 are issued under sec. 161o, 68 Stat. 950, as amended (42 U.S.C. 2201(o)).

2. Section 50.55a is amended as follows:

Paragraph (g)(3)(ii) is revised;

Paragraph (g)(4) is revised.

§50.55a Codes and standards.

* * * * *

(g) * * *

(3) * * *

(ii) Components which are classified as ASME Code Class 2, Class 3, Class MC, and supports for components which are classified as ASME Code Class 1, Class 2, Class 3, and Class MC shall be designed and provided with access to enable the performance of inservice examination of such components. These components shall also meet the preservice examination requirements set forth in Section XI of editions of the ASME Boiler and Pressure Vessel Code and Addenda applied to the construction of the particular component.

(4) Throughout the service life of a boiling or pressurized water-cooled nuclear power facility, components (including supports) which are classified as ASME Code Class 1, Class 2, Class 3, and Class MC shall meet the requirements, except design and access provisions and preservice examination requirements,

set forth in Section XI of editions of the ASME Boiler and Pressure Vessel Code and Addenda that become effective subsequent to editions specified in paragraphs (g)(2) and (g)(3) of this section and are incorporated by reference in paragraph (b) of this section, to the extent practical within the limitations of design, geometry and materials of construction of the components.

(iii) For Class MC components (including supports), individual facilities shall implement the provisions of paragraph (g)(4) no later than the second full inspection period after June 1, 1990. During that third of an inspection interval and the remainder of the inspection intervals, the inservice inspection of Class MC components (including supports) shall comply with the requirements in the latest edition and addenda of the Code incorporated by reference in paragraph (b) of this section on the date 6 months prior to the start of that third of an inspection interval, subject to the limitations and modifications listed in paragraph (b) of this section.

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Dated at _____ this _____ day of _____ 19__

For the Nuclear Regulatory Commission.

Victor Stello, Jr.

Executive Director for Operations

Draft
Regulatory Analysis for Current Proposed Amendment

Revision of 10 CFR 50.55a
Codes and Standards

1. Statement of the Problem

The General Design Criteria (Appendix A of Part 50) of the NRC Regulations require that structures, systems, and components of light-water-reactors be designed, fabricated, erected and tested to quality standards commensurate with the importance of the safety function performed. Appendix B establishes quality assurance requirements for the design, construction and operation of those structures, systems and components. The pertinent requirements of this appendix apply to all activities affecting the safety-related functions of those structures, systems and components; these activities include inspecting, testing, operating, maintaining, repairing and modifying. Without a set of specific rules to implement these quality standards, it would be necessary for each applicant/licensee to develop its own program for submittal to the NRC. Each program would have to be reviewed by the staff on a case-by-case basis. This would increase significantly the licensing review time and would make inspections by the staff more difficult because of the nonstandard nature of each program.

To provide a consistent set of rules, which the industry has participated in developing, §50.55a mandates use of Section XI of the ASME Code for in-service inspection of these components. Section XI is implemented by applicants and licensees of all light-water-cooled reactors. The NRC first endorsed the ASME Code by reference in 10 CFR 50.55a in 1971. The ASME publishes a new edition of the Code every three years and new addenda yearly. It has been a continuing policy of the Commission to update this section of the regulations to keep the references current. In those cases where an item in the ASME Code is inconsistent with NRC criteria, an exception may be taken to endorsing that portion of the Code, or supplementary criteria may be incorporated to make the item consistent with staff requirements.

In order to provide a consistent set of rules with appropriate examination details for containment structures, 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 (ASME Code). The purpose of this amendment is to incorporate by reference Subsection IWE into the NRC Regulations.

The ASME Code is developed by the consensus process, which ensures that the various industry sectors (e.g., utility, Nuclear Steam System Suppliers, regulators) are represented on the standards writing committees and that their viewpoints are considered in the standards writing process. Endorsement of the ASME Code by the NRC provides a method of 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. Many liners of concrete 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 significant degradation mecha-

nisms 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.

If the NRC did not take action to endorse the ASME Code, 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.

2. Objectives

The proposed rule would incorporate by reference into § 50.55a of the NRC's regulations Subsection IWE of Section XI, Division 1, of the ASME Boiler and Pressure Vessel Code.

3. Alternatives

An alternative to incorporating by reference into NRC's regulations the requirements of Subsection IWE would be to take no action. If the NRC did not take action to endorse Subsection IWE, the NRC position on examination practices for steel containment structures and steel liners of concrete containments would have to be established on a case-by-case basis. If the NRC does not take action to include the Subsection IWE rules by reference, improved examination practices for steel containment structures might not be implemented. This will result in containment examinations being performed solely to the present Appendix J rule. This is not the best approach since Appendix J is primarily concerned with containment leakage testing and does not provide procedures for weld and component examinations.

A second alternative to incorporating by reference the Subsection IWE requirements is to incorporate the entire text into the NRC regulations. Because of the volume of this section, this approach is not practicable.

4. Consequences

Incorporating by reference Subsection IWE, of Section XI, Division 1, of the ASME Code will establish the NRC staff position on the examination of steel containment structures and liners of concrete containments on a generic basis for applicants and licensees, thereby minimizing the need for case-by-case evaluations and reducing the time and effort required for submittal preparations and licensee reviews.

The value and impact of ASME Code revisions is balanced by the manner in which these revisions are achieved through the American National Standards Institute (ANSI) consensus process. The ANSI consensus process ensures that participation in ASME Code development is open to all persons and organizations that might reasonably be expected to be directly and materially affected by the activity, and ensures that such persons and organizations shall have the opportunity for fair and equitable participation without dominance by any single interest. Consensus is established when substantial agreement has been achieved by the interests involved. Consensus requires that all views and objectives be considered, and that a concerted effort be made toward resolution. ASME Code proposed revisions are published for public comment in the ASME Mechanical Engineering and ANSI Reporter publications prior to being submitted for final

ASME and ANSI approval. Adverse public comments are referred to the appropriate technical committee for resolution.

The consensus process ensures a proper balance between utility, regulatory and other interests concerned with revisions to the ASME Code, and ensures that the value of any Code revision is consistent with its impact.

Implementation of the new Code rules requires certain additional information collection requirements. The Supporting Statement for Information Collection Requirements in 10 CFR 50.55a is provided in Appendix A.

The proposed rule will not have a significant economic effect on a substantial number of small entities. This proposed rule affects only the licensing and operation of nuclear power plants. The companies that own these plants do not fall within the scope of the definition of "small entities" set forth in the Regulatory Flexibility Act in the Small Business Size Standards set out in regulations issued by the Small Business Administration at 13 CFR Part 121. Since these companies are dominant in their service areas, this proposed rule does not fall in the province of this Act.

a. Cost of and Benefits of Alternative

From information received from utility inservice inspection specialists, implementation of the Subsection IWE requirements is estimated to cost \$60,200 per year per plant.

° For the First 10 Year ISI Interval:

- 3,300 Hours Engineering Time to Prepare ISI Plan
(These are one-time costs and are detailed below)
- Drawing Update - Includes Preparation of ISI Drawings for the Containment Structure, Numbering ISI Components (Welds, Penetrations, Supports, etc.) and Performing Field As-Builts 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
- Additional Engineer and Consultant Work.....\$40,000

TOTAL ONE-TIME COSTS.....\$252,000

Costs which are listed below are repetitive costs:

- 8,000 Hours Technician Time for Performing Examinations, Including Site Coordination and Health Physics (This is an additional cost in the first 10 year interval which is not a one-time cost)
- ° For Successive 10 Year ISI Intervals:
 - 1,800 Hours Engineering for Plan Updates
 - 8,000 Hours Technician Time for Performing Examinations
- ° Total Time Per Plant for Thirty Years (Assuming Average of Three 10 Year Intervals Per Plant - Most Plants Are Presently in Their First Interval)
 - 30,600 Hours (1020 Hours Per Year Per Plant)
- ° Total Costs Per Plant:
 - 1020 Hours at \$60 Per Hour = \$60,200 Per Year Per Plant.

The ALARA impact of implementing Subsection IWE does not appear to be significant when compared with the impact of other Section XI ISI examinations and tests. As part of studying plant life extension for the Monticello plant, the containment liner was visually examined with 20 millirems exposure, compared with a total of 935 millirems for all the testing and surveillance activities conducted for plant life extension studies at this facility.

In determining other impacts of implementing Subsection IWE rules, the present containment examination practices are compared with Subsection IWE examinations requirements. Appendix J of the NRC Regulations states the following:

"V. Inspection and Reporting of Tests

- A. Containment inspection. A general inspection of the accessible interior and exterior surfaces of the containment structures and components shall be performed prior to any Type A test to uncover any evidence of structural deterioration which may affect either the containment structural integrity or leak-tightness. If there is evidence of structural deterioration, Type A tests shall not be performed until corrective action is taken in accordance with repair procedures, nondestructive examinations, and tests as specified in the applicable code specified in §50.55a at the commencement of repair work. Such structural deterioration and corrective actions taken shall be reported as part of the test report submitted in accordance with V.B."

Table 1 provides a comparison of the Subsection IWE rules with the present Appendix J rules and utility practices and summarizes cost/benefit information. ~~The cost data in the last column of Table 1 was calculated by multiplying the total cost by the average number of items to be examined for each examination category by the average of the total number of items to be examined in a Subsection IWE ISI program.~~

TABLE 1

COMPARISON OF CONTAINMENT EXAMINATION AND TESTING REQUIREMENTS

<u>IWE REQUIREMENT</u>	<u>APPENDIX J REQUIREMENT</u>	<u>PRESENT UTILITY PRACTICE</u>	<u>BENEFIT OF IWE CHANGE</u>
Category E-A Pressure Re- taining Welds in Vessels, re- quire VT-1 ¹ exam- ination on more important welds.	General visual exam, if acces- sible.	General visual exam, if acces- sible.	VT-1 exam applied to important welds.
Category E-A-1 Nonpressure- Retaining Welds require VT-3 examinations.	General visual exam, if accessible.	General visual exam, if acces- sible.	Weld posi- tions and coverage documented.
Category E-B Pressure Re- taining Welds in Containment Penetrations require VT-1 exam- inations on more important welds.	General visual exam, if acces- sible	General visual exam, if acces- sible.	VT-1 exam applied to important welds.
Category E-C Pressure Re- taining Welds in Airlocks & Equipment Hatches require VT-3 exam- inations.	General visual exam if accessible.	General visual exam, if acces- sible.	Weld & com- ponent cov- erage doc- umented.
Category E-D Seals & Gaskets require VT-3 examinations.	General visual exam, if accessible.	General visual exam, if acces- sible.	Assures these important items are examined.
Category E-E Integral Attach- ment Welds re- quire VT-3 exam- inations.	General visual exam, if accessi- ble.	General visual exam, if acces- sible.	Accessibil- ity is re- quired.

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¹See Appendix A for descriptions of VT-1, VT-2 and VT-3 examinations.

TABLE 1 (continued)

COMPARISON OF CONTAINMENT EXAMINATION AND TESTING REQUIREMENTS

<u>IWE REQUIREMENT</u>	<u>APPENDIX J REQUIREMENT</u>	<u>PRESENT UTILITY PRACTICE</u>	<u>BENEFIT OF IWE CHANGE</u>
Category E-F Pressure Retain- ing Dissimilar Metal Welds re- quire surface examination.	General vis- ual exam, if accessible.	General visual exam, if acces- sible.	More sensi- tive exam of important welds.
Category E-G Pressure Retain- ing Bolting re- quires VT-1 exam- ination and bolt torque or tension test.	General vis- ual exam, if accessible.	General visual exam, if acces- sible.	Control of bolting in- tegrity.
Category E-P, All Pressure Retaining Components, re- quire VT-3 exam- inations and leak- age tests.	General vis- ual exam, if accessible, and leakage tests.	General visual exam, if acces- sible, and leak- age tests.	Little change from present practices.
IWE 3000- Acceptance Stan- dards	None.	Acceptance stan- dards are devel- oped on a case-by case basis.	More consist- ency.
IWE 4000- Repair Proce- dures	ASME Code.	ASME Code.	No change.
IWE 5000- System Pressure Tests.	Leakage test.	Leakage test.	No change.
IWE 7000- Replacements.	ASME Code.	ASME Code.	No change.

Subsection IWE, Table IWE-2500-1, Examination Category E-P, All Pressure Retaining Components, references the Appendix J examination requirements and provides appropriate detail. A VT-3¹ visual test of the pressure retaining boundary and a VT-2¹ visual test for leakage are specified. If leak channels are used, they are required to be unplugged and tested during the Appendix J, Type A, containment integrated leakage test or tested independently by a Type B local leakage test.

A requirement of Subsection IWE is that the VT-2 and VT-3 visual examination personnel are required to be qualified to ANSI N45.2.6. Appendix J does not specify personnel qualification requirements.

Most of the examinations specified in Subsection IWE, Table IWE-2500-1 are VT-3 visual examinations. If these examinations were documented during the Examination Category E-P VT-3 examination of the pressure retaining boundary, these examinations would meet most of the requirements of the other examination categories in Table IWE-2500-1. However, it would be necessary to verify that all welds accessible for examination met Subsection IWE requirements. Present utility practice does not document coverage of specific welds, and in some cases, locations of welds are not known.

Subsection IWE exempts inaccessible welds from examination provided fabrication requirements specified in Subsection IWE-1221 are met. For older plants not designed to Section III of the ASME Code, these fabrication requirements may not have been met. In these cases, it may be necessary for utilities to request relief from the NRC for specific welds not meeting Subsection IWE accessibility requirements.

b. Impacts on Other Requirements

There is no impact on other present or proposed requirements.

c. Constraints

Implementation of Subsection IWE rules requires a backfit analysis in accordance with § 50.109.

- (1) Statement of the specific objectives that the proposed backfit is designed to achieve.

The objective of the proposal is to incorporate by reference into 10 CFR Part 50 Subsection IWE, "Requirements for Class CC and Metallic Liners of Class CC Components of Light-Water Cooled Power Plants", of Section XI, Division 1, of the ASME Code. Adoption of this amendment would provide details for satisfying the periodic inspection and surveillance program required by Criterion 53 of the General Design Criteria, and for the general inspection required by Appendix J of 10 CFR Part 50.

- (2) General description of the activity that would be required by the licensee or applicant in order to complete the backfit.

Implementing Subsection IWE requirements would require engineer-

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See Appendix A for descriptions of VT-2 and VT-3 examinations.

ing time amend present ISI plan to include additional examinations associated with inspection of steel containment structures and steel liners of concrete containments. Also, there will be added demands on personnel performing the ISI examinations in the areas of health physics support, site coordination and technicians for performing the ISI additional examinations required. The estimated cost of these activities is given in Section 4.a of the Draft Regulatory Analysis for Current Proposed Amendment.

- (3) Potential change in the risk to the public from the accidental off-site release of radioactive material.

The requirement to periodically leak test the containment system (Appendix J) is an important part of assuring that the containment integrity is maintained over the plant's lifetime. Incorporation of the Subsection IWE rules will complement the Appendix J tests by providing for detection of and correction of component degradation that might not be detected by the leak test. The proposal thus has the potential of reducing the risk to the public from the accidental off-site release of radioactive material.

- (4) Potential impact on radiological exposure of facility employees.

The ALARA impact of implementing Subsection IWE rules does not appear to be significant when compared with the impact of other Section XI ISI examinations and tests. As part of studying plant life extension for the Monticello plant, the containment liner was visually examined with 20 millirems exposure, compared with a total of 935 millirems for all the testing and surveillance activities conducted for plant life extension studies at this facility. In certain instances, the Subsection IWE rules could potentially reduce radiological exposure of facility employees by providing for earlier detection of and correction of problems before they grow more serious and thus require more extensive repair or replacement activities.

- (5) Installation and continuing costs associated with the backfit, including the cost of facility downtime or the cost of construction delay.

From consultations with utility inspection specialists, implementing the Subsection IWE requirements is estimated to require for a ten-year ISI interval 3,300 person-hours of engineering time to prepare maintain the ISI plan and 8,000 person-hours of technician time for performing examinations. This includes factors such as site coordination and health physics support. Based on extra effort required to develop the first Subsection IWE examination plan, the engineering time for subsequent 10-year ISI intervals would drop to about 1,800 person-hours. Assuming an average of three 10-year intervals (most operating are presently in their first ten-year interval) per plant gives $3,300 \text{ plus } 2 \text{ times } 1,800 \text{ plus } 3 \text{ times } 8,000 = 30,600 \text{ person-}$

hours for 30 years. This results in an average of 1020 hours per year per plant. Multiplying the 1020 person-hours per year per plant by \$60/hour gives a rounded off figure of \$60,000 per year per plant.

- (6) The potential safety impact of changes in plant or operational complexity, including the relationship to proposed and existing regulatory requirements.

The proposal will not change plant or operational complexity. There is also no impact on other requirements other than that the proposal will provide details for satisfying the General Design Criteria and Standard Technical Specifications mentioned in the Supplementary Information section of the Current Proposed Amendment to 10 CFR 50.55a.

- (7) The estimated resource burden on the NRC associated with the proposed backfit and the availability of such resources.

No significant resource burden on the NRC is anticipated since review of the Subsection IWE requirements can be included in the presently scheduled NRC audits of the ISI plans.

- (8) The potential impact of differences in facility type, design or age on the relevancy and practicality of the proposed backfit.

The Subsection IWE requirements will apply to all light-water cooled reactors. They will apply to plants with both metal and concrete containments since this subsection covers metal liners and penetration liners. Most of the Subsection IWE requirements can be followed by all facilities. However, older facilities may require relief from certain accessibility requirements. This is provided for in 10 CFR 50.55a (g)(5).

- (9) Whether the proposed backfit is interim or final and, if interim, the justification for imposing the proposed backfit on the interim basis.

This proposed revision to § 50.55a to reference Subsection IWE will be issued, after the public comment period, as final.

§ 50.109(a)(3) CONCLUSION

The proposed backfit cannot be proven quantitatively to provide a substantial increase in the 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. For the benefit of the public, the licensees and the NRC staff, this proposed rule should be issued at this time for public comment.

5. Decision Rationale

From the above analysis, it is concluded that the proposed revision to incorporate Subsection IWE of the ASME Code will provide uniform detailed criteria for conducting examinations of containment structures. The estimated cost of this alternative should be acceptable, considering the importance of maintaining containment structural integrity.

6. Implementation

No implementation problems are anticipated. The framework for implementation is already established in both the industry and the NRC. Subsection IWE examinations can be included with the updated ISI plan presently prepared to meet 10 CFR 50.55a(g) requirements.

APPENDIX A

ASME CODE SECTION XI VISUAL EXAMINATION DESCRIPTIONS

The descriptions of the VT-1, VT-2 and VT-3 visual examinations are contained in section IWA-2210, "Visual Examinations". IWA-2211, titled "Visual Examination VT-1", contains the following:

- A. The VT-1 visual examination shall be conducted to determine the condition of the part, component, or surface examined, including such conditions as cracks, wear, corrosion, erosion, or physical damage on the surfaces of the part or components.
- B. Direct VT-1 visual examination may be conducted when access is sufficient to place the eye within 24 inches of the surface to be examined and at an angle not less than 30 degrees to the surface. Mirrors may be used to improve the angle of vision. Lighting, natural or artificial, shall be sufficient to resolve a 1/32 inch black line on an 18% neutral gray card.
- C. Remote VT-1 visual examination may be substituted for direct examination. Remote examination may use aids, such as telescopes, borescopes, fiber optics, cameras, or other suitable instruments, provided such systems have a resolution capability at least equivalent to that attainable by direct visual examination.

A description of the VT-2 visual examination is contained in IWA-2212 and contains the following:

- A. The VT-2 visual examination shall be conducted to locate evidence of leakage from pressure retaining components, or abnormal leakage from components with or without leakage collection systems as required during the conduct of system pressure or functional test.
- B. The VT-2 visual examination shall be conducted in accordance with IWA-5240.

IWA-2213 contains the following information on the VT-3 visual examination:

- A. The VT-3 visual examination shall be conducted to determine the general mechanical and structural condition of components and their supports, such as the verification of clearances, setting, physical displacements, loose or missing parts, debris, corrosion, wear, erosion, or the loss of integrity at bolted or welded connections.
- B. The VT-3 examination shall include examination for conditions that could affect operability or functional adequacy of snubbers, and constant load and spring type supports.
- C. For component support and component interiors, the visual examination may be performed remotely with or without optical aids to verify the structural integrity of the component.

oil millman

AC-93-1 ✓

PDR

back-action
Harris/Pettis
pls review and
provide comments
in written



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

JUL 7 1988

MEMORANDUM FOR: J. G. Partlow, Director, OSP
L. C. Shao, Director, DEST, NRR
F. P. Gillespie, Director, PMAS, NRR
B. K. Grimes, Acting Director, DRIS, NRR
T. M. Novak, Director, DSP, AEOD
D. H. Grimsley, Director, DRR, ARM
R. S. Scott, Director, DISS, ARM
S. A. Treby, Asst. General Counsel, OGC

No comment
B. K. Pettis
7/27/88

FROM: R. J. Bosnak, Deputy Director
Division of Engineering
Office of Nuclear Regulatory Research

SUBJECT: INTEROFFICE REVIEW OF PROPOSED RULE FOR 10 CFR 50.55a TO
INCORPORATE BY REFERENCE SUBSECTION IWE OF SECTION XI,
DIVISION 1, OF THE ASME BOILER AND PRESSURE VESSEL CODE

Please review the enclosed proposed rule (Enclosure 1), including regulatory analysis (Enclosure 2), and provide written comments to the RES task leader before the requested completion date.

1. Title: Section 50.55a (10 CFR 50), "Codes and standards"
2. RES Task Leader: W. E. Norris, DE:SSEB, X23938
3. RES Task No.: MS 801-1
4. Cognizant Individual: C. Y. Cheng, NRR
5. Requested Action: Review, comment and make recommendations
6. Requested Completion Date: August 8, 1988
7. Background: The proposed rule would incorporate by reference the 1986 Edition with Addenda up through the 1987 Addenda of 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). (In a separate but parallel action, a proposed rule is under development to amend §50.55a to incorporate by reference the 1986 Edition with Addenda through the 1987 Addenda of Section III, Division 1, and Section XI, Division 1.) 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.