

TECHNICAL EVALUATION REPORT ON THE  
SECOND 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN:  
DUKE POWER COMPANY,  
MCGUIRE NUCLEAR STATION, UNIT 1,  
DOCKET NUMBER 50-369

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Published May 1994

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Prepared for the  
Division of Engineering Technology  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555  
Under DOE Idaho Operations Office  
Contract DE-AC07-76ID01570  
FIN No. L2556 (Task Order 12c)

## ABSTRACT

This report documents the results of the evaluation of the *McGuire Nuclear Station, Unit 1, Second 10-Year Interval Inservice Inspection (ISI) Program Plan*, Revision 0, submitted October 12, 1992, including the request for relief from the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Section XI requirements that the licensee has determined to be impractical. The *McGuire Nuclear Station, Unit 1, Second 10-Year Interval Inservice Inspection Program Plan* is evaluated in Section 2 of this report. The ISI Program Plan is evaluated for (a) compliance with the appropriate edition/addenda of Section XI, (b) acceptability of examination sample, (c) correctness of the application of system or component examination exclusion criteria, and (d) compliance with ISI-related commitments identified during previous Nuclear Regulatory Commission (NRC) reviews. The request for relief is evaluated in Section 3 of this report.

This work was funded under:

U.S. Nuclear Regulatory Commission  
FIN No. L2556 (Task Order 12c)  
Technical Assistance in Support of the  
NRC Inservice Inspection Program

## SUMMARY

The licensee, Duke Power Company, has prepared the *McGuire Nuclear Station, Unit 1, Second 10-Year Interval Inservice Inspection (ISI) Program Plan, Revision 0*, to meet the requirements of the 1986 Edition (86E) of the ASME Code, Section XI. The second 10-year interval began December 1, 1992 and ends December 1, 2002.

The information in the *McGuire Nuclear Station, Unit 1, Second 10-Year Interval Inservice Inspection Program Plan, Revision 0*, submitted October 12, 1992, was reviewed. Included in the review was the request for relief from the ASME Code Section XI requirements that the licensee has determined to be impractical. As a result of this review, a request for additional information (RAI) was prepared describing the information and/or clarification required from the licensee to complete the review. The licensee provided the requested information in the submittal dated September 1, 1993.

Based on the review of the *McGuire Nuclear Station, Unit 1, Second 10-Year Interval Inservice Inspection Program Plan, Revision 0*, and the licensee's response to the Nuclear Regulatory Commission's RAI, the Program Plan appears to be in compliance with the Code and the Regulations.

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## 1. INTRODUCTION

Throughout the service life of a water-cooled nuclear power facility, 10 CFR 50.55a(g)(4) (Reference 1) requires that components (including supports) that are classified as American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Class 1, Class 2, and Class 3 meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code Section XI, *Rules for Inservice Inspection of Nuclear Power Plant Components* (Reference 2), to the extent practical within the limitations of design, geometry, and materials of construction of the components. This section of the regulations also requires that inservice examinations of components and system pressure tests conducted during successive 120-month inspection intervals comply with the requirements in the latest edition and addenda of the Code incorporated by reference in 10 CFR 50.55a(b) on the date 12 months prior to the start of the 120-month inspection interval, subject to the limitations and modifications listed therein. The components (including supports) may meet requirements set forth in subsequent editions and addenda of this Code that are incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein. The licensee, Duke Power Company, has prepared the *McGuire Nuclear Station, Unit 1, Second 10-Year Interval Inservice Inspection (ISI) Program Plan*, Revision 0 (Reference 3), to meet the requirements of the 1986 Edition of the ASME Code, Section XI. The second 10-year interval began December 1, 1992 and ends December 1, 2002.

As required by 10 CFR 50.55a(g)(5), if the licensee determines that certain Code examination requirements are impractical and requests relief from them, the licensee shall submit information and justification to the Nuclear Regulatory Commission (NRC) to support that determination.



Pursuant to 10 CFR 50.55a(g)(6), the NRC will evaluate the licensee's determination that Code requirements are impractical to implement. The NRC may grant relief and may impose alternative requirements that are determined to be authorized by law, will not endanger life, property, or the common defense and security, and are otherwise in the public interest, giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

Alternatively, pursuant to 10 CFR 50.55a(a)(3), the NRC will evaluate the licensee's determination that either (i) the proposed alternatives provide an acceptable level of quality and safety, or (ii) Code compliance would result in hardship or unusual difficulty without a compensating increase in safety. Proposed alternatives may be used when authorized by the NRC.

The information in the *McGuire Nuclear Station, Unit 1, Second 10-Year Interval ISI Program Plan*, Revision 0, was reviewed, including the request for relief from the ASME Code Section XI requirement that the licensee has determined to be impractical. The review of the ISI Program Plan was performed using the Standard Review Plans of NUREG-0800 (Reference 4), Section 5.2.4, "Reactor Coolant Boundary Inservice Inspections and Testing," and Section 6.6, "Inservice Inspection of Class 2 and 3 Components."

In a letter dated June 17, 1993 (Reference 5), the NRC requested additional information that was required in order to complete the review of the ISI Program Plan. The requested information was provided by the licensee in the "Response to NRC Request for Additional Information" dated September 1, 1993 (Reference 6).

The *McGuire Nuclear Station, Unit 1, Second 10-Year Interval ISI Program Plan* is evaluated in Section 2 of this report. The ISI Program Plan is evaluated for (a) compliance with the appropriate edition/addenda of Section XI, (b) acceptability of examination sample, (c) correctness of the application of system or component examination exclusion criteria, and (d) compliance with ISI-related commitments identified during the NRC's previous reviews. The request for relief is evaluated in Section 3 of this report. Unless otherwise stated, references to the Code refer to the ASME Code, Section XI, 1986

Edition. Specific inservice test (IST) programs for pumps and valves are being evaluated in other reports.



## 2. EVALUATION OF INSERVICE INSPECTION PROGRAM PLAN

This evaluation consisted of a review of the applicable program documents to determine whether or not they are in compliance with the Code requirements and any previous license conditions pertinent to ISI activities. This section describes the submittals reviewed and the results of the review.

### 2.1 Documents Evaluated

Review has been completed on the following information from the licensee:

- (a) *McGuire Nuclear Station, Unit 1, Second 10-Year Interval ISI Program Plan*, Revision 0 (Reference 3); and
- (b) Response to the NRC's request for additional information (Reference 6).

### 2.2 Compliance with Code Requirements

#### 2.2.1 Compliance with Applicable Code Editions

Inservice inspection program plans must be based on the Code editions defined in 10 CFR 50.55a(g)(4) and 10 CFR 50.55a(b). Based on the starting date of December 1, 1992, the Code applicable to the second interval ISI program for McGuire Nuclear Station, Unit 1, is the 1986 Edition. As stated in Section 1 of this report, the licensee has prepared the *McGuire Nuclear Station, Unit 1, Second 10-Year ISI Program Plan* to meet the requirements of 1986 Edition of the Code.

#### 2.2.2 Acceptability of the Examination Sample

Inservice volumetric, surface, and visual examinations shall be performed on ASME Code Class 1, 2, and 3 components and their supports using sampling schedules described in Section XI of the ASME Code and 10 CFR 50.55a(b). Sample size and weld selection have been implemented in accordance with the Code and appear to be correct.

Based on the selection criteria of Examination Categories C-F-1 and C-F-2, portions of Class 2 Emergency Core Cooling (ECC) and Containment Heat Removal (CHR) systems (designated as NS and NV in the Program Plan) are being excluded from volumetric examination based on pipe wall thickness (i.e., less than 3/8 inch). The licensee has excluded these "thin-wall" welds from volumetric examination, leaving large portions of these systems susceptible to undetected inservice degradation, which may be caused by stagnant borated water or other mechanisms, that may result in failure. A representative sample from all piping in these engineered safety systems would be a better indicator of the system's overall inservice condition.

#### 2.2.3 Exemption Criteria

The criteria used to exempt components from examination shall be consistent with Paragraphs IWB-1220, IWC-1220, IWC-1230, IWD-1220, and 10 CFR 50.55a(b). The exemption criteria have been applied by the licensee in accordance with the Code, as discussed in the ISI Program Plan, and appear to be correct.

#### 2.2.4 Augmented Examination Commitments

In addition to the requirements specified in Section XI of the ASME Code, the licensee has committed to perform the following augmented examinations:

- (a) Reactor coolant pump flywheels will be inspected as required by USNRC Regulatory Guide 1.14 (Reference 7);
- (b) Steam generator tubing will be inspected as required by ASME Section XI and the Technical Specifications for McGuire Nuclear Station; and
- (c) Reactor vessel welds will be inspected in accordance with USNRC Regulatory Guide 1.150 (Reference 8);

### 2.3 Conclusion

Based on the review of the documents listed above, it appears that the *McGuire Nuclear Station, Unit 1, Second 10-Year Interval ISI Program Plan*, Revision 0, is in compliance with the Code and the Regulations.

### 3. EVALUATION OF RELIEF REQUEST

The request for relief from the ASME Code requirement that the licensee has determined to be impractical for the second 10-year inspection interval is evaluated in the following section.

#### 3.1 Class 1 Components

##### 3.1.1 Reactor Pressure Vessel

###### 3.1.1.1 Request for Relief No. 92-03, Examination Category B-D, Items B3.90 and B3.100, Scheduling Requirements for RPV Outlet Nozzle-to-Vessel Welds and Inside Radius Sections

Code Requirement: Section XI, Table IWB-2500-1, Examination Category B-D, Items B3.90 and B3.100, Note 2 requires that at least 25% but not more than 50% (credited) of the nozzles shall be examined by the end of the first inspection period and the remainder by the end of the inspection interval.

For Section XI, Table IWB-2500-1, Examination Category B-F reactor vessel nozzle safe ends, the Code-required examinations may be performed coincident with the vessel nozzle examinations required by Examination Category B-D.

Section XI, Paragraph IWB-2420(a) requires that the sequence of component examinations established during the first inspection interval be repeated during each successive inspection.

Licensee's Code Relief Request: The licensee requested relief from the scheduling requirements of IWB-2420(a) for the Reactor Pressure Vessel (RPV) outlet nozzle-to-vessel welds, outlet nozzle-to-safe end, and outlet nozzle safe end-to-Reactor Coolant System piping welds during the first period of the second 10-year inspection interval.

Licensee's Stated Basis for Requesting Relief:

"During the first period of the first inspection interval at McGuire Nuclear Station Unit 1, the 29" outlet nozzle-to-vessel welds, outlet nozzle-to-safe end, outlet nozzle safe end to Reactor Coolant System piping welds (nozzle side), were examined using Babcock & Wilcox's Automated Reactor Inspection Tool (ARIS).

"The four nozzle welds examined for Unit 1 meet the 50% requirement of Table IWB-2500-1 Category B-D (Note 2). \* No recordable indication were detected.

"During the third period of the first ten-year inspection interval all Reactor Vessel nozzle-to-vessel and all respective nozzle-to-pipe welds were examined using automated inspection equipment. Included in this examination were the 29" outlet nozzle-to-vessel and nozzle-to-pipe welds examined during the first period. The re-examination of these 29" outlet nozzles were performed meeting the 1989 ASME Section XI Code. Credit will be applied to the second interval, first period requirement for the 29" outlet nozzle-to-vessel welds under Table IWB-2500-1, Category B-D, Items B3.90 and B3.100. These examinations will not be performed during the first period of the second inspection interval."

Licensee's Proposed Alternative Examination: Automated re-examination of all the Reactor Vessel nozzle-to-vessel welds, including respective nozzle-to-pipe welds, will be deferred to the last period of the second ten-year inspection interval.

Evaluation: Paragraph IWB-2420(a), "Successive Inspections," states that the sequence of component examination established in the first inspection interval shall be repeated during successive inspection intervals, to the extent practical. Examinations or portions of examinations of the RPV welds should be performed at intervals not to exceed 10 years. Since the licensee re-examined the subject welds during the last period of the first inspection interval, 10 years will not be exceeded between successive examinations. Therefore, deferring the subject examinations until the third period of the second 10-year interval is acceptable for McGuire Nuclear Station, Unit 1.

Conclusions: The licensee's proposed alternative will provide an acceptable level of quality and safety since 10 years will not elapse between successive examinations. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), it is recommended that the proposed alternative be authorized.

3.1.2 Pressurizer (Does not apply to BWRs)

3.1.3 Heat Exchangers and Steam Generators (No relief requests)

3.1.4 Piping Pressure Boundary (No relief requests)

3.1.5 Pump Pressure Boundary (No relief requests)

3.1.6 Valve Pressure Boundary (No relief requests)

3.1.7 General (No relief requests)

3.2 Class 2 Components (No relief requests)

3.3 Class 3 Components (No relief requests)

3.4 Pressure Tests (No relief requests)

3.5 General (No relief requests)



#### 4. CONCLUSION

In the case of Request for Relief No. 92-03, it is recommended that the proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(i). The licensee's proposed alternative provides an acceptable level of quality and safety in lieu of the Code required examination.

The review of the *McGuire Nuclear Station, Unit 1, Second 10-Year Interval Inservice Inspection Program Plan*, Revision 0, and the licensee's response to the NRC's request for additional information has been completed. The review results showed that the *McGuire Nuclear Station, Unit 1, Second 10-Year Interval Inservice Inspection Program Plan*, Revision 0, appears to be in compliance with the Code and the Regulations.

## 5. REFERENCES

1. Code of Federal Regulations, Title 10, Part 50.
2. American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Division 1: 1986 Edition
3. *McGuire Nuclear Station, Unit 1, Second 10-Year Interval Inservice Inspection Program Plan*, Revision 0, submitted October 12, 1992.
4. NUREG-0800, *Standard Review Plans for the Review of Safety Analysis Reports for Nuclear Power Plants*, Section 5.2.4, "Reactor Coolant Boundary Inservice Inspection and Testing," and Section 6.6, "Inservice Inspection of Class 2 and 3 Components," July 1981.
5. Letter, dated June 17, 1993, V. Nerses (NRC) to T. C. McMeekin (Duke Power Company), containing request for additional information on the *McGuire Nuclear Station, Unit 1, Second 10-year Interval ISI Program Plan*.
6. Letter, dated September 1, 1993, T. C. McMeekin (Duke Power) to Document Control Desk (NRC), containing the response to the NRC's request for additional information.
7. USNRC Regulatory Guide 1.14, *Reactor Coolant Pump Flywheel Integrity*, Revision 1, August 1975.
8. USNRC Regulatory Guide 1.150, *Ultrasonic Testing of Reactor Vessel Welds During Preservice and Inservice Examinations*, Revision 1, February 1983.