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DUKE POWER

February 14, 1995

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 22055

Subject: McGuire Nuclear Station, Unit 2
Docket No 50-370
Request for Additional Information
TAC No. M87835

Dear Sir:

By letter dated October 12, 1994, we were informed that your staff with assistance from Idaho National Engineering Laboratory was reviewing and evaluating the Second 10 year ISI Program Plan and associated requests for relief from the ASME B&PV Code, Section XI requirements for McGuire Nuclear Station, Unit 2. This communication also advised that additional information was required in order for the staff to complete its review.

To this end, please find the attached Duke Power response to the questions posed by the above listed communication. Additional information in the form of isometric drawings and flow diagrams will be forwarded no later than April 1, 1995, as agreed in our telephone conference of December 7, 1995.

Please contact John Washam at (704) 875-4181 if questions arise concerning this submittal.

Very truly yours,

T.C. McMeekin

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Duke Power Company
Response to The
NRC Materials and Chemical Engineering Branch Division of Engineering
Request for Additional information To Complete Their Review
Of
The Duke Power Company Second 10 year Interval Inservice Inspection Plan McGuire Nuclear Station Unit 2
Docket Number 50-370

A. *The Licensee is requested to provide isometric and component drawings, showing all Code Class 1 and Class 2 piping, welds, components, and supports, at the earliest possible date. Also include system boundary diagrams for all ASME Code Class 1, Class 2 and Class 3 systems. These diagrams should define the ISI boundaries for all systems in the McGuire Nuclear Station Unit 2, Second 10-year Interval Inservice Inspection (ISI) Plan, Revision 0.*

Response:

As agreed in the telephone conference of December 7, 1994, between Duke Power and the NRC staff, Duke will provide the following additional drawings:

1. Color coded system flow diagrams defining the Inservice Inspection boundaries for Code Classes 1 and 2 piping welds, components, and supports.

2. Isometric drawings identifying Class 1 and 2 welds within the ISI boundaries

3. Component drawings necessary to locate Class 1 and 2 component welds.

4. Sketches for any hangers referenced in a request for relief.

The requested drawings will be provided by April 1, 1995.

B. *Provide an itemized list of components subject to examination during the second 10-year interval. This list should identify the specific component, the Code classification, the system, ASME Section XI Examination Category, Item Number, examination method, and ISI drawing number. The requested list, along with the requested isometric/component drawings, will permit the staff to determine if the extent of ISI examinations meets the applicable Code requirements.*

Response:

The McGuire Unit 2 Inservice Inspection (ISI) plan, submitted September 16, 1993, includes an itemized list of components subject to examination during the second 10 year interval. The information is sorted by Code Category, item number, and the outage/period in which the inspection is scheduled. For each Code item number, the weld or other component type, the examination method, drawing number, and system designation associated with the weld/component is provided. The Code classification is identified by the Code category/ Item numbers.

As agreed in the telephone conference of December 7, 1994 the total population of welds within the ISI boundaries may be obtained from the Isometric and component drawings to be provided.

C. *Address the degree of compliance with, or exceptions to, augmented examinations that have been established by the NRC when added assurance of structural reliability is deemed necessary. Examples of documents that address augmented examinations based on licensee commitments are listed below.*

(1) *Branch Technical Position MEB 3-1, "High Energy Fluid Systems, Protection Against Postulated Piping Failures in Fluid Systems Outside Containment;*

(2) *Regulatory Guide 1.150, Ultrasonic Testing of Reactor Vessel Welds During Preservice and Inservice examinations. (It is stated in Section 1.1.3 of the ISI Program Plan that the licensee will inspect the reactor pressure vessel welds in accordance with UNSNRC Regulatory Guide 1.150, Revision 1, to the extent committed to by Duke Power Company. Discuss the extent to which Duke Power Company is committed to complying with Regulatory Guide 1.150.)*

(3) *Code of Federal Regulations, Part 10, 50.55a(g)(6)(ii)(A), states that all licensees must augment their reactor vessel examinations by implementing once, during the inservice inspection interval in effect on September 8, 1992, the examination requirements for reactor vessel shell welds specified in Item B1.10 of Examination Category B-A of the 1989 Code.*

Response

(1) The McGuire Nuclear Station construction permit was issued prior to July 1, 1973. Therefore, Duke was not required to comply with MEB 3-1. Duke does, however, comply with much of MEB 3-1. Table 3-20 of the McGuire FSAR compares Duke's Pipe Rupture Criteria to NRC Branch Technical Position APCSB 3-1 (March 1973) and NRC Regulatory Guide (RG) 1.46 (May 1973). This comparison includes reference to MEB 3-1. Augmented Inservice Inspection is used as a part of the protection system for postulated pipe breaks Augmented inservice inspection to protect agains postulated piping failures will be inspected in accordance with SRG-78-01, revision 2, (Augmented Inservice Inspection for Pipe Rupture Protection), as referenced in the McGuire FSAR Paragraph 5.2.8.8. Eight locations in the 10 inch Safety Injection accumulator lines are identified in SRG-78-01 and Table 3-24 of the McGuire FSAR. These are listed in the Unit 2 ISI Plan as Item numbers G03.001.

(2) Duke Power complies with much of RG 1.150, Ultrasonic Testing of Reactor Vessel Welds During Preservice and Inservice Examinations. Duke Power's exceptions to RG 1.150 are discussed below:

> Revision 1 of RG 1.150 applies with the exceptions noted below. Sections numbers shown below refer to sections of RG 1.150.
>
> C.2.1: Section is not applicable. Mechanized scanning will be used.
>
> C.2.2: RG 1.150 is satisfactory as written, with the exception of calibration at scanning speed. Calibration and sizing will be accomplished in a static position. Mechanized scanning will be performed for flaw detection. Verification that the scanning sensitivity is adequate will be performed by demonstrating that the amplitude from the calibration reflectors meet DAC curve with the instrument set at scanning sensitivity and while moving the transducers across the reflectors at scanning speed.
>
> C.2.3: Not applicable
>
> C5: The RG will be met for the first 2 inches depth from the scanning surface (inner surface for vessel, outer surface for vessel head)

C.6.1: RG 1.150 is satisfactory as written, except Duke will record data at 20% of DAC only if the maximum amplitude of the indication exceeds 50% of DAC.

C.6.2: Same as C.6.1

C.6.2a: Duke records indications at scan intervals of 0.9x transducer width, plus minimum and maximum through wall and end points.

C.6.2b: RG 1.150 is satisfactory as written except Duke will record indications at 20%, 50%, and 100% DAC.

C.7a: RG 1.150 recommends that the best estimate of error band involved in sizing of flaws be included in the report. Duke takes exception to this recommendation on the basis that unless actual flaw dimensions are known, error band cannot be reliably calculated. No estimates of error band will be made.

JUSTIFICATION:

The RG requirements of Sections C.2.1, C.2.2, and C.2.3 do not apply to the type of inspection Duke will do (automated scanning with defects sized and recorded with the transducers in a static position). Section C.5 of the RG requires scanning with a transducer $\pm 15^{\circ}$ from perpendicular to the weld base metal interface. The most critical area for this scan is near the surface of the weld. Due to the long sound path required to scan the full thickness (up to 12 inches), it is impractical to inspect beyond the two inch near-surface area. Section C.6.2 of the RG requires recording of indications of 20% of DAC. This would produce a large volume of data on minor reflectors and an unacceptably large increase in inspection time. By recording 20% DAC information only if the peak amplitude exceeds 50% DAC, the volume of data and inspection time will be reduced, while the most useful data will still be recorded.

(3) On September 1, 1992, McGuire Unit 2 was in the 1st ISI Interval which was governed by the 1980 Edition of Section XI. During the last outage of the first interval, Duke Power ultrasonically examined 100% of the McGuire Unit 2 reactor vessel shell welds. In accordance with 10CFR paragraph 50.55a(g)(6)(ii)(A)(4) this meets the requirement for the augmented inspection. For welds which cannot meet the criteria for 90% coverage, an alternative examination will be submitted to the NRC in accordance with 10CFR paragraph 50.55a(g)(6)(ii)(A)(5)

(4) Duke Power has also committed to the following augmented inservice inspections at McGuire Unit 2.

2. Inservice inspection on the reactor coolant pump flywheels shall be performed in accordance with RG 1.14, revision 1. (McGuire FSAR paragraph 5.2.6.3). These inspections are Item Number G01.001 in the McGuire Unit 2 ISI plan.

3. Steam Generator Preheater Section Tube Examinations shall as a minimum comply with RG 1.83, revision 1 and the applicable McGuire Nuclear station Technical Specification. These inspections are listed under item number G02.001 in the McGuire Unit ISI plan.

4. VT-3 visual inspection of Modifications made to prevent tube vibration at the Feedwater nozzle of the Steam Generators. This is Item Number G04.001 in the McGuire Unit 2 ISI plan.

D. *Paragraph 10 CFR 50.55a(b)(2)(iv) requires that ASME Code Class 2 piping welds in the Residual Heat Removal (RHR), Emergency Core Cooling (ECC), and Containment Heat Removal (CHR) systems be examined. Portions of these systems are critical to the safe shut down of the plant and should not be completely excluded from inservice volumetric examination based on piping wall thickness. In consideration of the safety significance of the subject systems, has Duke Power Company planned and/or scheduled the examination of a sample of thin-wall piping welds in the subject Class 2 systems to assure continued system integrity? (A 7 1/2% sample is consistent with the extent of examination required for Class 2 piping.) If so, provide the number of thin-wall welds selected and the respective percents.*

Response:

Paragraph 10 CFR 50.55a(b)(2)(iv)(A) states "Appropriate Code Class 2 pipe welds in Residual Heat Removal systems, Emergency Core Cooling systems and Containment Heat removal Systems must be examined." As discussed in the telephone conference of December 7, 1994, the Code Editior to which the licensee is committed determines the appropriate welds to be examined.

The 1989 Edition of Section XI, Table IWC 2500-1, Categories C-F-1 and C-F-2, excludes welds < 3/8 inch nominal wall thickness for pipe > NPS 4 inches and welds < 1/5 inch nominal wall thickness for pipe ≥ NPS 2 inches and ≤ NPS 4 inches. At McGuire Unit 2, one system, Containment Spray (NS), addressed by Paragraph 10 CFR 50.55a(b)(2)(iv)(A), is fabricated from thin wall pipe. The 461 welds within the ISI boundaries of this system do not meet the criteria requiring inspection under Categories C-F-1 or C-F-2 and were not included in the ISI sample. These welds were included in the total weld count for categories C-F-1 and C-F-2 to which the 7.5% sampling rate is applied.

E. *Duke Power Company submitted a generic request for relief for McGuire Nuclear Station, Unit 2, by letter to the NRC dated December 2, 1993. In this letter, the licensee requested relief from Code examination coverage requirements. An ISI program plan revision, subsequent to the first interval, typically includes specific requests for relief for areas for which the preceding interval examinations have shown that the Code examination requirements cannot be met. The licensee has noted in its generic request for relief that a total of 328 ultrasonic examinations were performed for McGuire Nuclear Station, Unit 2, during the first inspection interval. Of the 328 ultrasonic examinations, 223 ultrasonic examination areas have documented limitations. This number of limited examinations is considered high and may have safety - significance depending upon the adequacy of the alternative examinations performed.*

To perform a complete review of the McGuire Nuclear Station Unit 2, Second 10-Year Interval Inservice Inspection (ISI) Plan, Revision 0, it will be necessary to review McGuire Nuclear Station, Unit 2, proposed alternatives for examination areas scheduled for the second 10-year interval that are known, from the first 10-year examinations, to have limitations. Where Code compliance will not be achieved, the information provided must include the extent of Code compliance and proposed alternatives that provide assurance of an acceptable level of quality and safety. Therefore, provide requests for relief specific to McGuire Nuclear Station, Unit 2, for examination areas with known limitations and that are scheduled for the second 10-year interval as well as for instances where the McGuire Nuclear Station, Unit 2, ISI program is not in strict compliance with the Code.

Response:

Duke Power's request for relief dated December 2, 1993, included statistics on limited examinations at McGuire Unit 1. It was noted that in Unit 1, 285 examinations were logged as limited but only 98 welds actually met the limited inspection criteria of having less than 90% coverage. Also as noted in the December 2, 1993, request of relief, Duke has not identified the welds in McGuire Unit 2 which received less than 90% examination coverage during the first interval. However, because of the similarities in the units, it can be expected that McGuire Unit 2 will have approximately the same or less number of limited examinations as Unit 1. Therefore, a significant number of the 223 welds listed as limited in the first Unit 2 interval will receive at least 90% coverage. The request for relief was a generic request which for McGuire Unit 2 addressed examinations performed during the first interval. Because the specific welds requiring limited examination during the second interval and the degree of limitation will not be identified until attempted examination, it is premature at this time to request relief for limited examinations. On December 8, 1994, Duke Power was notified that the December 2, 1993 request for relief should be withdrawn and the concern about limited welds will be handled by NRC inspectors from Region II. If the disposition of the question concerning limited welds affects second interval examinations, the plan will be addended accordingly.