Duke Power

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May 17, 2005

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Subject: Duke Energy Corporation
Catawba Nuclear Station, Unit 2
Docket Number 50-414
Request for Relief Number 04-CN-002
Reply to Request for Additional Information

Pursuant to 10 CFR 50.4, please find attached the subject reply. The format of the reply is to restate the NRC question, followed by Catawba's response. The NRC questions were transmitted via electronic mail dated December 7, 2004.

There are no regulatory commitments contained in this letter or its attachment.

If you have any questions concerning this material, please call L.J. Rudy at (803) 831-3084.

Very truly yours,

D.M. Jamil

LJR/s

Attachment

A047

xc (with attachment):

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REQUEST FOR ADDITIONAL INFORMATION
CATAWBA NUCLEAR STATION (Catawba) UNIT 2
TAC NO.: MC3057
DOCKET NOS.: 50-414

The staff is currently reviewing Duke Energy's April 19, 2004 request pertaining to limited weld examination coverage during its end-of-cycle 12 refueling outage. The staff finds that the information requested below is needed to continue its evaluation:

1. The licensee's Item Numbers listed in its submittal do not coincide with Item Numbers listed in the 1989 Edition of the ASME Section XI, Table IWC-2500 for Class 2 components. Please provide correct item numbers.

Duke Energy Corporation Response:

Item Numbers provided in the submittal, dated April 19, 2004, are Duke Power Company's unique inspection identifying numbers, based upon the 1989 ASME Section XI Code Table Item Numbers.

Example: Code Table Item Number B6.10
Duke Power ASME Section XI ISI Plan Item Number B06.010

The Item Numbers shown in the relief request are the correct Item Numbers. The Duke QA ISI FoxPro Database developed for the Catawba Second Interval ISI Plan used the Item Number format that was developed from a mainframe application for the Catawba First Interval ISI Program. The First Interval ISI Program was coded in a programming language known as PL/1. The Item Number scheme was standardized based on a formatting string that provided consistency for sorting and lookup of items. Item Numbers were padded with leading zeroes if needed to maintain a consistent number of digits to the left and right of the decimal.

2. The licensee's request states that the subject limited weld examinations that it refers to in its request were performed during the end-of-cycle 12 refueling outage (Spring 2003) yet one of the welds, 2ASWINJF-SH-HD appears to have been inspected in October, 2001. Please explain this inconsistency.

Duke Energy Corporation Response:

Weld ID# 2ASWINJF-SH-HD was inspected on October 30, 2001 during Cycle 12 operation. The inspection was performed eight days after the completion of the EOC11 outage. The inspection of this weld was reported in the EOC12 End of Cycle ISI Summary Report, which covered all inservice inspections from the EOC11 breaker close date (October 22, 2001) to the EOC12 breaker close date (March 27, 2003).

3. Did the licensee perform a surface examination on weld 2ASWINJF-SH-HD? Did the licensee consider performing a radiographic examination on weld 2ASWINJF-SH-HD?

Duke Energy Corporation Response:

A surface examination is not required by ASME Section XI for Weld ID# 2ASWINJF-SH-HD and one was not performed. Subsequent evaluation of this component shows that radiography could have been performed in lieu of ultrasonic examination. An access review was not performed on this component to ensure that adequate coverage could be obtained prior to the scheduled examination. (This discrepancy was entered into the corrective action program as Problem Investigation Process item G-05-00078.) The radiographic examination of Seal Water Injection Filter 2A Shell to Head Weld 2ASWINJF-SH-HD, Item # C01.020.012 will be performed at the next available opportunity in conjunction with the next filter change-out.

4. Is weld 2ASWINJF-SH-HD normally covered with insulation? What are the potential degradation mechanisms for this weld?

Duke Energy Corporation Response:

Weld number 2ASWINJF-SH-HD on the Seal Water Heat Exchanger 2A is not covered by insulation. The filter is located in a pit accessed from Elevation 577 of the Auxiliary Building. Periodic filter changeouts are performed and during these activities any leakage in the form of boron deposits would be evident. In addition, this filter is within the boundary of the reactor coolant inventory balance calculation. Any leakage would be indicated by this calculation which is required by Technical Specifications every 72 hours (this calculation is presently being performed every 24 hours).

The following have been considered as potential degradation mechanisms for this weld:

- corrosion fatigue,
- cast austenitic stainless steel aging;
- stagnant borated water intergranular stress corrosion cracking (IGSCC),
- general corrosion,
- microbiologically induced corrosion (MIC) attack of stainless steel welds in service water applications,
- cracking at inside diameter of stainless steel due to concentration of impurities during dryout,
- cracking at outside diameter of stainless steel due to chloride contamination,
- thermal fatigue cracking,
- fatigue failure of small-bore stainless steel lines,
- stress corrosion cracking (SCC) of control rod drive mechanism canopy seal welds,
- cracking in dead legs,
- inside diameter-initiated SCC of pressurized water reactor stainless steel piping in stagnant borated systems

Consideration of these mechanisms has been eliminated based on system application, particular weld location, or operating temperature and flow characteristics. The most relevant degradation mechanism for this weld is addressed below.

Weld 2ASWINJF-SH-HD is located between a SA182 F304 head forging containing the 2-inch inlet and outlet connections and the 4-inch NPS, SA312 TP304 filter shell. These materials are 18Cr-8Ni stainless steels and: a) have a high corrosion resistance with low contribution of corrosion products to the coolant, b) have good mechanical properties, and c) are highly weldable. Very few service-induced problems with stainless steel in pressurized water reactor coolant system applications have been observed in operating plants. There has been limited susceptibility to SCC due to chloride contamination and cracking in stagnant borated systems. However, chemistry controls on chlorides, fluorides, sulfides, and dissolved oxygen are mandated by plant Selected Licensee Commitments (SLC) and other administrative procedures at Catawba to ensure that any favorable conditions for SCC are precluded. In combination with the opposite filter train, this line is normally in service during operation; thus, concern with SCC of stagnant borated systems is not significant.

5. What are the potential degradation mechanisms for welds 2NI72-2, 2NI72-3, 2NI88-3?

Duke Energy Corporation Response:

A list of potential degradation mechanisms similar to that associated with weld 2ASWINJF-SH-HD (see item 4 above) has been considered for these welds.

Weld 2NI72-2 is located between an 8-inch butt welded tee and an 8-inch 90° elbow on the residual heat removal/intermediate head injection Train B flow path. Weld 2NI72-3 is adjacent to 2NI72-2 and is located between an 8-inch butt welded tee and an 8-inch x 6-inch concentric reducer. All of these fittings are wrought austenitic, seamless, stainless steel fabricated under material specification SA403 WP304. This material is an 18Cr-8Ni stainless steel that: a) has a high corrosion resistance with low contribution of corrosion products to the coolant, b) has good mechanical properties, and c) is highly weldable. Very few service-induced problems with stainless steel in pressurized water reactor coolant system applications have been observed in operating plants. There has been limited susceptibility with SCC at weld joints in stagnant borated water systems. Periodic recirculation of residual heat removal/intermediate head injection water in combination with chemistry controls on chlorides, fluorides, sulfides, and dissolved oxygen in primary systems at Catawba ensures that any favorable conditions for SCC are precluded. No other known degradation mechanisms are applicable to this material at this particular location within the system.

Weld 2NI88-3 is located between an 8-inch butt welded tee and 8-inch Schedule 160 piping. This weld location is the equivalent to the weld location for 2NI72-2, but is associated with residual heat removal/intermediate head injection Train A. The tee is wrought austenitic, seamless, stainless steel fitting fabricated under material specification SA403 WP304. The piping is SA376 TP304 material. These materials are 18Cr-8Ni stainless steels and the conclusions associated with welds 2NI72-2 and 2NI72-3 also apply to this weld.

6. The Table in the licensee's relief request lists welds 2NI72-2, 2NI72-3, and 2NI88-3 as part of the NI system but in two other locations in the licensee's submittal it lists a weld 2NI92-4. Please clarify.

Duke Energy Corporation Response:

In Section VI Justification For Granting Relief:
In the second paragraph: 2NI92-4 should read 2NI72-2.

In the fourth paragraph: 2NI92-4 should read 2NI72-2.

7. Category C-F-1 Item 5.11 requires a Volumetric and a Surface examination. Did the licensee perform a surface examination on welds 2NI72-2, 2NI72-3, 2NI88-3, and 2CF100-60 during the second interval? What were the results?

Duke Energy Corporation Response:

Yes, a surface examination was performed on these welds during the second interval. The status was clear.

8. The licensee uses abbreviations of CF and NI in its submittal. Please spell out the full names of the CF and NI systems.

Duke Energy Corporation Response:

CF Main Feedwater System
NI Safety Injection System (Intermediate Head Injection System)

9. Is there any history of degradation in the welds referenced in the licensee's relief request? Is there any history of degradation in the NI or CF system welds at Catawba or similar plants?

Duke Energy Corporation Response:

There is no history of degradation in the NI or CF system welds at Catawba. A limited number of failures due to SCC in the industry have been observed in the past on stainless steel welds attributed to sensitized welding and high levels of chlorides, fluorides, and dissolved oxygen. However, established limits at Catawba on primary and secondary chemistry, as well as controls on welding filler material consistent with Regulatory Guide 1.31, limit the susceptibility of these welds to SCC.