

From: "Larry E Nicholson" <lenicholson@duke-energy.com>
To: David LaBarge <DEL@nrc.gov>
Date: 4/30/01 5:09PM
Subject: U2 RVH Repair Overview

Dave,

Looks like at this point we will need 4 relief requests:

- Alloy 690 (similar to units 1 & 3)

- NDE Relief (similar to units 1 & 3)

- Relief from some specific weld process requirements that have been deleted from later code addenda or Code Case N-432

- Relief involving an engineered lack of fusion due to the weld process at interface between the end of nozzle and RV head base material.

We intend to repair using newly developed remote tooling, allowing huge dose savings. Repairs to be in accordance with provisions of ASME Section III, Subsection NB, 1989 Edition, No Addenda, except as approved in the above relief requests. The general nature of our repair involves:

- NDE to define repair scope

- ID roll to expand nozzle above repair area

- Machine out lower CRDM stub

- PT bored region of Alloy 600 nozzle

- Prep surface for welding

- Complete temper bead weld process

 - Preheat

 - Complete weld

 - 4 hour temp soak

 - Prep for NDE

 - NDE

7. Resolve any NDE flaws

Larry

CC: "Melvin L Arey Jr" <mlarey1@duke-energy.com>, "Calhoun W Hendrix Jr" <chendrix@dukeengineering.com>, "Michael R Robinson" <mrrobins@duke-energy.com>

ONS 2 NDE Preliminary Summary Results

The purpose of this note is to provide a brief summary of the nondestructive examinations and the examination results that have been performed on the ONS Unit 2 leaking CRDM nozzles. The pre-repair NDE performed on Unit 2 CRDM nozzles are the same set of inspections and examinations that were performed on both the Unit 1 and Unit 3 CRDM nozzles. This set of inspections consisted of 5 different inspections. Those inspections were:

1. Visual inspection, VT-2, of all 69 CRDM nozzles and the bare surface area of the RPV closure head.
2. Dye penetrant, PT, inspection of the portion of the CRDM nozzle that penetrates into the head plenum area. A 3" wide by 1" deep band of the nozzle to J-groove weld interface is inspected. This inspection was performed on those nozzles suspected as leaking.
3. Eddy Current Testing, ECT, was performed on suspected leaking nozzles. The inspection area is from 6" above the J-groove weld to the bottom or end of the nozzle.
4. Ultrasonic ,UT, inspection was performed to length size and depth sizes any ID or OD axial indications in the suspected leaking nozzles.
5. Ultrasonic, UT, inspection to detect and size any circumferential cracks was performed on suspected leaking nozzles.

All NDE data has been collected for the Unit 2 suspected leaking nozzles. The following preliminary conclusions can be made:

1. The Unit 2 NDE inspection results are very similar to the NDE results found on both Unit 1 and Unit 3.
2. The Unit 2 results have not identified any outliers or anything different from Unit 1 and 3. Cracks are due to PWSCC.
3. The majority of the indications on Unit 2 are OD initiated, originate at the nozzle to weld interface and penetrate into the nozzle base materials. There are several PT indications on the J-groove weld surface
4. Indications are primarily axial in orientation and appear in locations of predicted higher stress at the uphill and downhill locations.
5. A total of 37 indications have been mapped for the 4 suspected leaking nozzles. 36 of the indications are axial in orientation and 1 is circumferential in orientation. Nozzle 18 is the nozzle with the circumferential indication. Nozzle 18 also was determined to have a 0.3" lack of bond.
6. The circumferential indication is located above the J-groove weld. The above the J-groove weld is OD initiated and is about 1.25" in length and about 0.1" in depth. The indication is located just above the weld in the heat affected zone, HAZ, and located near the uphill location. Three axial indications are also located near the circumferential indication location.
7. Like Unit 3, each nozzle on Unit 2 has multiple axial indications. Nozzle 4 has 17 indications; nozzle 6 has 2 indications; nozzle 18 has 15 indications; and nozzle 30 has 3 indications.
8. Unlike Unit 3, the indications on Unit 2 are much shallower and not as long or as

deep. Unit 2 does not have any CRDM through wall indications.

9. Range of depths for the Unit 2 indications is from minimally detectable to 0.2".
10. Range of lengths for the Unit 2 indications is from 0.1" to 2.3".
11. The repair method for Unit 2 suspected leaking nozzles involves establishing a new pressure boundary. The repair method permanently removes all axial or circumferential cracks in the nozzle base material identified by the NDE.

E-mail message from D. E. LaBarge, Senior Project Manager, NRR, to:

Mr. W. R. McCollum, Jr.
Vice President, Oconee Site
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SUBJECT: OCONEE NUCLEAR STATION, UNIT 2 RE: REQUESTS FOR RELIEF NOS.
2001-06, 2001-07, AND 2001-08 (TAC NOS. MB1895, MB1896, AND MB1917,
RESPECTIVELY)

By letters dated May 7, 8, and 13, 2001, you requested relief from various requirements of the American Society of Mechanical Engineers (ASME) Code, Section XI as stated in the submittals. These reliefs are for activities associated with the repair of flaws in Oconee Nuclear Station, Unit 2, Control Rod Drive Mechanism Nozzle Nos. 4, 6, 18, and 30 nozzles and welds that resulted in boron leakage from the Reactor Coolant System at the reactor vessel head. Supplemental information was supplied by letters dated May 12, 15, 16, 22 (two letters), and 23, 2001. It has been determined that the staff must determine the acceptability of these requests for relief prior to entry into Mode 4.

The purpose of this message is to inform you that the Office of Nuclear Reactor Regulation staff has performed a comprehensive review of these three requests for relief and found the proposed alternatives to be acceptable as described in the appropriate submittals for Requests for Relief that you designated as Nos. 2001-06, 2001-07, and 2001-08.

We are presently in the process of writing the respective safety evaluations and routing them through our concurrence chain. However, this process cannot be completed prior to entry of the Unit 2 reactor into Mode 4 that is scheduled to begin on May 25, 2001. Consequently, this message informs you of the status of our review of the alternatives contained in the requests for relief and of our intent to issue the three safety evaluations as quickly as they can be processed.

Docket No. 50-270

cc: R. Haag, Rgn II
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