



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 24, 2012

MEMORANDUM TO: Douglas A. Broaddus, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

FROM: Araceli T. Billoch Colón, Project Manager *Araceli T. Billoch Colón*
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1 – VERBAL
AUTHORIZATION OF RELIEF REQUEST I3R-09 FOR REACTOR
VESSEL CLOSURE HEAD PENETRATION NOZZLES REPAIR
INSERVICE INSPECTION PROGRAM – THIRD 10-YEAR INTERVAL
(TAC NO. ME8523)

By letter dated May 3, 2012, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12128A007), Carolina Power and Light (CP&L), the licensee for Shearon Harris Nuclear Power Plant, Unit 1, submitted Relief Request I3R-09, Reactor Vessel Closure Head Nozzle Repairs Inservice Inspection Program – Third 10-year Interval. Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a, CP&L requested the U.S. Nuclear Regulatory Commission (NRC) approval of an alternative for the repair examination requirements of the American Society of Mechanical Engineers (ASME) Code associated with the reactor vessel closure head nozzle penetrations.

By letter dated May 18, 2012 (ADAMS Accession No. ML12139A407), the licensee submitted its response to the NRC's staff request for additional information. The licensee proposed to use the alternatives in ASME Code, Section XI, Code Case N-638-1 and Code Case N-729-1 to complete the repair procedures and non-destructive evaluation examinations.

The NRC staff reviewed the licensee's submittal and determined that the proposed alternative will provide an acceptable level of quality and safety. During a conference call with the licensee on May 24, 2012, the NRC staff granted a verbal authorization on the use of Relief Request I3R-09 in accordance with 10 CFR 5.55a(a)(3)(i). The script for the verbal authorization is enclosed.

NRC Participants:

D. Broaddus
D. Alley
J. Tsao
A. Billoch Colón

Licensee Participants:

J. Caves
W. Holly
D. Wasky

Docket No. 50-400

Enclosure: Verbal Authorization Script

VERBAL AUTHORIZATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
FOR RELIEF REQUEST I3R-09: REACTOR VESSEL CLOSURE HEAD PENETRATION
NOZZLES REPAIR INSERVICE INSPECTION PROGRAM – THIRD 10-YEAR INTERVAL
SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

Script read by David Alley, Acting Chief of the Office of Nuclear Reactor Regulation's Piping and Non-Destructive Examination Branch on May 24, 2012, to the staff of Carolina Power & Light Company (CP&L), with CP&L staff attendance coordinated by Araceli T. Billoch Colón from the NRC.

By letter to the U.S. Nuclear Regulatory Commission (NRC) dated May 3, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12128A007), as supplemented by letter dated May 18, 2012, (ADAMS Accession No. ML12139A407) Carolina Power & Light Company (the licensee), doing business as Progress Energy Carolinas Inc., requested relief from the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code for the repair of the degraded reactor vessel closure head penetration nozzles at Shearon Harris Nuclear Power Plant, Unit 1 (Harris). In Relief Request (RR) I3R-09, the licensee proposed to use the inside diameter temper bead welding method to repair the degraded nozzles Numbers 5, 17, 38, and 63 in accordance with ASME Code Case N-638-1 and N-729-1 in lieu of requirements of the ASME, Sections III and XI, and original Construction Code.

Harris requested relief in accordance with the *Code of Federal Regulations* (10 CFR) 10 CFR 50.55a(a)(3)(i) from the following:

- ASME Code Case N-638-1 requires direct measurement of interpass temperature. The alternative is to use heat flow calculation to estimate the interpass temperature.
- ASME Code Case N-638-1 requires a band around the welded area to be examined. The alternative is that the licensee will examine 70% of the weld surface with ultrasonic examination.
- ASME Code Case N-638-1 requires non-destructive evaluation (NDE) 48 hours after the weld is in ambient temperature. The proposed alternative is to allow NDE 48 hours after the third layer is completed.
- ASME Code, Section III, NB-5330(b) requires that indications characterized as cracks, lack of fusion, or incomplete penetration are unacceptable regardless of length. The proposed alternative is to assume a 0.1 inch flaw at the triple point junction and demonstrate that the growth of the flaw will not affect the structural integrity of the remnant nozzle and the new weld.
- ASME Code, Section XI, IWA-3300 requires characterization of flaws in the J-groove welds. The licensee proposed not to characterize the flaws in the J-groove welds.

Enclosure

Instead, the licensee assumed the J-groove welds have unacceptable flaws and performed flaw evaluation to demonstrate the structural integrity of the vessel head.

- ASME Code, Section III, NB-5245 requires incremental and final surface examination of partial penetration welds. The licensee proposed to perform a final liquid penetrant test and an ultrasonic examination of the welds and adjacent areas according to Figure 3 of the May 3, 2012, submittal to verify that defects have not been induced in the ferritic low alloy steel reactor vessel closure head penetration nozzles base material due to the welding process.

The NRC staff reviewed each of the above alternatives and found them to be acceptable.

In accordance with ASME Code, Section XI, IWB-3600, the licensee performed flaw evaluations of the J-groove weld, the remaining portion of the Alloy 600 nozzle, and a postulated anomaly at the triple point location in the new attachment weld. Based on its flaw evaluations, the licensee concluded that the design life of the repair is 14.8 effective full-power years. The staff reviewed the licensee's flaw evaluations and finds that the licensee's flaw evaluations satisfy the requirements of the ASME Code, Section XI, IWB-3600.

The licensee also performed a general corrosion analysis of the low alloy reactor vessel head at the bore of the repaired nozzles. The staff finds that the general corrosion of the bore of the reactor vessel head is acceptable for 40 years.

The NRC staff has reviewed the licensee's proposed repair procedures and nondestructive examination and finds that the proposed repair procedures and nondestructive examination either have satisfied the ASME Code, Section XI, Code Case N-638-1, and Code Case N-729-1 with conditions set forth in 10 CFR 50.55a(g)(6)(ii)(D), or have provided the acceptable quality and safety.

The NRC staff has determined that the proposed repair will restore pressure boundary and provide reasonable assurance that the structural integrity of the repaired reactor vessel closure head penetration nozzles will be maintained for a period of time that exceeds the inspection interval mandated by ASME Code Case N-729-1 with conditions set forth in 10 CFR 50.55a(g)(6)(ii)(D).

As set forth above, the NRC staff determines that the proposed alternative provides an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(a)(3)(i).

Script read by Douglas A. Broaddus, Chief of the Office of Nuclear Reactor Regulation's Plant Licensing Branch II-2 during the same conference call to CP&L.

As Chief of the Office of Nuclear Reactor Regulation's Plant Licensing Branch II-2, I concur with the Piping and Non-Destructive Examination Branch's conclusions.

Effective May 24, 2012, the NRC staff authorizes the proposed alternative at Harris for the reactor vessel head penetration repair described in RR I3R-09 until either the designed life of

14.8 effective full-power years is reached, another alternative is approved by the NRC, or the reactor vessel head is replaced, whichever occurs earlier. The inspection provision of RR I3R-09 is authorized until the end of the third 10-year inservice inspection interval that ends on May 1, 2017.

All other ASME Code, Section XI, requirements for which relief was not specifically requested and authorized by the NRC staff remain applicable, including the third party review by the Authorized Nuclear Inservice Inspector.

This verbal authorization does not preclude the NRC staff from asking additional clarification questions regarding RR I3R-09 while preparing the subsequent written safety evaluation.

May 24, 2012

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