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

October 27, 2016

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

FROM: Martha Barillas, Project Manager
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-16, FOR REACTOR VESSEL CLOSURE HEAD PENETRATION NOZZLE REPAIR TECHNIQUE, INSERVICE INSPECTION PROGRAM – THIRD 10-YEAR INTERVAL (CAC NO. MF8487)

By letter dated October 19, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16294A218), as supplemented by letters dated October 21, 2016 and October 24, 2016 (ADAMS Accession Nos. ML16295A159 and ML16298A133, respectively), Duke Energy Progress, LLC (the licensee) submitted Relief Request I3R-16, Reactor Vessel Closure Head Nozzle Repair Technique, Inservice Inspection Program – Third 10-Year Interval for Shearon Harris Nuclear Power Plant, Unit 1. Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a, the licensee 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) Boiler and Pressure Vessel Code (ASME Code) associated with Reactor Vessel Closure Head Penetration Nozzle Numbers 30, 40, and 51.

The licensee proposed to use the alternatives in ASME Code, Section XI, Code Case N-638-1, "Similar and Dissimilar Metal Welding Using Ambient temperature Machine GTAW Temper Bead Technicque, Section XI, Division 1," and Code Case N-729-1, "Alternative Examination Requirements for PWR [Pressurized-Water Reactor] Reactor Vessel Upper Heads With Nozzles Having Pressure-Retaining Partial-Penetration Welds Section XI, Division 1," to complete the repair procedures and nondestructive 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 October 27, 2016, the NRC staff granted a verbal authorization on the use of Relief Request I3R-16, in accordance with 10 CFR 50.55a(z)(1). The script for the verbal authorization is enclosed.

| NRC Participants: | | Licensee Participants: | |
|---|---|---|---|
| J. Dion | S. Rose | T. Hamilton | B. Waldrep |
| M. Barillas | M. Riches | S. O'Connor | F. Dean |
| J. Tsao | | J. Caves | L. Martin |
| D. Alley | | S. McDaniel | |

Docket No. 50-400

Enclosure:
Verbal Authorization Script

VERBAL AUTHORIZATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

FOR RELIEF REQUEST I3R-16

ALTERNATE REPAIR OF REACTOR VESSEL CLOSURE HEAD PENETRATION NOZZLES

DUKE ENERGY PROGRESS, LLC

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

DOCKET NO. 50-400

## 1.0 Technical Evaluation Read by David Alley, Chief of the Component Performance, Non-Destructive Examination, and Testing Branch, Office of Nuclear Reactor Regulation

By letter dated October 19, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16294A218), as supplemented by letters dated October 21, 2016 (ADAMS Accession No. ML16295A159), and October 24, 2016 (ADAMS Accession No. ML16298A133), Duke Energy Progress, LLC (the licensee) submitted Relief Request (RR) I3R-16 for the repair of degraded Reactor Vessel Closure Head Penetration Nozzle Numbers 30, 40, and 51 at the Shearon Harris Nuclear Power Plant, Unit 1. In Relief Request I3R-16, the licensee proposed to use the inside diameter temper bead welding method to repair reactor vessel closure head nozzles in accordance with American Society of Mechanical Engineers (ASME) Code Cases N-638-1 and N-729-1 in lieu of requirements of the ASME, Sections III and XI, and original Construction Code.

The licensee made this request in accordance with the requirements of 10 CFR 50.55a(z)(1) on the basis that the proposed alternative repair will provide an acceptable level of quality and safety.

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the proposed repair method and examinations; the evaluation of a postulated flaw in the J-groove weld that propagates into the reactor vessel head; the evaluation of a postulated flaw at the triple point; the evaluation of loose parts from the degraded J-groove weld falling into the reactor vessel; the corrosion evaluation of the bore of the reactor vessel head penetration exposing to primary coolant; available reinforcement area calculations; and the flaw evaluation of primary water stress corrosion cracking in the remnant nozzle, without considering the abrasive water jet machining remediation.

The NRC staff noted that the licensee derived a design life of 2.2 effective full power years for the repaired reactor vessel closure head nozzles without the abrasive water jet machining remediation. The licensee is required to examine all nozzles, including the subject nozzles, during every subsequent refueling outage, which is every 18 months, in accordance with ASME Code Case N-729-1 as conditioned in Title 10 of the *Code of Federal Regulations*, Part 50, Section 50.55a(g)(6)(ii)(D).

The NRC staff finds that the licensee's examination interval of the repaired nozzles is shorter than the design life, therefore, is acceptable to adequately monitor the condition of the repaired nozzles. The NRC staff further finds that the licensee's flaw evaluations provide assurance that should flaws occur, the structural integrity of the repaired nozzles and reactor vessel head will be maintained. The NRC staff determines that the proposed repair will restore the primary system pressure boundary and provide reasonable assurance that the structural integrity of the repaired reactor vessel closure head and repaired Nozzle Numbers 30, 40, and 51 will be maintained for a period of time that exceeds the inspection interval mandated by ASME Code Case N-729-1 as conditioned in 10 CFR 50.55a(g)(6)(ii)(D).

## 2.0 NRC Staff Conclusion Read by Jeanne Dion, Acting Branch Chief, Plant Licensing Branch II-2, Office of Nuclear Reactor Regulation

As Acting Chief of Plant Licensing Branch II-2, I concur with the Component Performance, Non-Destructive Examination, and Testing Branch's determinations.

The NRC staff concludes that Relief Request I3R-16 will provide an acceptable level of quality and safety for the reactor vessel head and repaired Nozzle Numbers 30, 40, and 51. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(1) and is in compliance with the requirements of the ASME Code, Section XI, ASME Code Case N-638-1 as conditioned in Regulatory Guide 1.147, and ASME Code Case N-729-1, as conditioned by 10 CFR 50.55a(g)(6)(ii)(D). Therefore, as of October 27, 2016, the NRC authorizes the use of Relief Request I3R-16 for Nozzle Numbers 30, 40, and 51 at Shearon Harris Nuclear Power Plant, Unit 1, for the remaining period of the third 10-year inservice inspection interval, which ends on May 1, 2017.

All other requirements of ASME Code, Section XI, and 10 CFR 50.55a(g)(6)(ii)(D) 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 questions and clarifications regarding Relief Request I3R-16 while preparing the subsequent written safety evaluation.

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 October 27, 2016, the NRC staff granted a verbal authorization on the use of Relief Request I3R-16, in accordance with 10 CFR 50.55a(z)(1). The script for the verbal authorization is enclosed.

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Docket No. 50-400

Enclosure:
Verbal Authorization Script

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| NAME | MBarillas | BClayton (PBlechman for) | DAlley | JDion | MBarillas |
| DATE | 10/27/16 | 10/27/16 | 10/27/16 | 10/27/16 | 10/27/16 |

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