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

October 20, 2017

Mr. James J. Hutto
Regulatory Affairs Director
Southern Nuclear Operating Company, Inc.
P.O. Box 1295 / Bin - 038
Birmingham, AL 35201-1295

SUBJECT: EDWIN I. HATCH NUCLEAR PLANT, UNIT NOS. 1 AND 2 – RELIEF REQUESTS ISI-RR-16, ISI-RR-17, ISI-RR-21, AND ISI-RR-22 FOR RELIEF FROM INSERVICE INSPECTION REQUIREMENTS (CAC NOS. MF9027, MF9030, MF9031, MF9034, MF9035, AND MF9036; EPID NOS. L-2016-LLR-0008, L-2016-LLR-0010, L-2016-LLR-0011, AND L-2016-LLR-0009)

Dear Mr. Hutto:

By letter dated December 27, 2016, as supplemented by letter dated May 31, 2017, the Southern Nuclear Operating Company (SNC, the licensee) submitted relief requests ISI-RR-13, -14, -15, -16, -17, -18, -19, -21, -22, -23, and -24 requesting relief from certain inservice inspection (ISI) requirements of Section IX of the 2001 Edition through the 2003 Addenda of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code for the Edwin I. Hatch Nuclear Plant (HNP), Unit Nos. 1 and 2.

For four of the eleven requests, ISI-RR-16, -17, -21, and -22, the licensee requested relief from specified BPV Code requirements pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(g)(5)(iii), on the basis that the code requirements are impractical. Specifically, the licensee requested relief from the required ISI of certain reactor pressure vessel and residual heat removal heat exchanger welds specified in the ASME BPV Code, Section XI, Table IWB-2500-1 and Table IWC-2500-1.

The U.S. Nuclear Regulatory Commission (NRC) staff has completed its review of relief requests ISI-RR-16, -17, -21, and -22, and concludes that SNC has adequately addressed all of the regulatory requirements and that the ASME BPV Code requirements are impractical for the subject welds. Therefore, the NRC staff grants relief for requests ISI-RR-16, -17, -21, and -22 in accordance with 10 CFR 50.55a(g)(6)(i) for the fourth 10-year ISI program interval, which began on January 1, 2006, and ended on December 31, 2015. The NRC staff's safety evaluation is enclosed.

All other ASME BPV Code requirements for which relief was not specifically requested and authorized herein by the NRC staff remain applicable.

The NRC staff granted relief request ISI-RR-15 by letter dated March 29, 2017. The NRC staff's review of relief requests ISI-RR-13, -14, -18, -19, -23, and -24 will be addressed in a separate correspondence.

If you have any questions, please contact the Project Manager, Randy Hall, at 301-415-4032 or by e-mail at Randy.Hall@nrc.gov.

Sincerely,

Michael T. Markley, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-321 and 50-366

Enclosure:
Safety Evaluation

cc w/encl: Distribution via Listserv

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

# SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

# RELIEF REQUESTS ISI-RR-16, -17, -21, AND -22

# REGARDING INSERVICE INSPECTION OF REACTOR PRESSURE VESSEL AND

# RESIDUAL HEAT REMOVAL HEAT EXCHANGER WELDS

# EDWIN I. HATCH NUCLEAR PLANT, UNIT NOS. 1 AND 2

# SOUTHERN NUCLEAR OPERATING COMPANY

# DOCKET NOS. 50-321 AND 50-366

## 1.0 INTRODUCTION

By letter dated December 27, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16362A273), the Southern Nuclear Operating Company (SNC, the licensee) submitted relief requests ISI-RR-13, -14, -15, -16, -17, -18, -19, -21, -22, -23, and -24, requesting relief from certain inservice inspection (ISI) requirements of Section IX of the 2001 Edition through the 2003 Addenda of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code for the Edwin I. Hatch Nuclear Plant (HNP), Units 1 and 2. By letter dated May 31, 2017 (ADAMS Accession No. ML17151A914), the licensee provided supplemental information related to relief requests ISI-RR-16, -17, -21, and -22.

Relief requests ISI-RR-16, -17, -21, and -22 have been reviewed by the U.S. Nuclear Regulatory Commission (NRC) staff and are the subject of this safety evaluation. For these four requests, the licensee requested relief from specified BPV Code requirements pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(g)(5)(iii), on the basis that the code requirements are impractical. Specifically, the licensee requested relief from the required ISI of certain reactor pressure vessel and residual heat removal heat exchanger welds specified in the ASME BPV Code, Section XI, Table IWB-2500-1 and Table IWC-2500-1.

The NRC staff granted relief request ISI-RR-15 by letter dated March 29, 2017 (ADAMS Accession No. ML17062A832). The staff's review of relief requests ISI-RR-13, -14, -18, -19, -23, and -24 will be addressed in separate correspondence.

## 2.0 REGULATORY EVALUATION

The licensee requested relief from the ASME BPV Code, Section XI, in accordance with 10 CFR 50.55a(g)(5)(iii). ASME BPV Code Class 1, 2, and 3 components must meet the requirements of Section XI of the ASME BPV Code as required by 10 CFR 50.55a(g)(4), which states, in part, that:

> Throughout the service life of a boiling or pressurized water-cooled nuclear power facility, components (including supports) that are classified as ASME Code Class 1, Class 2, and Class 3 must meet the requirements, except design and access provisions and preservice examination requirements, set forth in Section XI of editions and addenda of the ASME BPV Code...

The licensee may request relief from portions of the ASME BPV Code as provided in 10 CFR 50.55a(g)(5)(iii), which states, in part, that:

> If the licensee has determined that conformance with a Code requirement is impractical for its facility the licensee must notify the NRC and submit, as specified in §50.4, information to support the determinations. Determinations of impracticality in accordance with this section must be based on the demonstrated limitations experienced when attempting to comply with the Code requirements during the inservice inspection interval for which the request is being submitted.

The NRC staff may grant relief from ASME BPV Code requirements as provided in 10 CFR 50.55a(g)(6)(i), which states that:

> The Commission will evaluate determinations under paragraph (g)(5) of this section that code requirements are impractical. The Commission may grant such relief and may impose such alternative requirements as it determines are authorized by law, will not endanger life or property or the common defense and security, and are otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

Given that 10 CFR 50.55a(g)(4) requires the use of the ASME BPV Code, Section XI, that 10 CFR 50.55a(g)(5)(iii) permits the licensee to request relief, and that 10 CFR 50.55a(g)(6)(i) permits the NRC staff to grant relief for requests submitted under 10 CFR 50.55a(g)(5), the NRC staff finds that, subject to the following technical evaluation, the licensee may request relief from the ASME BPV Code, Section XI, and the NRC staff has the regulatory authority to grant the requested relief.

Additionally, requests for relief made in accordance with 10 CFR 50.55a(g)(5)(iii) must be submitted to the NRC no later than 12 months after the expiration of the initial or subsequent 120-month inspection interval for which relief is sought. The licensee submitted relief requests ISI-RR-16, -17, -21, and -22 on December 27, 2016, for the fourth 10-year ISI interval, which is not later than 12 months after the end of the interval on December 31, 2015.

## 3.0 TECHNICAL EVALUATION

The NRC staff's evaluation of the licensee's requests for relief reviewed: (1) whether the ASME BPV Code requirement is impractical; (2) whether the imposition of the ASME BPV Code required inspections would result in a burden to the licensee; and (3) whether the licensee's examination coverage provides reasonable assurance of structural integrity and leak tightness of the subject welds.

ASME Code of Record

The code of record for the fourth 10-year ISI interval at HNP, Units 1 and 2, is the ASME BPV Code, Section XI, 2001 Edition with 2003 Addenda. The fourth 10-year ISI interval began on January 1, 2006, and ended on December 31, 2015.

3.1 ISI-RR-16 (HNP, Units 1 and 2)

ASME Code Component Identification

| | |
|---|---|
| ASME Code Class: | ASME Code Class 1 |
| Examination Category: | B-D |
| Item Numbers: | B3.90 |
| Component: | Nozzle-to-Vessel Welds |
| Weld Numbers: | 1B11\1N1A, 1B11\1N2A, 1B11\1N2B, 1B11\1N2D, 1B11\1N2E, 1B11\1N2G, 1B11\1N2H, 1B11\1N2K, 1B11\1N2C, 1B11\1N2F, 1B11\1N2J, 1B11\1N3A, 1B11\1N3B, 1B11\1N3C, 1B11\1N4B, 1B11\1N4C, 1B11\1N4D, 1B11\1N5A, 1B11\1N5B, 1B11\1N9, 2B11\2N1A, 2B11\2N2C, 2B11\2N2E, 2B11\2N2H, 2B11\2N4A, 2B11\2N4C |

ASME Code Requirements

The examination requirement for nozzle-to-vessel welds (Item B3.90) is 100 percent volumetric examination of the volumes shown in ASME BPV Code, Section XI, Table IWB-2500-1 and Figures IWB-2500-7(a) through (d).

An alternative approved for use by the NRC in Regulatory Guide (RG) 1.147, Revision 17, "Inservice Inspection Code Case Acceptability, Section XI, Division 1," states that a reduction in examination coverage due to part geometry or interference for any ASME Class 1 or 2 weld is acceptable provided that the reduction is less than 10 percent, i.e., greater than 90 percent examination coverage is obtained.

Licensee's Relief Request

For the subject welds, the licensee achieved less than 90 percent coverage of the required examination volume, due to limitations as indicated in Tables RR-16-1 and RR-16-2 of Enclosure 4 of the licensee's December 27, 2016, letter, and is requesting relief from the ASME BPV Code requirements described above.

Burden Caused by Compliance

The licensee stated that increasing the coverage would require replacing the reactor pressure vessel (RPV) nozzles with a new design.

Licensee's Basis for Relief

The licensee stated, in part:

> Coverage was limited due to the geometry of the nozzles and in some cases the proximity of other nozzles or components, as defined in the attached tables. In

general, the barrel-type nozzle configuration [Section XI Figure IWB-2500-7(a)] had less coverage than the flange-type nozzle configuration [Section XI Figure IWB-2500-7(b)]. Figure RR-16-1[1] shows the 1N1 (flange-type nozzle) while Figure RR-16-2 shows the 1N2 (barrel-type nozzle) for comparison. Figure RR-16-3 has also been included to show the Unit-1 limitations related to the insulation support ring for the Reactor Recirculation nozzles.

In most cases, examination for axially-oriented flaws could not be performed from the nozzle side of the weld due to the configuration of the nozzle; however, the presence of an axial flaw does not have a significant impact on the structural integrity of a nozzle weld. The examination of circumferentially-oriented flaws was typically obtained for these welds. Selected limitations existed due to the insulation support ring on Unit-1 and adjacent nozzles limited certain examinations (the tables discuss the specific limitations). A significant volume of these welds along with the visual (VT-2 examinations) associated with the Class 1 leakage test performed each refueling outage provide adequate assurance that any flaw(s) that might have propagated through the subject welds are identified and repaired prior to returning the plant to power operation. During operation, leakage can be determined by the leakage detection system (LDS) located in the drywell (as described in the Hatch FSAR Sections 4.10 for Unit-1 and 5.2.7 for Unit-2)...

NRC Staff Evaluation

The ASME BPV Code requires 100 percent volumetric examination of ASME Code Class 1 full penetration nozzle-to-vessel welds for all RPV nozzles. The licensee performed the examinations from the outside of the nozzles and was able to examine approximately 32 percent to 89 percent of the ASME BPV Code-required volumes for the welds listed in Table RR-16-1 (Unit 1) and Table RR-16-2 (Unit 2). The NRC staff reviewed the sketches and technical descriptions provided by the licensee, and found that the examinations of the subject nozzles were limited by the nozzle configuration, proximity of a welded support ring/bracket, and interference from adjacent nozzles. Therefore, the NRC staff finds that it would be impractical for the licensee to appreciably increase coverage to meet the ASME BPV Code requirements.

For the licensee to achieve 100 percent volumetric coverage, the subject nozzles would have to be redesigned and modified, which would result in a prohibitively expensive capital cost and extended outage time for the licensee. Therefore, compliance with the ASME BPV Code requirement to perform 100 percent volumetric examinations of the subject welds would place a burden on the licensee.

By letter dated June 5, 2007 (ADAMS Accession No. ML071360297), the NRC staff approved a similar relief request submitted by the licensee for the third ISI interval. The physical limitations described in the third ISI interval relief request RR-44 are similar to those described in the fourth ISI interval relief request ISI-RR-16. The ultrasonic examinations performed for the fourth ISI interval under this relief request contained similar or higher composite coverages with all examinations performed to the Performance Demonstration Initiative techniques. The licensee stated that scans for circumferentially-oriented flaws, which have a more significant impact on structural integrity as compared to axially-oriented flaws, were generally obtained. Based on the level of examination coverage obtained for the nozzle-to-vessel welds listed in Tables RR-16-1

[1] Figures and tables are contained in the licensee's original submittal and supplement.

and RR-16-2, it is likely that evidence of significant service-induced degradation would be detected by the performed examinations. Furthermore, the licensee stated that no relevant industry-wide operating experience of detecting flaws in the subject welds was found. The licensee also provided a list of indications identified in previous examinations of the subject welds and stated that, except for those found in weld 1B11\1N3A, none of the indications were service-induced or surface-connected. The indications in weld 1B11\1N3A were evaluated per IWB-3610 in the fourth interval and found to be acceptable.

In addition to the above, the licensee stated that VT-2 examinations associated with the Class 1 leakage test are performed each refueling outage such that any flaws that propagate through the subject welds are identified and repaired and that operational leakage can be determined by the LDS system located in the drywell. These additional examinations, the examinations performed with no unacceptable indications identified, the coverage obtained, and the operating experience indicating no relevant industry history of detected flaws in these nozzles, provide reasonable assurance of structural integrity and leak tightness for the subject components.

Based on the above, the NRC staff concludes that the ASME BPV Code requirement is impractical, the imposition of the ASME BPV Code required inspections would result in a burden to the licensee, and the licensee's examination coverage provides reasonable assurance of structural integrity and leak tightness of the subject welds.

3.2 ISI-RR-17 (HNP, Unit 2)

ASME Code Component Identification

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|---|---|
| ASME Code Class: | ASME Code Class 1 |
| Examination Category: | B-A |
| Item Number: | B1.30 |
| Component: | Reactor Vessel Shell-to-Flange Weld |
| Weld Number: | 2B11/2C-1 |

ASME BPV Code Requirements

ASME BPV Code, Section XI, Table IWB-2500-1, Examination Category B-A, Item B1.30 requires a volumetric examination of essentially 100 percent of the weld length per Figure IWB-2500-4.

An alternative approved for use by the NRC in RG 1.147, Revision 17, states that a reduction in examination coverage due to part geometry or interference for any ASME Code Class 1 or 2 weld is acceptable provided that the reduction is less than 10 percent, i.e., greater than 90 percent examination coverage is obtained.

Licensee's Relief Request

For the subject weld, the licensee achieved less than 90 percent coverage of the required examination volume and is requesting relief from the ASME BPV Code requirements described above. The licensee achieved approximately 50.6 percent coverage.

Burden Caused by Compliance

The licensee stated that to appreciably increase the examination volume coverage of the

subject weld, a redesign of the RPV flange would be required since the examinations were limited by the flange taper of the RPV shell-to-flange weld and three thermocouple pads.

Licensee's Basis for Relief

The licensee stated, in part:

> A significant volume of the weld was examined and no unacceptable indications were found. Coverage for circumferential flaws originating at the inside surface or middle of the examination volume was in excess of 90%. Additionally, the reactor vessel vertical welds and the reactor vessel accessible bottom head welds were examined using Appendix VIII techniques without any unacceptable indications; therefore, it is unlikely that any pattern of degradation exists in the reactor vessel that has gone undetected. This examination coverage along with VT-2 examinations associated with the Class 1 leakage test performed each refueling outage provide reasonable assurance that unacceptable flaws have not developed in the subject weld or that they will be detected and repaired prior to the return of service. During operation, Hatch-2 leakage can be determined by the leakage detection system (LDS) located in the drywell (as described in the Hatch FSAR Section 5.2.7)...

NRC Staff Evaluation

The ASME BPV Code requires essentially 100 percent volumetric examination each inspection interval of the RPV shell-to-flange weld classified under the ASME BPV Code, Section XI, Table IWB-2500-1, Examination Category B-A, Item B1.30. Based on a review of the descriptions and figures provided by the licensee, the examinations of the subject weld were limited by the flange taper of the RPV shell-to-flange weld and three thermocouple pads. The NRC staff finds that it would be impractical for the licensee to appreciably increase coverage to meet the ASME Code requirements.

For the licensee to achieve 100 percent volumetric coverage, the RPV flange would have to be redesigned and modified, which would result in a prohibitively expensive capital cost and extended outage time for the licensee. Therefore, compliance with the ASME BPV Code requirements to perform the required volumetric examinations would place a burden on the licensee.

The licensee was able to examine approximately 50.6 percent of the required examination volume. As previously mentioned, the examinations were limited due to the flange taper and three thermocouple pads on the shell side of the weld, as shown in licensee-provided figures. Coverage for circumferential flaws originating at the inside surface or middle of the examination volume was in excess of 90 percent. Hence, the most meaningful coverage (i.e., the ISI information most important to structural integrity) that was achieved by the licensee for this application is greater than 90 percent of the inside and middle portions of the required examination volume. Further, the licensee stated that three relevant indications were identified and were found to be acceptable per IWB-3510 (i.e., the licensee did not detect any unacceptable indications), and the NRC staff did not identify any industry history of failures for the RPV shell-to-flange weld. The licensee stated that VT-2 examinations are performed each refueling outage and that operational leakage can be determined by the LDS located in the drywell. These additional examinations, the ASME BPV Code-required examination coverage achieved, the significance of the examined volume to structural integrity, and the lack of

unacceptable indications identified in the examined volume, provide reasonable assurance of structural integrity and leak tightness.

Based on the above, the NRC staff concludes that the ASME BPV Code requirement is impractical, the imposition of the ASME BPV Code required inspections would result in a burden to the licensee, and the licensee's examination coverage provides reasonable assurance of structural integrity and leak tightness of the subject weld.

3.3 ISI-RR-21 (HNP, Unit 2)

ASME Code Component Identification

| | |
|---|---|
| ASME Code Class: | ASME Code Class 2 |
| Examination Category: | C-A |
| Item Numbers: | C1.10 and C1.20 |
| Component: | Shell Circumferential Welds and Head Circumferential Welds for Residual Heat Removal (RHR) Heat Exchanger 2E11-2HX-A |
| Weld Numbers: | 2E11-2HX-A-1 (C1.20) Shell Head to Upper Shell Ring |
| | 2E11-2HX-A-2 (C1.10) Upper Shell Ring to Lower Shell Ring |
| | 2E11-2HX-A-3 (C1.10) Lower Shell Ring to Flange |

ASME Code Requirements

ASME BPV Code, Section XI, Table IWB-2500-1, Examination Category C-A, Items C1.10 and C1.20 require a volumetric examination of essentially 100 percent of the weld length per Figure IWC-2500-1.

An alternative approved for use by the NRC in Regulatory Guide (RG) 1.147, Revision 17, states that a reduction in examination coverage due to part geometry or interference for any ASME Code Class 1 or 2 weld is acceptable provided that the reduction is less than 10 percent, i.e., greater than 90 percent examination coverage is obtained.

Licensee's Relief Request

For the subject welds, the licensee achieved less than 90 percent coverage of the required examination volume due to limitations as indicated in Table ISI-RR-21-1 of the submittal and is requesting relief from the ASME BPV Code requirements described above. The licensee achieved coverages of 40 percent, 73 percent, and 85 percent for welds 2E11-2HX-A-1, 2E11-2HX-A-2, and 2E11-2HX-A-3, respectively.

Burden Caused by Compliance

The licensee stated that compliance would require replacement of the existing heat exchanger with a new heat exchanger fabricated with a special design to allow examinations of the subject welds since the examinations were limited due to obstructions, geometry, and component configuration as listed in Table ISI-RR-21-1 of the submittal.

Licensee's Basis for Relief

The licensee stated that a significant percentage of these three heat exchanger welds were examined and no unacceptable indications were found. The licensee also stated that ongoing

leakage tests are performed once every 10-year ISI interval.

NRC Staff Evaluation

The ASME BPV Code requires volumetric examination of essentially 100 percent of the weld length for RHR heat exchanger shell and head circumferential welds for each inspection interval. The licensee performed examinations to the extent practical and achieved limited coverages of 40 percent, 73 percent, and 85 percent for welds 2E11-2HX-A-1, 2E11-2HX-A-2, and 2E11-2HX-A-3, respectively. In the June 5, 2007, safety evaluation, the coverages for welds 2E11-2HX-A-2 and 2E11-2HX-A-3 during the third interval were documented as 78 percent and 70 percent, respectively. Therefore, the weld coverages are consistent with those obtained in the previous inspection interval. The NRC staff reviewed Table ISI-RR-21-1 of the submittal and finds that the examinations of each weld were limited due to obstructions, geometry, and component configuration to the extent that it is impractical for the licensee to appreciably increase coverage to meet the ASME BPV Code requirements.

In order to achieve essentially 100 percent volumetric coverage, the licensee would need to replace the existing heat exchanger with a new design, which would result in a prohibitively expensive capital cost and extended outage time for the licensee. Therefore, compliance with the ASME BPV Code requirement to perform 100 percent volumetric examinations of the subject welds would place a burden on the licensee.

As stated in the June 5, 2007, safety evaluation for relief request ISI-RR-60, the RHR heat exchanger shell and head are made of ASME SA-516 carbon steel plates and ASME SA-541 carbon and alloy steel forgings; moreover, NUREG-0313, "Technical Report on Material Selection and Processing Guidelines for BWR [boiling water reactor] Coolant Pressure Boundary Piping," (ADAMS Accession No. ML031470422) states that carbon steels employed in BWR environments are immune to sensitization and intergranular stress corrosion cracking (IGSCC). Based on the diagrams provided in the submittal and the coverages obtained, the NRC staff determined that the licensee was able to examine the inner examination volumes and is likely to have detected flaws originating from the inside surface for each of the welds. Additionally, the licensee stated that no recordable indications were found during the fourth interval inspections for the welds subject to ISI-RR-21; furthermore, the licensee compared the results with previous examinations and found no changes in the data. The licensee also stated that ongoing leakage tests are performed once every ISI period. These additional tests, the resistance of the components (carbon steel) to IGSCC, the coverage of the inner examination volumes where flaws are likely to originate, and the absence of reportable indications, provide reasonable assurance of structural integrity and leak tightness.

Based on the above, the NRC staff concludes that the ASME BPV Code requirement is impractical, the imposition of the ASME BPV Code required inspections would result in a burden to the licensee, and the licensee's examination coverage provides reasonable assurance of structural integrity and leak tightness of the subject welds.

3.4 ISI-RR-22 (HNP, Units 1 and 2)

ASME Code Component Identification

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|---|---|
| ASME Code Class: | ASME Code Class 2 |
| Examination Category: | C-B |
| Item Number: | C2.21 |

| | |
|---|---|
| Component: | Nozzle-to-Shell Residual Heat Removal Heat Exchanger Welds |
| Weld Numbers: | 1E11-2HX-A-I, 1E11-2HX-B-O<br>2E11-2HX-A-O |

ASME Code Requirements

The requirement for nozzle-to-shell welds is under ASME BPV Code, Section XI, Table IWC-2500-1, Examination Category C-B, Item C2.21, which requires volumetric and surface examinations of essentially 100 percent of the weld length per Figure IWC-2500-4.

An alternative approved for use by the NRC in RG 1.147, Revision 17, states that a reduction in examination coverage due to part geometry or interference for any ASME Code Class 1 or 2 weld is acceptable provided that the reduction is less than 10 percent, i.e., greater than 90 percent examination coverage is obtained.

Licensee's Relief Request

For the subject welds, the licensee achieved less than 90 percent coverage of the required examination volume due to limitations as indicated in Figures 2 and 3 of the submittal for ISI-RR-22 and is requesting relief from the ASME BPV Code requirements described above.

Burden Caused by Compliance

The licensee stated that compliance would require replacement of the existing heat exchanger with a new heat exchanger fabricated with a special design to allow examination.

Licensee's Basis for Relief

The licensee stated that a significant percentage of the RHR heat exchanger nozzle-to-shell welds were examined during the fourth ISI interval and that ongoing leakage tests are performed once every ISI period.

NRC Staff Evaluation

The ASME BPV Code, Section XI, Examination Category C-B, Item C2.21 requires essentially 100 percent volumetric and surface examinations of ASME Code Class 2 RHR heat exchanger nozzle-to-shell welds. The licensee was unable to examine these welds as required by the ASME BPV Code. The NRC staff reviewed the descriptions and depictions of the nozzle configurations in the submittal and determined that the examinations were limited by the weld contours. The NRC staff finds that it would be impractical for the licensee to appreciably increase coverage to meet the ASME BPV Code requirements.

In order to achieve essentially 100 percent volumetric coverage, the licensee would be required to redesign the RHR heat exchanger nozzle-to-shell welds, which would result in a prohibitively expensive capital cost and extended outage time for the licensee. Therefore, compliance with the ASME BPV Code requirement to perform the required volumetric examinations would place a burden on the licensee.

The licensee obtained coverages of 58 percent, 68 percent, and 85 percent for welds 1E11-2HX-A-I, 1E11-2HX-B-O, and 2E11-2HX-A-O, respectively. In the submittal, the licensee stated that greater than 90 percent coverage was obtained for circumferentially-oriented flaws,

while the scans for axially-oriented flaws were limited. The licensee also stated in the submittal that leakage tests are performed every ISI period.

Two ultrasonic examination indications were recorded on weld 1E11-2HX-A-I during the spring 2008 refueling outage. The licensee evaluated these indications per ASME BPV Code, Section XI, Table IWC-3410-1 and IWC-3511 and found them to be acceptable. The licensee performed a fracture mechanics and fatigue crack growth evaluation per IWC-3610 and IWB-3610, which concluded that the larger (and thus more limiting) flaw is acceptable since crack growth for the remaining life of the plant is minimal and the existing flaw size is much smaller (including growth to the end of plant life) than the calculated maximum allowable flaw size. Additionally, the licensee stated that two indications were also found in weld 2E11-2HX-A-O, but these were the result of fabrication issues (i.e., not service-induced). The greater than 90 percent coverage for circumferentially-oriented flaws (i.e., flaws that have a greater impact on structural integrity), the leakage tests performed every 10-year ISI period to identify flaws that require repair, and the absence of unacceptable indications during the fourth ISI interval, provide reasonable assurance of structural integrity and leak tightness.

Based on the above, the NRC staff concludes that the ASME BPV Code requirement is impractical, the imposition of the ASME BPV Code required inspections would result in a burden to the licensee, and the licensee's examination coverage provides reasonable assurance of structural integrity and leak tightness of the subject welds.

## 4.0 CONCLUSION

As set forth above for relief requests ISI-RR-16, ISI-RR-17, ISI-RR-21, and ISI-RR-22, the NRC staff finds that it is impractical for the licensee to comply with the ASME BPV Code, Section XI requirements, the proposed inspections provide reasonable assurance of structural integrity and leak tightness of the subject welds, and granting relief pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and will not endanger life or property or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(g)(6)(i). Therefore, the NRC staff grants relief for relief requests ISI-RR-16, ISI-RR-17, ISI-RR-21, and ISI-RR-22 for HNP, Units 1 and 2, for the fourth 10-year ISI interval, which commenced on January 1, 2006, and ended on December 31, 2015.

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

Principal Contributor: Alan Huynh NRR/DMLR/RCCB

SUBJECT: EDWIN I. HATCH NUCLEAR PLANT, UNIT NOS. 1 AND 2 – RELIEF REQUESTS ISI-RR-16, ISI-RR-17, ISI-RR-21, AND ISI-RR-22 FOR RELIEF FROM INSERVICE INSPECTION REQUIREMENTS (CAC NOS. MF9027, MF9030, MF9031, MF9034, MF9035, AND MF9036; EPID NOS. L-2016-LLR-0008, L-2016-LLR-0010, L-2016-LLR-0011, AND L-2016-LLR-0009) DATED OCTOBER 20, 2017

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RidsRgn2MailCenter Resource
RidsNrrDorlLpl2-1 Resource
RidsNrrDeEvib Resource
AHuynh, NRR
RidsNrrPMHatch Resource

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| NAME | MOrenak | RHall | KGoldstein |
| DATE | 10/2/17 | 10/17/17 | 09/29/17 |
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