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

May 1, 2009

Vice President, Operations
Entergy Nuclear Operations, Inc.
James A. FitzPatrick Nuclear Power Plant
P.O. Box 110
Lycoming, NY 13093

SUBJECT: JAMES A. FITZPATRICK NUCLEAR POWER PLANT - INSERVICE INSPECTION PROGRAM RELIEF REQUESTS THIRD 10-YEAR INTERVAL CLOSEOUT, REQUEST NO. RR-CRV-1 (TAC NO. MD8717)

Dear Sir or Madam:

By letter dated April 30, 2008, as supplemented by letters dated January 20 and March 26, 2009, Entergy Nuclear Operations, Inc. (the licensee) submitted an Inservice Inspection Program Relief Requests, Third 10-year Interval Closeout via request number RR-CRV-1 to the U.S. Nuclear Regulatory Commission (NRC) for relief from requirements of American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI 1989 with no Addenda, at James A. FitzPatrick Nuclear Power Plant (JAFNPP).

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(g)(5)(iii), you requested relief because of the reasons of impracticality of compliance and burden caused by compliance, to use the proposed alternative on the basis that the alternative provides an acceptable level of quality and safety.

The NRC staff has reviewed the licensee's submittal and concludes that compliance with ASME Code examination coverage requirements are impractical for the subject welds listed in Request for Relief RR-CRV-1. Further, based on the coverage obtained, it is reasonable to conclude that, if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. Furthermore, the NRC staff concludes that best effort examinations obtained during the licensee's examinations provide reasonable assurance of structural integrity of the subject welds.

Therefore, for RR-CRV-1, relief is granted, pursuant to 10 CFR 50.55a(g)(6)(i), for the third 10-year inspection interval for JAFNPP giving due consideration to the burden that could result upon the licensee, if the requirements were imposed on the facility.

The NRC staff's Safety Evaluation is enclosed.

Sincerely,

Richard V. Guzman, Acting Chief
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-333

Enclosure:
As stated

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

RELATED TO RELIEF REQUEST NO. RR-CRV-1

INSERVICE INSPECTION PROGRAM REQUESTS

THIRD 10-YEAR INTERVAL CLOSEOUT

ENTERGY NUCLEAR OPERATIONS, INC.

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

DOCKET NO. 50-333

1.0 INTRODUCTION

By letter dated April 30, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML081290489), as supplemented by letters dated January 20, and March 26, 2009 (ADAMS Accession Nos. ML090270450 and ML091000289, respectively), Entergy Nuclear Operations, Inc. (the licensee) requested relief No. RR-CRV-1 from requirements of American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI 1989 with no Addenda, at James A. FitzPatrick Nuclear Power Plant (JAFNPP).

The U. S. Nuclear Regulatory Commission (NRC) staff, with technical assistance from its contractor, the Pacific Northwest National Laboratory (PNNL), has reviewed and evaluated the information provided by the licensee in its request, as supplemented. The NRC staff adopts the evaluations and recommendations for granting relief contained in PNNL's Technical Letter Report (TLR) which has been incorporated into this Safety Evaluation (SE) and can be found in ADAMS at ML091030164. The attached table to this SE lists each relief request and the status of approval.

2.0 REGULATORY REQUIREMENTS

Inservice inspection of the ASME Code Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Code, and applicable addenda, as required by Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(g), except where specific relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). The regulation in 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if the licensee demonstrates that (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code, Section XI, to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code, which was incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The ASME Code of Record for JAFNPP third 10-year interval ISI program, which began in October 1998, is the 1989 Edition, No Addenda, of Section XI of the ASME Code.

3.0 EVALUATION

The information provided by the licensee in support of the requests for relief from ASME Code requirements has been evaluated and the basis for disposition is documented below. For clarity, the request has been evaluated in several parts according to ASME Code Examination Category.

3.1 Request for Relief RR-CRV-1, Part A:

ASME Code, Section XI,
Examination Category B-A, Items B1.21 and B1.22,
Pressure Retaining Welds in Reactor Pressure Vessel

3.1.1 ASME Code Requirement

ASME Code, Section XI, Examination Category B-A, Items B1.21 and B1.22 require essentially 100% volumetric examination, as defined by ASME Code, Section XI, Figure IWB-2500-3, of the length of ASME Code, Class 1 circumferential and meridional head welds on the reactor pressure vessel (RPV). "Essentially 100%", as clarified by ASME Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds," is greater than 90% coverage of the examination volume. ASME Code Case N-460 has been approved for use by the NRC in Regulatory Guide (RG) 1.147, Revision 15, "Inservice Inspection Code Case Acceptability" (RG 1.147).

3.1.2 Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from examining 100% of the ASME Code-required inspection volume for RPV bottom head circumferential weld VC-BH-2-3 and bottom head meridional welds VV-BH-2A thru 2F.

3.1.3 Licensee's Basis for Relief Request

The licensee stated that the welds were inaccessible due to control rod drive (CRD) and In-Core monitoring housings.

3.1.4 Licensee's Proposed Alternative Examination (as stated)

No additional volumetric examinations are proposed. A visual examination (VT-2) is performed in conjunction with the pressure testing conducted on these components every refuel outage (with no evidence of leakage detected) in accordance with [ASME Code, Section XI, Paragraphs] IWA-5000 and IWB-5000.

3.1.5 NRC Staff Evaluation - Relief RR-CRV-1, Part A

The ASME Code requires essentially 100% volumetric examination of RPV circumferential and meridional head welds. However, for RPV bottom head circumferential Weld VC-BH-2-3 and bottom head meridional Welds VV-BH-2A thru 2F, complete examinations are not possible due to the design of the RPV. In order to obtain full volumetric coverage, the RPV bottom head would require design modifications. Imposing this requirement would create a significant burden on the licensee; therefore, the ASME Code-required 100% volumetric examinations are impractical.

The domed RPV bottom head at JAFNPP is constructed using a circular (dollar) plate surrounded by two tiers of rings. The rings are formed by welded plate segments; the inner ring contains meridional Welds VV-BH-2a through 2f and the outer ring includes meridional Welds VV-BH-1a through 1h. The inner ring is joined to the dollar plate via circumferential Weld VC-BH-2-3, and welded to the outer ring at circumferential Weld VC-BH-1-2. Further, the RPV is designed with a support skirt, integrally joined to the bottom head just below circumferential Weld VC-BH-1-2, which provides limited access to the inner ring and dollar plate areas via four man-ways located at 0, 90, 180, and 270 degrees; these man-way locations coincide with only two of the inner meridional welds, which are located at 60-degree intervals around the circumference. Examinations of these two meridional welds were attempted from the man-ways with no coverage due to interference by vessel support and bottom head insulation. Finally, the bottom head is penetrated by 137 CRD housings and 43 in-core monitoring nozzles.

In concert, the JAFNPP RPV bottom head design features described above severely restrict access to the dollar plate and inner meridional welds. A review of the licensee's technical descriptions, drawings and sketches[1] adequately demonstrates that it is impractical to examine RPV bottom head circumferential Weld VC-BH-2-3 and meridional Welds VV-BH-2a through 2f. However, the licensee was able to examine outer ring circumferential Weld VC-BH-1-2 and meridional Welds VV-BH-1a through 1h to the full extent of the ASME Code requirements by accessing these welds from the outside surface of the RPV (above the support skirt). These outer ring welds are subjected to similar operating stresses and environmental conditions as the inner ring welds. No recordable indications were observed by the licensee during these examinations.

The NRC staff has determined that the licensee has shown that examining the ASME Code-required volume of RPV bottom head Welds VC-BH-2-3 and VV-BH-2a through 2f is impractical. To require the licensee to perform the ASME Code examination would be a burden

1 Sketches and technical descriptions provided by the licensee are not included in this report.

as the subject welds would have to be redesigned. Based on full volumetric coverage obtained on adjacent welds in the bottom head, it is reasonable to conclude that, if significant service-induced degradation was occurring, evidence of it would have been detected by the examinations that were performed.

3.2 Request for Relief RR-CRV-1, Part B:

ASME Code, Section XI,
Examination Category B-D, Item B3.90,
Full Penetration Welded Nozzles in Vessels

3.2.1 ASME Code Requirement

ASME Code, Section XI, Examination Category B-D, Item B3.90, requires 100% volumetric examination, as defined by ASME Code, Section XI, Figure IWB-2500-7, of Class 1 nozzle-to-vessel welds. ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 15, states that a reduction in examination coverage due to part geometry or interference for any Class 1 and 2 weld is acceptable provided that the reduction is less than 10%, i.e., greater than 90% examination coverage is obtained.

3.2.2 Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from examining 100% of the ASME Code-required inspection volume(s) for the nozzle-to-vessel welds shown in Table 3.2.2.

Table 3.2.2 – ASME Code, Section XI, Examination Category B-D

ASME Code Item	Weld ID	Weld Type	Percent of ASME Code Coverage Obtained
B3.90	N-TH-A	RPV Top Head-to-Nozzle Weld	27.3%
B3.90	N-TH-B	RPV Top Head-to-Nozzle Weld	79%
B3.90	N-TH-C	RPV Top Head-to-Nozzle Weld	57.3%
B3.90	N-1A	RPV-to-Reactor Water Recirculation Outlet Nozzle Weld	40.6%
B3.90	N-1B	RPV-to-Reactor Water Recirculation Outlet Nozzle Weld	23.9%
B3.90	N-2A, B, E, H&K	RPV-to-Reactor Water Recirculation Inlet Nozzle Weld	66.1%
B3.90	N-2F	RPV-to-Reactor Water Recirculation Inlet Nozzle Weld	68%
B3.90	N-2C, D, G & J	RPV-to-Reactor Water Recirculation Inlet Nozzle Weld	85.9%
B3.90	N-3A & B	RPV-to-Main Steam Nozzle Weld	35.6%

Table 3.2.2 – ASME Code, Section XI, Examination Category B-D			
ASME Code Item	**Weld ID**	**Weld Type**	**Percent of ASME Code Coverage Obtained**
B3.90	N-3C & D	RPV-to-Main Steam Nozzle Weld	46.3%
B3.90	N-4A & C	RPV-to-Feed Water Nozzle Weld	42%
B3.90	N-4B & D	RPV-to-Feed Water Nozzle Weld	53%
B3.90	N-5A	RPV-to-Core Spray Nozzle Weld	38.11%
B3.90	N-5B	RPV-to-Core Spray Nozzle Weld	38.6%
B3.90	N-8B	RPV-to-Jet Pump Instrumentation Nozzle Weld	71.6%
B3.90	N-9	RPV-to-CRD Nozzle Weld	66.2%

3.2.3 Licensee's Basis for Relief Request

The licensee stated that volumetric examinations were limited due to the outside diameter (OD) blend radius, insulation support rings and permanently installed insulation.

3.2.4 Licensee's Proposed Alternative Examination (as stated)

No additional volumetric examinations are proposed. A visual examination (VT-2) is performed in conjunction with the pressure testing conducted on these components every refuel outage (with no evidence of leakage detected) in accordance with [ASME Code, Section XI, Paragraphs] IWA-5000 and IWB-5000.

3.2.5 Relief RR-CRV-1, Part B NRC Staff Evaluation

The ASME Code requires 100% volumetric examination of full penetration welded nozzles and inside radius sections in ASME Code Class 1 pressure vessels. However, examinations of the nozzles listed above in Table 3.2.1 are limited by the design of the component and appurtenances associated with vessel insulation. In order for the licensee to obtain 100% of the ASME Code-required examination coverage of the subject nozzle-to-vessel welds, the RPV, nozzles and insulation would need to be redesigned and modified. This would place a burden on the licensee; therefore, the ASME Code volumetric requirements are impractical.

As shown on the sketches and technical descriptions[2] included in the licensee's submittal, examination of the subject nozzles has been performed to the extent practical with the licensee obtaining volumetric coverage ranging from approximately 27% to 86%. These nozzles are of the "set-in" design which essentially makes the welds concentric rings aligned parallel with the nozzle axes in the through-wall direction of the RPV shell. This design geometry limits ASME Code-required ultrasonic angle beam examinations to be performed only from the shell side of

2 Sketches and technical descriptions provided by the licensee are not included in this report.

the welds. In addition, the curvature for the nozzle radius forging or a combination of the nozzle configuration and adjacent components (such as other nozzles, permanently mounted insulation rings, or other appurtenances) precludes ultrasonic examination to the extent required by the ASME Code for each of the nozzles listed in Table 3.2.1.

Examinations of eleven of the nozzle-to-vessel welds listed in the tables were performed using personnel and techniques qualified and demonstrated through Electric Power Research Institute's (EPRI) Performance Demonstration Initiative (PDI); the remaining nozzles were examined using the ASME Code-required technical guidance at the time of the examinations. The ultrasonic examinations on these carbon steel nozzle welds included 0-degree longitudinal, and 45-, 60- and 70-degree shear waves from the shell side, including most of the weld and base materials near the inside surface of the vessel, which are the highest regions of stress and where one would expect degradation sources to be manifested should they occur. Although ultrasonic scans were primarily limited to the shell side only, recent studies have found that inspections conducted through carbon steel are equally effective whether the ultrasonic waves have only to propagate through the base metal, or have to also propagate through the carbon steel weldment[3]. No unacceptable indications were noted during any of the examinations.

The NRC staff has determined that the licensee has shown that examining the ASME Code-required volumes of the subject nozzle-to-vessel welds is impractical. However, based on the volumetric coverage that was obtained on the subject nozzles, it is reasonable to conclude that, if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed.

3.3 Request for Relief RR-CRV-1, Part C:

ASME Code, Section XI,
Examination Category B-G-1, Item B6.40,
Pressure Retaining Bolting, Greater than 2 inches in Diameter

3.3.1 ASME Code Requirement

ASME Code, Section XI, Examination Category B-G-1, Item B6.40, requires 100% volumetric examination, as defined by ASME Code, Section XI, Figure IWB-2500-12, of ASME Code, Class 1 threads in the closure flange on the RPV. ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 15, states that a reduction in examination coverage due to part geometry or interference for any Class 1 and 2 weld is acceptable provided that the reduction is less than 10%, i.e., greater than 90% examination coverage is obtained.

3 P.G. Heasler and S. R. Doctor, 1996. Piping Inspection Round Robin, NUREG/CR-5068, PNNL-10475, U. S. Nuclear Regulatory Commission, Washington, DC.

3.3.2 Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from examining 100% of the ASME Code-required inspection volume for the RPV threads in closure flange numbers 14 through 52.

3.3.3 Licensee's Basis for Relief Request

The licensee stated that volumetric examinations were limited due to design and configuration.

3.3.4 Licensee's Proposed Alternative Examination (as stated):

No additional volumetric examinations are proposed. A visual examination (VT-2) is performed in conjunction with the pressure testing conducted on these components every refuel outage (with no evidence of leakage detected) in accordance with [ASME Code, Section XI, Paragraph] IWA-5000 and IWB-5000.

3.3.5 Relief RR-CRV-1, Part C NRC Staff Evaluation

The ASME Code requires 100% volumetric examination of ASME Code Class 1 threaded areas in the RPV closure flange. However, examinations of these areas at JAFNPP are limited due to the design of the flange surface. In order for the licensee to obtain 100% of the ASME Code-required examination coverage of the threaded areas in the RPV closure flange at JAFNPP would need to be redesigned and modified. This would place a burden on the licensee; therefore, the ASME Code examinations are impractical.

The RPV closure flange at JAFNPP is designed with machined grooves for a metal O-ring seal, which limits the surface area available for ultrasonic probe placement. Thus, the probes cannot make the necessary contact in the grooved area to allow ultrasonic beam projection into the full ASME Code-required threaded (flange ligament) region.

As shown on the sketches and technical descriptions[4] included in the licensee's submittal, examination of the RPV flange threads has been performed to the extent practical. The licensee has achieved approximately 79% of the ASME Code-required coverage. No reportable flaws were detected during the examination of these threaded areas.

The NRC staff has determined that the licensee has shown that examining the ASME Code-required volume of the RPV flange threads is impractical. However, based on the volumetric coverage obtained, it is reasonable to conclude that, if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed.

4 Sketches and technical descriptions provided by the licensee are not included in this report.

3.4 Request for Relief RR-CRV-1, Part D:

ASME Code, Section XI,
Examination Category B-K, Item B10.10,
Integral Attachments for Piping, Pumps, and Valves

3.4.1 ASME Code Requirement

ASME Code, Section XI, Examination Category B-K, Item B10.10, requires 100% volumetric or surface examination, as defined by Figure IWB-2500-13, -14, and -15, as applicable, of ASME Code Class 1 integrally welded attachments. ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 15, states that a reduction in examination coverage due to part geometry or interference for any Class 1 and 2 weld is acceptable provided that the reduction is less than 10%, i.e., greater than 90% examination coverage is obtained.

3.4.2 Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from examining 100% of the ASME Code-required inspection surface for RPV Stabilizers 1, 2, 3, and 4.

3.4.3 Licensee's Basis for Relief Request

The licensee stated that surface examinations were limited due to design and configuration.

3.4.4 Licensee's Proposed Alternative Examination (as stated)

No additional volumetric examinations are proposed. A visual examination (VT-2) is performed in conjunction with the pressure testing conducted on these components every refuel outage (with no evidence of leakage detected) in accordance with [ASME Code, Section XI, Paragraph] IWA-5000 and IWB-5000.

3.4.5 Relief RR-CRV-1, Part D NRC Staff Evaluation

The ASME Code requires 100% surface or volumetric examination, as applicable, of ASME Code Class 1 integrally welded attachments. At JAFNPP, the stabilizer design requires that surface examinations be performed on the attachment welds. However, surface examinations of RPV stabilizer bracket welds 1, 2, 3, and 4 are limited by their design, which does not afford access to the welds on the bottom portion of the stabilizers. Achieving greater coverage of these integrally welded attachments would require that the RPV stabilizers be redesigned and modified. This would place a burden on the licensee; therefore, the ASME Code examinations are impractical.

As shown on the sketches and technical descriptions[5] included in the licensee's submittal, examinations of the integrally welded attachments to the RPV stabilizer welds 1, 2, 3, and 4 have been performed to the extent practical. The licensee obtained approximately 34% of the

5 Sketches and technical descriptions provided by the licensee are not included in this report.

ASME Code-required coverage. The RPV stabilizer brackets are only accessible on the top side for examination. The stabilizer connection clevis and pin does not allow access to the side welds for adequate cleaning and/or application of surface examination methods. The physical location of the bracket with the RPV stabilizer connected does not allow access to the bottom weld. The attachment is a 13" x 6 1/8" welded bracket providing a total of 38" of weld length. Approximately 13" of the weld length was examined. The remaining areas where visually examined to the extent possible as a supplemental examination. No indications were detected during these examinations.

The NRC staff has determined that the licensee has shown that examining the ASME Code-required surface areas of RPV stabilizer bracket Welds 1, 2, 3, and 4 is impractical. However, based on the coverage obtained, it is reasonable to conclude that, if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed.

3.5 Request for Relief RR-CRV-1, Part E:

ASME Code, Section XI,
Examination Category C-A, Item C1.20,
Pressure Retaining Welds in Pressure Vessels

3.5.1 ASME Code Requirement

ASME Code, Section XI, Examination Category C-A, Item C1.20, requires 100% volumetric examination, as defined by ASME Code, Section XI, Figure IWC-2500-1, of selected ASME Code Class 2 vessel head circumferential welds. ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 15, states that a reduction in examination coverage due to part geometry or interference for any Class 1 and 2 weld is acceptable provided that the reduction is less than 10%, i.e., greater than 90% examination coverage is obtained.

3.5.2 Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from examining 100% of the ASME Code-required inspection volume for the shell-to-bottom head weld on Scram Tank BH-1A.

3.5.3 Licensee's Basis for Relief Request

The licensee stated that volumetric examinations were limited due to support structures and weld-o-let nozzles.

3.5.4 Licensee's Proposed Alternative Examination (as stated)

No additional volumetric examinations are proposed. A visual examination (VT-2) is performed in conjunction with the pressure testing conducted on these components every refuel outage (with no evidence of leakage detected) in accordance with [ASME Code, Section XI, Paragraph] IWA-5000 and IWB-5000.

3.5.5 Relief RR-CRV-1, Part E NRC Staff Evaluation

The ASME Code requires 100% volumetric examination of Class 2 vessel circumferential head welds. However, for Weld BH-1A on the Scram Tank shell-to-bottom head weld, complete examinations are restricted by support structures and the proximity of weld-o-let nozzles. Achieving greater coverage on this weld would require that the Scram Tank be redesigned and modified. This would place a burden on the licensee; therefore, the ASME Code examinations are impractical.

As shown on the sketches and technical descriptions[6] included in the licensee's submittal, examinations of the Scram Tank shell-to-bottom head Weld BH-1A has been performed to the extent practical, with the licensee obtaining approximately 39% of the ASME Code volumetric inspection. The licensee examined Weld BH-1A from the shell side of the weld using both 45- and 70-degree ultrasonic beam angles to achieve axial coverage (perpendicular to the weld) along the weld length in areas not obstructed by support structures or weld-o-let nozzles located adjacent to the subject weld. The obstructed areas were scanned to the maximum amount possible in both the circumferential (perpendicular to the weld) and axial (parallel to the weld) directions. The scanning was conducted from both the shell side and bottom head side of the weld to achieve the greatest coverage possible.

The NRC staff has determined that the licensee has shown that it is impractical to meet the ASME Code-required 100% volumetric examination coverage for bottom head-to-shell Weld BH-1A on the Scram Tank due to interference from support structures and weld-o-let nozzles. Based on the volumetric coverage obtained with the ultrasonic techniques applied, it is reasonable to conclude that, if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed.

3.6 Request for Relief RR-CRV-1, Part F:

ASME Code, Section XI,
Examination Category C-B, Item C2.22,
Pressure Retaining Nozzle Welds in Vessels

3.6.1 ASME Code Requirement

ASME Code, Section XI, Examination Category C-B, Item C2.22, requires 100% volumetric examination, as defined by ASME Code, Section XI, Figure IWC-2500-4(a) or (b) of ASME Code Class 2 nozzle inside radius sections. ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 15, states that a reduction in examination coverage due to part geometry or interference for any Class 1 and 2 weld is acceptable provided that the reduction is less than 10%, i.e., greater than 90% examination coverage is obtained.

6 Sketches and technical descriptions provided by the licensee are not included in this report.

3.6.2 Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from examining 100% of the ASME Code-required inspection volume for the nozzle inner radius section designated as N-1-A-IR on the CRD Scram Tank.

3.6.3 Licensee's Basis for Relief Request

The licensee stated that volumetric examination was limited due to the design configuration and OD blend radius.

3.6.4 Licensee's Proposed Alternative Examination

No additional volumetric examinations have been proposed.

3.6.5 Relief RR-CRV-1, Part F NRC Staff Evaluation

The ASME Code requires 100% volumetric examination of Class 2 nozzle inside radius sections. However, for the CRD Scram Tank nozzle-to-shell inner radius section N-1-A-IR, complete examination is restricted by the nozzle configuration. In order to achieve greater volumetric coverage, the nozzle and vessel would need to be redesigned and modified. Imposition of this requirement would create a burden on the licensee; therefore, the ASME Code-required 100% volumetric examination is impractical.

The examination of CRD Scram Tank nozzle-to-shell inner radius section N-1-A-IR is limited by component configuration. The nozzle-to-vessel blend radius restricts transducer movement when scanning perpendicularly, which impedes volume coverage.

As shown on the sketches and technical descriptions[7] included in the licensee's submittal, examination of CRD Scram Tank nozzle-to-shell inner radius N-1-A-IR has been performed to the extent practical, with the licensee obtaining approximately 85% of the ASME Code required inspection volume. No unacceptable indications were noted by the licensee.

The NRC staff has determined that the licensee has shown that it is impractical to meet the ASME Code-required 100% volumetric examination coverage for the subject nozzle inner radius section N-1-A-IR due to the design of the nozzle. Based on the volumetric coverage obtained, along with the full examination of ASME Code-required volumes in other pressure retaining nozzle welds, it is reasonable to conclude that, if significant service-induced degradation had occurred, evidence of it would be have been detected by the examination that was performed.

3.7 Request for Relief RR-CRV-1, Part G:

ASME Code, Section XI,
Examination Category R-A, Item R1.20,
Risk-Informed Piping Examinations

7 Sketches and technical descriptions provided by the licensee are not included in this report.

3.7.1 ASME Code Requirement

The examination requirements for the subject piping welds at JAFNPP are governed by a Risk-Informed Inservice Inspection (RI-ISI) program that was approved by the NRC in an SE dated September 12, 2000 (ADAMS ML003741048). The RI-ISI program was developed in accordance with EPRI Topical Report TR-112657, Rev. B-A, Revised Risk-Informed Inservice Inspection Evaluation Procedure (January 2000). As part of the NRC-approved program, the licensee has implemented inspection requirements listed in ASME Code Case N-578-1[8], Risk-Informed Requirements for Class 1, 2, or 3 Piping, Method B, with more detailed provisions contained in TR-112657. The topical report includes a provision for requesting relief from volumetric examinations if 100% of the required volumes cannot be examined.

Table 1[9] of ASME Code Case N-578-1 assigns the Examination Category R-A, Item R1.20, to piping inspection elements not subject to a known damage mechanism. This table requires 100% of the examination location volume, as described in Figures IWB-2500-8, 9, 10, or 11, as applicable, including an additional ½-inch of base metal adjacent to the ASME Code volume, be completed for selected Class 1 circumferential piping welds. ASME Code Case N-460, Alternative Examination Coverage for Class 1 and Class 2 Welds, as an alternative approved for use by the NRC in RG 1.147, Revision 15, Inservice Inspection Code Case Acceptability (RG 1.147), states that a reduction in examination coverage due to part geometry or interference for any Class 1 and 2 weld is acceptable provided that the reduction is less than 10%, i.e., greater than 90% examination coverage is obtained.

3.7.2 Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from examining 100% of the ASME Code-required inspection volume for Class 2 pipe-to-valve Weld 14-23-433.

3.7.3 Licensee's Basis for Relief Request

The licensee stated that volumetric examination was limited due to the design and configuration of the weld.

3.7.4 Licensee's Proposed Alternative Examination

No additional volumetric examinations are proposed.

3.7.5 Relief RR-CRV-1, Part G NRC Staff Evaluation

The examination requirements for the subject piping weld at JAFNPP are governed by an RI-ISI program that was approved by the NRC in an SE dated September 12, 2000. This program assigns Examination Category R-A, Item R1.20 to piping elements not subject to a known damage mechanism, and requires inspection of 100% of the examination location volume for selected circumferential piping welds. However, an OD taper on the valve side of Weld 14-23-

8 ASME Code Case N-578-1 is not approved for general use NRC RG 1.147, Revision 15; however licensees use portions of it as guidance in developing their RI-ISI program.
9 Table 1 is not included in this SE.

433 limits the required volumetric examination. In order to meet the RI-ISI program coverage requirements, this component would have to be re-designed and modified. Therefore, the NRC staff determined that 100% volumetric examination is considered impractical for the subject valve-to-piping weld.

Weld 14-23-433 is a ASME Code Class 2 carbon steel pipe to valve weld located on the high-pressure cooling injection (HPCI) system. The OD taper of the valve limits scanning to the pipe side of the weld only. The licensee achieved cornplete axial ultrasonic coverage using both 45- and 70-degree angle beams. Circumferential coverage was also achieved on the pipe and weld crown up to the taper of the valve. The licensee's aggregate coverage for all axial and circumferential scans is estimated to be approximately 87.5% of the ASME Code-required volume. The licensee used an ultrasonic procedure that meets the requirements of ASME Code, Section XI, Appendix VIII, Supplement 3, for examination of this ferritic piping weld.

Further, the results of reliability studies[10] for ultrasonic examinations have shown that the probability of service-induced flaw detection in ferritic welds is typically very good, e.g., greater than 90%.

The NRC staff has determined that the licensee has shown that it is impractical to meet the ASME Code-required 100% volumetric examination coverage for the subject weld due to the OD taper of the adjacent valve body. However, based on the volumetric coverage obtained, and considering enhanced ultrasonic capabilities on ferritic welds, it is reasonable to conclude that, if significant service-induced degradation had occurred, evidence of it would be have been detected by the examination that was performed.

4.0 CONCLUSIONS

The NRC staff has reviewed the licensee's submittal and concludes that compliance with ASME Code examination coverage requirements are impractical for the subject welds listed in Request for Relief RR-CRV-1, Parts A through G. Further, based on the coverage obtained, it is reasonable to conclude that, if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. Furthermore, the NRC staff concludes that best effort examinations obtained during the licensee's examinations provides reasonable assurance of structural integrity of the subject welds.

Therefore, for RR-CRV-1, Parts A through G relief is granted, pursuant to 10 CFR 50.55a(g)(6)(i), for the third inspection interval at for JAFNPP. The NRC staff has determined that granting Requests for Relief No. RR-CRV-1, Parts A through G 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 given due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

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10 P. G. Heasler, and S. R. Doctor, 1996. Piping Inspection Round Robin, NUREG/CR-5068, PNNL-10475, U. S. Nuclear Regulatory Commission, Washington, DC.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in the subject requests for relief remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributors: T. McLellan
C. Nove

Date: May 1, 2009

JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Third 10-Year ISI Interval

TABLE 1
SUMMARY OF RELIEF REQUESTS

Relief Request Number	TLR RR Sec.	System or Component	Exam. Category	Item No.	Volume or Area to be Examined	Required Method	Licensee Proposed Alternative	Relief Request Disposition
RR-CRV-1, Part A	3.1	Class 1 RPV Head Welds	B-A	B1.21 B1.22	100% of accessible head meridional and circumferential welds	Volumetric	Use the percentage of volumetric coverage achieved	Granted 10 CFR 50.55a(g)(6)(i)
RR-CRV-1, Part B	3.2	Class 1 RPV Nozzle Welds	B-D	B3.90	100% of RPV nozzle welds	Volumetric	Use the percentage of volumetric coverage achieved	Granted 10 CFR 50.55a(g)(6)(i)
RR-CRV-1, Part C	3.3	Class 1 RPV Closure Flange Threads	B-G-1	B6.40	100% of threaded ligament areas in RPV closure flange	Volumetric	Use the percentage of volumetric coverage achieved	Granted 10 CFR 50.55a(g)(6)(i)
RR-CRV-1, Part D	3.4	Class 1 RPV Stabilizer Brackets	B-K	B10.10	100% of integral attachment welds on the RPV	Surface	Use the percentage of surface coverage achieved	Granted 10 CFR 50.55a(g)(6)(i)
RR-CRV-1, Part E	3.5	Class 2 Scram Tank Head Weld	C-A	C1.20	100% of circumferential head welds on selected vessels	Volumetric	Use the percentage of volumetric coverage achieved	Granted 10 CFR 50.55a(g)(6)(i)
RR-CRV-1, Part F	3.6	Class 2 Scram Tank Nozzle Inner Radius	C-B	C2.22	100% of nozzle inner radius sections on nozzles in selected vessels	Volumetric	Use the percentage of volumetric coverage achieved	Granted 10 CFR 50.55a(g)(6)(i)
RR-CRV-1, Part G	3.7	Class 2 Piping Weld – Risk Informed Program	R-A	R1.20	100% of defined volume of selected welds	Volumetric	Use the percentage of volumetric coverage achieved	Granted 10 CFR 50.55a(g)(6)(i)

Attachment

Enclosure

Therefore, for RR-CRV-1, relief is granted, pursuant to 10 CFR 50.55a(g)(6)(i), for the third 10-year inspection interval for JAFNPP giving due consideration to the burden that could result upon the licensee, if the requirements were imposed on the facility.

The NRC staff's Safety Evaluation is enclosed.

Sincerely,
/RA/

Richard V. Guzman, Acting Chief
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-333

Enclosure:
As stated

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