



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

September 14, 2016

Vice President, Operations  
Entergy Nuclear Operations, Inc.  
Indian Point Energy Center  
450 Broadway, GSB  
P.O. Box 249  
Buchanan, NY 10511-0249

SUBJECT: INDIAN POINT NUCLEAR GENERATING UNIT NO. 2 – SAFETY EVALUATION  
FOR RELIEF REQUEST IP2-ISI-RR-01, EXAMINATION OF UPPER  
PRESSURIZER WELDS (CAC NO. MF7082)

Dear Sir or Madam:

By letter dated October 29, 2015, as supplemented by letter dated September 6, 2016, Entergy Nuclear Operations, Inc., the licensee, submitted Relief Request IP2-ISI-RR-01, "Examination of Upper Pressurizer Welds," for the fifth 10-Year Inservice Inspection (ISI) Interval for Indian Point Nuclear Generating Unit No. 2 (IP2). The request is to visually examine the upper circumferential and longitudinal pressurizer welds during each refueling outage for evidence of leakage during system pressure tests in lieu of volumetric examinations.

The Nuclear Regulatory Commission (NRC) staff has reviewed the licensee's submittal and concludes that American Society of Mechanical Engineers Code requirements are impractical for the subject welds listed in Relief Request IP2-ISI-RR-01 for the IP2 fifth 10-year ISI interval. Furthermore, the staff concludes that the licensee's proposed VT-2 visual examinations, the plant's leakage and radiation monitoring system, and volumetric examinations of the pressurizer shell-to-bottom head circumferential weld PZRC-1 and longitudinal weld PZRL-1 provide reasonable assurance of the leak tightness of the pressurizer welds. Therefore, Relief Request IP2-ISI-RR-01 is granted, pursuant to 10 CFR 50.55a(g)(6)(i), for the IP2 fifth 10-year ISI interval.

The NRC staff has determined that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) for Relief Request IP2-ISI-RR-01 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.

The NRC staff's safety evaluation is enclosed. Please feel free to contact Douglas V. Pickett at (301) 415-1364 if you have any questions on this issue.

Sincerely,

A handwritten signature in black ink, reading "Travis L. Tate". The signature is written in a cursive style with a long horizontal flourish extending to the right.

Travis L. Tate, Chief  
Plant Licensing Branch I-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-247

Enclosure:  
Safety Evaluation

cc w/encl: Distribution via Listserv



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF NO. IP2-ISI-RR-01

ENTERGY NUCLEAR OPERATIONS, INC.

INDIAN POINT NUCLEAR GENERATING UNIT NO. 2

DOCKET NO. 50-247

1.0 INTRODUCTION

By letter dated October 29, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML15317A131), as supplemented by letter dated September 6, 2016 (ADAMS Accession No. ML16256A783), Entergy Nuclear Operations, Inc. the licensee, submitted Relief Request IP2-ISI-RR-01 for the fifth 10-Year Inservice Inspection (ISI) Interval for Indian Point Nuclear Generating Unit No. 2 (IP2). The request is to visually examine the upper circumferential and longitudinal pressurizer welds during each refueling outage for evidence of leakage during system pressure tests in lieu of volumetric examinations.

2.0 REGULATORY REQUIREMENTS

Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(g)(4), American Society of Mechanical Engineers (ASME) Code Class 1 components shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 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 incorporated by reference in 10 CFR 50.55a(a) twelve months prior to the start of the 120-month interval, subject to the conditions listed in 10 CFR 50.55a(b). The Code of Record for the fifth 10-year interval ISI program, which began on June 1, 2016, and will end on May 31, 2026, is the 2007 Edition with the 2008 Addenda of Section XI of the ASME Code.

Paragraph 10 CFR 50.55a(g)(5)(iii) states, in part, that licensees may determine that conformance with certain ASME Code requirements is impractical and that the licensee shall notify the U.S. Nuclear Regulatory Commission (NRC) and submit information in support of the determination. Determination 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 ISI interval for which the request is being submitted. Requests for relief

made in accordance with this section must be submitted to the NRC no later than 12 months after the expiration of the initial 120-month inspection interval or subsequent 120-month inspection interval for which relief is sought.

Paragraph 10 CFR 50.55a(g)(6)(i), states that the NRC will evaluate determinations under paragraph (g)(5) of this section that code requirements are impractical. The NRC may grant such relief and may impose such alternative requirements as it determines 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.

### 3.0 EVALUATION

#### ASME Code Component Identification

Class:	1
References:	IWB-2500-1, Category B-B, Figure IWB-2500-1 and 2
Examination Category:	B-B
Item Numbers:	B2.11, B2.12
Description:	Pressurizer Upper Shell-To-Head Circumferential and Longitudinal Welds
Component Numbers:	PZRC-5 (circumferential) and PZRL-4 (longitudinal)

#### ASME Code Requirement

ASME Code, Section XI, Table IWB-2500-1, Category B-B requires that the volumetric examination coverage stipulated by Figures IWB-2500-1 and 2 for the pressurizer shell-to-head welds be performed on 100% of the Code Class 1 circumferential welds and the adjoining 1 foot section of one longitudinal weld that intersects the circumferential weld per head.

ASME Code, Section XI, Table IWB-2500-1, Category B-P, Item 15.10 requires a system leakage test to be conducted prior to plant startup following each reactor refueling outage. This system leakage test is required to be performed in accordance with Article IWB-5220 with a VT-2 visual examination performed in accordance with Article IWA-5240 and acceptance standards contained in Article IWB-3522.

#### Licensee's Basis for Relief Request (As stated)

Pursuant to 10 CFR 50.55a(g)(5)(iii), relief is requested on the basis that compliance with the Code requirement is impractical. The pressurizer, insulation and shielding at IP2 was designed and fabricated to Codes in effect during the late 1960's and did not incorporate the clearances needed for the examination of the upper pressurizer welds.

The pressurizer was first installed and insulated, then the concrete biological shield was installed, and next all the piping in the top of the pressurizer was welded. The annular area between the vessel and the biological shield wall measures about eight inches, of which half is filled with asbestos insulation. The

upper circumferential (PZRC-5) and longitudinal (PZRL-4) welds are enclosed in this biological and missile shield and are therefore completely inaccessible for volumetric examination. The NRC staff approval of a similar request (ML072130487) for the fourth interval and (sic) stated in the Safety Evaluation; "The NRC staff determined that in order for the licensee to gain access to the subject welds to perform ASME Code-required volumetric examinations, the PZR [pressurizer] and piping would have to be redesigned, including the removal of the asbestos insulation and the removal and modification of the concrete biological shield surrounding the PZR. These modifications would place a burden on the licensee."

#### Licensee's Proposed Alternative Examination (As stated)

The examination of the accessible portions of the shell-to-bottom head circumferential and intersecting longitudinal weld (PZRC-1 and PZRL-1) will be performed as required by IWB-2500. Alternatively for the upper pressurizer welds [PZRC-5 and PZRL-4], it is proposed that they be visually examined (VT-2) during each refueling outage for evidence of leakage during system pressure tests performed in accordance with IWB-2500, Category B-P. It is expected that any through-wall defects would be detected by this examination prior to the failure of the pressurizer based on the expectation that the component will experience leakage before a catastrophic failure ("leak before break"). Additionally, the IP2 Improved Technical Specifications (TSs) Bases, Section B3.4.15, state the IP2 leakage detection system has the capability of detecting leakage increases of 0.5 to 1.0 gallons per minute. Also IP2 TS 3.4.15 requires monitoring of atmospheric radioactivity in containment.

The level of inspections proposed for the fifth interval has been in effect for the previous inspection intervals at Indian Point Unit 2. Based on the reliable operating history of this and similar vessels at other plants, the performance of VT-2 examinations for leakage, the TS required monitoring, approval of this relief request continues to provide reasonable assurance of the leak tightness of the upper pressurizer welds (PZRC-5 and PZRL-4).

#### Duration of Proposed Relief Request

The proposed duration of this request is for the Fifth Inspection Interval starting June 1, 2016, and currently scheduled to end May 31, 2026.

#### 4.0 NRC STAFF EVALUATION

The ASME Code requires that essentially 100 percent volumetric examination coverage be achieved for the pressurizer shell-to-head welds PZRC-5 and PZRL-4. The licensee indicated that it is unable to volumetrically examine essentially 100 percent of the subject weld lengths and has requested relief from the ASME Code volumetric examination requirements. As an alternative to the ASME Code, the licensee has proposed to perform VT-2 visual examinations for leakage on the subject welds each refueling outage in accordance with the ASME Code.

As stated by the licensee, the IP2 pressurizer was designed and fabricated to design requirements in effect during the late 1960's which did not require the same consideration of accessibility of the subject welds for inservice examination that is found in later ASME Code editions and Federal regulations. Pressurizer upper circumferential weld PZRC-5 and longitudinal weld PZRL-4 are enclosed in a biological and missile shield which makes the subject welds inaccessible for volumetric examination. During the review, the NRC staff noted to the licensee the requirement that impracticality must be based on the demonstrated limitations experience when attempting to comply with the Code requirements during the ISI interval for which the request is being submitted. In response, the license submitted a supplemental letter dated September 6, 2016, that highlighted prior relief granted by the staff during the fourth ISI interval. The staff determined that in order for the licensee to gain access to the subject welds to perform the ASME Code-required volumetric examinations, the pressurizer and piping would have to be redesigned, including the removal of the asbestos insulation and the removal and modification of the concrete biological shield surrounding the pressurizer. These modifications would place a burden on the licensee. Based upon the licensee's statement that the inaccessibility of the welds remains unchanged, the staff agrees that the inspections cannot be implemented. Therefore, the staff has determined that these ASME Code requirements are impractical.

The licensee noted that it will be able to volumetrically examine pressurizer shell-to-bottom head circumferential weld PZRC-1 and longitudinal weld PZRL-1. If significant service-induced degradation were occurring, there is reasonable assurance that evidence of it would be detected by these examinations. Since they are similar welds to PZRC-5 and PZRL-4, any degradation observed in welds PZRC-1 and PZRL-1 would also provide an indication of the integrity of welds PZRC-5 and PZRL-4.

As discussed in Section 3.0 of this SE, the licensee states that in the event of a through-wall defect, the component will experience leakage before a catastrophic failure and this leakage will be detected by the proposed VT-2 examinations. According to the IP2 Improved TSs Bases, Section B3.4.15, Revision 2 dated August 15, 2006, the IP2 leakage detection system has the capability of detecting leakage increases of 0.5 to 1.0 gallons per minute (gpm). In addition, IP2 TS 3.4.15 requires that the licensee monitor atmospheric radioactivity in the containment, which would also provide an indication of reactor system coolant leakage. These TS requirements will enable the licensee to detect a leak in time to take corrective action according to TSs and plant operating procedures.

Therefore, the licensee's proposed alternative to perform VT-2 visual examinations of the subject welds each refueling outage in accordance with the ASME Code, the plant's leakage and radiation monitoring systems, and volumetric examinations of welds PZRC-1 and PZRL-1, provide reasonable assurance of the leak tightness of the pressurizer welds.

## 5.0 CONCLUSION

The NRC staff has reviewed the licensee's submittal and concludes that ASME Code requirements are impractical for the subject welds listed in Relief Request IP2-ISI-RR-01 for the IP2 fifth 10-year ISI interval. Furthermore, the NRC staff concludes that the licensee's proposed VT-2 visual examinations, the plant's leakage and radiation monitoring system, and volumetric examinations of the pressurizer shell-to-bottom head circumferential weld PZRC-1 and longitudinal weld PZRL-1, provide reasonable assurance of the leak tightness of the

pressurizer welds. Therefore, Relief Request IP2-ISI-RR-01 is granted, pursuant to 10 CFR 50.55a(g)(6)(i), for the IP2 fifth 10-year ISI interval.

The NRC staff has determined that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) for Relief Request IP2-ISI-RR-01 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. All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in the subject relief request remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: Joel G. Jenkins

Date: September 14, 2016

The NRC staff's safety evaluation is enclosed. Please feel free to contact Douglas V. Pickett at (301) 415-1364 if you have any questions on this issue.

Sincerely,

*/RA/*

Travis L. Tate, Chief  
Plant Licensing Branch I-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-247

Enclosure:  
Safety Evaluation

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