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August 3, 2011

NL-11-094

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

SUBJECT: Request For Relief Request 14 - Code Case N-770-1 Weld Inspection  
Frequency Extension  
Indian Point Unit Number 2  
Docket No. 50-247  
License No. DPR-26

Dear Sir or Madam:

Entergy Nuclear Operations, Inc. (Entergy) is submitting Relief Request No. 14 (IP2-ISI-RR-14) (Enclosure 1) for Indian Point Unit No. 2 (IP2). This relief request is for the Fourth 10-year Inservice Inspection (ISI) Interval.

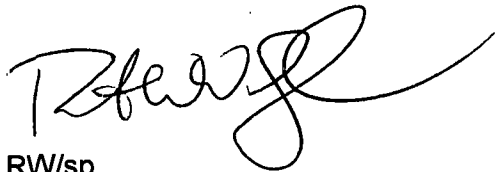
The purpose of this relief request is to extend the reactor vessel cold leg nozzle to safe-end welds (21-14A, 22-14A, 23-14A, 24-14A), which are Alloy 600 welds covered by Code Case N-770-1, Table 1, Inspection Item B. The requested extension is until the end of the operating license for IP2 but not later than March 2014. The current operating License expires September 28, 2013. However, an application for License renewal was filed with the NRC on April 23, 2007. Therefore, the provisions of 10 CFR 2.109 are applicable "b) If the licensee of a nuclear power plant licensed under 10 CFR 50.21(b) or 50.22 files a sufficient application for renewal of either an operating license or a combined license at least 5 years before the expiration of the existing license, the existing license will not be deemed to have expired until the application has been finally determined." This request is made in accordance with 10 CFR 50.55a(a)(3)(i), an alternative provides an acceptable level of quality and safety.

Entergy requests approval of the relief request by November 2011 to support the planning of the IP2 Refueling Outage (RFO) – 2R20 in March 2012.

A047  
NRC

There are no new commitments identified in this submittal. If you have any questions or require additional information, please contact Mr. Robert Walpole, Licensing Manager at 914-734-6710.

Sincerely,



RW/sp

Enclosure: 1. Relief Request No IP2-ISI-RR-14 - Code Case N-770-1 Weld Inspection Frequency Extension

cc: Mr. John P. Boska, Senior Project Manager, NRC NRR DORL  
Mr. William M. Dean, Regional Administrator, NRC Region I  
NRC Resident Inspector's Office Indian Point  
Mr. Paul Eddy, New York State Department of Public Service  
Mr. Francis J. Murray, Jr., President and CEO, NYSERDA

ENCLOSURE 1 TO NL-11-094

RELIEF REQUEST NO IP2-ISI-RR-14

CODE CASE N-770-1 WELD INSPECTION FREQUENCY EXTENSION

ENTERGY NUCLEAR OPERATIONS, INC.  
INDIAN POINT NUCLEAR GENERATING UNIT NO. 2  
DOCKET NO. 50-247

**Indian Point Unit 2**  
**Fourth 10-year ISI Interval**  
**Relief Request No: IP2-ISI-RR-14**  
**Code Case N-770-1 Weld Inspection Frequency Extension**  
**Proposed Alternative**  
**In Accordance with 10 CFR 50.55a(a)(3)(i)**  
**-Alternative Provides Acceptable Level of Quality and Safety-**

**1. ASME Code Component(s) Affected**

The affected components are the Indian Point Unit 2 (IP2) reactor vessel cold leg nozzle to safe-end welds (21-14A, 22-14A, 23-14A, 24-14A), which are Alloy 600 welds covered by Code Case N-770-1, Table 1, Inspection Item B.

These welds had an Alloy 600 ID onlay installed during original fabrication and do not join any cast stainless steel materials.

<b>Examination Category</b>	<b>Inspection Item</b>	<b>Description</b>
CC N-770-1	B	Weld 21-14A - Loop 21 cold leg nozzle to safe-end weld
CC N-770-1	B	Weld 22-14A - Loop 22 cold leg nozzle to safe-end weld
CC N-770-1	B	Weld 23-14A - Loop 23 cold leg nozzle to safe-end weld
CC N-770-1	B	Weld 24-14A - Loop 24 cold leg nozzle to safe-end weld

**2. Applicable Code Edition and Addenda**

Code Case N-770-1 as referenced in 10CFR50.55a(g)(6)(ii)(F).

**3. Applicable Code Requirement**

Table 1 of Code Case N-770-1, requires volumetric examination of essentially 100% of Inspection Item B pressure retaining welds once every second inspection period not to exceed 7 years.

**4. Reason for Request**

Relief is being requested at this time due to the NRC imposition of Code Case N-770-1 through rulemaking and the scheduling aspects of the new requirement conflicting with the current plans at IP2. Due to this conflict, Entergy is requesting an alternative that provides an acceptable level of quality and safety as compared to the requirements of Code Case N-770-1, as conditioned by 10CFR50.55a.

Examination of Item A-2 (Hotleg) and Item B (Coldleg) welds are performed from the inside surface of the pipe (ID) at IP2 due to extremely limited access provisions from the outside

surface of the pipe. The IP2 Item A-2 and Item B welds are located inside a "sandbox" which was installed during original plant construction after all welding was completed. Additionally, these welds are covered with asbestos insulation. The estimated cost (\$750,000) and personnel radiation exposure (approximately 11 Rem) to perform these examinations from the OD make the OD exam undesirable. The inspection of the Item A-2 (Hotleg) welds from the ID does not require removal of the reactor vessel core barrel, while the inspection of the Item B (Coldleg) welds from the ID does require removal of the reactor vessel core barrel.

Baseline inspections of Code Case N-770-1 Inspection Item B welds, 21-14A, 22-14A, 23-14A and 24-14A were performed in May 2006. The ultrasonic examinations performed in 2006 met Section XI, Appendix VIII requirements, including examination volume of essentially 100%. Table 1 of Code Case N-770-1 requires the successive examination of these welds to be performed by May 2013. Therefore, inspection of these welds would require removal of the core barrel during the March 2012 refueling outage.

Since inspection of these welds requires that the core barrel be removed from the reactor vessel, these inspections had previously been planned to be performed concurrently with the vessel shell weld inspections and the vessel internals inspections required by MRP-227. IP2 has submitted Relief Request IP2-ISI-RR-13 to the NRC staff to allow deferral of the vessel shell weld inspections from 2012 to 2014. Approval of this request will eliminate the need to remove the core barrel during the March 2012 refueling outage to perform the Code Case N-770-1 Inspection Item B weld inspections and again during the March 2014 refueling outage to perform the vessel shell weld inspections and MRP-227 vessel internals inspections. Rescheduling the Code Case N-770-1 Inspection Item B weld inspections from the March 2012 refueling outage to the end of the operating license for IP2 but not later than the March 2014 refueling outage would allow the Code Case N-770-1 inspections, the vessel shell weld inspections, and the MRP-227 vessel internals inspections to be performed during the same refueling outage. This would eliminate the need to remove the core barrel during the March 2012 refueling outage resulting in a person-Rem savings of approximately 1.5 Rem.

## **5. Proposed Alternative and Basis for Use**

10CFR50.55a(a)(3) states:

"Proposed alternatives to the requirements of (c), (d), (e), (f), (g), and (h) of this section or portions thereof may be used when authorized by the Director of Nuclear Reactor Regulation. The applicant shall demonstrate that:

- (i) the proposed alternatives would provide an acceptable level of quality and safety, or
- (ii) compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety."

Entergy believes that the proposed alternatives of this request provide an acceptable level of quality and safety.

IP2 proposes a one time extension to the Code Case N-770-1, Table 1, Inspection Item B, volumetric examinations from a period of not to exceed 7 years to a period of not to exceed 8 years. The inspections which are currently required to be performed by May 2013 will be performed by the end of the operating license for IP2 but not later than the March 2014 refueling outage.

Operating experience on Primary Water Stress Corrosion Cracking (PWSCC) of Alloy 82/182 welds show that weld repairs performed during original plant construction are a significant contributor in the initiation and propagation of cracking. A review of the construction records and a weld repair search performed for the IP2 Reactor Vessel nozzle Alloy 82/182 welds did not identify any weld repairs performed on these welds during original plant construction. Additionally, IP2 has implemented Zinc injection since December 2007 which contributes to lower probability of PWSCC crack initiation during future plant operation.

The susceptibility to PWSCC of Alloy 82/182 welds is largely a function of time at temperature. Since IP2 operated at a low cold leg temperature ( $< 535^{\circ}\text{F}$ ) for a significant portion of its operating life, it is ranked only moderately susceptible to PWSCC based on the susceptibility formula provided in NRC Order EA 03-009 for the upper vessel head penetrations.

Examination of Item A-2 (Hotleg) and Item B (Coldleg) welds are performed from the ID at IP2 due to extremely limited access provisions from the outside surface of the pipe. The IP2 Item A-2 and Item B welds are located inside a "sandbox" which was installed during original plant construction after all welding was completed. Additionally, these welds are covered with asbestos insulation. The estimated cost (\$750,000) and personnel radiation exposure (approximately 11 Rem) to perform these examinations from the OD make the OD exam undesirable. The inspection of the Item A-2 (Hotleg) welds from the ID does not require removal of the reactor vessel core barrel, while the inspection of the Item B (Coldleg) welds from the ID does require removal of the reactor vessel core barrel.

In March 2010, ultrasonic (volumetric) and eddy current (surface) exams were performed on the Code Case N-770-1 Inspection Item A-2 (Hotleg) welds and no indications were identified. In 2012, ultrasonic (volumetric) and eddy current (surface) exams are scheduled to be performed on the Code Case N-770-1 Inspection Item A-2 (Hotleg) welds. Since PWSCC is temperature dependant, it would be expected that Inspection Item A-2 (Hotleg) welds would show evidence of crack initiation before Inspection Item B (Coldleg) welds. Therefore, the lack of any indications in the Inspection Item A-2 (Hotleg) welds provides added assurance that the one time extension of the inspection of the Inspection Item B (Coldleg) welds by one year provides an acceptable level of quality and safety.

The baseline inspection requirements of the Code Case N-770-1 Inspection Item B (Coldleg) welds, as required by Code Case N-770-1 -2200, can be satisfied by crediting the MRP-139 examination that was performed in May 2006. At that time, in addition to the ultrasonic

(volumetric) examination, an additional surface examination utilizing an eddy current technique was performed. Both the ultrasonic (volumetric) and eddy current (surface) examinations were performed from the ID surface and confirmed the absence of any unacceptable indications after approximately 33 years of operation. The ultrasonic examinations performed in 2006 met Section XI, Appendix VIII requirements, including examination volume of essentially 100%. Since PWSCC initiates from the inside wetted surface of the pipe and propagates radially, an internal surface examination is the preferred inspection technique for this failure mechanism. The use of eddy current examination in addition to the Code Case N-770-1 required ultrasonic examination provides a higher probability of detection of smaller flaws than an ultrasonic examination alone. Since the Code Case N-770-1 inspection frequency is based on flaw sizes associated with ultrasonic examination, the proposed alternative provides an equivalent protection against unacceptable PWSCC as the Code Case N-770-1 exam schedule.

Based on the fact that no weld repairs were documented on these welds during plant construction, zinc addition which decreases the probability of PWSCC crack initiation has been implemented at IP2 since December 2007, the hotleg examinations including both ultrasonic and eddy current inspections were performed in 2010 with no indications, hotleg examinations including both ultrasonic and eddy current inspections are scheduled to be performed in 2012, and the coldleg examinations including both ultrasonic and eddy current inspections were performed from the ID in 2006 with no indications, the one time alternative inspection frequency of every 8 years instead of every 7 years provides an acceptable level of quality and safety. Additionally, this would eliminate the need to remove the core barrel during the March 2012 refueling outage resulting in a person-Rem savings of approximately 1.5 Rem.

## **6. Duration of Proposed Alternative**

This request is applicable to Entergy's inservice inspection program for the fourth interval for Indian Point Unit 2.

## **7. References**

1. *Code Case N-770-1, Alternative Examination Requirements and Acceptance Standards for Class 1 PWR Piping and Vessel Nozzle Butt Welds Fabricated with UNS N06082 or UNS W86182 Weld Filler Material With or Without Application of listed Mitigation Activities Section XI, Division 1.*