January 29, 2008

Mr. Michael A. Balduzzi
Sr. Vice President & COO
Regional Operations, NE
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

SUBJECT: INDIAN POINT NUCLEAR GENERATING UNIT NO. 2 - RELIEF REQUEST (RR) NO. RR-05 (TAC NO. MD4700)

Dear Mr. Balduzzi:

By letter dated February 28, 2007, as supplemented by letter dated July 19, 2007, Entergy Nuclear Operations, Inc. (the licensee), submitted a relief request for the fourth 10-Year Inservice Inspection Interval. The request is to use the Risk-Informed Inservice Inspection (RI-ISI) program as an alternative to the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, for Class 1 piping, category B-F and B-J welds. Relief Request (RR)-05 is similar to RR-63 approved by the Nuclear Regulatory Commission (NRC) for the third 10-Year ISI interval.

Inservice inspection of ASME Code Class 1, 2, and 3 components is 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) Section 50.55a(g), except where specific relief has been granted by the NRC pursuant to 10 CFR 50.55a(g)(6)(i). Also, 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if: (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.

Based on the enclosed safety evaluation, the NRC concludes that the proposed alternative inspections provide an acceptable level of quality and safety and authorizes the request to use the RI-ISI program as an alternative to the requirements of the ASME Code, Section XI, for Class 1 piping, category B-F and B-J welds.

If you have any questions regarding this approval, please contact the Indian Point Project Manager, John Boska, at (301) 415-2901.

Sincerely,

/ra/

Mark G. Kowal, 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: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF NO. RR-05

ENTERGY NUCLEAR OPERATIONS, INC.

INDIAN POINT NUCLEAR GENERATING UNIT NO. 2

DOCKET NO. 50-247

1.0 INTRODUCTION

By letter dated February 28, 2007, Agencywide Documents Access and Management System (ADAMS) Accession Number ML070640101, as supplemented by letter dated July 19, 2007, ADAMS Accession Number ML072080472, Entergy Nuclear Operations, Inc. (Entergy or the licensee) submitted a request to the Nuclear Regulatory Commission (NRC) for approval of the fourth 10-year interval inservice inspection (ISI) plan for Indian Point Unit 2 (IP2). Within the ISI plan, the licensee requested NRC approval of Relief Request (RR) RR-05 to use the Risk-Informed ISI (RI-ISI) program as an alternative to the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Section XI, for Class 1 piping, category B-F and B-J welds. The RI-ISI program in RR-05 is similar to the RI-ISI program in RR-63 for the third 10-year ISI interval approved by the NRC on March 19, 2004, ADAMS Accession Number ML040860006. The licensee proposed to extend the RI-ISI program approved for the third 10-year interval to the fourth 10-year interval at IP2. The fourth 10-year interval started on March 1, 2007, and is scheduled to end on April 3, 2016.

The licensee's RI-ISI program is an alternative pursuant to Section 50.55a(a)(3)(i) of Title 10 of the *Code of Federal Regulations* (10 CFR). The licensee developed the RI-ISI program in accordance with the methodology contained in the Electric Power Research Institute (EPRI) Report TR-112657, Revision B-A (Reference 1). The NRC staff approved the topical report TR-112657 in a safety evaluation report (SER) dated October 28, 1999 (ADAMS Accession Number ML993190474).

2.0 REGULATORY EVALUATION

Pursuant to 10 CFR 50.55a(g), ISI of the ASME Code Class 1, 2, and 3 components must be performed in accordance with Section XI of the ASME Code, "Rules for Inservice Inspection of Nuclear Power Plant Components" (hereinafter called Code) and applicable addenda, except where specific relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). The regulation of 10 CFR 50.55a(a)(3) states in part that alternatives to the requirements of paragraph 50.55a(g) may be used, when authorized by the Director of the Office of Nuclear Reactor Regulation, if the licensee demonstrates that the proposed alternatives would provide an acceptable level of quality and safety, or if 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) must meet the requirements set forth in the Code, to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that ISI of components conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of the Code 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 Code of Record for the fourth 10-year interval is the 2001 Edition through the 2003 Addenda of the ASME Code, Section XI.

Regulatory Guide (RG) 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," (Reference 7) defines the following safety principles that should be met in an acceptable RI-ISI program:

1. The proposed change meets current regulations unless it is explicitly related to an exemption.
2. The proposed change is consistent with the defense-in-depth philosophy.
3. The proposed change maintains sufficient safety margins.
4. When proposed changes result in an increase in risk, the increases should be small and consistent with the intent of the Commission's Safety Goal Policy Statement.
5. The impact of the proposed change should be monitored using performance measurement strategies.

RG 1.178, "An Approach For Plant-Specific Risk-Informed Decisionmaking for Inservice Inspection of Piping," (Reference 8) describes methods acceptable to the NRC staff (the staff) for integrating insights from probabilistic risk assessment (PRA) techniques with traditional engineering analyses into ISI programs for piping, and addresses risk-informed approaches that are consistent with the basic elements identified in RG 1.174.

In its SER approving EPRI topical report TR-112657, Revision B-A, the staff concluded that the RI-ISI methodology conforms to the guidance provided in RGs 1.174 and 1.178, and that no significant risk increase should be expected from the changes to the ISI program resulting from applying the RI-ISI methodology. The staff stated in the transmittal letter for the topical report's SER that an RI-ISI program as described in the topical report utilizes a sound technical approach and will provide an acceptable level of quality and safety. The staff also stated that, pursuant to 10 CFR 50.55a, any RI-ISI program meeting the requirements of the topical report provides an acceptable alternative to the piping ISI requirements with regard to (1) the number of locations, (2) the locations of inspections, and (3) the methods of inspection.

Since the issuance of the SER approving TR-112657, several instances of primary water stress-corrosion cracking (PWSCC) of alloy 82/182 dissimilar metal welds have occurred in the industry. This degradation has prompted the NRC to send a letter (Reference 2) to the Chairman of the ASME Subcommittee on Nuclear Inservice Inspection, stating that the operating experience with leakage and flaws caused by PWSCC support a position that current ASME Code inspection requirements are not sufficient for managing PWSCC-susceptible butt welds in the reactor coolant pressure boundary. This letter represents a departure from the

staff's conclusions in the topical report's SER. Therefore, the staff reviews the inspection of alloy 82/182 welds in the piping systems with more stringent guidance than the welds in the RI-ISI program that are not susceptible to PWSCC.

The submittal follows the staff-approved RI-ISI process and methodology delineated in EPRI TR-112657, Revision B-A, "Revised Risk-Informed Inservice Inspection Evaluation Procedure" (Reference 1). By assessing piping failure potential and piping failure consequences, and performing probabilistic risk assessment (PRA) and safety significance ranking of piping segments, the number of inspection locations can be significantly reduced. However, the program retains the fundamental requirements of the Code, such as inspection methods, acceptance guidelines, pressure testing, corrective measures, documentation requirements and quality control requirements. Thus, ISI program requirements of other non-related portions of the ASME Code, Section XI are unaffected. The licensee stated that no augmented programs were affected by the RI-ISI application on Class 1 piping at IP.

3.0 PROPOSED RELIEF REQUEST RR-05

3.1 ASME Code Components Affected

The components affected by RR-05 are risk-informed ISI for Class 1 B-F and B-J welds of the reactor coolant system, chemical and volume control system, safety injection system, and auxiliary cooling system (residual heat removal). As specified in Subarticle IWB-2500-1 of the ASME Code, Section XI, the ASME Code item numbers for the subject welds are as follows: B5.10, B5.20, B5.30, B5.40, B5.50, B5.60, B5.70, B5.80, B5.90, B5.100, B5.110, B5.120, B9.11, B9.21, B9.31, B9.32, and B9.40.

3.2 Applicable Code Edition and Addenda

The Code of Record for IP2's fourth 10-year inservice inspection interval is the ASME Code Section XI, 2001 Edition including the 2003 Addenda.

3.3 Applicable Code Requirement

ASME Code, Section XI, 2001 Edition with 2003 Addenda, subarticle IWB-2500-1 requires in part that for each successive 10-Year ISI Interval, 100% of Category B-F welds and 25% of B-J welds for the ASME Class 1 piping having nominal pipe size (NPS) 4 inch or larger be selected for volumetric and surface examination.

3.4 Proposed Alternative and Basis

The licensee stated that ASME Code, Section XI, 2001 Edition with 2003 Addenda, subarticle IWB-2500-1, Examination Categories B-F and B-J currently contain the requirements for the non-destructive examination (NDE) of Class 1 piping components. The previously NRC approved RI-ISI program which is part of the proposed RR-05 will be used as an alternative for Class 1 piping (Examination Categories B-F and B-J) examination requirement.

The licensee developed the IP2 RI-ISI Program in accordance with the EPRI methodology contained in EPRI TR-112657. The NRC approved the RI-ISI program for use at IP2 during the

third period of the third 10-year interval. The licensee stated the program is still applicable for the fourth inspection interval. The licensee stated that it has updated the RI-ISI program, consistent with the intent of NEI-04-05, "Living Program Guidance to Maintain Risk-Informed Inservice Inspection Programs for Nuclear Plant Piping Systems," dated April 2004, and continues to meet EPRI TR-112657 and RG 1.174 risk acceptance criteria.

The licensee stated that it reviewed various inputs required to develop the RI-ISI program to meet its commitment to maintain a living program. The effort consisted of reviewing probabilistic safety assessment changes, plant design changes, procedures, NDE inspection results, plant specific operating history, and industry operating events since the original RI-ISI program was submitted. The licensee stated that it did not identify any changes that impact the proposed RI-ISI program. Therefore, the licensee concludes that there has been no change to the 61 locations selected for NDE for the fourth 10-year interval relative to the 61 locations selected during the original RI-ISI program evaluation for the third 10-year interval.
The licensee stated that there were no changes as a result of the above updating process. Reasons for this include a large portion of the piping, if it were to fail, would result in a loss-of-coolant accident (LOCA), which for pressurized-water reactors, typically results in a high consequence rank per the EPRI methodology.

The licensee stated that with respect to the PRA, the model has undergone changes since the initial RI-ISI submittal. These include converting from a large event tree/small fault tree approach to a linked fault tree approach and resolution of all level A and B and most level C and D Facts and Observations (F&Os) identified during the peer review process. The licensee stated that remaining lower level F&Os have no significant effect on the model results and therefore, have no bearing on the RI-ISI program. Examples of key changes to the PRA include:

1. Credit for feedwater and/or condensate recovery, where available
2. Treatment of cross header common cause for both the essential and non-essential service water headers
3. Update of equipment performance and unavailability data
4. Update and upgrade of the human error probabilities based on extensive thermal-hydraulic calculations
5. Incorporation of a more current reactor coolant pump seal LOCA model
6. Inclusion of internal flooding events

The licensee completed ASME Code, Section XI required examinations with a minimum percentage (66%) in the first and second period of the third ISI interval and the remaining thirty-four percent (34%) of the welds by the end of the third inspection interval. The licensee stated that 100% of the RI-ISI Program weld examinations will be completed in the fourth inspection interval. As indicated in Note 2 to Table 1 of RR-05, no augmented programs were affected by the RI-ISI application on Class 1 piping at IP2.

3.5 Duration of Proposed Alternative

RR-05 is requested for the fourth 10-Year interval (effective from March 1, 2007 to April 3, 2016). The plant's current operating license will expire on September 28, 2013. The licensee has submitted IP2's license renewal application. The end date of the fourth 10-year interval will

be controlled by the ISI and/or containment ISI Program Plan, commensurate with the license renewal application.

4.0 TECHNICAL EVALUATION

Pursuant to 10 CFR 50.55a(a)(3), the NRC staff has reviewed and evaluated the licensee's proposed RI-ISI program in RR-05 based on guidance and acceptance criteria provided in EPRI TR-112657, NRC RGs 1.174 and 1.178, Standard Review Plan (SRP) Chapter 3.9.8 (Reference 9), NRC SER for TR-112657, and NRC letter to the Chairman of the ASME Subcommittee on Nuclear Inservice Inspection (Reference 2).

4.1 Proposed Changes to the ISI Program

During the course of its review, the staff concluded that the proposed RI-ISI program (i.e., proposed changes to the traditional ISI program) is consistent with the guidelines contained in EPRI TR-112657, which states that industry and plant-specific piping failure information, if any, is to be utilized to identify piping degradation mechanisms and failure modes, and consequence evaluations are to be performed using PRA to establish piping segment safety ranking for determining new inspection locations. Thus, the staff concludes that the licensee's application of the EPRI TR-112657 approach is an acceptable alternative to the current IP2 piping ISI requirements with regard to the number, locations, and methods of inspections, and provides an acceptable level of quality and safety pursuant to 10 CFR 50.55a(a)(3).

4.2 Engineering Analysis

In accordance with the guidance provided in RGs 1.174 and 1.178, an engineering analysis of the proposed changes to the ISI program (i.e., the RI-ISI program) is required using a combination of traditional engineering analysis and supporting insights from the PRA. The licensee elaborated as to how the engineering analyses conducted for the IP2 RI-ISI program ensure that the proposed changes to the ISI program are consistent with the principles of defense-in-depth. This is accomplished by evaluating a location's susceptibility to a particular degradation mechanism and then performing an independent assessment of the consequence of a failure at that location. No changes to the evaluation of design-basis accidents in the final safety analysis report are being made by the RI-ISI process. Therefore, sufficient safety margins will be maintained.

The RI-ISI program at IP2 is limited to ASME Class 1 piping welds. The licensee stated in its submittal that other non-risk-informed portions of the ASME Code will be unaffected by this program. Piping systems defined by the scope of the RI-ISI program were divided into piping segments. Pipe segments are defined as lengths of pipe whose failure leads to similar consequences and are exposed to the same degradation mechanisms. That is, some lengths of pipe whose failure would lead to the same consequences may be split into two or more segments when two or more regions are exposed to different degradation mechanisms. The licensee generated failure potential categories using industry failure history, plant-specific failure history, and other relevant information using the guidance provided in EPRI TR-112657. The degradation mechanisms identified in the submittal include thermal fatigue including thermal stratification, cycling and striping (TASCS) and thermal transients (TT), and intergranular stress-corrosion cracking (IGSCC).

The staff finds that the licensee performed engineering analysis of the RI-ISI program in accordance with RGs 1.174 and 1.178 and, therefore, the licensee's engineering analysis of the RI-ISI program is acceptable.

In Sections 1.8.5 and 2.8 of the licensee's fourth 10-year ISI program plan, the licensee discussed its plan for managing PWSCC for reactor vessel dissimilar metal butt welds. The licensee stated that EPRI has developed a program titled "Materials Reliability Program: Primary System Piping Butt Weld Inspection and Evaluation Guideline (MRP-139)," Final Report, July 14, 2005. The program identifies primary system dissimilar metal butt weld locations susceptible to PWSCC and developed approaches for inspection, re-inspection, mitigation, and flaw evaluation. This includes terminal ends, where most of the Alloy 82/182 welds are located. In accordance with MRP-139, guidance has been provided to inspect dissimilar butt welds joining the reactor vessel nozzle to safe-ends. In this guidance, IP2 falls under the classification of "D" and "E", and "J" and "K", as defined in MRP-139.

The licensee stated that it will comply with the criteria of MRP-139 for welds that are potentially susceptible to PWSCC. At IP2 this consists of eight welds where piping attaches to the reactor pressure vessel nozzles. The licensee stated that the pressurizer and steam generators contain no alloy 82/182 dissimilar metal butt welds. The eight dissimilar metal welds are identified in Table 4.1-1 of the ISI plan as follows.

Table 4.1-1 – Dissimilar Metal Welds

Weld (Component) ID	Description
RPVS21-1A	Cold Leg SAFEND RO@202
RPVS21-14A	Hot Leg SAFEND RI@247
RPVS22-1A	Cold Leg SAFEND RO@158
RPVS22-14A	Hot Leg SAFEND RI@113
RPVS23-1A	Cold Leg SAFEND RO@338
RPVS23-14A	Hot Leg SAFEND RI@293
RPVS24-1A	Cold Leg SAFEND RO@022
RPVS24-14A	Hot Leg SAFEND RI@067

The licensee reported that all eight reactor vessel dissimilar metal butt welds were volumetrically examined internally during the 2006 refueling outage (2R17) with no recordable indications.

The staff finds that the licensee will comply with the examination guidance of MRP-139 for the above eight dissimilar metal butt welds which are susceptible to PWSCC. The staff finds that the examination guidance of MRP-139 is more stringent than the requirements of the RI-ISI program, and, therefore, the inspection requirements for alloy 82/182 weld metal of the reactor vessel nozzles are acceptable.

4.3 Probabilistic Risk Assessment (PRA)

The licensee is requesting relief that would permit continued use of the approved RI-ISI program plan in the fourth 10-year ISI interval instead of the ASME Code, Section XI program. An acceptable RI-ISI program plan is expected to meet the five key principles of risk-informed decisionmaking, discussed in RG 1.174 (Reference 7), SRP 3.9.8 (Reference 9), NUREG-0800 Chapter 19 (Reference 10), and the EPRI TR-112657, Rev. B-A, as stated below.

1. The proposed change meets the current regulations unless it is explicitly related to a requested exemption or rule change.
2. The proposed change is consistent with the defense-in-depth philosophy.
3. The proposed change maintains sufficient safety margins.
4. When proposed changes result in an increase in core damage frequency and/or large early release frequency (LERF), the increases should be small and consistent with the intent of the Commission's Safety Goal Policy Statement.
5. The impact of the proposed change should be monitored by using performance measurement strategies.

The first principle is met in this relief request because an alternative ISI program may be authorized pursuant to 10 CFR 50.55a(3)(i) and therefore, an exemption request is not required.

The second and third principles require assurance that the alternative program is consistent with the defense-in-depth philosophy and that sufficient safety margins are maintained, respectively. The methodology used to develop the fourth 10-year RI-ISI program interval is unchanged from the methodology approved for use in the third 10-year RI-ISI program interval. Assurance that the second and third principles are met is based on the application of the approved methodology and not on the particular inspection locations selected. Therefore, the second and third principles are met.

The fourth principle requires an estimate of the change in risk, and the change in risk is dependent on the number and location of inspections in the proposed ISI program compared to the number and location of inspections that would be inspected using the requirements of the ASME Code, Section XI. The topical requires that a change in risk measurement must consider the discontinuance of ASME Code required inspections, as well as any new inspections resulting from the application of its methodology. The licensee is continuing to inspect the same number and location as approved in the third 10-year ISI interval. The submittal argues that the number and locations of inspections have not changed and, therefore, the original changes in risk estimate remain valid.

For the third 10-year interval, the licensee states in Reference 4 that the IP2 PRA has been through a peer review as part of the Westinghouse Owners' Group (WOG) PRA certification review. For the fourth 10-year interval, the licensee states, in Reference 6, it has reviewed the inputs from the updated PRA against inputs used in the original RI-ISI consequence assessment. The result of the review concluded there are no required changes to the RI-ISI consequence ranking due to the updated PRA input. The EPRI method estimates risk based on bounding values for the consequence categories. Therefore, the staff concurs that the results and conclusions of the original risk impact analysis are unaffected because the risk ranking of line segments has not changed and the number and location of exams has not changed.

Given the above considerations concerning the increase in risk and IP2 PRA quality, the staff finds that the licensee's analysis provides assurance that the fourth key principle is met and, thus, will not cause the NRC safety goals to be exceeded.

For the fifth principle of risk-informed decision making, the IP2 RR states that the RI-ISI program is developed in accordance with the methodology contained in EPRI Report TR-112657. For the fourth interval, this program has been updated with inputs from the updated PRA model, and thus continues to be a living program and to meet the risk acceptance criteria. Therefore, the fifth key principle is also met. Based on the above discussion, the staff concludes that the five key principles of risk-informed decision making are ensured by the licensee's proposed fourth 10-year RI-ISI program, and, therefore, the proposed program for the fourth 10-year ISI interval is acceptable.

4.4 Integrated Decision Making

The licensee used an integrated approach in defining the proposed RI-ISI program by considering in concert the traditional engineering analysis, risk evaluation, and the implementation and performance monitoring of piping under the RI-ISI program. This is consistent with the guidance of RG 1.178.

The licensee selected pipe segments to be inspected using the results of the risk category rankings and other operational considerations. Table 1 of RR-05 provides the number of locations and inspections by risk category for the various IP2 systems. Table 1 of RR-05 also provides a comparison of the number of inspections required under the existing ASME Code, Section XI, ISI program with the alternative RI-ISI program. The licensee used the methodology described in EPRI TR-112657 to guide the selection of examination elements within high and medium risk ranked piping segments. The EPRI TR-112657 report describes targeted examination volumes (typically associated with welds) and methods of examination based on the type(s) of degradation expected. The staff has reviewed these guidelines and has determined that, if implemented as described, the RI-ISI examinations should result in improved detection of service-related degradations over those currently required by ASME Code, Section XI.

The staff finds that the licensee's location selection process is consistent with the process approved for EPRI TR-112657 and is acceptable because the licensee considers in its process defense-in-depth, degradation mechanisms of the welds, and augmented inspection programs.

4.5 Implementation and Monitoring

Implementation and performance monitoring strategies require careful consideration by the licensee and are addressed in Element 3 of RG 1.178 and SRP 3.9.8. The objective of Element 3 is to assess the performance of the affected piping systems under the proposed RI-ISI program by implementing monitoring strategies that confirm the assumptions and analyses used in the development of the RI-ISI program. To approve an alternative pursuant to 10 CFR 50.55a(a)(3)(i), implementation of the RI-ISI program, including inspection scope, examination methods, and methods of evaluation of examination results, must provide an acceptable level of quality and safety. The licensee confirmed that the applicable portions of the ASME Code, such

as inspection methods, acceptance guidelines, pressure testing, corrective measures, documentation requirements, and quality control requirements would be retained.

The licensee stated that the RI-ISI program is a living program and its implementation will require feedback of new relevant information to ensure the appropriate identification of safety significant piping locations. The licensee stated that the RI-ISI program will be reviewed on a 10-year ISI interval basis. In addition, significant changes may require more frequent adjustment as directed by NRC generic communications, or by industry and plant-specific feedback. As stated above, the licensee used industry guidelines of NEI-04-05, TR-112657, and RG 1.174 to update the RI-ISI program.

The submittal presented the criteria for engineering evaluation and additional examinations if unacceptable flaws or relevant conditions are found during examinations. The licensee stated that the evaluation will include whether other elements in the segment or segments are subject to the same root cause conditions or degradation mechanisms as the identified flaw or relevant condition. The additional examinations will include high risk significant elements and medium risk significant elements, if needed, up to a number equivalent to the number of elements required to be inspected on the segment or segments during the current outage. If unacceptable flaws or relevant conditions are again found similar to the initial problem, the remaining elements identified as susceptible will be examined. An evaluation of the root cause and degradation mechanism shall be performed to determine the size of the second expansion sample to be examined in the current outage. No additional examinations will be performed if there are no additional elements identified as being susceptible to the same root cause conditions.

The implementation of an RI-ISI program for piping should be initiated at the start of a plant's 10-year ISI interval consistent with the requirements of the ASME Code and Addenda committed to by the licensee in accordance with 10 CFR 50.55a. If the implementation begins within an existing interval, the examinations should be scheduled and distributed consistent with the ASME Code requirements. For example, the minimum examinations completed at the end of the three inspection periods under ASME Code Program B should be 16 percent, 50 percent, and 100 percent, respectively. The maximum examinations credited at the end of the respective periods should be 34 percent, 67 percent, and 100 percent.

It is also the NRC staff's view that the inspections for the RI-ISI program and for the balance of the ISI program should be on the same interval start and end dates. This can be accomplished by either implementing the RI-ISI program at the beginning of the interval or merging the RI-ISI program into the ISI program for the balance of the inspections if the RI-ISI program is to begin during an existing ISI interval. One reason for this view is that it eliminates the problem of having a different Code of record for the RI-ISI program and for the balance of the ISI program. A potential problem with using two different interval start dates and hence two different Codes of record would be having two sets of repair/replacement rules depending upon which program identified the need for repair (e.g., a weld inspection versus a pressure test). As part of the submittal, the licensee will implement the RI-ISI program in concert with the traditional ISI program on the same interval start and end dates. Therefore, the potential problems with using two different interval dates or a different Code of record do not exist.

As stated above, the licensee completed 100% of required weld inspection in the third 10-year ISI interval. This shows that the licensee has performed the necessary inspection in accordance with its RI-ISI program in the third 10-year ISI interval.

The staff finds that the proposed periodic reporting requirements meet existing ASME Code requirements and applicable regulations and, therefore, are acceptable. The staff finds that the proposed process for RI-ISI program updates meets the guidelines of RG 1.174 which provide that risk-informed applications should include performance monitoring and feedback provisions. Therefore, the licensee's proposed process for program updates is acceptable. Therefore, the staff finds that the implementation and monitoring aspect of the RI-ISI program are acceptable.

5.0 CONCLUSIONS

The staff finds that the results of the different elements of the engineering analysis are considered in an integrated decision-making process. The impact of the proposed change (i.e., the RI-ISI program) on the ISI program is acceptable based on the adequacy of the engineering analysis and acceptable change in plant risk in accordance with RG 1.174 and 1.178 guidelines.

The IP2's RI-ISI methodology also considers implementation and performance monitoring strategies. Inspection strategies ensure that failure mechanisms of concern have been addressed and there is adequate assurance of detecting damage before structural integrity is affected. The risk significance of piping segments is taken into account in defining the inspection scope for the RI-ISI program.

The staff finds that system pressure tests and visual examination of piping structural elements will continue to be performed on all Class 1, 2, and 3 systems in accordance with the ASME Code, Section XI program. The IP2's RI-ISI program applies the same performance measurement strategies as existing ASME Code requirements and increases the inspection volumes at weld locations that are exposed to thermal fatigue.

The IP2's RI-ISI methodology provides for conducting an engineering analysis of the proposed changes using a combination of engineering analysis with supporting insights from a PRA. The staff finds that defense-in-depth and quality of the piping systems are not degraded in that the RI-ISI methodology provides reasonable confidence that any reduction in existing inspections will not lead to degraded piping performance when compared to existing performance levels. Inspections of pipe welds are focused on locations with active degradation mechanisms as well as selected locations that monitor the performance of system piping.

On the basis of its review of the licensee's proposed RI-ISI program in RR-05, the staff concludes that the RI-ISI program is an acceptable alternative to the current ISI program for Class 1 piping, category B-F and B-J welds, because the alternative provides an acceptable level of quality and safety. Pursuant to 10 CFR 50.55a(a)(3)(i), the NRC authorizes application of the proposed RI-ISI program in RR-05 for the fourth 10-year ISI interval at IP2.

6.0 REFERENCES

1. EPRI TR-112657, Revision B-A, "Revised Risk-Informed Inservice Inspection Evaluation Procedure," January 2000.

2. Letter from J. E. Dyer, Director of Nuclear Reactor Regulations, to Gary C. Park, Chairman ASME Subcommittee on Nuclear Inservice Inspection, "Gary C. Park Ltr. Re. Primary water stress corrosion cracking in reactor coolant system nickel-based alloy butt welds," dated December 20, 2005 (ADAMS ML053480359).

3. Letter from Patric W. Conroy to NRC, dated February 28, 2007, "4th Ten-Year Interval Inservice Inspection and Containment Inservice Inspection Program Plan at Indian Point Unit 2 (IP2)."

4. Letter from T. R. Jones to NRC, dated July 19, 2007, "Supplemental Submittal Regarding Relief Request RR-02, "Proposed Alternative for Regenerative Heat Exchanger Welds," and RR-05, "Risk-Informed ISI (Relief from B-F & B-J examination requirements)." (TAC Nos. MD4696 and MD4700)

5. Letter from Fred R. Dacimo, Indian Point Energy Center, to NRC, dated May 12, 2003, "Indian Point Nuclear Generating Unit No.2, risk-Informed Inservice Inspection Program, Rev. 0 (Relief Request RR 63).

6. Letter from NRC to Entergy Nuclear Operations, Inc., dated March 19, 2004, "Relief Request No. RR 63 Regarding Risk-Informed Inservice Inspection Program, Indian Point Nuclear Generating Unit No. 2. (TAC No. MC0624)

7. NRC RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," November 2002.

8. NRC RG 1.178, "An Approach for Plant-Specific Risk-Informed Decision Making: Inservice Inspection of Piping," September 1998.

9. NRC NUREG-0800, Chapter 3.9.8, "Standard Review Plan for Trial Use for the Review of Risk-Informed Inservice Inspection of Piping," September 2003.

10. NRC NUREG-0800, Chapter 19, "Use of Probabilistic risk Assessment in Plant-Specific, Risk-Informed Decisionmaking: General Guidance," November 2002.

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