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AEP:NRC:6055-09
10 CFR 50.55a(3)(i)

Docket Nos. 50-315
50-316

U. S. Nuclear Regulator Commission
ATTN: Document Control Desk
Mail Stop O-P1-17
Washington, DC 20555-0001

Donald C. Cook Nuclear Plant Units 1 and 2
REQUEST FOR APPROVAL OF RISK-INFORMED INSERVICE INSPECTION PROGRAM FOR CLASS 1 AND 2 PIPING AMERICAN SOCIETY OF MECHANICAL ENGINEERS CODE, CATEGORY B-F, B-J, C-F-1, AND C-F-2 PIPING WELDS

Pursuant to the requirements of 10 CFR 50.55a(3)(i), Indiana Michigan Power Company (I&M), the licensee for Donald C. Cook Nuclear Plant (CNP) Units 1 and 2, is proposing an alternative to the requirements of the 1989 Edition of the American Society of Mechanical Engineers Code, Section XI, in order to implement a Risk-Informed Inservice Inspection (RI-ISI) Program for Class 1, Code Category B-F, B-J, C-F-1, and C-F-2 piping welds. The program, which is described in Attachment 1 to this letter, has been developed in accordance with Code Case N-716, "Alternative Piping Classification and Examination Requirements."

I&M plans to implement the proposed RI-ISI Program during the third period of the third 10-year inservice inspection interval that began on July 1, 1996. I&M requests approval of the RI-ISI Program by September 30, 2007, to facilitate planning for the remainder of the Third Ten-Year Inservice Inspection Interval.

In making this submittal, I&M is volunteering CNP as the pressurized water reactor (PWR) pilot plant for the use of Code Case N-716 as the basis for an RI-ISI program.

The provisions of 10 CFR 170.11(a)(1)(ii) and (iii) state that no application fees, license fees, renewal fees, inspection fees, or special project fees shall be required to assist the Nuclear Regulatory Commission (NRC) in developing a rule, regulatory guide, policy state, generic letter, or bulletin; or as a means of exchanging information between industry organizations and the NRC for the specific purpose of supporting the NRC's generic regulatory improvements or efforts. In that the I&M development and NRC review of the licensing actions required for the implementation of a PWR RI-ISI program based on Code Case N-716 would satisfy these provisions, I&M will be requesting a waiver of the associated NRC fees in accordance with 10 CFR 170.5 in a separate letter.

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Commitments made in this letter are identified in Attachment 2. Should you have any questions, please contact Ms. Susan D. Simpson, Regulatory Affairs Manager, at (269) 466-2428.

Sincerely,

Joseph N. Jensen
Site Support Services Vice President

Attachments: 1. Donald C. Cook Nuclear Plant Units 1 and 2, Risk-Informed/Safety-Based Inservice Inspection Program Plan.

2. Regulatory Commitment.

RGV/jen

c: R. Aben – Department of Labor and Economic Growth
J. L. Caldwell – NRC Region III
K. D. Curry – AEP Ft. Wayne, w/o attachments
J. T. King – MPSC
MDEQ – WHMD/RPMWS
NRC Resident Inspector
P. S. Tam – NRC Washington, DC

Attachment 1 to AEP:NRC:6055-09

Donald C. Cook Nuclear Plant Units 1 and 2
RISK-INFORMED/SAFETY-BASED INSERVICE INSPECTION PROGRAM PLAN

Table of Contents

1. INTRODUCTION

The Donald C. Cook Nuclear Plant (CNP) is currently in the third inservice inspection (ISI) interval as defined by the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Section XI Code for Inspection Program B. Indiana Michigan Power Company (I&M), the licensee for CNP, plans to start implementing a risk-informed/safety-based inservice inspection (RIS_B) program during the third inspection period of the current interval. Initial RIS_B Program implementation is planned for each unit as indicated below. The ASME Section XI Code of Record for the third ISI interval at CNP is the 1989 Edition.

Unit	Refueling Outage	
	Number	Scheduled Start
1	Unit 1, Cycle 22	Spring 2008
2	Unit 2, Cycle 17	Fall 2007

The objective of this submittal is to request the use of the RIS_B process for the inservice inspection of Class 1 and 2 piping. The RIS_B process used in this submittal is based upon Reference 1, which is founded in large part on the Risk-Informed ISI (RI-ISI) process as described in Reference 2.

1.1 Relation to Nuclear Regulatory Commission (NRC) Regulatory Guides 1.174 and 1.178

As a risk-informed application, this submittal meets the intent and principles of References 3 and 4. Further information is provided in Section 3.6.2 relative to defense-in-depth.

1.2 Probabilistic Risk Assessment (PRA) Quality

I&M has exhibited a long-term commitment to using, maintaining, and updating the CNP PRA model. In 1992, I&M submitted responses, including a Level 3 internal events PRA, seismic PRA, and a fire PRA, to fulfill the requirements of NRC Generic Letter 88-20. In 1995, I&M submitted extensive revisions to the human reliability analysis, seismic, and fire models. Further PRA model updates to address plant modifications and to update data were completed in 1996 and 1997. In June 2001, I&M completed a project to update and make other improvements to the existing version of the PRA. The overall purpose of this project was to enhance the usage of the PRA model to support compliance with 10 CFR 50.65(a)(4) for management of risk during maintenance activities, and to support the new risk-informed, performance-based regulatory environment. This project included:

- Updating the PRA model to include new plant specific data, making necessary model changes because of procedure and/or design changes, updating the treatment of common-cause failures, and removing unnecessary or unwarranted conservatisms and simplifications;

- Adding a large early release frequency (LERF) model to the PRA model; and

- Developing a separate Unit 2 model.

In September 2001, the updated PRA model received a certification review in accordance with the Westinghouse Owner's Group (WOG) certification process. This review led to a number of Facts and Observations (F&Os), including three "A" Level significance F&Os and 24 "B" Level significance F&Os. The WOG Certification process assigns "A" Level significance to F&Os that are considered extremely important and necessary to address to assure the technical adequacy or quality of the PRA model, while "B" Level significance is assigned to F&Os that are considered important and necessary to address, but may be deferred until the next PRA model update.

Following receipt of the draft WOG certification report, I&M undertook a model update that addressed all of the "A" and "B" Level F&Os, with the exception of an "A" Level F&O that concerned internal flooding. The goal of these updates was to assure that the F&Os were addressed sufficiently to meet the criteria identified for ASME PRA Standard Quality Category 2. Implementation of these changes to the PRA notebooks was completed in October 2003. Quantification of the revisions was completed in April 2004. Subsequent to the latest update effort, I&M had the F&O resolutions reviewed and validated as satisfactory by an independent contractor. This contractor also performed a gap assessment of the updated model compared to Regulatory Guide 1.200. Internal flooding was recently addressed (2006) to complete the effort to address all WOG certification Level A and B F&Os.

Since the completion of the major updates, there have been two focused-scope updates related to increased Station Blackout mitigation capability. Specifically, in August 2005, the CNP PRA model was updated to include the addition of Supplemental Diesel Generators, which provide a non-safety-related, on-site back-up power source for the safety-related Emergency Diesel Generators. In June 2006, the CNP PRA model was updated to include a change in procedural guidance for beyond-licensing-basis Station Blackout that directs usage of the Charging system inter-unit cross-tie.

The CNP Reference 1 application uses bounding high values relative to CNP's latest PRA model. The base case Core Damage Frequency (CDF) is 2.1E-05/year, and the base case LERF is 4.2E-06/year.

Based on the foregoing, it is judged that the current PRA model, used in the RIS_B evaluation, has an acceptable quality to support this application.

2. PROPOSED ALTERNATIVE TO CURRENT ISI PROGRAMS

2.1 ASME Section XI

ASME Section XI Examination Categories B-F, B-J, C-F-1, and C-F-2 currently contain the requirements for the nondestructive examination (NDE) of Class 1 and 2 piping components. The alternative RIS_B Program for piping is described in Reference 1. The RIS_B Program will be substituted for the current program for Class 1 and 2 piping (Examination Categories B-F, B-J, C-F-1, and C-F-2) in accordance with 10 CFR 50.55a(a)(3)(i) by alternatively providing an acceptable level of quality and safety. Other non-related portions of the ASME Section XI Code will be unaffected.

2.2 Augmented Programs

The plant augmented inspection programs listed below were considered during the RIS_B application. It should be noted that this section documents only those plant augmented inspection programs that address common piping with the RIS_B application scope (i.e., Class 1 and 2 piping).

- The plant augmented inspection program for flow accelerated corrosion per Generic Letter 89-08 is relied upon to manage this damage mechanism, but is not otherwise affected or changed by the RIS_B Program.

- A plant augmented inspection program is being implemented at CNP in response to Reference 5. The requirements of MRP-139 will be used for the inspection and management of primary water stress corrosion cracking (PWSCC) susceptible welds and will supplement the RIS_B Program selection process. The RIS_B Program will not be used to eliminate any Reference 5 requirements.

- I&M is in the process of evaluating MRP-146, "Materials Reliability Program: Management of Thermal Fatigue in Normally Stagnant Non-Isolable Reactor Coolant System Branch Lines," and these results will be incorporated into the RIS_B Program if warranted.

3. RISK-INFORMED/SAFETY-BASED ISI PROCESS

The process used to develop the RIS_B Program conformed to the methodology described in Reference 1 and consisted of the following steps:

- Safety Significance Determination
- Failure Potential Assessment
- Element and NDE Selection
- Risk Impact Assessment
- Implementation Program
- Feedback Loop

3.1 Safety Significance Determination

The systems assessed in the RIS_B Program are provided in Tables 3.1-1 and 3.1-2 for Units 1 and 2, respectively. The piping and instrumentation diagrams and additional plant information, including the existing plant ISI Program, were used to define the piping system boundaries.

Per Reference 1 requirements, piping welds are assigned safety significance categories that are used to determine the treatment requirements. High safety significant (HSS) welds are determined in accordance with the requirements below. Low safety significant (LSS) welds shall include all other Class 2, 3, or Non-Class welds.

(1) Class 1 portions of the reactor coolant pressure boundary (RCPB), except as provided in (c)(2)(i) and (c)(2)(ii) of 10 CFR 50.55a;

(2) applicable portions of the shutdown cooling pressure boundary function shall be included. That is, Class 1 and 2 welds of systems or portions of systems needed to utilize the normal shutdown cooling flowpath either:

(i) as part of the RCPB from the reactor pressure vessel (RPV) to the second isolation valve (i.e., farthest from the RPV) capable of remote closure or to the containment penetration, whichever encompasses the larger number of welds, or

(ii) other systems or portions of systems from the RPV to the second isolation valve (i.e., farthest from the RPV) capable of remote closure or to the containment penetration, whichever encompasses the larger number of welds;

(3) that portion of the Class 2 feedwater system [> nominal pipe size (NPS) 4 inches] of Pressurized Water Reactors (PWRs) from the steam generator to the outer containment isolation valve;

(4) piping within the break exclusion region [> NPS 4 inches] for high energy piping systems as defined by the Owner; and

(5) any piping segment whose contribution to core damage frequency is greater than 1E-06 based upon a plant-specific PRA of pressure boundary failures (e.g., pipe whip, jet impingement, spray, inventory losses). This may include Class 3 or Non-Class piping.

3.2 Failure Potential Assessment

Failure potential estimates were generated utilizing industry failure history, plant specific failure history, and other relevant information. These failure estimates were determined using the guidance provided in Reference 2, with the exception of the deviation discussed below.

Tables 3.2-1 and 3.2-2 summarize the failure potential assessment by system for each degradation mechanism that was identified as potentially operative for Units 1 and 2, respectively.

A deviation to Reference 2 has been implemented in the failure potential assessment for CNP. Table 3-16 of Reference 2 contains criteria for assessing the potential for thermal stratification, cycling, and striping (TASCS). Key attributes for horizontal or slightly sloped piping greater than 1-inch NPS include:

1. Potential exists for low flow in a pipe section connected to a component allowing mixing of hot and cold fluids; or

2. Potential exists for leakage flow past a valve, including in-leakage, out-leakage, and cross-leakage allowing mixing of hot and cold fluids; or

3. Potential exists for convective heating in dead-ended pipe sections connected to a source of hot fluid; or

4. Potential exists for two phase (steam/water) flow; or

5. Potential exists for turbulent penetration into a relatively colder branch pipe connected to header piping containing hot fluid with turbulent flow;

AND

- temperature differential (ΔT) > 50°F;

AND

- Richardson Number > 4 (*this value predicts the potential buoyancy of a stratified flow).*

These criteria, based on meeting a high cycle fatigue endurance limit with the actual ΔT assumed equal to the greatest potential ΔT for the transient, will identify locations where stratification is likely to occur, but allows for no assessment of severity. As such, many locations will be identified as subject to TASCS where no significant potential for thermal fatigue exists. The critical attribute missing from the existing methodology that would allow consideration of fatigue severity is a criterion that addresses the potential for fluid cycling. The impact of this additional consideration on the existing TASCS susceptibility criteria is presented below.

1. **Turbulent penetration TASCS**

   Turbulent penetration typically occurs in lines connected to piping containing hot flowing fluid. In the case of downward sloping lines that then turn horizontal, significant top-to-bottom cyclic ΔTs can develop in the horizontal sections if the horizontal section is less than about 25 pipe diameters from the reactor coolant piping. Therefore, TASCS is considered for this configuration.

   For upward sloping branch lines connected to the hot fluid source that turn horizontal or in horizontal branch lines, natural convective effects combined with effects of turbulence penetration will keep the line filled with hot water. If there is no potential for in-leakage towards the hot fluid source from the outboard end of the line, this will result in a well-mixed fluid condition where significant top-to-bottom ΔTs will not occur. Therefore, TASCS is not considered for these configurations. Even in fairly long lines, where some heat loss from the outside of the piping will tend to occur and some fluid stratification may be present, there is no significant potential for cycling as has been observed for the in-leakage case. The effect of TASCS will not be significant under these conditions and can be neglected.

2. **Low flow TASCS**

   In some situations, the transient startup of a system (e.g., residual heat removal system suction piping) creates the potential for fluid stratification as flow is established. In cases where no cold fluid source exists, the hot flowing fluid will rapidly displace the cold fluid in stagnant lines, while fluid mixing will occur in the piping further removed from the hot source and stratified conditions will exist only briefly as the line fills with hot fluid. As such, since the situation is transient in nature, it can be assumed that the criteria for thermal transients will govern.

3. Valve leakage TASCS

Sometimes a very small leakage flow of hot water can occur outward past a valve into a line that is relatively colder, creating a significant temperature difference. However, since this is a generally a "steady-state" phenomenon with no potential for cyclic temperature changes, the effect of TASCS is not significant and can be neglected.

4. Convection heating TASCS

Similarly, there sometimes exists the potential for heat transfer across a valve to an isolated section beyond the valve, resulting in fluid stratification due to natural convection. However, since there is no potential for cyclic temperature changes in this case, the effect of TASCS is not significant and can be neglected.

In summary, these additional considerations for determining the potential for thermal fatigue as a result of the effects of TASCS provide an allowance for the consideration of cycle severity. The above criteria have previously been submitted by EPRI for generic approval by References 6 and 7. The methodology used in the CNP RIS_B application for assessing TASCS potential conforms to these updated criteria. Final materials reliability program guidance on the subject of TASCS will be incorporated into the CNP RIS_B application if warranted. It should be noted that the NRC has granted approval (References 8 and 9) for RI-ISI relief requests incorporating these TASCS criteria at several facilities, including Comanche Peak and South Texas Project.

3.3 Element and NDE Selection

Reference 1 provides criteria for identifying the number and location of required examinations. Ten percent of the high safety significant welds shall be selected for examination as follows:

(1) Examinations shall be prorated equally among systems to the extent practical, and each system shall individually meet the following requirements:

(a) A minimum of 25 percent of the population identified as susceptible to each degradation mechanism and degradation mechanism combination shall be selected.

(b) If the examinations selected above exceed ten percent of the total number of high safety significant welds, the examinations may be reduced by prorating among each degradation mechanism and degradation mechanism combination, to the extent practical, such that at least ten percent of the high safety significant population is inspected.

(c) If the examinations selected above are not at least ten percent of the high safety significant weld population, additional welds shall be selected so that the total number selected for examination is at least ten percent. The additional welds will be selected in accordance with Reference 1.

(2) For the RCPB, at least two-thirds of the examinations shall be located between the first isolation valve (i.e., the isolation valve closest to the RPV) and the reactor pressure vessel.

(3) A minimum of ten percent of the welds in that portion of the RCPB that lies outside containment shall be selected.

(4) A minimum of ten percent of the welds within the break exclusion region shall be selected.

In contrast to a number of RI-ISI Program applications where the percentage of Class 1 piping locations selected for examination has fallen substantially below ten percent, Reference 1 mandates that ten percent be chosen. A brief summary is provided below, and the results of the selections are presented in Tables 3.3-1 and 3.3-2 for Units 1 and 2, respectively. Section 4 of Reference 2 was used as guidance in determining the examination requirements for these locations.

Unit	Class 1 Piping Welds(1)		Class 2 Piping Welds(2)		All Piping Welds(3)	
	Total	Selected	Total	Selected	Total	Selected
1	1196	124	1730	22	2926	146
2	1217	126	1628	20	2845	146

Notes

1. Includes all Category B-F and B-J locations. All 1196 Unit 1 Class 1 piping weld locations and 1217 Unit 2 Class 1 piping weld locations are HSS.
2. Includes all Category C-F-1 and C-F-2 locations. Of the 1730 Unit 1 Class 2 piping weld locations, 240 are HSS and the remaining 1490 are LSS. Of the 1628 Unit 2 Class 2 piping weld locations, 228 are HSS and the remaining 1400 are LSS.
3. All in-scope piping components, regardless of safety significance, will continue to receive Code required pressure testing, as part of the current ASME Section XI Program. VT-2 visual examinations are scheduled in accordance with the station's pressure test program that remains unaffected by the RIS_B Program.

3.3.1 Additional Examinations

The RIS_B Program in all cases will determine through an engineering evaluation the cause of any unacceptable flaw or relevant condition found during examination. The evaluation will include the applicable service conditions and degradation mechanisms to establish that the element(s) will still perform their intended safety function during subsequent operation. Elements not meeting this requirement will be repaired or replaced.

The evaluation will include whether other elements in the segment or additional segments are subject to the same causal conditions. Additional examinations will be performed on those elements with the same causal conditions or degradation mechanisms. The additional examinations will include high safety significant elements up to a number equivalent to the number of elements required to be inspected 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 during the current outage. No additional examinations will be performed if there are no additional elements identified as being susceptible to the same causal conditions.

3.3.2 Program Relief Requests

An attempt has been made to select RIS_B locations for examination such that a minimum of >90% coverage (i.e., Code Case N-460 criteria) is attainable. However, some limitations will not be known until the examination is performed, since some locations may be examined for the first time by the specified techniques.

In instances where locations are found at the time of the examination that do not meet the >90% coverage requirement, the process outlined in Reference 2 will be followed.

Relief requests ISIR-005 and ISIR-006, which are currently in CNP's ISI program will be withdrawn following NRC approval of the RIS_B Program. These relief requests pertain to the surface and volumetric examination of feedwater and main steam pipe-to-flued head welds. The pipe-to-flued head welds in the feedwater system are included in the scope that is designated high safety significant, but have not been selected for examination. The main steam system in its entirety is designated low safety significant and is not subject to NDE.

3.4 Risk Impact Assessment

The RIS_B Program has been conducted in accordance with Reference 3 and the requirements of Reference 1, and the risk from implementation of this program is expected to remain neutral or decrease when compared to that estimated from current requirements.

This evaluation categorized segments as HSS or LSS in accordance with Reference 1, and then determined what inspection changes are proposed for each system. The changes include changing the number and location of inspections and, in many cases, improving the effectiveness of the inspection to account for the findings of the RIS_B degradation mechanism assessment. For example, for locations subject to thermal fatigue, examinations will be conducted on an expanded volume and will be focused to enhance the probability of detection (POD) during the inspection process.

3.4.1 Quantitative Analysis

Reference 1 has adopted the Electric Power Research Institute (EPRI) RI-ISI process for risk impact analyses whereby limits are imposed to ensure that the change in risk of implementing the RIS_B Program meets the requirements of References 3 and 4. The EPRI criterion requires that the cumulative change in CDF and LERF be less than 1E-07 and 1E-08 per year per system, respectively.

I&M has conducted a risk impact analysis per the requirements of Section 5 of Reference 1 that is consistent with the "Simplified Risk Quantification Method" described in Section 3.7 of Reference 2. The analysis estimates the net change in risk due to the positive and negative influence of adding and removing locations from the inspection program.

The conditional core damage probability (CCDP) and conditional large early release probability (CLERP) values used to assess risk impact were estimated based on pipe break location. Based on these estimated values, a corresponding consequence rank was assigned per the requirements of Reference 2 and upper bound threshold values were used as provided on the following page. Consistent with Reference 2, the upper bound for all break locations that fall within the high consequence rank range was based on the highest CCDP value obtained (i.e., large break loss-of coolant accident (LOCA) for CNP).

CCDP and CLERP Values Based on Break Location

<table>
<tr><th rowspan="2">Break Location</th><th colspan="2">Estimated</th><th rowspan="2">Consequence Rank</th><th colspan="2">Upper Bound</th></tr>
<tr><th>CCDP</th><th>CLERP</th><th>CCDP</th><th>CLERP</th></tr>
<tr><td>LOCA</td><td>3. 00E-02</td><td>3. 00E-03</td><td>HIGH</td><td>3. 00E-02</td><td>3. 00E-03</td></tr>
<tr><td colspan="6">RCPB pipe breaks that result in a loss of coolant accident (LOCA) – The highest CCDP for Large Break LOCA (LBLOCA) was used as the basis for estimating (0.1 margin used for CLERP)</td></tr>
<tr><td>ILOCA</td><td>1. 20E-04</td><td>1. 20E-05</td><td>HIGH</td><td>3. 00E-02</td><td>3. 00E-03</td></tr>
<tr><td colspan="6">RCPB pipe breaks that result in an isolable LOCA (ILOCA) – Calculated based on LBLOCA CCDP of 3E-2 and motor operated valve failure to close on demand rate of 4E-3 (0.1 margin used for CLERP)</td></tr>
<tr><td>PLOCA</td><td>6. 00E-05</td><td>6. 00E-06</td><td>MEDIUM</td><td>1.00E-04</td><td>1.00E-05</td></tr>
<tr><td colspan="6">RCPB pipe breaks that result in a potential LOCA (PLOCA) – Calculated based on LBLOCA CCDP of 3E-2 and check valve (CV) rupture or failure to close rate of 2E-3 (0.1 margin used for CLERP)</td></tr>
<tr><td>PILOCA – OC</td><td>2.00E-03</td><td>2.00E-03</td><td>HIGH</td><td>3. 00E-02</td><td>3. 00E-03</td></tr>
<tr><td colspan="6">RCPB pipe breaks that result in a potential isolable LOCA outside containment (PILOCA – OC) – Calculated based on a CCDP and CLERP of 1.0 for LOCA outside containment and a CV rupture rate of 2E-3 [isolation not credited]</td></tr>
<tr><td>PILOCA – IC</td><td>6. 00E-05</td><td>6. 00E-06</td><td>MEDIUM</td><td>1.00E-04</td><td>1.00E-05</td></tr>
<tr><td colspan="6">RCPB pipe breaks that result in a potential isolable LOCA inside containment (PILOCA – IC) – Calculated based on LBLOCA CCDP of 3E-2 and a CV rupture rate of 2E-3 (0.1 margin used for CLERP) [isolation not credited]</td></tr>
<tr><td>Class 2 SDC – IC</td><td>1.00E-04</td><td>1.00E-05</td><td>MEDIUM</td><td>1.00E-04</td><td>1.00E-05</td></tr>
<tr><td colspan="6">Non RCPB pipe breaks that occur in Class 2 shutdown cooling piping inside containment (Class 2 SDC – IC) – Estimated based on a loss of shutdown cooling during mid-loop operation (0.1 margin used for CLERP)</td></tr>
<tr><td>Class 2 FWU – OC</td><td>1.00E-03</td><td>1. 50E-04</td><td>HIGH</td><td>3. 00E-02</td><td>3. 00E-03</td></tr>
<tr><td colspan="6">Non RCPB pipe breaks that occur in Class 2 feedwater piping unisolable from the steam generator outside containment (Class 2 FWU – OC) – The CCDP for steam line break outside containment (SLBO) for piping downstream of the main steam isolation valve (MSIV) was used as the basis for estimating (0.15 margin used for CLERP)</td></tr>
<tr><td>Class 2 FWU – IC</td><td>1.00E-03</td><td>1. 50E-04</td><td>HIGH</td><td>3. 00E-02</td><td>3. 00E-03</td></tr>
<tr><td colspan="6">Non RCPB pipe breaks that occur in Class 2 feedwater piping unisolable from the steam generator inside containment (Class 2 FWU – IC) – The CCDP for steam line break inside containment was used as the basis for estimating (0.15 margin used for CLERP)</td></tr>
<tr><td>Class 2 FWI – OC</td><td>1.00E-03</td><td>1. 50E-04</td><td>HIGH</td><td>3. 00E-02</td><td>3. 00E-03</td></tr>
<tr><td colspan="6">Non RCPB pipe breaks that occur in Class 2 feedwater piping isolable from the steam generator outside containment (Class 2 FWI – OC) – The CCDP for SLBO for piping downstream of the MSIV was used as the basis for estimating (0.15 margin used for CLERP)</td></tr>
<tr><td>Class 2 LSS</td><td>1.00E-04</td><td>1.00E-05</td><td>MEDIUM</td><td>1.00E-04</td><td>1.00E-05</td></tr>
<tr><td colspan="6">Non RCPB pipe breaks that occur in all other Class 2 system piping designated as low safety significant (Class 2 LSS) – Estimated based on upper bound for Medium Consequence</td></tr>
</table>

The likelihood of pressure boundary failure (PBF) is determined by the presence of different degradation mechanisms and the rank is based on the relative failure probability. The basic likelihood of PBF for a piping location with no degradation mechanism present is given as x_0 and is expected to have a value less than 1E-08. Piping locations identified as medium failure potential have a likelihood of $20x_0$. These PBF likelihoods are consistent with those listed in References 9 and 14 of Reference 2. In addition, the analysis was performed both with and without taking credit for enhanced inspection effectiveness due to an increased POD from application of the RIS_B approach.

Tables 3.4-1 and 3.4-2 present summaries of the RIS_B Program versus 1989 ASME Section XI Code Edition program requirements on a per system basis.

As indicated on the following page, this evaluation has demonstrated that unacceptable risk impacts will not occur from implementation of the RIS_B Program, and satisfies the acceptance criteria of References 1 and 3.

Unit 1 Risk Impact Results

System[1]	$\Delta Risk_{CDF}$		$\Delta Risk_{LERF}$	
	w/ POD	w/o POD	w/ POD	w/o POD
RC	-2.21E-08	-1.65E-09	-2.21E-09	-1.65E-10
CS	-3.77E-08	-2.09E-08	-3.77E-09	-2.09E-09
RH	-2.70E-11	-2.70E-11	-2.70E-12	-2.70E-12
SI	-4.15E-11	-4.15E-11	-4.15E-12	-4.15E-12
FW	-2.70E-09	8.10E-09	-2.70E-10	8.10E-10
MS	1.60E-10	1.60E-10	1.60E-11	1.60E-11
CTS	1.40E-10	1.40E-10	1.40E-11	1.40E-11
Total	**-6.22E-08**	**-1.42E-08**	**-6.22E-09**	**-1.42E-09**

Note
1. Systems are defined on Page 19

Unit 2 Risk Impact Results

System[1]	$\Delta Risk_{CDF}$		$\Delta Risk_{LERF}$	
	w/ POD	w/o POD	w/ POD	w/o POD
RC	-2.22E-08	-1.80E-09	-2.22E-09	-1.80E-10
CS	-3.77E-08	-2.09E-08	-3.77E-09	-2.09E-09
RH	-4.70E-11	-4.70E-11	-4.70E-12	-4.70E-12
SI	-4.03E-10	-4.03E-10	-4.03E-11	-4.03E-11
FW	-9.45E-09	-3.45E-09	-9.45E-10	-3.45E-10
MS	1.70E-10	1.70E-10	1.70E-11	1.70E-11
CTS	7.00E-11	7.00E-11	7.00E-12	7.00E-12
Total	**-6.95E-08**	**-2.63E-08**	**-6.95E-09**	**-2.63E-09**

Note
1. Systems are defined on Page 19.

3.4.2 Defense-in-Depth

The intent of the inspections mandated by ASME Section XI for piping welds is to identify conditions such as flaws or indications that may be precursors to leaks or ruptures in a system's pressure boundary. Currently, the process for picking inspection locations is based upon structural discontinuity and stress analysis results. As depicted in ASME White Paper 92-01-01, Revision 1, "Evaluation of Inservice Inspection Requirements for Class 1, Category B-J Pressure Retaining Welds," this method has been ineffective in identifying leaks or failures. References 1 and 2 provide a more robust selection process founded on actual service experience with nuclear plant piping failure data.

This process has two key independent ingredients; that is, a determination of each location's susceptibility to degradation, and secondly, an independent assessment of the consequence of the piping failure. These two ingredients assure defense-in-depth is maintained. First, by evaluating a location's susceptibility to degradation, the likelihood of finding flaws or indications that may be precursors to leaks or ruptures is increased. Secondly, a generic assessment of high consequence sites has been determined by Reference 1, supplemented by plant-specific evaluations, thereby requiring a minimum threshold of inspection for important piping whose failure would result in a LOCA or break exclusion region (BER) break. Finally, Reference 1 requires that any piping on a plant-specific basis that has a contribution to CDF of greater than 1E-06 be included in the scope of the application. No such piping was identified at CNP.

All locations within the Class 1 and 2 pressure boundaries will continue to receive a system pressure test and visual VT-2 examination as currently required by the Code regardless of its safety significance.

4. IMPLEMENTATION AND MONITORING PROGRAM

Upon approval of the RIS_B Program, procedures that comply with the guidelines described in Reference 2 will be prepared to implement and monitor the program. The new program will be integrated into the third inservice inspection interval. No changes to the Technical Specifications or Updated Final Safety Analysis Report are necessary for program implementation.

The applicable aspects of the ASME Code not affected by this change will be retained, such as inspection methods, acceptance guidelines, pressure testing, corrective measures, documentation requirements, and quality control requirements. Existing ASME Section XI program implementing procedures will be retained and modified to address the RIS_B process, as appropriate.

The monitoring and corrective action program will contain the following elements:

A. Identify
B. Characterize
C. (1) Evaluate, determine the cause and extent of the condition identified
   (2) Evaluate, develop a corrective action plan or plans
D. Decide
E. Implement
F. Monitor
G. Trend

The RIS_B Program is a living program requiring feedback of new relevant information to ensure the appropriate identification of high safety significant piping locations. As a minimum, this review will be conducted on an ASME period basis. In addition, significant changes may require more frequent adjustment as directed by NRC Bulletin or Generic Letter requirements, or by industry and plant-specific feedback.

5. PROPOSED ISI PROGRAM PLAN CHANGE

A comparison between the RIS_B Program and ASME Section XI 1989 Code Edition program requirements for in-scope piping is provided in Tables 5-1 and 5-2 for Units 1 and 2, respectively.

CNP plans to start implementing the RIS_B Program during the third inspection period. Initial RIS_B Program implementation is planned for each unit as indicated below. Upon implementation, inspection locations selected per the RIS_B process will replace those formerly selected per ASME Section XI criteria. The table below indicates the percentage of piping weld examinations required by ASME Section XI that have been completed thus far in the second ISI interval for Examination Categories B-F, B-J, C-F-1, and C-F-2 through the end of the second period. The table also indicates the percentage of inspection locations selected for examination per the RIS_B process that will be examined in the third period to ensure the performance of 100% of the required examinations during the current ten-year ISI interval as discussed in Relief Request ISIR-19, Reference 10.

Unit	Refueling Outage		Examination Percentages	
	Number	Scheduled Start	ASME Section XI	RIS_B Program
1	U1 C22	Spring 2008	34%	66%
2	U2 C17	Fall 2007	34%	66%

Subsequent ISI intervals will implement 100% of the inspection locations selected for examination per the RIS_B Program. Examinations shall be performed such that the period percentage requirements of ASME Section XI, paragraphs IWB-2412 and IWC-2412 are met.

REFERENCES

1. ASME Code Case N-716, "Alternative Piping Classification and Examination Requirements, Section XI Division 1," dated April 19, 2006.

2. EPRI TR-112657, Revision B-A, "Revised Risk-Informed Inservice Inspection Evaluation Procedure," dated December 1999.

3. Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions On Plant-Specific Changes to the Licensing Basis," dated November 2002.

4. Regulatory Guide 1.178, "An Approach for Plant-Specific Risk-Informed Decisionmaking for Inservice Inspection of Piping," dated September 2003.

5. MRP-139, "Materials Reliability Program: Primary System Piping Butt Weld Inspection and Evaluation Guidelines," dated August 2005.

6. Letter from Pat O'Regan, EPRI, to Brian W. Sheron, NRC, "Extension of Risk-Informed Inservice Inspection (RI-ISI) Methodology," Accession Number ML010650169, dated February 28, 2001.

7. Letter from Pat O'Regan, EPRI, to Brian W. Sheron, NRC, "Extension of Risk-Informed Inservice Inspection (RI-ISI) Methodology," Accession Number ML011070238, dated March 28, 2001.

8. Letter from Robert A. Gramm, NRC, to C. Lance Terry, TXU Electric, "Comanche Peak Steam Electric Station (CPSES), Units 1 and 2 – Approval of Relief Request for Application of Risk-Informed Inservice Inspection Program for American Society of Mechanical Engineers Boiler and Pressure Vessel Code Class 1 and 2 Piping (TAC Nos. MB1201 and MB1202)," Accession Number ML012710112, dated September 28, 2001.

9. Letter from Robert A. Gramm, NRC, to William T. Cottle, STP Nuclear Operating Company, "Approval of Relief Request for Application of Risk-Informed Inservice Inspection program for American Society of Mechanical Engineers Boiler and Pressure Vessel Code Class 1 and 2 Piping for South Texas Project, Units 1and 2 (TAC Nos. MB1277 and MB1278)," Accession Number ML020390041, dated March 5, 2002.

10. Letter from Daniel P. Fadel, I&M, to NRC Document Control Desk, "Donald C. Cook Nuclear Plant Units 1 and 2, Proposed Alternative to the American Society of Mechanical Engineers Code, Section XI Weld Inspection Requirements," AEP:NRC:5055-10, Accession Number ML052780450, dated September 22, 2005.

The following provides the definition of the terms used in Table 3.1-1 thru Table 5-2.

BER	Break Exclusion Region
CS	Charging System
CC	Crevice Corrosion
CDF	Core Damage Frequency
CTS	Containment Spray System
DMs	Degradation Mechanisms
ECSCC	External Chloride Stress Corrosion Cracking
E-C	Erosion-Cavitation
FAC	Flow-Accelerated Corrosion
FW	Feedwater System
HSS	High Safety Significant
IGSCC	Intergranular stress corrosion cracking
IFIV	Inside First Isolation Valve
LERF	Large Early Release Frequency
LSS	Low Safety Significant
MIC	Microbiologically-Influenced Corrosion
MS	Main Steam System
OC	Outside Containment
PIT	Pitting
POD	Probability of Detection
PWR: FW	Pressurized Water Reactor: Feedwater
PWSCC	Primary Water Stress Corrosion Cracking
RC	Reactor Coolant System
RCPB	Reactor Coolant Pressure Boundary
RH	Residual Heat Removal System
SDC	Shutdown Cooling Piping
SI	Safety Injection System
TASCS	Thermal Stratification, Cycling, and Striping
TGSCC	Transgranular Stress Corrosion Cracking
TT	Thermal Transients
Vol	Volume
Sur	Surface

Table 3.1-1

N-716 Safety Significance Determination for Unit 1

System Description[1]	Weld Count	N-716 Safety Significance Determination					Safety Significance	
		RCPB	SDC	PWR: FW	BER	CDF > 1E-6	High	Low
RC	662	✓					✓	
CS	70	✓					✓	
	239							✓
RH	22	✓	✓				✓	
	26		✓				✓	
	282							✓
SI	51	✓	✓				✓	
	391	✓					✓	
	586							✓
FW	214			✓			✓	
MS	218							✓
CTS	165							✓
SUMMARY RESULTS FOR ALL SYSTEMS	73	✓	✓				✓	
	1123	✓					✓	
	26		✓				✓	
	214			✓			✓	
	1490							✓
TOTALS	2926						1436	1490

Note

1. Systems are defined on Page 19.

Table 3.1-2

N-716 Safety Significance Determination for Unit 2

System Description[1]	Weld Count	N-716 Safety Significance Determination					Safety Significance	
		RCPB	SDC	PWR: FW	BER	CDF > 1E-6	High	Low
RC	669	✓					✓	
CS	64	✓					✓	
	213							✓
RH	27	✓	✓				✓	
	28		✓				✓	
	273							✓
SI	56	✓	✓				✓	
	401	✓					✓	
	545							✓
FW	200			✓			✓	
MS	211							✓
CTS	158							✓
SUMMARY RESULTS FOR ALL SYSTEMS	83	✓	✓				✓	
	1134	✓					✓	
	28		✓				✓	
	200			✓			✓	
	1400							✓
TOTALS	2845						1445	1400

Note

1. Systems are defined on Page 19.

Table 3.2-1

Failure Potential Assessment Summary for Unit 1

System(1)	Thermal Fatigue		Stress Corrosion Cracking				Localized Corrosion			Flow Sensitive	
	TASCS	TT	IGSCC	TGSCC	ECSCC	PWSCC	MIC	PIT	CC	E-C	FAC
RC	✓	✓				✓					
CS(2)		✓									
RH(2)											
SI(2)			✓								
FW	✓										
MS(2)											
CTS(2)											

Notes

1. Systems are defined on Page 19.
2. A degradation mechanism assessment was not performed on low safety significant piping segments. This includes the MS and CTS systems in their entirety, as well as portions of the CS, RH and SI systems.

Table 3.2-2

Failure Potential Assessment Summary for Unit 2

System[1]	Thermal Fatigue		Stress Corrosion Cracking				Localized Corrosion			Flow Sensitive	
	TASCS	TT	IGSCC	TGSCC	ECSCC	PWSCC	MIC	PIT	CC	E-C	FAC
RC	✓	✓				✓					
CS[2]		✓									
RH[2]											
SI[2]			✓								
FW	✓										
MS[2]											
CTS[2]											

Notes

1. Systems are defined on Page 19.
2. A degradation mechanism assessment was not performed on low safety significant piping segments. This includes the MS and CTS systems in their entirety, as well as portions of the CS, RH and SI systems.

Table 3.3-1

N-716 Element Selections for Unit 1

System(1)	Weld Count		N-716 Selection Considerations				Selections(2)
	HSS	LSS	DMs	RCPB^{IFIV}	RCPB^{OC}	BER	
RC	6		TASCS, TT	✓			2
RC	1		TT, PWSCC	✓			1
RC	12		TASCS	✓			3
RC	2		TT	✓			1
RC	9		PWSCC	✓			9
RC	621		None	✓			51
RC	11		None				0
CS	28		TT	✓			7
CS	4		TT				0
CS	16		None	✓			0
CS	22		None				0
CS		239					
RH	3		None	✓			2
RH	19		None				3
RH	26		None	NA	NA		0
RH		282					
SI	47		IGSCC				14
SI	32		None	✓			8
SI	9		None		✓		2
SI	354		None				21
SI		586					
FW	8		TASCS	NA	NA		2
FW	206		None	NA	NA		20
MS		218					
CTS		165					
SUMMARY RESULTS FOR ALL SYSTEMS	6		TASCS, TT	✓			2
	1		TT, PWSCC	✓			1
	12		TASCS	✓			3
	8		TASCS	NA	NA		2
	30		TT	✓			8
	4		TT				0
	47		IGSCC				14
	9		PWSCC	✓			9

Table 3.3-1 (Cont'd)

N-716 Element Selections for Unit 1

System[1]	Weld Count		N-716 Selection Considerations				Selections[2]
	HSS	LSS	DMs	RCPB^{IFIV}	RCPB^{OC}	BER	
SUMMARY RESULTS FOR ALL SYSTEMS (CONT'D)	672		None	✓			61
	9		None		✓		2
	406		None				24
	232		None	NA	NA		20
		1490					
TOTALS	**1436**	**1490**					**146**

Notes
1. Systems are defined on Page 19.
2. For RH and SI, Code Case N-716 Requirement 4(c) could not be met. At least 25 percent of the welds located between the first isolation valve (i.e., the isolation valve closest to the RPV) and the RPV were selected.

Table 3.3-2

N-716 Element Selections for Unit 2

System[1]	Weld Count		N-716 Selection Considerations				Selections[2]
	HSS	LSS	DMs	RCPB^{IFIV}	RCPB^{OC}	BER	
RC	8		TASCS, TT	✓			2
RC	1		TT, PWSCC	✓			1
RC	10		TASCS	✓			3
RC	2		TT	✓			1
RC	5		PWSCC	✓			5
RC	632		None	✓			55
RC	11		None				0
CS	29		TT	✓			7
CS	5		TT				0
CS	14		None	✓			0
CS	16		None				0
CS		213					
RH	3		None	✓			2
RH	24		None				4
RH	28		None	NA	NA		0
RH		273					
SI	43		IGSCC				12
SI	32		None	✓			8
SI	9		None		✓		2
SI	373		None				24
SI		545					
FW	8		TASCS	NA	NA		2
FW	192		None	NA	NA		18
MS		211					
CTS		158					
SUMMARY RESULTS FOR ALL SYSTEMS	8		TASCS, TT	✓			2
	1		TT, PWSCC	✓			1
	10		TASCS	✓			3
	8		TASCS	NA	NA		2
	31		TT	✓			8
	5		TT				0
	43		IGSCC				12
	5		PWSCC	✓			5

Table 3.3-2 (Cont'd)

N-716 Element Selections for Unit 2

System[1]	Weld Count		N-716 Selection Considerations				Selections[2]
	HSS	LSS	DMs	RCPB[IFIV]	RCPB[OC]	BER	
SUMMARY RESULTS FOR ALL SYSTEMS (CONT'D)	681		None	✓			65
	9		None		✓		2
	424		None				28
	220		None	NA	NA		18
		1400					
TOTALS	**1445**	**1400**					**146**

Notes

1. Systems are defined on Page 19.
2. For RH and SI, Code Case N-716 Requirement 4(c) could not be met. At least 25 percent of the welds located between the first isolation valve (i.e., the isolation valve closest to the RPV) and the RPV were selected.

Table 3.4-1

Risk Impact Analysis Results for Unit 1

System[1]	Safety Significance	Break Location	Failure Potential		Inspections			CDF Impact		LERF Impact	
			DMs	Rank	SXI[2]	RIS_B	Delta	w/ POD	w/o POD	w/ POD	w/o POD
RC	High	LOCA	TASCS, TT	Medium	3	2	-1	-5.40E-09	3.00E-09	-5.40E-10	3.00E-10
RC	High	LOCA	TT, PWSCC	Medium	1	1	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RC	High	LOCA	TASCS	Medium	2	3	1	-1.26E-08	-3.00E-09	-1.26E-09	-3.00E-10
RC	High	LOCA	TT	Medium	0	1	1	-5.40E-09	-3.00E-09	-5.40E-10	-3.00E-10
RC	High	LOCA	PWSCC	Medium	9	9	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RC	High	LOCA	None	Low	60	51	-9	1.35E-09	1.35E-09	1.35E-10	1.35E-10
RC	High	PLOCA	None	Low	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RC TOTAL								**-2.21E-08**	**-1.65E-09**	**-2.21E-09**	**-1.65E-10**
CS	High	LOCA	TT	Medium	0	7	7	-3.78E-08	-2.10E-08	-3.78E-09	-2.10E-09
CS	High	ILOCA	TT	Medium	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CS	High	PLOCA	TT	Medium	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CS	High	LOCA	None	Low	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CS	High	PLOCA	None	Low	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CS	Low	Class 2 LSS	N/A	Assume Medium	11	0	-11	1.10E-10	1.10E-10	1.10E-11	1.10E-11
CS TOTAL								**-3.77E-08**	**-2.09E-08**	**-3.77E-09**	**-2.09E-09**
RH	High	LOCA	None	Low	1	2	1	-1.50E-10	-1.50E-10	-1.50E-11	-1.50E-11
RH	High	PLOCA	None	Low	5	3	-2	1.00E-12	1.00E-12	1.00E-13	1.00E-13
RH	High	Class 2 SDC-IC	None	Low	4	0	-4	2.00E-12	2.00E-12	2.00E-13	2.00E-13
RH	Low	Class 2 LSS	N/A	Assume Medium	12	0	-12	1.20E-10	1.20E-10	1.20E-11	1.20E-11
RH TOTAL								**-2.70E-11**	**-2.70E-11**	**-2.70E-12**	**-2.70E-12**

Table 3.4-1 (Cont'd)

Risk Impact Analysis Results for Unit 1

System(1)	Safety Significance	Break Location	Failure Potential		Inspections			CDF Impact		LERF Impact	
			DMs	Rank	SXI(2)	RIS_B	Delta	w/ POD	w/o POD	w/ POD	w/o POD
SI	High	PLOCA	IGSCC	Medium	13	14	1	-1.00E-11	-1.00E-11	-1.00E-12	-1.00E-12
SI	High	LOCA	None	Low	5	8	3	-4.50E-10	-4.50E-10	-4.50E-11	-4.50E-11
SI	High	PLOCA	None	Low	38	4	-34	1.70E-11	1.70E-11	1.70E-12	1.70E-12
SI	High	PILOCA-OC	None	Low	0	2	2	-3.00E-10	-3.00E-10	-3.00E-11	-3.00E-11
SI	High	PILOCA-IC	None	Low	0	17	17	-8.50E-12	-8.50E-12	-8.50E-13	-8.50E-13
SI	Low	Class 2 LSS	N/A	Assume Medium	71	0	-71	7.10E-10	7.10E-10	7.10E-11	7.10E-11
SI TOTAL								**-4.15E-11**	**-4.15E-11**	**-4.15E-12**	**-4.15E-12**
FW	High	Class 2 FWU-IC	TASCS	Medium	5	2	-3	-1.80E-09	9.00E-09	-1.80E-10	9.00E-10
FW	High	Class 2 FWU-OC	None	Low	7	4	-3	4.50E-10	4.50E-10	4.50E-11	4.50E-11
FW	High	Class 2 FWU-IC	None	Low	3	0	-3	4.50E-10	4.50E-10	4.50E-11	4.50E-11
FW	High	Class 2 FWI-OC	None	Low	4	16	12	-1.80E-09	-1.80E-09	-1.80E-10	-1.80E-10
FW TOTAL								**-2.70E-09**	**8.10E-09**	**-2.70E-10**	**8.10E-10**
MS	Low	Class 2 LSS	N/A	Assume Medium	16	0	-16	1.60E-10	1.60E-10	1.60E-11	1.60E-11
MS TOTAL								**1.60E-10**	**1.60E-10**	**1.60E-11**	**1.60E-11**
CTS	Low	Class 2 LSS	N/A	Assume Medium	14	0	-14	1.40E-10	1.40E-10	1.40E-11	1.40E-11
CTS TOTAL								**1.40E-10**	**1.40E-10**	**1.40E-11**	**1.40E-11**
GRAND TOTAL								**-6.22E-08**	**-1.42E-08**	**-6.22E-09**	**-1.42E-09**

Notes

1. Systems are defined on Page 19.
2. Only those ASME Section XI Code inspection locations that received a volumetric examination in addition to a surface examination are included in the count. Inspection locations previously subjected to a surface examination only were not considered in accordance with Section 3.7.1 of EPRI TR-112657.

Table 3.4-2

Risk Impact Analysis Results for Unit 2

System[1]	Safety Significance	Break Location	Failure Potential		Inspections			CDF Impact		LERF Impact	
			DMs	Rank	SXI[2]	RIS_B	Delta	w/ POD	w/o POD	w/ POD	w/o POD
RC	High	LOCA	TASCS, TT	Medium	3	2	-1	-5.40E-09	3.00E-09	-5.40E-10	3.00E-10
RC	High	LOCA	TT, PWSCC	Medium	1	1	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RC	High	LOCA	TASCS	Medium	2	3	1	-1.26E-08	-3.00E-09	-1.26E-09	-3.00E-10
RC	High	LOCA	TT	Medium	0	1	1	-5.40E-09	-3.00E-09	-5.40E-10	-3.00E-10
RC	High	LOCA	PWSCC	Medium	5	5	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RC	High	LOCA	None	Low	63	55	-8	1.20E-09	1.20E-09	1.20E-10	1.20E-10
RC	High	PLOCA	None	Low	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RC TOTAL								**-2.22E-08**	**-1.80E-09**	**-2.22E-09**	**-1.80E-10**
CS	High	LOCA	TT	Medium	0	7	7	-3.78E-08	-2.10E-08	-3.78E-09	-2.10E-09
CS	High	ILOCA	TT	Medium	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CS	High	PLOCA	TT	Medium	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CS	High	LOCA	None	Low	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CS	High	PLOCA	None	Low	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CS	Low	Class 2 LSS	N/A	Assume Medium	12	0	-12	1.20E-10	1.20E-10	1.20E-11	1.20E-11
CS TOTAL								**-3.77E-08**	**-2.09E-08**	**-3.77E-09**	**-2.09E-09**
RH	High	LOCA	None	Low	1	2	1	-1.50E-10	-1.50E-10	-1.50E-11	-1.50E-11
RH	High	PLOCA	None	Low	6	4	-2	1.00E-12	1.00E-12	1.00E-13	1.00E-13
RH	High	Class 2 SDC-IC	None	Low	4	0	-4	2.00E-12	2.00E-12	2.00E-13	2.00E-13
RH	Low	Class 2 LSS	N/A	Assume Medium	10	0	-10	1.00E-10	1.00E-10	1.00E-11	1.00E-11
RH TOTAL								**-4.70E-11**	**-4.70E-11**	**-4.70E-12**	**-4.70E-12**

Table 3.4-2 (Cont'd)

Risk Impact Analysis Results for Unit 2

System[1]	Safety Significance	Break Location	Failure Potential		Inspections			CDF Impact		LERF Impact	
			DMs	Rank	SXI[2]	RIS_B	Delta	w/ POD	w/o POD	w/ POD	w/o POD
SI	High	PLOCA	IGSCC	Medium	12	12	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SI	High	LOCA	None	Low	3	8	5	-7.50E-10	-7.50E-10	-7.50E-11	-7.50E-11
SI	High	PLOCA	None	Low	38	9	-29	1.45E-11	1.45E-11	1.45E-12	1.45E-12
SI	High	PILOCA-OC	None	Low	0	2	2	-3.00E-10	-3.00E-10	-3.00E-11	-3.00E-11
SI	High	PILOCA-IC	None	Low	0	15	15	-7.50E-12	-7.50E-12	-7.50E-13	-7.50E-13
SI	Low	Class 2 LSS	N/A	Assume Medium	64	0	-64	6.40E-10	6.40E-10	6.40E-11	6.40E-11
SI TOTAL								**-4.03E-10**	**-4.03E-10**	**-4.03E-11**	**-4.03E-11**
FW	High	Class 2 FWU-IC	TASCS	Medium	1	2	1	-9.00E-09	-3.00E-09	-9.00E-10	-3.00E-10
FW	High	Class 2 FWU-OC	None	Low	6	2	-4	6.00E-10	6.00E-10	6.00E-11	6.00E-11
FW	High	Class 2 FWU-IC	None	Low	5	0	-5	7.50E-10	7.50E-10	7.50E-11	7.50E-11
FW	High	Class 2 FWI-OC	None	Low	4	16	12	-1.80E-09	-1.80E-09	-1.80E-10	-1.80E-10
FW TOTAL								**-9.45E-09**	**-3.45E-09**	**-9.45E-10**	**-3.45E-10**
MS	Low	Class 2 LSS	N/A	Assume Medium	17	0	-17	1.70E-10	1.70E-10	1.70E-11	1.70E-11
MS TOTAL								**1.70E-10**	**1.70E-10**	**1.70E-11**	**1.70E-11**
CTS	Low	Class 2 LSS	N/A	Assume Medium	7	0	-7	7.00E-11	7.00E-11	7.00E-12	7.00E-12
CTS TOTAL								**7.00E-11**	**7.00E-11**	**7.00E-12**	**7.00E-12**
GRAND TOTAL								**-6.95E-08**	**-2.63E-08**	**-6.95E-09**	**-2.63E-09**

Notes

1. Systems are defined on Page 19.
2. Only those ASME Section XI Code inspection locations that received a volumetric examination in addition to a surface examination are included in the count. Inspection locations previously subjected to a surface examination only were not considered in accordance with Section 3.7.1 of EPRI TR-112657.

Table 5-1

Inspection Location Selection Comparison Between ASME Section XI Code and Code Case N-716 for Unit 1

System[1]	Safety Significance		Break Location	Failure Potential		Code Category	Weld Count	Section XI		Code Case N-716	
	High	Low		DMs	Rank			Vol/Sur	Sur Only	RIS_B	Other[2]
RC	✓		LOCA	TASCS, TT	Medium	B-J	6	3	0	2	-
RC	✓		LOCA	TT, PWSCC	Medium	B-F	1	1	0	1	-
RC	✓		LOCA	TASCS	Medium	B-J	12	2	2	3	-
RC	✓		LOCA	TT	Medium	B-J	2	0	0	1	-
RC	✓		LOCA	PWSCC	Medium	B-F	9	9	0	9	-
RC	✓		LOCA	None	Low	B-F	12	12	0	4	-
						B-J	609	48	111	47	-
RC	✓		PLOCA	None	Low	B-J	11	0	3	0	-
CS	✓		LOCA	TT	Medium	B-J	28	0	5	7	-
CS	✓		ILOCA	TT	Medium	B-J	2	0	0	0	-
CS	✓		PLOCA	TT	Medium	B-J	2	0	1	0	-
CS	✓		LOCA	None	Low	B-J	16	0	7	0	-
CS	✓		PLOCA	None	Low	B-J	22	0	5	0	-
CS		✓	Class 2 LSS	N/A	Assume Medium	C-F-1	239	11	3	0	-
RH	✓		LOCA	None	Low	B-J	3	1	0	2	-
RH	✓		PLOCA	None	Low	B-J	19	5	0	3	-
RH	✓		Class 2 SDC-IC	None	Low	C-F-1	26	4	0	0	-
RH		✓	Class 2 LSS	N/A	Assume Medium	C-F-1	282	12	0	0	-
SI	✓		PLOCA	IGSCC	Medium	B-J	47	13	2	14	-
SI	✓		LOCA	None	Low	B-J	32	5	6	8	-
SI	✓		PLOCA	None	Low	B-J	232	38	33	4	-
SI	✓		PILOCA-OC	None	Low	B-J	9	0	2	2	-
SI	✓		PILOCA-IC	None	Low	B-J	122	0	21	17	-
SI		✓	Class 2 LSS	N/A	Assume Medium	C-F-1	586	71	0	0	-

Table 5-1 (Cont'd)

Inspection Location Selection Comparison Between ASME Section XI Code and Code Case N-716 for Unit 1

System[1]	Safety Significance		Break Location	Failure Potential		Code Category	Weld Count	Section XI		Code Case N-716	
	High	Low		DMs	Rank			Vol/Sur	Sur Only	RIS_B	Other[2]
FW	✓		Class 2 FWU-IC	TASCS	Medium	C-F-2	8	5	0	2	-
FW	✓		Class 2 FWU-OC	None	Low	C-F-2	97	7	0	4	-
FW	✓		Class 2 FWU-IC	None	Low	C-F-2	46	3	0	0	-
FW	✓		Class 2 FWI-OC	None	Low	C-F-2	63	4	0	16	-
MS		✓	Class 2 LSS	N/A	Assume Medium	C-F-2	218	16	0	0	-
CTS		✓	Class 2 LSS	N/A	Assume Medium	C-F-1	165	14	0	0	-

Notes

1. Systems are defined on Page 19.
2. The column labeled "Other" is generally used to identify plant augmented inspection program locations credited per Section 4 of Code Case N-716. Code Case N-716 allows the existing plant augmented inspection program for IGSCC (Categories B through G) in a BWR to be credited toward the 10% requirement. This option is not applicable for the CNP RIS_B application. The "Other" column has been retained in this table solely for uniformity purposes with other RIS_B application template submittals.

Table 5-2

Inspection Location Selection Comparison Between ASME Section XI Code and Code Case N-716 for Unit 2

System[1]	Safety Significance		Break Location	Failure Potential		Code Category	Weld Count	Section XI		Code Case N-716	
	High	Low		DMs	Rank			Vol/Sur	Sur Only	RIS_B	Other[2]
RC	✓		LOCA	TASCS, TT	Medium	B-J	8	3	0	2	-
RC	✓		LOCA	TT, PWSCC	Medium	B-F	1	1	0	1	-
RC	✓		LOCA	TASCS	Medium	B-J	10	2	3	3	-
RC	✓		LOCA	TT	Medium	B-J	2	0	0	1	-
RC	✓		LOCA	PWSCC	Medium	B-F	5	5	0	5	-
RC	✓		LOCA	None	Low	B-F	16	16	0	0	-
						B-J	616	47	115	55	-
RC	✓		PLOCA	None	Low	B-J	11	0	3	0	-
CS	✓		LOCA	TT	Medium	B-J	29	0	8	7	-
CS	✓		ILOCA	TT	Medium	B-J	3	0	1	0	-
CS	✓		PLOCA	TT	Medium	B-J	2	0	0	0	-
CS	✓		LOCA	None	Low	B-J	14	0	4	0	-
CS	✓		PLOCA	None	Low	B-J	16	0	5	0	-
CS		✓	Class 2 LSS	N/A	Assume Medium	C-F-1	213	12	5	0	-
RH	✓		LOCA	None	Low	B-J	3	1	0	2	-
RH	✓		PLOCA	None	Low	B-J	24	6	0	4	-
RH	✓		Class 2 SDC-IC	None	Low	C-F-1	28	4	0	0	-
RH		✓	Class 2 LSS	N/A	Assume Medium	C-F-1	273	10	0	0	-
SI	✓		PLOCA	IGSCC	Medium	B-J	43	12	1	12	-
SI	✓		LOCA	None	Low	B-J	32	3	8	8	-
SI	✓		PLOCA	None	Low	B-J	239	38	31	9	-
SI	✓		PILOCA-OC	None	Low	B-J	9	0	4	2	-
SI	✓		PILOCA-IC	None	Low	B-J	134	0	21	15	-
SI		✓	Class 2 LSS	N/A	Assume Medium	C-F-1	545	64	0	0	-

Table 5-2 (Cont'd)

Inspection Location Selection Comparison Between ASME Section XI Code and Code Case N-716 for Unit 2

System[1]	Safety Significance		Break Location	Failure Potential		Code Category	Weld Count	Section XI		Code Case N-716	
	High	Low		DMs	Rank			Vol/Sur	Sur Only	RIS_B	Other[2]
FW	✓		Class 2 FWU-IC	TASCS	Medium	C-F-2	8	1	0	2	-
FW	✓		Class 2 FWU-OC	None	Low	C-F-2	93	6	0	2	-
FW	✓		Class 2 FWU-IC	None	Low	C-F-2	45	5	0	0	-
FW	✓		Class 2 FWI-OC	None	Low	C-F-2	54	4	0	16	-
MS		✓	Class 2 LSS	N/A	Assume Medium	C-F-2	211	17	0	0	-
CTS		✓	Class 2 LSS	N/A	Assume Medium	C-F-1	158	7	0	0	-

Notes

1. Systems are defined on Page 19.
2. The column labeled "Other" is generally used to identify plant augmented inspection program locations credited per Section 4 of Code Case N-716. Code Case N-716 allows the existing plant augmented inspection program for IGSCC (Categories B through G) in a BWR to be credited toward the 10% requirement. This option is not applicable for the CNP RIS_B application. The "Other" column has been retained in this table solely for uniformity purposes with other RIS_B application template submittals.

Attachment 2 to AEP:NRC:6055-09

REGULATORY COMMITMENT

The following table identifies the action committed to by Indiana Michigan Power Company (I&M) in this document. Any other actions discussed in this submittal represent intended or planned actions by I&M. They are described to the Nuclear Regulatory Commission (NRC) for the NRC's information and are not regulatory commitments.

Commitment	Date
I&M will withdraw approved relief requests ISIR-005 and ISIR-006.	Following approval and implementation of the risk-informed inservice inspection program.