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Fred Dacimo
Vice President
License Renewal

January 17, 2008

Re: Indian Point Units 2 & 3
Docket Nos. 50-247 & 50-286
NL-08-014

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

SUBJECT: Entergy Nuclear Operations Inc.
Indian Point Nuclear Generating Unit Nos. 2 & 3
Docket Nos. 50-247 and 50-286
Clarifications to Reactor Vessel Surveillance Program and Neutron Embrittlement Time-Limited Aging Analyses and Audit Item #105; and Revision to License Renewal Regulatory Commitment List

REFERENCES:

1. Entergy Letter dated April 23, 2007, F. R. Dacimo to Document Control Desk, "License Renewal Application" (NL-07-039)
2. Entergy Letter dated April 23, 2007, F. R. Dacimo to Document Control Desk, "License Renewal Application Boundary Drawings" (NL-07-040)
3. Entergy Letter dated April 23, 2007, F. R. Dacimo to Document Control Desk, "License Renewal Application Environmental Report References" (NL-07-041)
4. Entergy Letter dated October 11, 2007, F. R, Dacimo to Document Control Desk, "License Renewal Application (LRA)" (NL-07-124)
5. Entergy Letter November 14, 2007, F. R, Dacimo to Document Control Desk, "Supplement to License Renewal Application (LRA) Environmental Report References" (NL-07-133)
6. Entergy Letter dated November 28, 2007, F.R. Dacimo to Document Control Desk, "Reply to Request for Additional Information Regarding License Renewal Application" (NL-07-140)
7. Entergy Letter December 18, 2007, F. R, Dacimo to Document Control Desk, "Amendment 1 to License Renewal Application (LRA)" (NL-07-153)

Dear Sir or Madam:

In the referenced letters, Entergy Nuclear Operations, Inc. (Entergy) applied for renewal of the Indian Point Energy Center operating license for Unit 2 and 3 and responded to staff questions regarding Reactor Vessel Surveillance Program and Reactor Neutron Embrittlement Time-Limited Aging Analyses. Per telecom between the NRC staff and Entergy on December 4, 2007, Entergy agreed to clarify the RAI responses submitted in Reference 6.

Attachment 1 provides additional clarification to address staff questions regarding Reactor Vessel Surveillance Program and Reactor Neutron Embrittlement Time-Limited Aging Analyses. Attachment 2 provides clarification to Audit Item #105. Attachment 3 consists of a revision to the list of regulatory commitments associated with the LRA.

If you have any questions, or require additional information, please contact Mr. Robert Walpole at 914-734-6710.

I declare under penalty of perjury that the foregoing is true and correct. Executed on 1-17-08.

Sincerely,

Patricia W Conway for
Fred R. Dacimo per telecon
Vice President
License Renewal

Attachments:

1. Reactor Vessel Surveillance Program and Reactor Neutron Embrittlement Time-Limited Aging Analyses RAI Clarifications
   (This clarification supplements submittal in letter NL-07-140 dated 11-28-2007)

2. Audit Item #105 Clarification
   (This revision supersedes the revision submitted in letter NL-07-153 dated 12-18-2007)

3. List of Regulatory Commitments, Revision 2
   (This revision supersedes the revision submitted in letter NL-07-153 dated 12-18-2007)

cc: Mr. Samuel J. Collins, Regional Administrator, NRC Region I
Mr. Kenneth Chang, NRC Branch Chief, Engineering Review Branch I
Mr. Bo M. Pham, NRC Environmental Project Manager
Mr. John Boska, NRR Senior Project Manager
Mr. Paul Eddy, New York State Department of Public Service
NRC Resident Inspector's Office
Mr. Paul D. Tonko, President, New York State Energy, Research, & Development Authority

ATTACHMENT 1 TO NL-08-014

Reactor Vessel Surveillance Program and Reactor Neutron Embrittlement Time-Limited Aging Analyses RAI Clarifications

(This clarification supplements submittal in letter NL-07-140 dated 11-28-2007)

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 & 3
DOCKET NOS. 50-247 AND 50-286

INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 AND 3
LICENSE RENEWAL APPLICATION (LRA)
REQUESTS FOR ADDITIONAL INFORMATION (RAI)

Entergy responded in letter NL-07-140, Reply to Request for Additional Information Regarding License Renewal Application, dated November 28, 2007 to staff questions regarding Reactor Vessel Surveillance Program and Reactor Neutron Embrittlement Time-Limited Aging Analyses. Per telecom between the NRC staff and Entergy on December 4, 2007, Entergy agreed to clarify the RAI responses (ML073450327).

RAI 4.2.1-1

The Charpy Upper-Shelf Energy (USE) and Pressurized Thermal Shock analyses utilize the neutron fluence at 48 effective full power years (EFPY) to represent the neutron fluence for the reactor vessels at the end of the period of extended operation.

A) What were the EFPY achieved for each unit prior to the last refueling outage? What capacity factors and neutron flux were assumed for each unit from the last refueling outage to the end of the period of extended operation to result in 48 EFPY at the end of the period of extended operation? Explain why these capacity factors and neutron flux values are applicable for determining the neutron fluence for the reactor vessels at the end of the period of extended operation.

B) How will future capacity factors, neutron flux and neutron fluence values be monitored to ensure 48 EFPY values bound the actual conditions of the reactor vessels at the end of the period of extended operation?

Response for RAI 4.2.1-1
A response to the RAI was provided in Reference 6. Per telecom on December 4, 2007 (ML073450327) the following clarification is provided:

For IP2, the calculated fluence received by the vessel at 21.8 EFPY (end of cycle 17) is 9.190E+18 n/cm^2. The expected neutron flux corresponding to the licensed reactor power rating for Cycle 18 through the period of extended operation is as follows.

Cycle	45 degree vessel location flux [n/cm^2-s]
18	1.14E+10
19	1.16E+10
Future cycles to 48 EFPY	1.22E+10

The IP3 expected neutron flux corresponding to the licensed reactor power rating from Cycle 14 through the period of extended operation is documented in Table 6-2 of WCAP-16251, "Analysis of Capsule X from Entergy's Indian Point 3 Reactor Vessel Radiation Surveillance Program". At the end of Cycle 14, Indian Point 3 had operated for 19.3 EFPY with a calculated fluence of 6.86E+18 n/cm^2. Using WCAP-16251 Table 6-2, the expected neutron flux corresponding to the licensed reactor power rating for Cycle 15 through the period of extended operation is as follows.

Cycle	45 degree vessel location flux [n/cm^2-s]
15	9.63E+9
16	9.78E+9
Future cycles to 48 EFPY	9.78E+9

RAI 4.2.2-1

Table 4.2-2 in the LRA indicates that the percentage drop in Charpy USE for plate B2803-3 is 21.3 percent at 48 EFPY. The percentage drop in Charpy USE for plate B2803-3 was determined using its surveillance data, in accordance with Position 2.2 of Regulatory Guide (RG) 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials." Provide the analysis that was used to determine the percentage drop in Charpy USE for plate B2803-3, include all surveillance data (unirradiated and irradiated Charpy USE and surveillance capsule neutron fluence) and references for the surveillance data.

Response for RAI 4.2.2-1

A response to the RAI was provided in Reference 6. Per telecom on December 4, 2007 (ML073450327) the following revision/clarification is provided:

The second paragraph of our original response is being revised as follows:

> "However, to maximize accuracy, IPEC used a spreadsheet and the equations for the RG 1.99 Figure 2 curves (available in NUREG/CR-5799) to effectively plot a parallel curve. ~~Four~~ Seven sets of surveillance data were reviewed, and a correction factor for each surveillance point was determined. The highest~~lowest~~ correction factor (giving the

highest % drop in USE) was then used in the formula to predict the 48 EFPY % drop in USE."

The last paragraph and table are being deleted as follows:

~~*The surveillance data from the reactor vessel integrity database (RVID2) as shown below was used to determine the correction factor.*~~

~~*Type*~~	~~*Heat ID*~~	~~*Capsule*~~	~~*Lead Factor*~~	~~*Fluence, 10E19*~~	~~*%Cu*~~	~~*%Ni*~~	~~*USE, Unirr*~~	~~*Measured USE*~~	~~*% drop in USE offset line*~~
~~*Plate*~~	~~*A0512-2*~~	~~*T*~~	~~*3.74*~~	~~*0.31*~~	~~*0.24*~~	~~*0.52*~~	~~*67*~~	~~*58*~~	~~*1.24451*~~
~~*Plate*~~	~~*A0512-2*~~	~~*Y*~~	~~*3.74*~~	~~*0.72*~~	~~*0.24*~~	~~*0.52*~~	~~*67*~~	~~*57*~~	~~*1.20619*~~
~~*Plate*~~	~~*A0512-2*~~	~~*Z*~~	~~*3.46*~~	~~*1.04*~~	~~*0.24*~~	~~*0.52*~~	~~*105*~~	~~*82*~~	~~*1.33662*~~
~~*Plate*~~	~~*A0512-2*~~	~~*Z*~~	~~*3.46*~~	~~*1.04*~~	~~*0.24*~~	~~*0.52*~~	~~*67*~~	~~*56*~~	~~*1.21140*~~

Clarification for RAI 4.2.2-1 is as follows:

The surveillance data from WCAP-16251, "Analysis of Capsule X from Entergy's Indian Point 3 Reactor Vessel Radiation Surveillance Program" as shown below was used to determine the correction factor.

Type	*Heat ID*	*Capsule*	*Fluence, 10E19*	*%Cu*	*%Ni*	**Measured % drop in USE**	**Predicted % drop in USE**	*Correction Factor*
Plate	*A0512-2*	*T*	0.263	*0.24*	*0.52*	12.00%	24.05%	-7.54
Plate	*A0512-2*	*T*	0.263	*0.24*	*0.52*	16.00%	24.05%	-2.05
Plate	*A0512-2*	*Y*	0.692	*0.24*	*0.52*	25.00%	30.24%	3.28
Plate	*A0512-2*	*Z*	1.04	*0.24*	*0.52*	22.00%	33.31%	-2.20
Plate	*A0512-2*	*Z*	1.04	*0.24*	*0.52*	18.00%	33.31%	-6.17
Plate	*A0512-2*	X	0.874	*0.24*	*0.52*	23.00%	31.96%	-0.25
Plate	*A0512-2*	X	0.874	*0.24*	*0.52*	24.00%	31.96%	0.78

Using a correction factor of 3.28 the 48 EFPY USE for lower shell plate B2803-3 as shown in the LRA is revised. Refer to the attached LRA revision for changes to LRA Table 4.2-2.

With the additional surveillance data, the chemistry factor for lower shell plate B2803-3 for 48 EFPY shown in LRA Tables 4.2-4 and 4.2-6 requires revision based on Table D-1 of WCAP-16251. Refer to the LRA revision attachment for changes to these tables.

RAI 4.2.5-1

A) Table 4.2-3 in the LRA indicates that the ΔRT_{NDT} value caused by irradiation for the intermediate shell axial welds and the lower shell axial welds in IP2 were determined using surveillance data reported in WCAP-15629, Revision 1, "Indian Point Unit 2 Heatup and Cooldown Limit Curves for Normal Operation and PTLR Support Documentation." This WCAP has surveillance data from IP2, IP3, and H.B. Robinson, Unit 2. The IP2 fluences were calculated using approved methodologies (WCAP-15557-R0, "Qualification of the Westinghouse Pressure Vessel Neutron Fluence Evaluation Methodology," and WCAP-14040-NP-A, Revision 2, "Methodology Used to Develop Cold Overpressure Mitigating System Setpoints and RCS Heatup and Cooldown Limit Curves") that are based on RG 1.190, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence," March 2001, (This RG requires the use of ENDF/BVI for determining neutron cross-sections which are included in the BUGLE-96 cross-section file). In addition, there is excellent agreement between calculated and corresponding measured values. The IP3 capsule analyses also used approved methods and cross sections, thus, they are acceptable. The H.B. Robinson calculations are reported in WCAP-14044, "Westinghouse Surveillance Capsule Neutron Fluence Re-evaluation," that was issued in 1994 (before the issuance of RG 1.190 and the availability of BUGLE-96 and ENDF/BVI). WCAP-15629, Revision 1 indicates that 15% was added to the values reported in WCAP-14044. Explain why 15% was added to the values reported in WCAP-14044. Provide neutron fluence values derived using a methodology that adheres to the guidance in RG 1.190. If the revised analysis results in a change in neutron fluence for the H.B. Robinson, Unit 2 surveillance capsules, provide the ΔRT_{NDT} value caused by irradiation and the RT_{PTS} value for the intermediate shell axial welds and the lower shell axial welds in IP2 and provide the surveillance data analysis required by 10 CFR 50.61(c)(2)(i).

B) Table 4.2-4 in the LRA indicates that the ΔRT_{NDT} caused by irradiation for the lower shell plate B2803-3 in IP3 was determined using surveillance data reported by the licensee's response to Generic Letter (GL) 92-01, "Reactor Vessel Structural Integrity." This surveillance data was reported in Attachment I to a September 4, 1998, letter from J. Knubel (New York Power Authority). As discussed in RAI 4.2.5-1A, the surveillance data from IP3 is also reported in WCAP-15629, Revision 1. The neutron fluence values for the IP3 surveillance capsule that are reported in WCAP-15629, Revision 1 and in the September 4, 1998, letter have different values. The applicant is requested to revise the PTS analyses using neutron fluence values for the surveillance capsules that are determined using the guidance in RG 1.190 and to provide the surveillance data analysis required by 10 CFR 50.61(c)(2)(I).

Response for RAI 4.2.5-1

A response to the RAI was provided in Reference 6. Per telecom on December 4, 2007 (ML073450327) the original response is being revised in its entirety. The following is the revised RAI 4.2.5-1 response:

Part A Response for RAI 4.2.5-1

The latest surveillance data for H. B. Robinson Unit 2 (HBR2) is shown in WCAP-15805, "Analysis of H.B. Robinson Unit 2 Capsule X", and the latest IP3 data is shown in WCAP-16251, "Analysis of Capsule X from Entergy's Indian Point 3 Reactor Vessel Radiation Surveillance Program". Both reports use the guidance of RG 1.190. Combining the IP2, IP3, and HBR2 surveillance data results in revised IP2 intermediate shell and lower shell axial weld chemistry factors. Refer to the attached LRA revision for changes to LRA Tables 4.2-3 and 4.2-5.

An incorrect margin term was discovered in LRA Table 4.2-3 while preparing this RAI clarification. Since intermediate shell plate B2002-2 used RG 1.99 position 2.1, the correct margin term is 17.0. Refer to the attached LRA revision for changes to LRA Tables 4.2-3 and 4.2-5.

The surveillance data for IP2 intermediate shell plates B2002-1, B2002-2, and B2002-3 was updated by WCAP-15629 which resulted in changes to 48 EFPY USE values for these plates. Refer to the attached LRA revision for changes to LRA Table 4.2-1.

Part B Response for RAI 4.2.5-1

The IP3 48 EFPY neutron fluence values reported in LRA Table 4.2-4 are shown in Table 6-2 of WCAP 16251, "Analysis of Capsule X from Entergy's Indian Point 3 Reactor Vessel Radiation Surveillance Program" which follows the guidance of RG 1.190.

RAI 4.2.5-2

10 CFR 50.61(b)(4) indicates that each pressurized water nuclear power reactor for which the analysis required by PTS rule indicates that if there is no reasonably practicable flux reduction program to prevent the RT_{PTS} value from exceeding the PTS screening criteria based on the neutron fluence at the expiration date of the operating license, the licensee shall submit a safety analysis to determine what, if any, modifications to equipment, systems, and operation are necessary to prevent potential failure of the reactor vessel as a result of postulated PTS events if continued operation beyond the screening criteria is allowed. The analysis must be submitted at least three years before the RT_{PTS} value is projected to exceed the PTS screening criteria.

Section 4.2.5 in the LRA indicates that the RT_{PTS} value for plate B2803-3 in IP3 will exceed the PTS screening criterion. Identify the flux reduction program initiated by the applicant to prevent the RT_{PTS} value for plate B2803-3 in IP3 from exceeding the PTS screening criterion. Based on the information provided in response to RAI 4.2.5-1(B) and RAI 4.2.1-1, identify when the RT_{PTS} value for plate B2803-3 in IP3 is projected to exceed the PTS screening criterion.

Response for RAI 4.2.5-2

A response to the RAI was provided in Reference 6. Per telecom on December 4, 2007 (ML073450327) the following clarification is provided:

The response to RAI 4.2.5-2 is not affected by the clarified response to RAI 4.2.5-1.

LRA Revisions

Per telecom on December 4, 2007 (ML073450327) the following LRA revisions are provided:

LRA Section 4.2.2, Charpy Upper-Shelf Energy, Unit 2, is revised as follows.

The upper shelf energy (USE) values have been determined based on the maximum projected 48 EFPY beltline fluence shown in Section 4.2.1. The beltline region chemistry and surveillance data, including the un-irradiated C_VUSE information, is from ~~the RVID2 database and clarified in~~ WCAP-15629, Revision 1, WCAP-16251, Analysis of Capsule X from Entergy's Indian Point 3 Reactor Vessel Radiation Surveillance Program, and WCAP-15805, Analysis of H.B. Robinson Unit 2 Capsule X. The projected 48 EFPY peak beltline fluence level at the clad/base metal interface of 1.906E+19 n/cm^2 was applied to all beltline materials except axial welds where the expected peak fluence is 1.295E+19 n/cm^2. The resulting projected 48 EFPY C_VUSE drop and resulting ¼t C_VUSE are shown in Table 4.2-1. One intermediate shell plate (B2002-3) and one lower shell plate (B2003-1) have projected upper shelf energy levels that fall below 50 ft-lb during the period of extended operation. All remaining plate and weld beltline materials exceed 50 ft-lb at 48 EFPY.

10 CFR Part 50, Appendix G, Section IV.A.1 requires licensees to take further corrective actions for cases where the 50 ft-lbs end-of-life USE criterion cannot be met (e.g., when the EOL USE falls below the USE value criterion specified in a previously NRC-approved EMA). As noted in Table 4.2-1, the lowest projected USE level for the IP2 beltline plate material through the period of extended operation is ~~47.4~~ 48.3 ft-lb for intermediate shell plate B2002-3. An equivalent margins analysis performed in WCAP-13587, Rev. 1 demonstrated that the minimum acceptable USE for reactor vessel plate material in 4 loop plants such as IP2 is 43 ft-lbs. In the safety assessment of WCAP-13587, the NRC concluded the report demonstrated margins of safety equivalent to those of the ASME code for beltline plate and forging materials. The IP2 USE values are therefore acceptable since the IP2 lowest projected USE level for the IP2 beltline plate material through the period of extended operation of ~~47.4~~ 48.3 ft-lb for intermediate shell plate B2002-3 is above the 43 ft-lbs minimum acceptable USE for 4 loop plants determined in WCAP-13587 Rev. 1. This determination is consistent with NUREG-1800, Section 4.2.2.1.1.2, and with the NRC Safety Evaluation Report of acceptable USE for H. B Robinson Unit 2 as documented in NUREG-1785. The TLAA for USE is projected through the period of extended operation in accordance with 10CFR54.21(c)(1)(ii).

LRA Section 4.2.2, Charpy Upper Shelf Energy, Unit 3, is revised as follows.

The IPEC Unit 3 upper shelf energy values have been determined based on the maximum projected 48 EFPY beltline fluence and the beltline region chemistry and surveillance data including the un-irradiated C_VUSE information as summarized in ~~the RVID2 database~~ WCAP-16251, Analysis of Capsule X from Entergy's Indian Point 3 Reactor Vessel Radiation Surveillance Program. The projected 48 EFPY peak beltline fluence level at the clad/base metal interface of 1.560E+19 n/cm^2 was conservatively applied to all beltline materials. The 48 EFPY ¼t fluence level of 9.298E+18 n/cm^2 was calculated in accordance with Regulatory Guide 1.99, Equation (3) based on a vessel thickness of 8.625". The resulting projected 48 EFPY C_VUSE drop and resulting ¼t C_VUSE are displayed in Table 4.2-2. All plate and weld beltline materials exceed 50 ft-lb at 48 EFPY ~~and an~~

~~equivalent margins analysis is not required~~ with the exception of the lower shell plate B2803-3 with a predicted USE of 49.8 ft-lbs. As noted above for IP2, an equivalent margins analysis performed in WCAP-13587, Rev. 1 demonstrated that the minimum acceptable USE for reactor vessel plate material in 4 loop plants such as IP3 is 43 ft-lbs. Therefore, the IP3 lower shell plate B2803-3 USE value of 49.8 ft-lbs is acceptable. This determination is consistent with NUREG-1800, Section 4.2.2.1.1.2, and with the NRC Safety Evaluation Report of acceptable USE for H. B Robinson Unit 2 as documented in NUREG-1785. The TLAA for USE is projected through the period of extended operation in accordance with 10CFR54.21(c)(1)(ii)

LRA Section 4.2.5, Pressurized Thermal Shock, Unit 3, first paragraph is revised as follows.

The projected 48 EFPY peak beltline fluence level at the clad/base metal interface of 1.560E+19 n/cm^2 was applied to all beltline materials. The resulting projected 48 EFPY RT_{PTS} are shown in Table 4.2-4. All projected RT_{PTS} values are within the established screening criteria for 48 EFPY with the exception of plate B2803-3, which exceeds the screening criterion by ~~9.9~~ 9.5 °F. Values of RT_{NDT} for the IP3 beltline materials at ¼ T and ¾ T are summarized in Table 4.2-6.

Table 4.2-1
IP2 Charpy Upper-Shelf Energy Data for 48 Effective Full-Power Years (EFPY)

Reactor Vessel Location (Beltline Identification)	Material Ident	Material Type	Heat #	Fluence Vessel Clad/BM 48 EFPY	Fluence 1/4T 48 EFPY	%Cu	Un-irradiated USE	% Drop in USE	48 EFPY USE at 1/4 T	RG 1.99 Position
Intermediate shell	B2002-1	A302BM	B-4688-2	1.906E+19	1.136E+19	0.190	70	~~21.1%~~ 21.8%	~~55.2~~ 54.7	2.2
Intermediate shell	B2002-2	A302BM	B-4701-2	1.906E+19	1.136E+19	0.170	73	~~22.8%~~ 24.3%	~~56.4~~ 55.3	2.2
Intermediate shell	B2002-3	A302BM	B-4922-1	1.906E+19	1.136E+19	0.250	74	~~36.0%~~ 34.8%	~~47.4~~ 48.3	2.2
Lower shell	B2003-1	A302BM	B-4791-1	1.906E+19	1.136E+19	0.200	71	29.9%	49.8	1.2
Lower shell	B2003-2	A302BM	B-4782-1	1.906E+19	1.136E+19	0.190	88	28.9%	62.6	1.2
Intermediate shell axial welds	2-042 A/B/C	Linde 1092	W5214	1.295E+19	7.72E+18	0.213	121	~~42.2%~~ 49.8%	~~69.9~~ 60.8	2.2
Lower shell axial welds	3-042 A/B	Linde 1092	W5214	1.295E+19	7.72E+18	0.213	121	~~42.2%~~ 49.8%	~~69.9~~ 60.8	2.2

Table 4.2-1
IP2 Charpy Upper-Shelf Energy Data for 48 Effective Full-Power Years (EFPY)

Reactor Vessel Location (Beltline Identification)	Material Ident	Material Type	Heat #	Fluence Vessel Clad/BM 48 EFPY	Fluence 1/4T 48 EFPY	%Cu	Un-irradiated USE	% Drop in USE	48 EFPY USE at 1/4 T	RG 1.99 Position
Intermediate to lower shell circumferential weld	9-042	Linde 1092	34B009	1.906E+19	1.136E+19	0.192	82	34.2%	53.9	1.2

Table 4.2-2
IP3 Charpy Upper-Shelf Energy Data for 48 Effective Full-Power Years (EFPY)

Reactor Vessel Location (Beltline Identification)	Material Ident	Material Type	Heat #	Fluence Vessel Clad/BM 48 EFPY	Fluence 1/4T 48 EFPY	%Cu	Un-irradiated USE	% Drop in USE	48 EFPY USE at 1/4 T	RG 1.99 Position
Intermediate shell	B2802-1	A302BM	B-5394-2	1.560E+19	9.298E+18	0.200	102	28.5%	72.9	1.2
Intermediate shell	B2802-2	A302BM	A-0516-2	1.560E+19	9.298E+18	0.220	97	30.5%	67.4	1.2
Intermediate shell	B2802-3	A302BM	B-5391-2	1.560E+19	9.298E+18	0.200	95	28.5%	67.9	1.2
Lower shell	B2803-1	A302BM	A-0495-2	1.560E+19	9.298E+18	0.190	72	27.5%	52.2	1.2
Lower shell	B2803-2	A302BM	C-1397-3	1.560E+19	9.298E+18	0.220	94	30.5%	65.4	1.2
Lower shell	B2803-3	A302BM	A-0512-2	1.560E+19	9.298E+18	0.240	68	~~21.3%~~ 26.8%	~~53.5~~ 49.8	2.2
Intermediate shell axial welds	2-042	Linde 1092	34B009	1.560E+19	9.298E+18	0.192	112	32.6%	75.5	1.2
Lower shell axial welds	3-042	Linde 1092	34B009	1.560E+19	9.298E+18	0.192	112	32.6%	75.5	1.2

Table 4.2-2
IP3 Charpy Upper-Shelf Energy Data for 48 Effective Full-Power Years (EFPY)

Reactor Vessel Location (Beltline Identification)	Material Ident	Material Type	Heat #	Fluence Vessel Clad/BM 48 EFPY	Fluence 1/4T 48 EFPY	%Cu	Un-irradiated USE	% Drop in USE	48 EFPY USE at 1/4 T	RG 1.99 Position
Intermediate to lower shell circumferential weld	9-042	Linde 1092	13253	1.560E+19	9.298E+18	0.221	111	35.5%	71.6	1.2

Table 4.2-3
IP2 Pressurized Thermal Shock Data for 48 Effective Full-Power Years (EFPY)

Reactor Vessel Location (Beltline Identification)	Material Ident	Material Type	Heat Number	%Cu	%Ni	Fluence Vessel Clad/BM (10^{19} n/cm^2)	Fluence Factor	Chemistry Factor ~~WCAP-15629 Rev. 1~~	Un-irradiated RT_{NDT} (°F)	ΔRT_{NDT} (°F)	Margin (°F)	48 EFPY RT_{PTS} (°F)	Method RG 1.99
Intermediate shell	B2002-1	A302BM	B-4688-2	0.190	0.650	1.906	1.176	114.0	34.0	134.1	17.0	185.1	2.1
Intermediate shell	B2002-2	A302BM	B-4701-2	0.170	0.460	1.906	1.176	118.2	21.0	139.1	~~34.0~~ 17.0	~~194.1~~ 177.1	2.1
Intermediate shell	B2002-3	A302BM	B-4922-1	0.250	0.600	1.906	1.176	181.9	21.0	214.0	17.0	252.0	2.1
Lower shell	B2003-1	A302BM	B-4791-1	0.200	0.660	1.906	1.176	152.00	20.0	178.8	34.0	232.8	1.1
Lower shell	B2003-2	A302BM	B-4782-1	0.190	0.480	1.906	1.176	128.80	-20.0	151.5	34.0	165.5	1.1
Intermediate shell axial welds	2-042 A/B/C	Linde 1092	W5214	0.213	1.007	1.295	1.072	~~254.7~~ 251.8	-56	~~273.0~~ 269.9	44.0	~~261.0~~ 257.9	2.1
Lower shell axial welds	3-042 A/B	Linde 1092	W5214	0.213	1.007	1.295	1.072	~~254.7~~ 251.8	-56	~~273.0~~ 269.9	44.0	~~261.0~~ 257.9	2.1

Table 4.2-3
IP2 Pressurized Thermal Shock Data for 48 Effective Full-Power Years (EFPY)

Reactor Vessel Location (Beltline Identification)	Material Ident	Material Type	Heat Number	%Cu	%Ni	Fluence Vessel Clad/BM (10^{19} n/cm^2)	Fluence Factor	Chemistry Factor ~~WCAP-15629 Rev. 1~~	Un-irradiated RT_{NDT} (°F)	ΔRT_{NDT} (°F)	Margin (°F)	48 EFPY RT_{PTS} (°F)	Method RG 1.99
Intermediate to lower shell circumferential weld	9-042	Linde 1092	34B009	0.192	1.007	1.906	1.176	220.9	-56	259.9	65.5	269.4	1.1

Table 4.2-4
IP3 Pressurized Thermal Shock Data for 48 Effective Full-Power Years (EFPY)

Reactor Vessel Location (Beltline Identification)	Material Ident	Material Type	Heat Number	%Cu	%Ni	Fluence Vessel Clad/BM (10^{19} n/cm^2)	Fluence Factor	Chemistry Factor ~~GL 92-01~~	Un-irradiated RT_{NDT} (°F)	ΔRT_{NDT} (°F)	Margin (°F)	48 EFPY RT_{PTS} (°F)	Method RG 1.99
Intermediate shell	B2802-1	A302BM	B-5394-2	0.200	0.500	1.560	1.123	137.0	5.0	153.8	34.0	192.8	1.1
Intermediate shell	B2802-2	A302BM	A-0516-2	0.220	0.530	1.560	1.123	151.6	-4.0	170.2	34.0	200.2	1.1
Intermediate shell	B2802-3	A302BM	B-5391-2	0.200	0.490	1.560	1.123	135.8	17.0	152.5	34.0	203.5	1.1
Lower shell	B2803-1	A302BM	A-0495-2	0.190	0.470	1.560	1.123	127.7	49.0	143.4	34.0	226.4	1.1
Lower shell	B2803-2	A302BM	C-1397-3	0.220	0.520	1.560	1.123	150.2	-5.0	168.7	34.0	197.7	1.1
Lower shell	B2803-3	A302BM	A-0512-2	0.240	0.520	1.560	1.123	~~168.2~~ 167.9	74.0	~~188.9~~ 188.5	17.0	~~279.9~~ 279.5	2.1
Intermediate shell axial welds	2-042	Linde 1092	34B009	0.192	1.007	1.560	1.123	221.3	-56	248.5	65.5	258.0	1.1
Lower shell axial welds	3-042	Linde 1092	34B009	0.192	1.007	1.560	1.123	221.3	-56	248.5	65.5	258.0	1.1

Table 4.2-4
IP3 Pressurized Thermal Shock Data for 48 Effective Full-Power Years (EFPY)

Reactor Vessel Location (Beltline Identification)	Material Ident	Material Type	Heat Number	%Cu	%Ni	Fluence Vessel Clad/BM (10^{19} n/cm^2)	Fluence Factor	Chemistry Factor ~~GL 92-01~~	Un-irradiated RT_{NDT} (°F)	ΔRT_{NDT} (°F)	Margin (°F)	48 EFPY RT_{PTS} (°F)	Method RG 1.99
Intermediate to lower shell circumferential weld	9-042	Linde 1092	13253	0.221	0.732	1.560	1.123	189.1	-54	212.3	56.0	214.3	1.1

Table 4.2-5
IP2 Adjusted Reference Temperature at 48 Effective Full-Power Years (EFPY)

Reactor Vessel Location (Beltline Identification)	Material Ident	Heat Number	Chemistry Factor ~~WCAP-15629 Rev. 1~~	Un-irradiated RT_{NDT} (° F)	1/4 T Neutron Fluence (10^{19} n/cm^2)	1/4 T Fluence Factor	1/4 T ΔRT_{NDT} (°F)	3/4 T Neutron Fluence (10^{19} n/cm^2)	3/4 T Fluence Factor	3/4 T ΔRT_{NDT} (°F)	48 EFPY 1/4 T RT_{NDT} (°F)	48 EFPY 3/4 T RT_{NDT} (°F)
Intermediate shell	B2002-1	B-4688-2	114.0	34.0	1.136	1.036	118.1	0.404	0.748	85.3	169.1	136.3
Intermediate shell	B2002-2	B-4701-2	118.2	21.0	1.136	1.036	122.4	0.404	0.748	88.5	~~177.4~~ 160.4	~~143.5~~ 126.5
Intermediate shell	B2002-3	B-4922-1	181.9	21.0	1.136	1.036	188.4	0.404	0.748	136.1	226.4	174.1
Lower shell	B2003-1	B-4791-1	152.00	20.0	1.136	1.036	157.4	0.404	0.748	113.8	211.4	167.8
Lower shell	B2003-2	B-4782-1	128.80	-20.0	1.136	1.036	133.4	0.404	0.748	96.4	147.4	110.4
Intermediate shell axial welds	2-042 A/B/C	W5214	~~254.7~~ 251.8	-56	0.772	0.927	~~236.2~~ 233.5	0.274	0.647	~~164.9~~ 163.0	~~224.2~~ 221.5	~~152.9~~ 151.0
Lower shell axial welds	3-042 A/B	W5214	~~254.7~~ 251.8	-56	0.772	0.927	~~236.2~~ 233.5	0.274	0.647	~~164.9~~ 163.0	~~224.2~~ 221.5	~~152.9~~ 151.0

Table 4.2-5
IP2 Adjusted Reference Temperature at 48 Effective Full-Power Years (EFPY)

Reactor Vessel Location (Beltline Identification)	Material Ident	Heat Number	Chemistry Factor ~~WCAP-15629 Rev. 1~~	Un-irradiated RT_{NDT} (° F)	1/4 T Neutron Fluence (10^{19} n/cm^2)	1/4 T Fluence Factor	1/4 T ΔRT_{NDT} (°F)	3/4 T Neutron Fluence (10^{19} n/cm^2)	3/4 T Fluence Factor	3/4 T ΔRT_{NDT} (°F)	48 EFPY 1/4 T RT_{NDT} (°F)	48 EFPY 3/4 T RT_{NDT} (°F)
Intermediate to lower shell circumferential weld	9-042	34B009	220.9	-56	1.136	1.036	228.8	0.404	0.748	165.3	238.3	174.8

Table 4.2-6
IP3 Adjusted Reference Temperature at 48 Effective Full-Power Years (EFPY)

Reactor Vessel Location (Beltline Identification)	Material Ident	Heat Number	Chemistry Factor ~~RVID2~~	Un-irradiated RT_{NDT} (° F)	1/4 T Neutron Fluence (10^{19} n/cm^2)	1/4 T Fluence Factor	1/4 T ΔRT_{NDT} (° F)	3/4 T Neutron Fluence (10^{19} n/cm^2)	3/4 T Fluence Factor	3/4 T ΔRT_{NDT} (° F)	48 EFPY 1/4 T RT_{NDT} (° F)	48 EFPY 3/4 T RT_{NDT} (° F)
Intermediate shell	B2802-1	B-5394-2	137.0	5.0	0.930	0.980	134.2	0.330	0.695	95.2	173.2	134.2
Intermediate shell	B2802-2	A-0516-2	151.6	-4.0	0.930	0.980	148.5	0.330	0.695	105.4	178.5	135.4
Intermediate shell	B2802-3	B-5391-2	135.8	17.0	0.930	0.980	133.0	0.330	0.695	94.4	184.0	145.4
Lower shell	B2803-1	A-0495-2	127.7	49.0	0.930	0.980	125.1	0.330	0.695	88.8	208.1	171.8
Lower shell	B2803-2	C-1397-3	150.2	-5.0	0.930	0.980	147.1	0.330	0.695	104.4	176.1	133.4
Lower shell	B2803-3	A-0512-2	~~168.2~~ 167.9	74.0	0.930	0.980	~~164.8~~ 164.5	0.330	0.695	~~1169~~ 116.7	~~255.8~~ 255.5	~~207.9~~ 207.7
Intermediate shell axial welds	2-042	34B009	221.3	-56	0.930	0.980	216.7	0.330	0.695	153.8	226.2	163.3
Lower shell axial welds	3-042	34B009	221.3	-56	0.930	0.980	216.7	0.330	0.695	153.8	226.2	163.3
Intermediate to lower shell circumferential	9-042	13253	189.1	-54	0.930	0.980	185.2	0.330	0.695	131.4	187.2	133.4

Table 4.2-6
IP3 Adjusted Reference Temperature at 48 Effective Full-Power Years (EFPY)

Reactor Vessel Location (Beltline Identification)	Material Ident	Heat Number	Chemistry Factor ~~RVID2~~	Un-irradiated RT_{NDT} (° F)	1/4 T Neutron Fluence (10^{19} n/cm^2)	1/4 T Fluence Factor	1/4 T ΔRT_{NDT} (° F)	3/4 T Neutron Fluence (10^{19} n/cm^2)	3/4 T Fluence Factor	3/4 T ΔRT_{NDT} (° F)	48 EFPY 1/4 T RT_{NDT} (° F)	48 EFPY 3/4 T RT_{NDT} (° F)
weld												

LRA Section A.2.2.1.3, Charpy Upper-Shelf Energy, third paragraph, is revised as follows.

An equivalent margins analysis performed in WCAP-13587, Rev. 1, demonstrated that the minimum acceptable USE for reactor vessel plate material in four-loop plants is 43 ftlbs. In the safety assessment of WCAP-13587, the NRC concluded the report demonstrated margins of safety equivalent to those of the ASME code for beltline plate and forging materials. The USE values are therefore acceptable since the lowest projected USE level for the beltline plate material through the period of extended operation of ~~47.4~~48.3 ft-lb for intermediate shell plate B2002-3 is above the 43 ft-lbs minimum acceptable USE for four-loop plants determined in WCAP-13587 Rev. 1.

LRA Section A.3.2.1.3, Charpy Upper-Shelf Energy, is revised as follows.

The predictions for percent drop in C_VUSE at 48 EFPY are based on chemistry data, unirradiated C_VUSE data, and 1/4 T fluence values. The projected 48 EFPY peak beltline fluence level was conservatively applied to all beltline materials.

~~All plate and weld beltline materials meet the requirement of exceeding a C_VUSE value of 50 ft-lb at 48 EFPY.~~

One lower shell plate (B2803-3) has a projected upper shelf energy level below 50 ft-lb during the period of extended operation. The CvUSE for all remaining plate and weld beltline materials meets the acceptable value of greater than 50 ft-lb at 48 EFPY.

An equivalent margins analysis performed in WCAP-13587, Rev. 1, demonstrated that the minimum acceptable USE for reactor vessel plate material in four-loop plants is 43 ftlbs. In the safety assessment of WCAP-13587, the NRC concluded the report demonstrated margins of safety equivalent to those of the ASME code for beltline plate and forging materials. The USE value is therefore acceptable since the projected USE level through the period of extended operation of 49.8 ft-lb for lower shell plate B2003-3 is above the 43 ft-lbs minimum acceptable USE for four-loop plants determined in WCAP-13587 Rev. 1.

ATTACHMENT 2 TO NL-08-014

Audit Item #105 Clarification

(This clarification supersedes the revision submitted in letter NL-07-153 dated 12-18-2007)

INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 AND 3
LICENSE RENEWAL APPLICATION (LRA)
AUDIT ITEM CLARIFICATION

Audit Item 105 Clarification

The LRA amendment for Audit Item 105 communicated in letter NL-07-153, dated December 18, 2007, is replaced with the following.

LRA Section B.1.14, Fire Water System, Enhancements, is revised as follows.

The following enhancements will be implemented prior to the period of extended operation.

Attributes Affected	Enhancements
3. Parameters Monitored or Inspected 4. Detection of Aging Effects 6. Acceptance Criteria	~~IP3:~~ Revise applicable procedures to inspect the internal surface of the foam based fire suppression tanks. Acceptance criteria will be enhanced to verify no significant corrosion.

LRA Section A.2.1.13, Fire Water System Program, fourth paragraph, is revised to add the following.

- Revise applicable procedures to inspect the internal surface of the foam-based fire suppression tanks. Acceptance criteria will be enhanced to verify no significant corrosion.

ATTACHMENT 3 TO NL-08-014

List of Regulatory Commitments, Revision 2

(This revision supersedes the revision submitted in letter NL-07-153, dated 12-18-2007)

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 & 3
DOCKET NOS. 50-247 and 50-286

List of Regulatory Commitments
Rev. 2

The following table identifies those actions committed to by Entergy in this document.

Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
1	Enhance the Aboveground Steel Tanks Program for IP2 and IP3 to perform thickness measurements of the bottom surfaces of the condensate storage tanks, city water tank, and fire water tanks once during the first ten years of the period of extended operation. Enhance the Aboveground Steel Tanks Program for IP2 and IP3 to require trending of thickness measurements when material loss is detected.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039	A.2.1.1 A.3.1.1 B.1.1
2	Enhance the Bolting Integrity Program for IP2 and IP3 to clarify that actual yield strength is used in selecting materials for low susceptibility to SCC and clarify the prohibition on use of lubricants containing MoS_2 for bolting. The Bolting Integrity Program manages loss of preload and loss of material for all external bolting.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039 NL-07-153	A.2.1.2 A.3.1.2 B.1.2 Audit Items 201, 241, 270
3	Implement the Buried Piping and Tanks Inspection Program for IP2 and IP3 as described in LRA Section B.1.6. This new program will be implemented consistent with the corresponding program described in NUREG-1801 Section XI.M34, Buried Piping and Tanks Inspection.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039 NL-07-153	A.2.1.5 A.3.1.5 B.1.6 Audit Item 173

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
4	Enhance the Diesel Fuel Monitoring Program to include cleaning and inspection of the IP2 GT-1 gas turbine fuel oil storage tanks, IP2 and IP3 EDG fuel oil day tanks, IP2 SBO/Appendix R diesel generator fuel oil day tank, and IP3 Appendix R fuel oil storage tank and day tank once every ten years. Enhance the Diesel Fuel Monitoring Program to include quarterly sampling and analysis of the IP2 SBO/Appendix R diesel generator fuel oil day tank, IP2 security diesel fuel oil day tank, and IP3 Appendix R fuel oil storage tank. Particulates, water and sediment checks will be performed on the samples. Filterable solids acceptance criterion will be less than or equal to 10mg/l. Water and sediment acceptance criterion will be less than or equal to 0.05%. Enhance the Diesel Fuel Monitoring Program to include thickness measurement of the bottom surface of the following tanks once every ten years. IP2: EDG fuel oil storage tanks, EDG fuel oil day tanks, SBO/Appendix R diesel generator fuel oil day tank, GT-1 gas turbine fuel oil storage tanks, and diesel fire pump fuel oil storage tank; IP3: EDG fuel oil day tanks, Appendix R fuel oil storage tank, and diesel fire pump fuel oil storage tank. Enhance the Diesel Fuel Monitoring Program to change the analysis for water and particulates to a quarterly frequency for the following tanks. IP2: GT-1 gas turbine fuel oil storage tanks and diesel fire pump fuel oil storage tank; IP3: Appendix R fuel oil day tank and diesel fire pump fuel oil storage tank. Enhance the Diesel Fuel Monitoring Program to specify acceptance criteria for thickness measurements of the fuel oil storage tanks within the scope of the program. Enhance the Diesel Fuel Monitoring Program to direct samples be taken near the tank bottom and include direction to remove water when detected. Enhance the Diesel Fuel Monitoring Program to direct the addition of chemicals including biocide when the presence of biological activity is confirmed.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039 NL-07-153	A.2.1.8 A.3.1.8 B.1.9 Audit items 128, 129, 132

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
5	Enhance the External Surfaces Monitoring Program for IP2 and IP3 to include periodic inspections of systems in scope and subject to aging management review for license renewal in accordance with 10 CFR 54.4(a)(1) and (a)(3). Inspections shall include areas surrounding the subject systems to identify hazards to those systems. Inspections of nearby systems that could impact the subject systems will include SSCs that are in scope and subject to aging management review for license renewal in accordance with 10 CFR 54.4(a)(2).	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039	A.2.1.10 A.3.1.10 B.1.11
6	Enhance the Fatigue Monitoring Program for IP2 to monitor steady state cycles and feedwater cycles or perform an evaluation to determine monitoring is not required. Review the number of allowed events and resolve discrepancies between reference documents and monitoring procedures. Enhance the Fatigue Monitoring Program for IP3 to include all the transients identified. Assure all fatigue analysis transients are included with the lowest limiting numbers. Update the number of design transients accumulated to date.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039 NL-07-153	A.2.1.11 A.3.1.11 B.1.12, Audit Item 164

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
7	Enhance the Fire Protection Program to inspect external surfaces of the IP3 RCP oil collection systems for loss of material each refueling cycle. Enhance the Fire Protection Program to explicitly state that the IP2 and IP3 diesel fire pump engine sub-systems (including the fuel supply line) shall be observed while the pump is running. Acceptance criteria will be revised to verify that the diesel engine does not exhibit signs of degradation while running; such as fuel oil, lube oil, coolant, or exhaust gas leakage. Enhance the Fire Protection Program to specify that the IP2 and IP3 diesel fire pump engine carbon steel exhaust components are inspected for evidence of corrosion and cracking at least once each operating cycle. Enhance the Fire Protection Program for IP3 to visually inspect the cable spreading room, 480V switchgear room, and EDG room CO_2 fire suppression system for signs of degradation, such as corrosion and mechanical damage at least once every six months.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039	A.2.1.12 A.3.1.12 B.1.13

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
8	Enhance the Fire Water Program to include inspection of IP2 and IP3 hose reels for evidence of corrosion. Acceptance criteria will be revised to verify no unacceptable signs of degradation. Enhance the Fire Water Program to replace all or test a sample of IP2 and IP3 sprinkler heads required for 10 CFR 50.48 using guidance of NFPA 25 (2002 edition), Section 5.3.1.1.1 before the end of the 50-year sprinkler head service life and at 10-year intervals thereafter during the extended period of operation to ensure that signs of degradation, such as corrosion, are detected in a timely manner. Enhance the Fire Water Program to perform wall thickness evaluations of IP2 and IP3 fire protection piping on system components using non-intrusive techniques (e.g., volumetric testing) to identify evidence of loss of material due to corrosion. These inspections will be performed before the end of the current operating term and at intervals thereafter during the period of extended operation. Results of the initial evaluations will be used to determine the appropriate inspection interval to ensure aging effects are identified prior to loss of intended function. Enhance the Fire Water Program to inspect the internal surface of foam based fire suppression tanks. Acceptance criteria will be enhanced to verify no significant corrosion.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039 NL-07-153 NL-08-014	A.2.1.13 A.3.1.13 B.1.14 Audit Items 105, 106

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
9	Enhance the Flux Thimble Tube Inspection Program for IP2 and IP3 to implement comparisons to wear rates identified in WCAP-12866. Include provisions to compare data to the previous performances and perform evaluations regarding change to test frequency and scope. Enhance the Flux Thimble Tube Inspection Program for IP2 and IP3 to specify the acceptance criteria as outlined in WCAP-12866 or other plant-specific values based on evaluation of previous test results. Enhance the Flux Thimble Tube Inspection Program for IP2 and IP3 to direct evaluation and performance of corrective actions based on tubes that exceed or are projected to exceed the acceptance criteria. Also stipulate that flux thimble tubes that cannot be inspected over the tube length and cannot be shown by analysis to be satisfactory for continued service, must be removed from service to ensure the integrity of the reactor coolant system pressure boundary.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039	A.2.1.15 A.3.1.15 B.1.16

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
10	Enhance the Heat Exchanger Monitoring Program for IP2 and IP3 to include the following heat exchangers in the scope of the program. • Safety injection pump lube oil heat exchangers • RHR heat exchangers • RHR pump seal coolers • Non-regenerative heat exchangers • Charging pump seal water heat exchangers • Charging pump fluid drive coolers • Charging pump crankcase oil coolers • Spent fuel pit heat exchangers • Secondary system steam generator sample coolers • Waste gas compressor heat exchangers • SBO/Appendix R diesel jacket water heat exchanger (IP2 only) Enhance the Heat Exchanger Monitoring Program for IP2 and IP3 to perform visual inspection on heat exchangers where non-destructive examination, such as eddy current inspection, is not possible due to heat exchanger design limitations. Enhance the Heat Exchanger Monitoring Program for IP2 and IP3 to include consideration of material-environment combinations when determining sample population of heat exchangers. Enhance the Heat Exchanger Monitoring Program for IP2 and IP3 to establish minimum tube wall thickness for the new heat exchangers identified in the scope of the program. Establish acceptance criteria for heat exchangers visually inspected to include no unacceptable signs of degradation.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039 NL-07-153	A.2.1.16 A.3.1.16 B.1.17, Audit Item 52

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
11	Enhance the ISI Program for IP2 and IP3 to provide periodic visual inspections to confirm the absence of aging effects for lubrite sliding supports used in the steam generator and reactor coolant pump support systems.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039 NL-07-153	A.2.1.17 A.3.1.17 B.1.18 Audit item 59
12	Enhance the Masonry Wall Program for IP2 and IP3 to specify that the IP1 intake structure is included in the program.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039	A.2.1.18 A.3.1.18 B.1.19
13	Enhance the Metal-Enclosed Bus Inspection Program to add IP2 480V bus associated with substation A to the scope of bus inspected. Enhance the Metal-Enclosed Bus Inspection Program for IP2 and IP3 to visually inspect the external surface of MEB enclosure assemblies for loss of material at least once every 10 years. The first inspection will occur prior to the period of extended operation and the acceptance criterion will be no significant loss of material. Enhance the Metal-Enclosed Bus Inspection Program for IP2 and IP3 to inspect bolted connections at least once every five years if performed visually or at least once every ten years using quantitative measurements such as thermography or contact resistance measurements. The first inspection will occur prior to the period of extended operation. The plant will process a change to applicable site procedure to remove the reference to "re-torquing" connections for phase bus maintenance and bolted connection maintenance.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039 NL-07-153	A.2.1.19 A.3.1.19 B.1.20 Audit Item 124 Audit Item 133
14	Implement the Non-EQ Bolted Cable Connections Program for IP2 and IP3 as described in LRA Section B.1.22.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039	A.2.1.21 A.3.1.21 B.1.22

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
15	Implement the Non-EQ Inaccessible Medium-Voltage Cable Program for IP2 and IP3 as described in LRA Section B.1.23. This new program will be implemented consistent with the corresponding program described in NUREG-1801 Section XI.E3, Inaccessible Medium-Voltage Cables Not Subject To 10 CFR 50.49 Environmental Qualification Requirements.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039 NL-07-153	A.2.1.22 A.3.1.22 B.1.23 Audit item 173
16	Implement the Non-EQ Instrumentation Circuits Test Review Program for IP2 and IP3 as described in LRA Section B.1.24. This new program will be implemented consistent with the corresponding program described in NUREG-1801 Section XI.E2, Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039 NL-07-153	A.2.1.23 A.3.1.23 B.1.24 Audit item 173
17	Implement the Non-EQ Insulated Cables and Connections Program for IP2 and IP3 as described in LRA Section B.1.25. This new program will be implemented consistent with the corresponding program described in NUREG-1801 Section XI.E1, Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039 NL-07-153	A.2.1.24 A.3.1.24 B.1.25 Audit item 173

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
18	Enhance the Oil Analysis Program for IP2 to sample and analyze lubricating oil used in the SBO/Appendix R diesel generator consistent with oil analysis for other site diesel generators. Enhance the Oil Analysis Program for IP2 and IP3 to sample and analyze generator seal oil and turbine hydraulic control oil. Enhance the Oil Analysis Program for IP2 and IP3 to formalize preliminary oil screening for water and particulates and laboratory analyses including defined acceptance criteria for all components included in the scope of this program. The program will specify corrective actions in the event acceptance criteria are not met. Enhance the Oil Analysis Program for IP2 and IP3 to formalize trending of preliminary oil screening results as well as data provided from independent laboratories.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039	A.2.1.25 A.3.1.25 B.1.26
19	Implement the One-Time Inspection Program for IP2 and IP3 as described in LRA Section B.1.27. This new program will be implemented consistent with the corresponding program described in NUREG-1801, Section XI.M32, One-Time Inspection.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039 NL-07-153	A.2.1.26 A.3.1.26 B.1.27 Audit item 173
20	Implement the One-Time Inspection – Small Bore Piping Program for IP2 and IP3 as described in LRA Section B.1.28. This new program will be implemented consistent with the corresponding program described in NUREG-1801, Section XI.M35, One-Time Inspection of ASME Code Class I Small-Bore Piping.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039 NL-07-153	A.2.1.27 A.3.1.27 B.1.28 Audit item 173
21	Enhance the Periodic Surveillance and Preventive Maintenance Program for IP2 and IP3 as necessary to assure that the effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis through the period of extended operation.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039	A.2.1.28 A.3.1.28 B.1.29

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
22	Enhance the Reactor Vessel Surveillance Program for IP2 and IP3 revising the specimen capsule withdrawal schedules to draw and test a standby capsule to cover the peak reactor vessel fluence expected through the end of the period of extended operation. Enhance the Reactor Vessel Surveillance Program for IP2 and IP3 to require that tested and untested specimens from all capsules pulled from the reactor vessel are maintained in storage.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039	A.2.1.31 A.3.1.31 B.1.32
23	Implement the Selective Leaching Program for IP2 and IP3 as described in LRA Section B.1.33. This new program will be implemented consistent with the corresponding program described in NUREG-1801, Section XI.M33 Selective Leaching of Materials.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039 NL-07-153	A.2.1.32 A.3.1.32 B.1.33 Audit item 173
24	Enhance the Steam Generator Integrity Program for IP2 and IP3 to require that the results of the condition monitoring assessment are compared to the operational assessment performed for the prior operating cycle with differences evaluated.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039	A.2.1.34 A.3.1.34 B.1.35
25	Enhance the Structures Monitoring Program to explicitly specify that the following structures are included in the program. • Appendix R diesel generator foundation (IP3) • Appendix R diesel generator fuel oil tank vault (IP3) • Appendix R diesel generator switchgear and enclosure (IP3) • city water storage tank foundation • condensate storage tanks foundation (IP3) • containment access facility and annex (IP3) • discharge canal (IP2/3)	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039 NL-07-153	A.2.1.35 A.3.1.35 B.1.36 Audit item 86 Audit item 88 Audit Item 87
	• emergency lighting poles and foundations (IP2/3) • fire pumphouse (IP2) • fire protection pumphouse (IP3) • fire water storage tank foundations (IP2/3) • gas turbine 1 fuel storage tank foundation • maintenance and outage building-elevated passageway (IP2)			

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
	• new station security building (IP2) • nuclear service building (IP1) • primary water storage tank foundation (IP3) • refueling water storage tank foundation (IP3) • security access and office building (IP3) • service water pipe chase (IP2/3) • service water valve pit (IP3) • superheater stack • transformer/switchyard support structures (IP2) • waste holdup tank pits (IP2/3) Enhance the Structures Monitoring Program for IP2 and IP3 to clarify that in addition to structural steel and concrete, the following commodities (including their anchorages) are inspected for each structure as applicable. • cable trays and supports • concrete portion of reactor vessel supports • conduits and supports • cranes, rails and girders • equipment pads and foundations • fire proofing (pyrocrete) • HVAC duct supports • jib cranes • manholes and duct banks • manways, hatches and hatch covers • monorails • new fuel storage racks • sumps, sump screens, strainers and flow barriers Enhance the Structures Monitoring Program for IP2 and IP3 to inspect inaccessible concrete areas that are exposed by excavation for any reason. IP2 and IP3 will also inspect inaccessible concrete areas in environments where observed conditions in accessible areas exposed to the same environment indicate that significant concrete degradation is occurring. Enhance the Structures Monitoring Program for IP2 and IP3 to perform inspections of elastomers (seals, gaskets, seismic joint filler, and roof elastomers) to identify cracking and change in material properties			

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
	and for inspection of aluminum vents and louvers to identify loss of material. Enhance the Structures Monitoring Program for IP2 and IP3 to perform an engineering evaluation of groundwater samples to assess aggressiveness of groundwater to concrete on a periodic basis (at least once every five years). IPEC will obtain samples from at least 5 wells that are representative of the ground water surrounding below-grade site structures. Samples will be monitored for sulfates, pH and chlorides. Enhance the Structures Monitoring Program for IP2 and IP3 to perform inspection of normally submerged concrete portions of the intake structures at least once every 5 years.			
26	Implement the Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program for IP2 and IP3 as described in LRA Section B.1.37. This new program will be implemented consistent with the corresponding program described in NUREG-1801, Section XI.M12, Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039 NL-07-153	A.2.1.36 A.3.1.36 B.1.37 Audit item 173
27	Implement the Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program for IP2 and IP3 as described in LRA Section B.1.38. This new program will be implemented consistent with the corresponding program described in NUREG-1801 Section XI.M13, Thermal Aging and Neutron Embrittlement of Cast Austenitic Stainless Steel (CASS) Program.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039 NL-07-153	A.2.1.37 A.3.1.37 B.1.38 Audit item 173

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
28	Enhance the Water Chemistry Control – Closed Cooling Water Program to maintain water chemistry of the IP2 SBO/Appendix R diesel generator cooling system per EPRI guidelines. Enhance the Water Chemistry Control – Closed Cooling Water Program to maintain the IP2 and IP3 security generator cooling water system pH within limits specified by EPRI guidelines.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039	A.2.1.39 A.3.1.39 B.1.40
29	Enhance the Water Chemistry Control – Primary and Secondary Program for IP2 to test sulfates monthly in the RWST with a limit of <150 ppb.	IP2: September 28, 2013	NL-07-039	A.2.1.40 B.1.41
30	For aging management of the reactor vessel internals, IPEC will (1) participate in the industry programs for investigating and managing aging effects on reactor internals; (2) evaluate and implement the results of the industry programs as applicable to the reactor internals; and (3) upon completion of these programs, but not less than 24 months before entering the period of extended operation, submit an inspection plan for reactor internals to the NRC for review and approval.	IP2: September 28, 2011 IP3: December 12, 2013	NL-07-039	A.2.1.41 A.3.1.41
31	Additional P-T curves will be submitted as required per 10 CFR 50, Appendix G prior to the period of extended operation as part of the Reactor Vessel Surveillance Program.	IP2: September 28, 2013 IP3: December 12, 2015	NL-07-039	A.2.2.1.2 A.3.2.1.2 4.2.3
32	As required by 10 CFR 50.61(b)(4), IP3 will submit a plant-specific safety analysis for plate B2803-3 to the NRC three years prior to reaching the RT_{PTS} screening criterion. Alternatively, the site may choose to implement the revised PTS (10 CFR 50.61) rule when approved, which would permit use of Regulatory Guide 1.99, Revision 3.	IP3: December 12, 2015	NL-07-039	A.3.2.1.4 4.2.5

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
33	At least 2 years prior to entering the period of extended operation, for the locations identified in LRA Table 4.3-13 (IP2) and LRA Table 4.3-14 (IP3), IP2 and IP3 will implement one or more of the following: (1) Refine the fatigue analyses to determine valid CUFs less than 1 when accounting for the effects of reactor water environment. This includes applying the appropriate Fen factors to valid CUFs determined in accordance with one of the following: 1. For locations, including NUREG/CR-6260 locations, with existing fatigue analysis valid for the period of extended operation, use the existing CUF to determine the environmentally adjusted CUF. 2. In addition to the NUREG/CR-6260 locations, more limiting plant-specific locations with a valid CUF may be evaluated. In particular, the pressurizer lower shell will be reviewed to ensure the surge nozzle remains the limiting component. 3. Representative CUF values from other plants, adjusted to or enveloping the IPEC plant specific external loads may be used if demonstrated applicable to IPEC. 4. An analysis using an NRC-approved version of the ASME code or NRC-approved alternative (e.g., NRC-approved code case) may be performed to determine a valid CUF. (2) Manage the effects of aging due to fatigue at the affected locations by an inspection program that has been reviewed and approved by the NRC (e.g., periodic non-destructive examination of the affected locations at inspection intervals to be determined by a method acceptable to the NRC). (3) Repair or replace the affected locations before exceeding a CUF of 1.0. Should IPEC select the option to manage the aging effects due to environmental-assisted fatigue during the period of extended operation, details of the aging management program such as scope, qualification, method, and frequency will be submitted to the NRC at least 2 years prior to the period of extended operation.	IP2: September 28, 2011 IP3: December 12, 2013	NL-07-039 NL-07-153	A.2.2.2.3 A.3.2.2.3 4.3.3 Audit item 146

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
34	IP2 SBO / Appendix R diesel generator will be installed and operational by April 30, 2008. This committed change to the facility meets the requirements of 10 CFR 50.59(c)(1) and, therefore, a license amendment pursuant to 10 CFR 50.90 is not required.	April 30, 2008	NL-07-078	2.1.1.3.5