


ATTACHMENT 9.1

VENDOR DOCUMENT REVIEW STATUS

Sheet 1 of 1

	ENTERGY NUCLEAR MANAGEMENT MANUAL EN-DC-149
VENDOR DOCUMENT REVIEW STATUS	
<input checked="" type="checkbox"/> FOR ACCEPTANCE <input type="checkbox"/> FOR INFORMATION	
<input checked="" type="checkbox"/> IPEC <input type="checkbox"/> JAF <input type="checkbox"/> PLP <input type="checkbox"/> PNPS <input type="checkbox"/> VY <input type="checkbox"/> ANO <input type="checkbox"/> GGNS <input type="checkbox"/> RBS <input type="checkbox"/> W3 <input type="checkbox"/> NP	
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Document Title: Review of the Fatigue Monitoring Aging Management Program for License renewal Implementation	
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Acceptance does not constitute approval of design details, calculations, analyses, test methods, or materials developed or selected by the supplier and does not relieve the supplier from full compliance with contractual negotiations.	
Responsible Engineer <u>Nelson Azevedo</u> / <u>11/13/12</u> Print Name Signature Date	
Engineering Supervisor <u>Nelson Azevedo</u> / <u>11/13/12</u> Print Name Signature Date	

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Reviewer: NELSON AREVALO / Nelson Arevalo Ext. 6775
Print Name/ Signature Date 11/19/12

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*I = Included, O = Omitted

RE: NELSON AREVEDO / Nelson Arevedo 11/4/12
Print Name/Signature Date



ENTERGY NUCLEAR
Engineering Report Cover Sheet

Engineering Report Title:
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation

Engineering Report Type:
New ☒ Revision ☐ Cancelled ☐ Superseded ☐
Superseded by: _____

Applicable Site(s)

IP1 <input type="checkbox"/>	IP2 <input checked="" type="checkbox"/>	IP3 <input checked="" type="checkbox"/>	JAF <input type="checkbox"/>	PNPS <input type="checkbox"/>	VY <input type="checkbox"/>	WPO <input type="checkbox"/>
ANO1 <input type="checkbox"/>	ANO2 <input type="checkbox"/>	ECH <input type="checkbox"/>	GGNS <input type="checkbox"/>	RBS <input type="checkbox"/>	WF3 <input type="checkbox"/>	PLP <input type="checkbox"/>

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Report Origin: ☒ Entergy ☐ Vendor
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Supervisor / Manager (Print Name/Sign)

IPEC License Renewal Implementation Project	IP-RPT-11-LRD13 Revision 0 Page 2 of 23
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation	

REVISION DESCRIPTION SHEET

Revision Number	Description	Pages and/or Sections Revised
0	Initial Issue	

IPEC License Renewal Implementation Project	IP-RPT-11-LRD13 Revision 0 Page 3 of 23
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation	

TABLE OF CONTENTS

1.0 Program Description..... 4

2.0 Reference Documents..... 6

3.0 Commitments and License Action Requests (LAR) 8

4.0 Commitment/Program Requirements and Program Status.....10

5.0 Site Program Owner/Lead..... 15

Attachment 1: License Renewal Fatigue Monitoring Program Implementation Action Tracking 16

IPEC License Renewal Implementation Project	IP-RPT-11-LRD13 Revision 0 Page 4 of 23
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation	

1.0 Program Description

This report documents review of the Fatigue Monitoring Program that was credited for license renewal of IPEC Units 2 and 3. (Ref. 5, 6) This review is intended to identify specific requirements tied to the program as well as the status of the site documentation for purposes of ensuring the proper implementation of the program for the period of extended operation and completion of the commitments.

The following is a description of the Fatigue Monitoring Program as described in the LRA and modified by the NL-08-21 correspondence.

The Fatigue Monitoring Program is an existing program that tracks the number of critical thermal and pressure transients for selected reactor coolant system components. The program ensures the validity of analyses that explicitly analyzed a specified number of fatigue transients by assuring that the actual effective number of transients does not exceed the analyzed number of transients.

The program provides for update of the fatigue usage calculations to maintain a CUF of < 1.0 for the period of extended operation. For the locations identified in LRA Table 4.3-13 (IP2) and LRA Table 4.3-14 (IP3), updated calculations will account for the effects of the reactor water environment including an evaluation of the bounding locations. (Note: These calculations have already been completed and the results are documented in WCAP-17199 and WCAP-17200.)

The analysis methods for determination of stresses and fatigue usage will be in accordance with an NRC endorsed Edition of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III Rules for Construction of Nuclear Power Plant Components Division 1 Subsection NB, Class 1 Components, Sub articles NB-3200 or NB-3600 as applicable to the specific component. IPEC will utilize design transients from IPEC Design Specifications to bound all operational transients. The numbers of cycles used for evaluation will be based on the design number of cycles and actual IPEC cycle counts projected out to the end of the license renewal period (60 years).

Environmental effects on fatigue usage will be assessed using methodology consistent with the Generic Aging Lessons Learned Report, NUREG-1801, Rev. 1, (GALL) that states; "The sample of critical components can be evaluated by applying environmental life correction factors to the existing ASME Code fatigue analyses. Formulae for calculating the environmental life correction factors are contained in NUREG/CR-6583 for carbon and low-alloy steels and in NUREG/CR-5704 for austenitic stainless steels." Alternatively the rules of NUREG-6906 may also be used.

The Fatigue Monitoring Program tracks actual plant transients and evaluates these against the design transients. Cycle counts show no limits are expected to be approached for the current license term. The Fatigue Monitoring Program will ensure that the numbers of transient cycles experienced by the plant remain within the analyzed numbers of cycles and hence, the component CUFs remain below the values calculated in the design basis fatigue evaluations. If ongoing monitoring indicates the potential for a condition outside that analyzed above, IPEC may perform further reanalysis of the identified configuration using established configuration management processes as described above.

IPEC License Renewal Implementation Project	IP-RPT-11-LRD13 Revision 0 Page 5 of 23
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation	

The program requires corrective actions including repair or replacement of affected components before fatigue usage calculations determine the CUF exceeds 1.0. Specific corrective actions are implemented in accordance with the IPEC corrective action program. Repair or replacement of the affected component(s), if necessary, will be in accordance with established plant procedures governing repair and replacement activities.

The attached pages document the review of the site Fatigue Monitoring Program including related commitments, requirements, and procedures or other documents that implement the program. This review assesses readiness for entering the period of extended operation including assessment of license renewal commitments. Attachment 1 provides a tabular consolidation of these individual program requirements, commitments and recommended actions with additional details.

IPEC License Renewal Implementation Project	IP-RPT-11-LRD13 Revision 0 Page 6 of 23
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation	

2.0 Reference Documents

1. IP-RPT-06-LRD02, Aging Management Program Evaluation – Class 1 Mechanical, Rev. 4, available on Merlin.
2. IP-RPT-06-LRD07, Aging Management Program Evaluation – Non-Class 1 Mechanical, Rev. 6, available on Merlin.
3. IP-RPT-06-LRD08, Aging Management Program Evaluation – Structural/Civil, Rev. 3, available on Merlin.
4. IP-RPT-06-LRD09, Aging Management Program Evaluation – Electrical, Rev. 4, available on Merlin.
5. Indian Point Energy Center, License Renewal Application, (program descriptions are in Appendix B), available on Merlin, and at <http://www.nrc.gov/reading-rm/adams.html#web-based-adams> and “Begin Web-based ADAMS Search” with Accession # ML071210523.
6. NUREG-1930, Safety Evaluation Report (SER) Related to the License Renewal of Indian Point Nuclear Generating Unit Nos. 2 and 3, published in November 2009, available on Merlin, and at <http://www.nrc.gov/reading-rm/adams.html#web-based-adams> and “Begin Web-based ADAMS Search” with Accession # ML093170671.
7. Safety Evaluation Report (SER) Related to the License Renewal of Indian Point Nuclear Generating Unit Nos. 2 and 3, SER Supplement 1, published in August 2011, available on Merlin, and at <http://www.nrc.gov/reading-rm/adams.html#web-based-adams> and “Begin Web-based ADAMS Search” with Accession # ML11242A215.
8. LO-LAR-2011-0174 IPEC LRA Commitment Corrective Actions.
9. Correspondence from Entergy to NRC, NL-11-101.
10. IP-RPT-06-LRD04, Revision 1, TLAA - Metal Fatigue.
11. Indian Point Unit 3 Procedure, 3-PT-M051, Plant Operation Information, Revision 10, January 4, 2008.
12. Indian Point Unit 2 Procedure, 2-PT-2Y15, Thermal Cycle Monitoring Program, Revision 1, July 15, 2006.
13. WCAP-17149-P, Rev. 1, “Evaluation of Pressurizer Insurge/Outsurge Transients for Indian Point Unit 2,” July, 2010.
14. WCAP-17162-P, Rev. 1, “Evaluation of Pressurizer Insurge/Outsurge Transients for Indian Point Unit 3,” July, 2010.
15. WCAP-17199-P, Rev. 0, “Environmental Fatigue Evaluations for Indian Point Unit 2,” June, 2010.

IPEC License Renewal Implementation Project	IP-RPT-11-LRD13 Revision 0 Page 7 of 23
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation	

16. WCAP-17200-P, Rev. 0, "Environmental Fatigue Evaluations for Indian Point Unit 3," June, 2010.
17. Letter LTR-NEM-11-720, "Westinghouse Offer for Evaluation of Environmental Effects on Non-6260 Locations for Indian Point Units 2 and 3".
18. Letter NL-10-082, License Renewal Application, Completion of Commitment 33 Regarding Fatigue Monitoring Program, Aug. 9, 2010.
19. WCAP-16898-P, Indian Point Unit 3 Transient and Fatigue Cycle Monitoring Program Transient History Evaluation.
20. Letter NL-08-021, License Renewal Application Amendment 2, January 22, 2008.

IPEC License Renewal Implementation Project	IP-RPT-11-LRD13 Revision 0 Page 8 of 23
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation	

3.0 Commitments and License Action Requests (LAR)

LO-LAR-2011-0174 CA 4 License Renewal Commitment # 6

1) 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.

2) Maintain the Fatigue Monitoring program during the Period of Extended Operations as described in the LRA sections A.2.1.11, A.3.1.11, B.1.12, and the current NRC commitment list. Program documents shall be revised or generated that ensures the program will be maintained during the PEO before closing this corrective action.

LO-LAR-2011-0174 CA 23&24 License Renewal Commitment # 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), under the Fatigue Monitoring Program, IP2 and IP3 will implement one or more of the following:

(1) Consistent with the Fatigue Monitoring Program, Detection of Aging Effects, update the fatigue usage calculations using refined fatigue analyses to determine valid CUFs less than 1.0 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 in LRA Table 4.3-13 (IP2) and LRA Table 4.3-14 (IP3), with existing fatigue analysis valid for the period of extended operation, use the existing CUF.
2. Additional 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) Consistent with the Fatigue Monitoring Program, Corrective Actions, repair or replace the affected locations before exceeding a CUF of 1.0.

LO-LAR-2011-0174 CA 62 License Renewal Commitment # 43

IPEC will review design basis ASME Code Class 1 fatigue evaluations to determine whether the NUREG/CR-6260 locations that have been evaluated for the effects of the reactor coolant environment on fatigue usage are the limiting locations for the IP2 and IP3 configurations. If more limiting locations are identified, the most limiting location will be evaluated for the effects of the reactor coolant environment on fatigue usage.

IPEC will use the NUREG/CR-6909 methodology in the evaluation of the limiting locations consisting of nickel alloy, if any.

LO-LAR-2011-0174 CA 63 License Renewal Commitment # 44

IPEC will include written explanation and justification of any user intervention in future evaluations using the WESTEMS "Design CUF" module.

IPEC License Renewal Implementation Project	IP-RPT-11-LRD13 Revision 0 Page 9 of 23
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation	

Program documents shall be revised or generated that ensures the program will be maintained during the PEO before closing this corrective action.

LO-LAR-2011-0174 CA 64 License Renewal Commitment # 45

IPEC will not use the NB-3600 option of the WESTEMS program in future design calculations until the issues identified during the NRC review of the program have been resolved.

Program documents shall be revised or generated that ensures the program will be maintained during the PEO before closing this corrective action.

License renewal commitments are included in LR submittal correspondence from Entergy to NRC NL-11-101 (**Ref. 9**). These commitments and additional actions are identified in LO-LAR-2011-0174 (**Ref. 8**).

Commitments in LO-LAR-2011-0174 Corrective Actions (**Ref. 8**) are located on the shared drive in the Indian Point implementation folder Z:\License Renewal Implementation\Indian Point Implementation\Implementation Template. Commitments requiring completion prior to the PEO are to be implemented prior to September 28, 2013 for Unit 2 and prior to December 12, 2015 for Unit 3.

IPEC License Renewal Implementation Project	IP-RPT-11-LRD13 Revision 0 Page 10 of 23
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation	

4.0 Commitment/Program Requirements and Program Status

The Fatigue Monitoring Program is an existing program that tracks the number of critical thermal and pressure transients for selected reactor coolant system components. The program ensures the validity of analyses that explicitly analyzed a specified number of fatigue transients by assuring that the actual effective number of transients does not exceed the analyzed number of transients.

When the LRA was submitted, this program did not include the review of environmental assisted fatigue (EAF). To resolve NRC concerns raised during the LRA review, NL-08-021 credited the program with “managing effects of reactor water environment on fatigue life”. Commitment #33 was revised in NL-08-021 to evaluate the effects of reactor water environment on fatigue for six NUREG-6260 locations identified in the LRA and committed that the pressurizer lower shell would be reviewed to ensure the surge nozzle remains the limiting component. Following this submittal, the NRC determined that an *additional* evaluation was required to determine if these NUREG-6260 locations were the limiting locations present in the RCS. This is captured in Commitment #43 which requires additional analysis prior to the PEO.

As a result of these and other reviews, NRC concerns with the use of specific WESTEMS features were identified that required the site to commit to specific requirements related to the use of the features in future design calculations until the issues identified during the NRC review of the program have been resolved. Commitments #44 and #45 provide the requirements on using these features until the concerns have been resolved.

This program is credited in the following:

- IP-RPT-06-LRD03, TLAA and Exemption Evaluation Results
- IP-RPT-06-LRD04, TLAA – Mechanical Fatigue

The following are program requirements from the source documents (that are not identified as a commitment) and their current status. Commitments follow the requirements.

1. Maintaining the fatigue usage factor below the design code limit and considering the effect of the reactor water environment, as described under the program description, will provide adequate margin against fatigue cracking of reactor coolant system components due to anticipated cyclic strains.

Status

By tracking the cycles and maintaining them below the analyzed values, the CUFs are assured to remain below 1.

Originally this program did not include the review of environmental assisted fatigue (EAF). NL-08-021 credited the program with “managing effects of reactor water environment on fatigue life”. Commitment #33 was revised in NL-08-021 to evaluate the effects of reactor water environment on fatigue for six NUREG-6260 locations identified in the LRA and committed that the pressurizer lower shell would be reviewed to ensure the surge nozzle remains the limiting component.

Calculations WCAP 17149-P and WCAP 17162-P were prepared by Westinghouse for the pressurizer surge nozzle evaluations. Calculations WCAP-17199 and WCAP-17200

IPEC License Renewal Implementation Project	IP-RPT-11-LRD13 Revision 0 Page 11 of 23
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation	

were prepared by Westinghouse for the EAF review of the six NUREG- 6260 locations. Letter NL-10-082 notified the NRC that this commitment had been completed.

Following this submittal, the NRC determined that an additional evaluation was required to determine if these NUREG-6260 locations were the limiting locations present in the RCS. This is captured in Commitment #43 which requires reanalysis prior to the PEO.

Action

After the program procedures are updated to track the additional IP3 transients and final EAF evaluation of bounding locations and allowable cycles is completed and the procedures are updated, the program will meet this requirement.

2. The program monitors all plant transients that cause cyclic strains, which are significant contributors to the fatigue usage factor. The number of plant transients that cause significant fatigue usage for each critical reactor coolant pressure boundary component is to be monitored. Alternatively, more detailed local monitoring of the plant transient may be used to compute the actual fatigue usage for each transient.

Status

IP2 program tracks the required cycles in 2-PT-2Y015 but the IP3 program in 3-PT-M051 does not list all transients. Westinghouse prepared a report with the additional IP3 transients that required tracking. The program documentation has not been revised to include the additional transients identified by Westinghouse for IP3.

Action

After the final EAF evaluation of bounding locations (Westinghouse calculation) is completed and the program procedures are updated, the program will meet this requirement.

3. The program provides for periodic update of the fatigue usage calculations.

Status

The IPEC program monitors plant operating transient cycles on IP2 and IP3 in procedures 2-PT-2Y015 and 3-PT-M051. While the accumulated cycles remain less than the analyzed design cycles, the reactor coolant system components remain bounded by the current fatigue usage calculations. When the accumulated cycles approach the analyzed design cycles, corrective action is required to ensure the design cycle limit is not exceeded. An engineering evaluation is performed prior to exceeding a CUF of 1.0 and constitutes periodic updates to fatigue usage calculations.

Action

No additional action is required.

4. The program monitors a sample of high fatigue usage locations. This sample is to include the locations identified in NUREG/CR-6260, as minimum, or propose alternatives based on plant configuration.

Status

The Fatigue Monitoring Program monitors the number of transient cycles and periodically compares this cycle count with the analyzed number of design cycles to ensure that the fatigue sensitive components remain within their allowable design. Monitoring the cycle count according to the Fatigue Monitoring Program will ensure that the number of cycles are maintained within their design limits and tracked to identify when action is required.

IPEC License Renewal Implementation Project	IP-RPT-11-LRD13 Revision 0 Page 12 of 23
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation	

Action

After the EAF bounding locations calculations are completed, the fatigue monitoring program should be reviewed to ensure the limiting number of cycles reflects the cycles used in the EAF analyses.

5. The acceptance criteria involves maintaining the fatigue usage below the design code limit considering environmental fatigue effects as described under the program description.

Status

The current limits in 2-PT-2Y015 and 3-PT-M051 do not reflect the reduced number of cycles used in the EAF analyses.

Action

Complete EAF analyses for the bounding locations to determine the limiting number of cycles. These cycles then need to be added to the program documents 2-PT-2Y015 and 3-PT-M051.

Specific Commitment or LAR Actions Status

LO-LAR-2011-0174 CA 4 License Renewal Commitment # 6

1) 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.

2) Maintain the Fatigue Monitoring program during the Period of Extended Operations as described in the LRA sections A.2.1.11, A.3.1.11, B.1.12, and the current NRC commitment list. Program documents shall be revised or generated that ensures the program will be maintained during the PEO before closing this corrective action.

IP2 Status

IP-2 In a telecom on 10/23/2011 with Nelson Azevedo it was determined no action has yet been taken for this commitment.

IP2 Action

1. Site to contract with Westinghouse to determine feedwater transients for IP2. The IP2 procedure 2-PT-2Y15 (**Ref. 12**) will then be modified to reflect necessary transients. A completion date of September 30, 2012 was suggested for this activity.
2. The review of the IP2 procedure 2-PT-2Y015 should include applicable results of the new calculation (WCAP-16898-P **Ref. 19**) that was generated to identify the IPEC Unit 3 design transients.

IP-3 Status

Calculation (WCAP-16898-P **Ref. 19**) has been generated to identify the IPEC Unit 3 design transients and project the rate of occurrence to verify adequate cycles for 60 years of operation.

IPEC License Renewal Implementation Project	IP-RPT-11-LRD13 Revision 0 Page 13 of 23
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation	

IP3 Action

The IP3 procedure 3-PT-M051 (Ref. 11 or its replacement) needs to be revised to reflect the results of this analysis.

LO-LAR-2011-0174 CA 23&24 License Renewal Commitment # 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), under the Fatigue Monitoring Program, IP2 and IP3 will implement one or more of the following:

(1) Consistent with the Fatigue Monitoring Program, Detection of Aging Effects, update the fatigue usage calculations using refined fatigue analyses to determine valid CUFs less than 1.0 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 in LRA Table 4.3-13 (IP2) and LRA Table 4.3-14 (IP3), with existing fatigue analysis valid for the period of extended operation, use the existing CUF.
2. Additional 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) Consistent with the Fatigue Monitoring Program, Corrective Actions, repair or replace the affected locations before exceeding a CUF of 1.0.

Status

New calculations WCAP 17149-P and WCAP 17162-P have been completed by Westinghouse for the pressurizer surge nozzle evaluations. (Ref. 13, 14) Calculations WCAP-17199 and WCAP-17200 have been completed by Westinghouse for the EAF review of the six NUREG- 6260 locations. (Ref. 15, 16) Letter NL-10-082 notified the NRC that this commitment had been completed. (Ref. 18)

Action

Revise site procedures 2-PT-2Y15 and 3-PT-M051 to reflect the reduced number of cycles (projected values) used in the EAF analyses (WCAP-17199P and WCAP-17200P as described in conclusions 2 and 3 in section 6).

LO-LAR-2011-0174 CA 62 License Renewal Commitment # 43

IPEC will review design basis ASME Code Class 1 fatigue evaluations to determine whether the NUREG/CR-6260 locations that have been evaluated for the effects of the reactor coolant environment on fatigue usage are the limiting locations for the IP2 and IP3 configurations. If more limiting locations are identified, the most limiting location will be evaluated for the effects of the reactor coolant environment on fatigue usage.

IPEC will use the NUREG/CR-6909 methodology in the evaluation of the limiting locations consisting of nickel alloy, if any.

Status

The contract has been issued and the review is on-going. (Ref. 17)

IPEC License Renewal Implementation Project	IP-RPT-11-LRD13 Revision 0 Page 14 of 23
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation	

Action

1. Site to obtain funding and provide contract to Westinghouse to begin review
2. Site to determine scope of remaining work and issue contracts to complete analyses as necessary.

LO-LAR-2011-0174 CA 63 License Renewal Commitment # 44

IPEC will include written explanation and justification of any user intervention in future evaluations using the WESTEMS "Design CUF" module.

Program documents shall be revised or generated that ensures the program will be maintained during the PEO before closing this corrective action.

Status

No action has been taken.

Action

This needs to be added to the IPEC Licensing Commitment Database to ensure that it is captured during the PAD review required for new calculations. Procedure 2-PT-2Y15 (**Ref. 12**) and procedure 3-PT-M051 (**Ref. 11** or its replacement) need to be revised to reflect the commitment.

LO-LAR-2011-0174 CA 64 License Renewal Commitment # 45

IPEC will not use the NB-3600 option of the WESTEMS program in future design calculations until the issues identified during the NRC review of the program have been resolved.

Program documents shall be revised or generated that ensures the program will be maintained during the PEO before closing this corrective action.

Status

No action has been taken.

Action

This needs to be added to the IPEC Licensing Commitment Database to ensure that it is captured during the PAD review required for new calculations. Procedure 2-PT-2Y15 (**Ref. 12**) and procedure 3-PT-M051 (**Ref. 11** or its replacement) need to be revised to reflect the commitment.

IPEC License Renewal Implementation Project	IP-RPT-11-LRD13 Revision 0 Page 15 of 23
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation	

5.0 Site Program Owner/Lead

Nelson Azevedo is the lead and supervisor for this activity for IP2 and IP3.

IPEC License Renewal Implementation Project		IP-RPT-11-LRD13
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation		Revision 0 Page 16 of 23

Attachment 1: License Renewal Fatigue Monitoring Program Implementation Action Tracking

Commitments and Program Requirements	Commitment / Program Requirement Status	Affected Procedure(s) (or other documentation)	Recommended Action(s) and Completion Date	Action Status/ Date
1. Maintaining the fatigue usage factor below the design code limit and considering the effect of the reactor water environment, as described under the program description, will provide adequate margin against fatigue cracking of reactor coolant system components due to anticipated cyclic strains.	<p>By tracking the cycles and maintaining them below the analyzed values, the CUFs are assured to remain below 1.</p> <p>When the LRA was submitted, this program did not include the review of environmental assisted fatigue (EAF). NL-08-021 credited the program with "managing effects of reactor water environment on fatigue life". Commitment #33 was revised in NL-08-021 to evaluate the effects reactor water environment on fatigue for six NUREG-6260 locations identified in the LRA and committed that the pressurizer lower shell would be reviewed to ensure the surge nozzle remains the limiting component.</p> <p>Calculations WCAP 17149-P and WCAP 17162-P were prepared by Westinghouse for the pressurizer surge nozzle evaluations. Calculations WCAP-17199 and WCAP-17200 were prepared by Westinghouse for the EAF review of the six NUREG- 6260 locations. Letter NL-10-082 notified the NRC that this commitment had been</p>	<p>2-PT-2Y015 3-PT-M051 or its replacement</p>	<p>After the program procedures are updated to track the additional IP3 transients and final EAF evaluation of bounding locations and allowable cycles is completed and the procedures are updated, the program will meet this requirement.</p> <p>Prior to September 28, 2013 for Unit 2 and December 12, 2015 for Unit 3.</p>	

IPEC License Renewal Implementation Project		IP-RPT-11-LRD13 Revision 0 Page 17 of 23
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation		

Commitments and Program Requirements	Commitment / Program Requirement Status	Affected Procedure(s) (or other documentation)	Recommended Action(s) and Completion Date	Action Status/ Date
2. The program monitors all plant transients that cause cyclic strains, which are significant contributors to the fatigue usage factor. The number of plant transients that cause significant fatigue usage for each critical reactor coolant pressure boundary component is to be monitored. Alternatively, more detailed local monitoring of the plant transient may be used to compute the actual fatigue usage for each transient.	completed. IP2 program tracks the required cycles in 2-PT-2Y015 but the IP3 program in 3-PT-M051 does not list all transients. Westinghouse prepared a report with the additional IP3 transients that required tracking. The program documentation has not been revised to include the additional transients identified by Westinghouse for IP3.	2-PT-2Y015 3-PT-M051 or its replacement	After the final EAF evaluation of bounding locations (Westinghouse calculation) is completed and the program procedures are updated, the program will meet this requirement. See commitment 43 below for details. Prior to September 28, 2013 for Unit 2 and December 12, 2015 for Unit 3.	
3. The program provides for periodic update of the fatigue usage calculations.	The IPEC program monitors plant operating transient cycles on IP2 and IP3 in procedures 2-PT-2Y015 and 3-PT-M051. While the accumulated cycles remain less than the analyzed design cycles, the reactor coolant system components remain bounded by the current fatigue usage calculations. When the accumulated cycles approach the analyzed design cycles, corrective action is required to ensure the design cycle limit is not exceeded. An engineering evaluation is performed	2-PT-2Y015 3-PT-M051 or its replacement	No additional action is required.	

IPEC License Renewal Implementation Project		IP-RPT-11-LRD13
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation		Revision 0 Page 18 of 23

Commitments and Program Requirements	Commitment / Program Requirement Status	Affected Procedure(s) (or other documentation)	Recommended Action(s) and Completion Date	Action Status/ Date
	prior to exceeding a CUF of 1.0 and constitutes periodic updates to fatigue usage calculations.			
4. The program monitors a sample of high fatigue usage locations. This sample is to include the locations identified in NUREG/CR-6260, as minimum, or propose alternatives based on plant configuration.	The Fatigue Monitoring Program monitors the number of transient cycles and periodically compares this cycle count with the analyzed number of design cycles to ensure that the fatigue sensitive components remain within their allowable design. Monitoring the cycle count according to the Fatigue Monitoring Program will ensure that the number of cycles are maintained within their design limits and tracked to identify when action is required.	2-PT-2Y015 3-PT-M051 or its replacement	After the EAF bounding locations calculations are completed, the fatigue monitoring program should be reviewed to ensure the limiting number of cycles reflects the cycles used in the EAF analyses. Prior to September 28, 2013 for Unit 2 and December 12, 2015 for Unit 3.	
5. The acceptance criteria involves maintaining the fatigue usage below the design code limit considering environmental fatigue effects as described under the program description.	The current limits in 2-PT-2Y015 and 3-PT-M051 do not reflect the reduced number of cycles used in the EAF analyses.	2-PT-2Y015 3-PT-M051 or its replacement	Complete EAF analyses for the bounding locations to determine the limiting number of cycles. These cycles then need to be added to the program documents 2-PT-2Y015 and 3-PT-M051. Prior to September 28, 2013 for Unit 2 and December 12, 2015 for Unit 3.	
LO-LAR-2011-0174 CA 4 License Renewal Commitment #	IP2- In a telecom on 10/23/2011 with Nelson	2-PT-2Y015 3-PT-M051 or its	IP2- 1. Site to contract with	

IPEC License Renewal Implementation Project		IP-RPT-11-LRD13
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation		Revision 0 Page 19 of 23

Commitments and Program Requirements	Commitment / Program Requirement Status	Affected Procedure(s) (or other documentation)	Recommended Action(s) and Completion Date	Action Status/ Date
<p>6</p> <p>1) 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.</p> <p>2) Maintain the Fatigue Monitoring program during the Period of Extended Operations as described in the LRA sections A.2.1.11, A.3.1.11, B.1.12, and the current NRC commitment list. Program documents shall be revised or generated that ensures the program will be maintained during the PEO before closing</p>	<p>Azevedo it was determined for IP2 no action has yet been taken for this commitment.</p> <p>IP3- A new calculation (WCAP-16898-P Ref. 19) was generated to identify the IPEC Unit 3 design transients and project the rate of occurrence to verify adequate cycles for 60 years of operation.</p>	<p>replacement</p>	<p>Westinghouse to determine feedwater transients for IP2. The IP2 procedure 2-PT-2Y15 (Ref. 12) will then be modified to reflect necessary transients. A completion date of December 31, 2012 is recommended for this activity.</p> <p>2. The review of the IP2 procedure 2-PT-2Y015 should include applicable results of the new calculation (WCAP-16898-P Ref. 19) that was generated to identify the IPEC Unit 3 design transients.</p> <p>IP-3 The IP3 procedure 3-PT-M051 (Ref. 11 or its replacement) needs to be modified to reflect the results of WCAP-16898-P (Ref. 19).</p> <p>When the procedures are updated, they should also be revised to reflect this will be maintained in the PEO as identified in item 2.</p>	

IPEC License Renewal Implementation Project		IP-RPT-11-LRD13
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation		Revision 0 Page 20 of 23

Commitments and Program Requirements	Commitment / Program Requirement Status	Affected Procedure(s) (or other documentation)	Recommended Action(s) and Completion Date	Action Status/ Date
this corrective action.			A completion date of December 31, 2012 is recommended for these activities. Update affected procedures to include reference to LO-LAR-2011-0174 CA 4.	
LO-LAR-2011-0174 CA 23& 24 License Renewal Commitment # 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), under the Fatigue Monitoring Program, IP2 and IP3 will implement one or more of the following: (1) Consistent with the Fatigue Monitoring Program, Detection of Aging Effects, update the fatigue usage calculations using refined fatigue analyses to determine valid CUFs less than 1.0 when accounting for the effects of reactor water environment. This includes applying the appropriate Fen factors to valid CUFs determined in accordance with	New calculations WCAP 17149-P and WCAP 17162-P have been completed by Westinghouse for the pressurizer surge nozzle evaluations. (Ref. 13, 14) Calculations WCAP-17199 and WCAP-17200 have been completed by Westinghouse for the EAF review of the six NUREG- 6260 locations. (Ref. 15, 16) Letter NL-10-082 notified the NRC that this commitment had been completed. (Ref. 18)	2-PT-2Y015 3-PT-M051 or its replacement	Revise site procedures 2-PT-2Y15 and 3-PT-M051 to reflect the reduced number of cycles (projected values) used in the EAF analyses (WCAP-17199P and WCAP-17200P as described in conclusions 2 and 3 in section 6). Prior to September 28, 2013 for Unit 2 and December 12, 2015 for Unit 3.	

IPEC License Renewal Implementation Project		IP-RPT-11-LRD13
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation		Revision 0 Page 21 of 23

Commitments and Program Requirements	Commitment / Program Requirement Status	Affected Procedure(s) (or other documentation)	Recommended Action(s) and Completion Date	Action Status/ Date
<p>one of the following:</p> <ol style="list-style-type: none"> For locations in LRA Table 4.3-13 (IP2) and LRA Table 4.3-14 (IP3), with existing fatigue analysis valid for the period of extended operation, use the existing CUF. Additional 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. Representative CUF values from other plants, adjusted to or enveloping the IPEC plant specific external loads may be used if demonstrated applicable to IPEC. 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. Consistent with the Fatigue Monitoring Program, Corrective Actions, repair or replace the 				

IPEC License Renewal Implementation Project		IP-RPT-11-LRD13 Revision 0 Page 22 of 23
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation		

Commitments and Program Requirements	Commitment / Program Requirement Status	Affected Procedure(s) (or other documentation)	Recommended Action(s) and Completion Date	Action Status/ Date
affected locations before exceeding a CUF of 1.0.				
LO-LAR-2011-0174 CA 62 License Renewal Commitment # 43 IPEC will review design basis ASME Code Class 1 fatigue evaluations to determine whether the NUREG/CR-6260 locations that have been evaluated for the effects of the reactor coolant environment on fatigue usage are the limiting locations for the IP2 and IP3 configurations. If more limiting locations are identified, the most limiting location will be evaluated for the effects of the reactor coolant environment on fatigue usage. IPEC will use the NUREG/CR-6909 methodology in the evaluation of the limiting locations consisting of nickel alloy, if any.	Contract has been issued and the review is ongoing (Ref. 17)	New calculation to be generated	Site to determine scope of remaining work and issue contracts to complete analyses as necessary. Prior to September 28, 2013 for Unit 2 and December 12, 2015 for Unit 3.	
LO-LAR-2011-0174 CA 63 License Renewal Commitment # 44 IPEC will include written explanation and justification of	No action has been taken.	Licensing Commitment Database and 2-PT-2Y15 3-PT-M051 or its	This commitment needs to be added to the Licensing Commitment Database, procedure 2-PT-2Y15 (Ref. 12) and procedure 3-PT-	

IPEC License Renewal Implementation Project		IP-RPT-11-LRD13
Review of the Fatigue Monitoring Aging Management Program for License Renewal Implementation		Revision 0 Page 23 of 23

Commitments and Program Requirements	Commitment / Program Requirement Status	Affected Procedure(s) (or other documentation)	Recommended Action(s) and Completion Date	Action Status/ Date
any user intervention in future evaluations using the WESTEMS "Design CUF" module. Program documents shall be revised or generated that ensures the program will be maintained during the PEO before closing this corrective action.		replacement	M051 (Ref. 11 or its replacement) to reflect the limitation. Prior to September 28, 2013 for Unit 2 and December 12, 2015 for Unit 3.	
LO-LAR-2011-0174 CA 64 License Renewal Commitment # 45 IPEC will not use the NB-3600 option of the WESTEMS program in future design calculations until the issues identified during the NRC review of the program have been resolved. Program documents shall be revised or generated that ensures the program will be maintained during the PEO before closing this corrective action.	No action has been taken.	Licensing Commitment Database and 2-PT-2Y15 3-PT-M051 or its replacement	This commitment needs to be added to the Licensing Commitment Database, procedure 2-PT-2Y15 (Ref. 12) and procedure 3-PT-M051 (Ref. 11 or its replacement) to reflect the limitation. Prior to September 28, 2013 for Unit 2 and December 12, 2015 for Unit 3.	