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CP-201500244
TXX-15032

Ref. # 10CFR50.55a(z)(1)

March 4, 2015

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

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT
DOCKET NO. 50-446
RELIEF REQUEST 2A3-1 FOR UNIT 2 INSERVICE INSPECTION FOR APPLICATION OF AN ALTERNATIVE TO THE ASME BOILER AND PRESSURE VESSEL CODE SECTION XI EXAMINATION REQUIREMENTS FOR CLASS 1 AND 2 PIPING WELDS (2007 EDITION OF ASME CODE, SECTION XI, 2008 ADDENDA
THIRD INTERVAL START DATE: AUGUST 3, 2014
THIRD INTERVAL END DATE: AUGUST 2, 2023)

Dear Sir or Madam:

Pursuant to 10 CFR 50.55a(z)(1i), Luminant Generation Company, LLC (Luminant Power) is submitting Relief Request 2A3-1 (see attachment) for Comanche Peak Unit 2 for the third ten year inservice inspection interval. Luminant Power is requesting the continued use of a risk-informed process as an alternative for the selection of Class 1 and Class 2 piping welds for examination. The alternative process provides an acceptable level of quality and safety as determined by the attached Probabilistic Risk Assessment model.

Luminant Power requests approval of this relief request by September 30, 2015, to support the upcoming CPNPP Unit 2 refueling outage.

This communication contains no new licensing basis commitments regarding Comanche Peak Unit 2. Should you have any questions, please contact Mr. Jack Hicks at (254) 897-6725.

Sincerely,

Luminant Generation Company LLC

Rafael Flores

By: [signature]
Fred W. Madden
Director, External Affairs

A047
NRR

Attachment – Relief Request 2A3-1 for Risk-Informed Inservice Inspection of Piping Welds

c - Marc L. Dapas, Region IV
Balwant K. Singal, NRR
Resident Inspectors, Comanche Peak
Robert Free, TDLR
Jack Ballard, ANII, Comanche Peak

COMANCHE PEAK NUCLEAR POWER PLANT UNIT 2
Relief Request Number 2A3-1
Proposed Alternative In Accordance with 10CFR50.55a (z)(1)
(Third 10-Year ISI Interval Start Date: August 3, 2014)

ASME Code Components Affected

Class 1 and Class 2 Piping Welds

Applicable Code and Edition

The CPNPP Unit 2 ISI program is based on the 2007 Edition of ASME Section XI with the 2008 Addenda.

Applicable Code Requirement

Table IWB-2500-1, Examination Category B-F and Category B-J
Table IWC-2500-1, Examination Category C-F-1 and Category C-F-2

Reason For Request

The continued use of a Risk-Informed process as an alternative for the selection of Class 1 and Class 2 Piping Welds for examination is requested.

Proposed Alternative and Basis for Use

As an alternative to the Code Requirement, a Risk-Informed process will continue to be used for selection of Class 1 and Class 2 Piping Welds for examination.

The CPNPP Unit 2 ISI program for the examination of Class 1 and Class 2 piping welds is currently in accordance with a risk-informed process submitted December 15, 2005. NRC approved this request on October 5, 2006 (Accession Numbers ML053630046 and ML062750371). In the previous submittal, TXU Electric committed to review and adjust the risk ranking of piping segments as a minimum on an ASME period basis. To satisfy the periodic review requirements, evaluations and updates were performed after each period in accordance with the Nuclear Energy Institute document 04-05, "Living Program Guidance To Maintain Risk-Informed Inservice Inspection Programs For Nuclear Plant Piping Systems", published April, 2004. These Evaluations and Updates were documented in calculations CPSE-002-C02, CPSE-002-C04, CPSE-007-C01, CPSE-007-C02, CPSE-010-C01, and CPSE-010-C02. The updated program resulting from these reviews is the subject of this proposed alternative.

In accordance with the guidance provided by NEI 04-05, a table is provided identifying the number of welds added to and deleted from the previously approved RI-ISI program. The changes from the previous program are attributable to the specific issues identified in each review.

During the review after the First Period, the following issues were identified:

1. The Comanche Peak probabilistic risk assessment (PRA) model used to evaluate the consequences of pipe rupture for the previous RI-ISI update was Revision 3B dated May 2005. For that model, the Core Damage Frequency (CDF) was 1.107E-05 and Large Early Release Frequency (LERF) was 6.308E-7. Maximum CCDP used as the Upper Bound in the Risk Impact Analysis was 7.52E-03 associated with a Large LOCA Initiating Event. The PRA Model of Record at the end of the First Period was Revision 3C dated June 2007. CDF was 9.782E-06 and LERF was 6.23E-07. Maximum CCDP used as the Upper Bound in the Risk Impact Analysis changed to 1.92E-02 associated with a Loss of RWST. Consequence segments 2-CT03A, 2-CT03B, 2-CT04A, 2-CT04B, 2-CT05A, and 2-CT05B changed consequence rank from Medium to High. Consequence segment 2-CT07 changed consequence rank from Low to Medium. Consequence segment 2-CVCS09 changed consequence rank from Medium to High. Consequence segments 2-SI01 and 2-SI02 changed consequence rank from High to Low. As a result of these changes, ten Risk Segments changed from a risk rank of Low to a risk rank of Medium, five Risk Segments changed from a risk rank of Medium to a risk rank of Low, and nine Risk Segments changed from Risk Category 7a to Risk Category 6a, but remained risk rank Low. As a result of the PRA update, 10 previously selected welds were no longer required to be examined; however, it was decided to continue to examine them to address Class 1 selection percentage criteria.
2. Welds inspected under the Primary Water Stress Corrosion Cracking Augmented Program were designated with (PWSCC) as an augmented degradation mechanism in the Risk Ranking, and the Failure Potential Rank and Risk Rank modified accordingly.
3. Weld numbers changed as a result of MRP-139 mitigative actions were updated in the Risk Ranking.
4. Five existing welds were removed and eight new welds were added as a result of replacing existing MOVs 2-HV-4758 and 2-HV-4759 with new valves 2-CT-0024 and 2-CT-0076.
5. When determining the number of elements required to be inspected, it was realized that the previous number of welds added to assure selection of 10% of all Class 1 butt welds had inadvertently been based on the total number of Class 1 welds, including socket welds. The number of Class 1 welds selected was adjusted to reflect approximately 10% of Class 1 butt welds only.
6. During the walkdown in preparation for element selection, it was discovered that 28 welds added by a modification in 1989 during unit startup were never reflected in the ISI Location Isometrics (Weld Sketches). This omission was reported in the CPSES Corrective Action Program (SMF). These welds were proactively added to the RI-ISI program. The affected segments (CVCS-018 and CVCS-021) were Category 6a, so no adjustment to the element selection was required.

During the review after the Second Period the following issues were identified:

1. The Comanche Peak probabilistic risk assessment (PRA) model used to evaluate the consequences of pipe rupture for the previous RI-ISI update was Revision 3C dated June 2007. Core Damage Frequency (CDF) was 9.782E-06 and Large Early Release Frequency (LERF) was 6.23E-07. Maximum CCDP used as the Upper Bound in the Risk Impact Analysis was 1.92E-02 associated with a Loss of RWST. Maximum CLERP was 7.43E-04. The PRA Model of Record at the end of the Second Period was Revision 4A dated July 2011. The CDF was 2.82E-06 and LERF was 2.06E-07. Maximum CCDP used as the Upper Bound in the Risk Impact Analysis was 1.87E-03 associated with a Large Break LOCAs. Maximum CLERP was 1.65E-03 associated with a shutdown LOCA in containment. Two Consequence Segments changed consequence rank from Low to Medium. Four Consequence Segments changed consequence rank from High to Low. Nineteen Consequence Segments changed consequence rank from High to Medium. Twenty Consequence Segments changed consequence rank from Medium to Low.

As a result of these changes, twenty Risk Segments changed from a Risk Rank of Low (High) to a Risk Rank of Low (Medium), twelve Risk Segments changed from a Risk Rank of Medium (High) to a Risk Rank of Low (Medium), thirty-two Risk Segments changed from a Risk Rank of Medium to a Risk Rank of Low, and sixty eight Risk Segments changed from Risk Category 6a to Risk Category 7a or Risk Category 7a to Risk Category 6a, but remained Risk Rank Low. Forty four Risk Segments containing 651 welds reduced from Medium Risk Rank to Low Risk Rank, including 67 welds previously selected for examination. Eighty eight Risk Segments changed Risk Category, but remained Low Risk Rank. As a result of the decrease in Risk Rank, the number of required selections decreased from 150 to 62; however, 19 Class 1 selections were retained to maintain the appropriate percentage of Class 1 welds selected for inspection. The number of High Risk Rank elements remained 31. The number of Low Risk Rank elements increased from 2045 to 2664. The number of Medium Risk Rank elements decreased from 1162 to 533. The number of elements selected for inspection decreased from 150 to 81.

2. Based on implementation of ASME Code Case N-770-1, "Alternative Examination Requirements and Acceptance Standards for Class 1 PWR Piping and Vessel Nozzle Butt Welds Fabricated with UNS N06082 or UNS W86182 Weld Filler Material with or without Application of Listed Mitigation Activities," per paragraphs (g)(6)(ii)(F)(2) through (g)(6)(ii)(F)(10) of 10 CFR 50.55a, the Risk Ranking, Element Selection, and Risk Impact Analysis were changed to reflect the inspection of PWSCC under the Code Case, with the applicable welds removed from the RI-ISI Element Selection process. This resulted in no welds being selected for RI-ISI examination that are examined per Code Case N-770-1.
3. During the Second Period, the Risk Ranking Report was re-formatted to show a single weld per line, rather than multiple sketches, lines, and welds per segment. The re-formatted Report was then compared to the CPNPP ISI weld database (ISIC) and any discrepancies reconciled.
4. FDA-2008-001609-02-00 replaced existing valve 2-SI-8819D. As a result of this replacement six existing welds were removed and replaced.

During the review after the Third Period the following issues were identified:

1. The Comanche Peak probabilistic risk assessment (PRA) model used to evaluate the consequences of pipe rupture for the previous RI-ISI update was Revision 4A dated July 2011. For this model the total CDF was 2.82E-06 and the total LERF was 2.06E-07. Maximum CCDP used as the Upper Bound in the Risk Impact Analysis was 1.87E-03 and Max CLERP was 1.65E-03. The PRA Model of Record at the end of the Third Period is Revision 4B dated June 2013. For this model the total CDF is 3.77E-06 and the total LERF is 2.54E-07. Maximum CCDP used as the Upper Bound in the Risk Impact Analysis was 1.98E-03, associated with a Large LOCA, and Max CLERP was 1.65E-03, associated with a Shutdown LOCA Inside Containment. There were no changes in consequence ranks, so the Risk Ranking and Element Selection were unchanged. The Risk Impact Analysis was updated to reflect the change in maximum CCDP from 1.87E-03 to 1.98E-03.
2. During the initial RI-ISI application, one of the criteria for selecting piping welds for examination is that the weld is inspectable. However, during application it is common to find that a selected weld is not fully accessible or has issues resulting in limited examination coverage. In these instances, other welds may be selected to replace the initial selections. Typically these replacement welds are in the same Risk Group to ensure a "like-for-like" examination. During the RI-ISI evaluation for the Third Period of the Second Interval, two such re-selections from the Second Period were discovered that were previously undocumented. They were as follows:
   A) Weld TCX-1-4304-24 was not fully accessible and the selection was replaced by weld TCX-1-4504-12. Subsequently, weld TCX-1-4504-12 was also found to have examination coverage issues and the selection was replaced by weld TCX-1-4504-11.
   B) Weld TCX-1-4109-5 was not fully accessible and the selection was replaced by weld TCX-1-4109-10.

3. During the Second Period, weld TCX-1-4102-12 was dropped from a Risk Category 6a to Risk Category 7a. It was initially retained as a selection in order to increase the number of Class 1 welds that are being examined. During the Third Interval, this selection was reconsidered and ultimately dropped as a selection due to the fact that it is a Risk Category 7a weld which has a negligible impact on the overall risk captured by the examination.

All issues identified in the Periodic Reviews have been incorporated into the Risk Ranking, Summary, and Matrix. A new Risk Impact Analysis was performed, and the revised program continues to represent a risk reduction when compared to the last deterministic Section XI inspection program. The previous program represented a reduction in overall risk of 6.91E-09 in regards to CDF and 4.26E-09 in regards to LERF, while the revised program represents a reduction in overall risk of 1.74E-09 in regards to CDF and 1.39E-09 in regards to LERF. These smaller reductions in overall risk are due primarily to a decreased Upper Bound CDF and LERF in the revised PRA. The CDF Upper Bound dropped from 7.52E-03 to 1.98E-03, and the LERF Upper Bound dropped from 4.70E-03 to 1.65E-03.

The Risk-Informed process continues to provide an adequate level of quality and safety for selection of the Class 1 and Class 2 Piping Welds for examination. Therefore, pursuant to 10CFR50.55a(z)(1) it is requested that the proposed alternative be authorized.

Duration of Proposed Alternative

The alternative will be used for CPNPP Unit 2 until the end of that unit's third ten-year ISI program inspection interval, subject to the review and update guidance of NEI 04-05. The third inspection interval is currently scheduled to end August 2, 2023.

CPNPP Unit 2 - Inspection Location Selection Comparison Between Previous (Interval 2) Approved and Revised (Interval 3) RI-ISI Program by Risk Category												
System[1]	Risk		Consequence Rank	Failure Potential		Code Category	Previous (Interval 2)			Updated (Interval 3)		
	Category[6]	Rank[6]		DMs[6]	Rank[6]		Weld Count	RI-ISI	Other[2]	Weld Count	RI-ISI	Other[2]
RCS	2	High	High	TASCS, TT	Medium	B-J	6	2		6	2	
RCS	2	High	High	TASCS	Medium	B-J	13	6		13	6	
RCS	2	High	High	TT	Medium	B-J	11	1		11	0	
RCS	2 (2)	High (High)	High	TT (PWSCC)	Medium (Medium)	B-F	1	0		1	0	
RCS	4	Medium	High	None	Low	B-F	8	4		8	4	
						B-J	193	26		193	26[3]	
RCS	4 (2)	Medium (High)	High	None (PWSCC)	Low (Medium)	B-F	12	10		12	0	
RCS	5	Medium	Medium	TASCS	Medium	B-J	19	2		19	2	
RCS	5	Medium	Medium	TT	Medium	B-J	39	5		39	6[4]	
RCS	5 (5)	Medium (Medium)	Medium	TT (PWSCC)	Medium (Medium)	B-F	1	0		1	0	
RCS	6	Low	Medium	None	Low	B-J	50	0		50	0	
RCS	7	Low	Low	None	Low	B-J	15	0		15	0	
CVCS	5	Medium	Medium	TT	Medium	B-J	1	1		1	0	
CVCS	6	Low	Medium	None	Low	B-J	60	0		60	0	
						C-F-1	213	0		241	0	
CVCS	6	Low	Low	TT	Medium	B-J	8	0		8	0	
CVCS	7	Low	Low	None	Low	B-J	42	0		42	0	
SIS	4	Medium	High	None	Low	B-J	85	7		0	0	
						C-F-1	241	26		96	10	
SIS	5	Medium	Medium	IGSCC	Medium	B-J	12	2		0	0	

CPNPP Unit 2 - Inspection Location Selection Comparison Between Previous (Interval 2) Approved and Revised (Interval 3) RI-ISI Program by Risk Category													
System[1]	Risk		Consequence Rank	Failure Potential		Code Category	Previous (Interval 2)			Updated (Interval 3)		
	Category[6]	Rank[6]		DMs[6]	Rank[6]		Weld Count	RI-ISI	Other[2]	Weld Count	RI-ISI	Other[2]
SIS	6	Low	Medium	None	Low	B-J	82	0		84	7[5]	
						C-F-1	456	0		507	0	
SIS	6	Low	Low	IGSCC	Medium	B-J	20	0		32	2[5]	
SIS	7	Low	Low	None	Low	B-J	126	0		208	0	
						C-F-1	104	0		198	0	
RHRS	4	Medium	High	None	Low	B-J	12	1		12	2	
						C-F-1	246	25		117	11	
RHRS	6	Low	Medium	None	Low	C-F-1	5	0		135	0	
CSS	4	Medium	High	None	Low	C-F-1	11	2		11	2	
CSS	6	Low	Medium	None	Low	C-F-1	178	0		180	0	
CSS	7	Low	Low	None	Low	C-F-1	239	0		239	0	
FWS	4 (1)	Medium (High)	High	None (FAC)	Low (High)	C-F-2	112	12		0	0	
FWS	5 (3)	Medium (High)	Medium	TASCS (FAC)	Medium (High)	C-F-2	8	1		0	0	
FWS	6 (3)	Low (High)	Medium	None (FAC)	Low (High)	C-F-2	329	0		0	0	
FWS	6 (5)	Low (Medium)	Low	TASCS (FAC)	Medium (High)	C-F-2	0	0		8	0	
FWS	7 (5)	Low (Medium)	Low	None (FAC)	Low (High)	C-F-2	0	0		441	0	

CPNPP Unit 2 - Inspection Location Selection Comparison Between Previous (Interval 2) Approved and Revised (Interval 3) RI-ISI Program by Risk Category												
System[1]	Risk		Consequence Rank	Failure Potential		Code Category	Previous (Interval 2)			Updated (Interval 3)		
	Category[6]	Rank[6]		DMs[6]	Rank[6]		Weld Count	RI-ISI	Other[2]	Weld Count	RI-ISI	Other[2]
MSS	6	Low	Medium	None	Low	C-F-2	167	0		0	0	
MSS	7	Low	Low	None	Low	C-F-2	0	0		167	0	
AFW	4 (1)	Medium (High)	High	None (FAC)	Low (High)	C-F-2	81	9		0	0	
AFW	6 (3)	Low (High)	Medium	None (FAC)	Low (High)	C-F-2	0	0		73	0	

Notes

1. Systems were described in Table 3.1-2 of the original submittal, with the exception of Auxiliary Feedwater.
2. The column labeled "Other" is generally used to identify augmented inspection program locations that are credited beyond those locations selected per the RI-ISI process, as addressed in Section 3.6.5 of EPRI TR-112657. This option was not applicable for the CPNPP RI-ISI application. The "Other" column has been retained in this table solely for uniformity purposes with other RI-ISI application template submittals.
3. 8 of these 26 welds were added to address the Class 1 selection percentage criteria described in Section 3.6.4.2 of EPRI TR-112657. See Section 3.5 of the original submittal for details.
4. 2 of these 6 welds were added to address the Class 1 selection percentage criteria described in Section 3.6.4.2 of EPRI TR-112657. See Section 3.5 of the original submittal for details.
5. Even though no selections are required in Low Risk segments, these welds were retained to address the Class 1 selection percentage criteria described in Section 3.6.4.2 of EPRI TR-112657. See Section 3.5 of the original submittal for details.
6. The data provided in parenthesis under "Category", "Rank" and "DMs" is for information only. It acknowledges that PWSCC or FAC are also potential degradation mechanisms for the subject piping. However, these degradation mechanisms are addressed under separate augmented examination programs and as such their presence does not alter the RI-ISI selections. Therefore, the RI-ISI selections are based on the information that is not within the parentheses.

Summary Statement of Comanche Peak Nuclear Power Plant (CPNPP) PRA Model Capability for Use in Risk-Informed Inservice Inspection Program Licensing Actions for Unit 2 – Third Ten Year Inservice Inspection Interval

Introduction

Comanche Peak Nuclear Power Plant (CPNPP) employs a multi-faceted approach to establishing and maintaining the technical adequacy and plant fidelity of the PRA models for the operating CPNPP units. This approach includes both a proceduralized PRA maintenance and update process, and the use of self-assessments and independent peer reviews. The following information describes this approach as it applies to the CPNPP PRA.

PRA Maintenance and Update

The CPNPP risk management process ensures that the applicable PRA model remains an accurate reflection of the as-built and as-operated plant. This process is defined in the CPNPP risk management program, which consists of a governing procedure ECE-2.15 "Risk and Reliability Functions" and subordinate implementation documents. CPNPP desktop instruction R&R-DI-009, "Maintenance and Update of PRA Models" delineates the responsibilities and guidelines for updating the full power internal events PRA models at CPNPP. The overall CPNPP risk management program, including R&R-DI-009, defines the process for implementing regularly scheduled and interim PRA model updates, for tracking issues identified as potentially affecting the PRA models (e.g., due to changes in the plant, errors or limitations identified in the model, industry operational experience), and for controlling the model and associated computer files. To ensure that the current PRA model remains an accurate reflection of the as-built, as-operated plant, the following activities are routinely performed:

- Design changes and procedure changes are reviewed for their impact on the PRA model.
- Changes to procedures and calculations affecting the PRA model are reviewed for their impact on the PRA model.
- Maintenance unavailabilities are captured.
- Plant specific initiating event frequencies, failure rates, and maintenance unavailabilities are updated approximately every 5-7 years.

In addition to these activities, CPNPP risk management procedures/desktop instructions provide the guidance for particular risk management and PRA quality and maintenance activities. This guidance includes:

- Documentation of the PRA model, PRA products, and bases documents.
- The approach for controlling electronic storage of Risk Management (RM) products including PRA update information, PRA models, and PRA applications.
- Guidelines for updating the full power, internal events PRA models for CPNPP.
- Guidance for use of quantitative and qualitative risk models in support of the On-Line Work Control Process Program for risk evaluations for maintenance tasks (corrective maintenance, preventive maintenance, minor maintenance, surveillance tests and modifications) on systems, structures, and components (SSCs) within the scope of the Maintenance Rule [10CFR50.65 (a)(4)].

In accordance with this guidance, regularly scheduled PRA model updates nominally occur on an approximately 5-7 year cycle; longer intervals may be justified if it can be shown that the PRA continues to adequately represent the as-built, as-operated plant. CPNPP performed a regularly scheduled update to the Rev. 4 CPNPP PRA model in 2011, in part to meet the requirements of the ASME PRA quality standard [11] and R.G. 1.200 [12]. CPNPP is currently using the Rev. 4B of the PRA model, from 2013, that has incorporated minor plant changes since the Rev. 4A update. Revision 4A incorporated resolutions from the Peer Review process.

PRA Self-Assessment and Peer Review

Several assessments of technical capability have been made, and continue to be planned, for the CPNPP PRA models. These assessments are as follows:

- An independent PRA peer review was conducted under the auspices of the Westinghouse Owners Group (WOG) in 2002, following the Industry PRA Peer Review process [1].
- In 2004 a self-assessment of the Systems Analysis (SY) element of the PRA model was done against the ASME PRA Standard [2] prior to the 2004 update. No gaps were identified relative to technical adequacy.
- In 2004 during the update process a self-assessment was performed with two industry peer reviewers using the WOG peer review process. This review included an assessment of the PRA model maintenance and update process and the loss of offsite power calculation and convolution data.. Results confirmed the technical adequacy of the CPNPP PRA model, with certain changes to the model that were incorporated during the update, and that the model would be maintained in a manner that would support risk informed applications.
- Following the Rev. 3 PRA model update a focused peer review was completed by two outside consultants utilizing the quantification elements of the ASME PRA standard [2A]. The review focused on the RCP Seal LOCA model, the thermal hydraulic analyses associated with the RCP Seal LOCA scenarios, Loss of offsite power model changes, and the quantification process. No category A or B Facts & Observations (F&Os) were identified in the review and all other F&O items were resolved in a subsequent update.
- During April 2006, the CPNPP PRA model results were evaluated in the WOG PRA cross-comparisons study performed in support of implementation of the mitigating systems performance indicator (MSPI) process. Results of this cross-comparison are presented in WCAP-16464 [4]. Noted in this document was the fact that, after allowing for plant-specific features, there are no MSPI cross-comparison outliers for CPNPP.
- In 2009, a gap analysis was performed against the available versions of the ASME PRA Standard [6] and Regulatory Guide 1.200, Rev. 1 [3]. The assessment reviewed the extent to which the gaps existed and a PRA model update is in progress and will address the gaps that were identified.

A summary of the disposition of the 2002 Industry Peer Review facts and observations (F&Os) for the CPNPP models was documented as part of the statement of PRA capability in the MSPI Bases Document [5]. As noted in that document all significance level A and B F&Os were addressed and closed out with the completion of the cited version of the model of record.

A gap analysis for the Rev. 3C CPNPP PRA models was completed in 2009 and was documented in the initial revision of R&R-PN-202 [8]. The gap analysis was performed against the available version of the ASME PRA Standard [6] and Regulatory Guide 1.200, Rev. 1 [3]. This gap analysis defined a number supporting requirements from the ASME Standard [6] for which potential gaps to the ASME PRA Standard were identified. Revision 4 to the model of record was developed to address those gaps and was the basis for a full scope Peer Review of the CPNPP PRA Model which was completed by the PWROG in March 2011 against the requirements of the American Society of Mechanical Engineers (ASME)/American Nuclear Society (ANS) PRA standard [11] and any Clarifications and Qualifications provided in the Nuclear Regulatory Commission (NRC) endorsement of the Standard contained in Revision 2 to Regulatory Guide (RG) 1.200 [12]. The outcome of the

Peer Review showed that the CPNPP Model of Record (MOR) revision 4 meets ASME/ANS RA-Sa-2009 Parts 1, 2, and 3 Capability Category II or better for nearly all of the Supporting Requirements. After Findings and Observations were addressed through post-Peer Review model work and documentation (MOR revision 4A), all but three Supporting Requirements met Capability Category II or better. The three Category I exceptions, are provided below. Revision 4B of the MOR incorporated minor changes to the plant and is the current model of record.

Resolution of Peer Review Findings and Observations

The results of the PWROG Peer Review of the CPNPP PRA Model Revision 4 [13] showed 21 Findings and 55 Observations / Suggestions and 4 Best Practices. All findings were resolved by either modifying the model, enhancing the documentation, or a combination of both. The suggested resolutions provided by the peer review team for each F&O were considered and generally incorporated. However, in some cases the PRA staff felt a different solution was best for CPNPP and still satisfied the F&O as written.
After the F&O's were fully addressed through post-Peer Review model work and documentation, as reflected in Revision 4A, all Supporting Requirements previously judged to have been "Not Met" were judged to be Cat II or greater.

Four of the seven Supporting Requirements previously judged to have been "Cat I" were judged to be Cat II or greater. The following three SR's remain at Cat I:

- LE-C11 (was LE-C9a)
- IFEV-A6 (was IF-D5a)
- IFSN-A6 (was IF-C3)

CPNPP has submitted and received a SER for the NEI Option 5b Surveillance Frequency extension program. The NEI Option 5b application is similar to this submittal in that they both deal with risk information and the impact on risk when changes to inspection/surveillances are changed. Excerpts from the NRC SER for CPNPP pertaining to the CPNPP PRA quality are provided on page 15 of this attachment and the overall conclusions are considered applicable to this submittal.

General Conclusion Regarding PRA Capability

The CPNPP PRA maintenance and update processes and technical capability evaluations described above provide a robust basis for concluding that the PRA is suitable for use in risk-informed licensing actions. As specific risk-informed PRA applications are performed, remaining gaps to specific requirements in the PRA standard will be reviewed to determine which, if any, would merit application-specific sensitivity studies in the presentation of the application results. For this application, gaps that were identified prior to MOR revision 4B had sensitivities performed however the current MOR has no gaps identified that would warrant sensitivity studies.

Assessment of PRA Capability Needed for Risk-Informed Inservice Inspection

In the risk-informed in-service inspection (RI-ISI) program at CPNPP, the EPRI RI-ISI methodology [9] is used to define alternative in-service inspection requirements. Plant-specific PRA-derived risk significance information is used during the RI-ISI plan development to support the consequence assessment, risk ranking and delta risk evaluation steps.

The importance of PRA consequence results, and therefore the necessary scope of PRA technical capability, is tempered by two processes in the EPRI methodology.

First, PRA consequence results are binned into one of three conditional core damage probability (CCDP) and conditional large early release probability (CLERP) ranges before any welds are chosen for RI-ISI inspection. Table 2 illustrates the binning process.

Table 2 – Consequence Results Binning Groups

Consequence Category	CCDP Range	CLERP Range
High	CCDP > 1E-4	CLERP > 1E-5
Medium	1E-6 < CCDP < 1E-4	1E-7 < CLERP < 1E-5
Low	CCDP < 1E-6	CLERP < 1E-7

The risk importance of a weld is therefore not tied directly to a specific PRA result. Instead, it depends only on the range in which the PRA result falls. The wide binning provided in the methodology generally reduces the significance of specific PRA results.

Secondly, the influence of specific PRA consequence results is further reduced by the joint consideration of the weld failure potential via a non-PRA-dependent damage mechanism assessment. The results of the consequence assessment and the damage mechanism assessment are combined to determine the risk ranking of each pipe segment (and ultimately each element) according to the EPRI Risk Matrix. The Risk Matrix, which equally takes both assessments into consideration, is reproduced below.

POTENTIAL FOR PIPE RUPTURE PER DEGRADATION MECHANISM SCREENING CRITERIA	**CONSEQUENCES OF PIPE RUPTURE** IMPACTS ON CONDITIONAL CORE DAMAGE PROBABILITY AND LARGE EARLY RELEASE PROBABILITY			
	NONE	**LOW**	**MEDIUM**	**HIGH**
HIGH FLOW ACCELERATED CORROSION	**LOW** **Category 7**	**MEDIUM** **Category 5**	**HIGH** **Category 3**	**HIGH** **Category 1**
MEDIUM OTHER DEGRADATION MECHANISMS	**LOW** **Category 7**	**LOW** **Category 6**	**MEDIUM** **Category 5**	**HIGH** **Category 2**
LOW NO DEGRADATION MECHANISMS	**LOW** **Category 7**	**LOW** **Category 7**	**LOW** **Category 6**	**MEDIUM** **Category 4**

These facets of the methodology reduce the influence of specific PRA results on the final list of candidate welds.

The limited use of specific PRA results in the RI-ISI process is also reflected in the risk-informed license application guidance provided in Regulatory Guide 1.174 [10]. Section 2.2.6 of Regulatory Guide 1.174 provides the following insight into PRA capability requirements for this type of application:

> *There are, however, some applications that, because of the nature of the proposed change, have a limited impact on risk, and this is reflected in the impact on the elements of the risk model.*
> *An example is risk-informed inservice inspection (RI-ISI). In this application, risk significance was used as one criterion for selecting pipe segments to be periodically examined for cracking. During the staff review it became clear that a high level of emphasis on PRA technical acceptability was not necessary. Therefore, the staff review of plant-specific RI-ISI typically will include only a limited scope review of PRA technical acceptability.*

Further, Table 1.3-1 of the ASME PRA Standard' [6] identifies the bases for PRA capability categories. The bases for Capability Category I for scope and level of detail attributes of the PRA states:

> *Resolution and specificity sufficient to identify the relative importance of the contributors at the system or train level including associated human actions.*

Based on the above, in general, Capability Category I should be sufficient for PRA quality for a RI-ISI application.

However, EPRI TR-1018427 [7] was developed to define the specific capability category requirements necessary for the PRA model to be used in the RI-ISI program. The NRC accepted the EPRI category capability with additional comments [7a]. The NRC staff "concurs with 4 of the 5 justifications for accepting a lower than the current good practice Capability Category II (or "Met") identified in RG 1.200. The staff finds that the proposed justifications, as endorsed in Table 1 of this SE, appropriately reflect the potential impact of each "less than current" good practice SR on RI-ISI programs. Therefore, a PRA that meets or exceeds the guidelines in the NRC approved version of this TR has sufficient quality to support a proposed RI-ISI program."

From EPRI TR-1018427 [7] and the associated NRC SE [7a] a specific list of capability category requirements for the RI-ISI program defined which of the ASME PRA Standard [6, 11] supporting requirements should fall under categories I, II, or III.

The supporting requirements for the RI-ISI program listed in the TR and SE tables was reviewed to verify that the current CPNPP MOR met or exceeded the defined categorization. It was noted that the internal flooding supporting requirements are included only for the EPRI Streamlined RI-ISI approach. The CPNPP RI-ISI program is based on the Traditional RI-ISI approach and was developed using insights from the plant's deterministic flooding analysis in lieu of the PRA internal flooding model and its results. Therefore the internal flooding technical supporting requirements are not applicable to the PRA analysis for the CPNPP RI-ISI program.

As previously stated the review of the CPNPP Peer Review documentation [13] and CPNPP resolutions [8] against the EPRI TR-1018427 [7] and its associated SE [7a] found that the CPNPP PRA met or exceeded the SR categorization listed in those documents for the EPRI Traditional RI-ISI.

The EPRI methodology further provides an alternate means to estimate the pipe rupture consequence, namely lookup tables. Although these lookup tables were not used, the impact of the loss of systems or trains is done in a generic (not plant-specific) fashion for this alternative method. This allowable alternative underscores the relatively low dependence of the process on specific PRA quality capabilities.

In addition to the above, it is noted that welds are not eliminated from the ISI program solely on the basis of risk information. The risk significance of a weld may fall from Medium Risk Ranking to Low Risk Ranking, resulting in it not being a candidate for inspection. However, it remains in the program, and if, in the future, the assessment of its ranking changes (either by damage mechanism or PRA risk) then it can again become a candidate for inspection. If a weld is determined, outside the PRA evaluation, to be susceptible to either flow-accelerated corrosion (FAC), inter-granular stress corrosion cracking (IGSCC) or microbiological induced cracking (MIC) in the absence of any other damage mechanism, then it moves into an "augmented" program where it is monitored for those special damage mechanisms. That occurs no matter what the Risk Ranking of the weld is determined to be.

<u>Conclusion Regarding PRA Capability for Risk-Informed ISI</u>

The CPNPP PRA model continues to be suitable for use in the RI-ISI application. This conclusion is based on:

- the PRA maintenance and update processes in place,
- the PRA technical capability evaluations that have been performed and are being planned, and
- the RI-ISI process considerations, as noted above, that demonstrate the relatively limited reliance of the process on PRA quality capability.

[1] Table A-1 of Regulatory Guide 1.200 identifies the NRC staff position as "No objection" to Section 1.3 of the ASME PRA Standard, which contains Table 1.3-1.

References

1. NEI-00-02, "Probabilistic Risk Assessment (PRA) Peer Review Process Guidance," Rev. A3.
2. American Society of Mechanical Engineers, Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications, ASME Ra-Sa-2002, New York, New York, April 2002.
2A. American Society of Mechanical Engineers, Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications, ASME Ra-Sa-2003, New York, New York, December 2003.
3. U.S. Nuclear Regulatory Commission, An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities, Regulatory Guide 1.200, Rev. 1, January 2007.
4. WCAP-16464-NP, "Westinghouse Owner's Group Mitigating Systems Performance Index Cross Comparison," Revision 0, August 2005.
5. Comanche Peak Nuclear Power Plant, Reactor Oversight Program (ROP) Mitigating Systems Performance Index (MSPI) Bases Document, R&R-PN-112, Rev. 3, December 2008.
6. American Society of Mechanical Engineers, Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications, ASME RA-Sb-2005, New York, New York, December 2005.
7. Electric Power Research Institute, Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-Informed In-Service Inspection Programs, EPRI 1021467, Palo Alto, CA 2011.
7a. SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION AND THE OFFICE OF NEW REACTORS FOR EPRI TOPICAL REPORT 1021467 "NONDESTRUCTIVE EVALUATION: PROBABILISTIC RISK ASSESSMENT TECHNICAL ADEQUACY GUIDANCE FOR RISK-INFORMED IN-SERVICE INSPECTION PROGRAMS"
8. Comanche Peak Nuclear Power Plant, R.G. 1.200 Compliance, R&R-PN-202, Revision 2, Oct 2011.
9. Revised Risk-Informed Inservice Inspection Evaluation Procedure, EPRI TR-112657, Revision B-A, December 1999.
10. U.S. Nuclear Regulatory Commission, An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis, Regulatory Guide 1.174, Revision 1, November 2002.
11. ASME/ANS Ra-Sa-2009 – Addenda to ASME/ANS RA-S-2008 Standard for Level 1 / Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications
12. Regulatory Guide 1.200, Revision 2, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," USNRC
13. Letter: McCoy, D.E. to Zachariah, T. dated May 19, 2011 SUBJ: RG 1.200 PRA Peer Review Against the ASME/ANS PRA Standard Requirements for the Comanche Peak Nuclear Power Plant Probabilistic Risk Assessment, Westinghouse LTR-RAM-II-11-038, Attachment: RG 1.200 PRA Peer Review Against the ASME/ANS PRA Standard Requirements for the Comanche Peak Nuclear Power Plant Probabilistic Risk Assessment, Westinghouse Proprietary Class 2.

Excerpts from NRC SER for CPNPP Risk Informed Applications Option 5b Submittal
(From 5b SER - ADAMS Accession No. ML12067A244)

A proposed amendment would adopt the NRC-approved Technical Specifications Task Force (TSTF) traveler TSTF--425, Revision 3, "Relocate Surveillance Frequencies to Licensee Control-RITSTF Initiative 5b." TSTF--425, Revision 3, would relocate the frequencies of most periodic surveillances from the TS to a new licensee-controlled program, the Surveillance Frequency Control Program (SFCP), and would impose requirements for the new SFCP in the Administrative Controls section of the TSs.

3.2.1.4.1 Quality of the PRA

The quality of the CPNPP PRA must be compatible with the safety implications of the proposed TS change and the role the PRA plays in justifying the change. That is, the more the potential change in risk or the greater the uncertainty in that risk from the requested TS change, or both, the more rigor that must go into ensuring the quality of the PRA.

RG 1.200 is the NRC's developed regulatory guidance for assessing the technical adequacy of a PRA. Revision 2 of this RG endorses (with comments and qualifications) the use of the American Society of Mechanical Engineers (ASME) I American Nuclear Society (ANS) RA-Sa-2009, "Addenda to ASME RA-S-2008 Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications", NEI 00-02, "PRA Peer Review Process Guidelines", and NEI 05-04, "Process for Performing Follow-On PRA Peer Reviews Using the ASME PRA Standard". Revision 1, of this RG had endorsed the internal events PRA standard ASME RA-Sb-2005, "Addenda to ASME RA-S-2002 Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications". For the internal events PRA, there are no significant technical differences in the standard requirements; therefore, assessments using the previously endorsed internal events standard are acceptable.

The licensee has performed an assessment of the PRA models used to support the SFCP using the guidance of RG 1.200 to assure that the PRA models are capable of determining the change in risk due to changes to surveillance frequencies of SSCs, using plant-specific data and models. Capability category II is required by NEI 04-10 for the internal events PRA, and any identified deficiencies to those requirements are assessed further to determine any impacts to proposed decreases to surveillance frequencies, including by the use of sensitivity studies where appropriate.

The CPNPP PRA internal events model identified as Revision 4 was subject to a full scope industry peer review by the Pressurized Water Reactor Owners' Group (PWROG) in March 2011, using the internal events PRA standard endorsed by RG 1.200, Revision 2. The current model of record, identified as Revision 4A, includes responses to identified findings and observations (F&O) from the peer review, which were summarized in Table 2-1, "F&O Summary Findings," of the licensee's submittal. In addition, the licensee identified in Table 2-2, "SRs Assessed as Not Met or Category I for the CPNPP PRA," of its submittal the supporting requirements (SRs) from the internal event PRA standard which were identified as not met or only meeting capability category I.

Based on the licensee's assessment using the applicable PRA standard and RG 1.200, the NRC staff concludes that the level of PRA quality, combined with the proposed evaluation and disposition of remaining gaps to capability category II of the standard, is sufficient to support the evaluation of changes proposed to surveillance frequencies within the SFCP, and is consistent with Regulatory Position 2.3.1 of RG 1.177.