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PNP 2013-013

February 21, 2013

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

SUBJECT: Response to Clarification Request – License Amendment Request to Adopt NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactors

Palisades Nuclear Plant
Docket 50-255
License No. DPR-20

References: 1. Entergy Nuclear Operations, Inc. letter, PNP 2012-106, "License Amendment Request to Adopt NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactors," dated December 12, 2012 (ADAMS Accession No. ML12348A455)

Dear Sir or Madam:

In Reference 1, Entergy Nuclear Operations, Inc. (ENO) submitted a license amendment request to adopt the National Fire Protection Association (NFPA) 805 performance-based standard for fire protection for light water reactors.

On February 5, 2013, a conference call was held with the NRC to discuss clarification questions which were sent via electronic mail on February 4, 2013. A follow-up call was conducted with the NRC on February 6, 2013, to confirm the clarification questions and required response timeframe.

Attachment 1 provides the ENO responses to the clarification questions.

A copy of this response has been provided to the designated representative of the State of Michigan.

This letter contains no new or revised commitments.

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I declare under penalty of perjury that the foregoing is true and correct. Executed on February 21, 2013.

Sincerely,



ajv/jse

Attachment: 1. Response to Clarification Requests – License Amendment Request to Adopt NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactors

cc: Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC
State of Michigan

ATTACHMENT 1
Response to Clarification Request
License Amendment Request to Adopt NFPA 805 Performance-Based
Standard for Fire Protection for Light Water Reactors

A request for clarification was received from the Nuclear Regulatory Commission (NRC), by electronic mail on February 4, 2013. Subsequent conference calls with the NRC on February 5, 2013 and February 6, 2013 were conducted to confirm the clarification questions and required response timeframe.

The Entergy Nuclear Operations, Inc. (ENO) response is provided below.

NRC Request

- 1. Several critical review elements from the last full-scope fire PRA peer review were either incomplete or received a significant number of findings, indicating the fire PRA was not able to be fully reviewed by the peer review team. As such, a focused-scope peer review is needed for the following elements to support the close out of the licensee proposed dispositions/resolutions: FSS (Fire Scenario Selection), FQ (Fire Quantification), HRA (Human Reliability Analysis) and UNC (Uncertainty Analysis). A list of the findings includes, but is not necessarily limited to, the following: FQ-C1-01, HRA-A2-01, HRA-A3-01, HRA-A4-01, HRA-B3-01, HRA-C1-01, HRA-D2-01, HRA-E1-01, PRM-B11-01, CS-A9-01, CS-C1-01, FSS-B1-01, FSS-E3-01, FSS-H5-01, CS-B1-01, PRM-B3-02, PRM-B9-01, PRM-B5-01, FQ-A4-01, ES-A3-01 and UNC-A2-01.*

ENO Response

1. Attachment V of the Palisades license amendment request (LAR), presents the cumulative results of three independent Peer reviews of the Palisades fire probabilistic risk analysis (PRA) model and supporting documentation; two in-process Peer reviews and one Final Peer review. The resulting findings and observations (F&Os), as written by the Peer review team, were presented verbatim in Attachment V. The Staff was concerned that the F&O descriptions imply several PRA elements were incomplete or received a number of findings indicating that they could not be reviewed. This document provides supplemental information to demonstrate that all applicable PRA high level requirements (HLR) were reviewed in detail by the Peer review team.

The Palisades Fire PRA Peer Review was evaluated in three phases against the requirements of ASME/ANS RA-Sa-2009, Part 4 [15] by essentially the same personnel.

1. The first in-process Peer review (Phase 1) was conducted during the week of January 18th, 2010.
2. The second in-process Peer review (Phase 2) which included two NRC observers was conducted during the week of August 27, 2010.

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3. The final phase (Final) was conducted during the week of March 21, 2011. The final report as described in paragraph two in Attachment V of the LAR, SCIENTECH document 17825-1, was released in July 2011.

The Peer review team consisted of subject matter experts from SCIENTECH, Edan Engineering, SAIC, and ABS Consulting; two of the team members were authors of NUREG/CR-6850, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities". The final report as described in paragraph two in Attachment V of the LAR, SCIENTECH document 17825-1 [16], describes the Phase 1, Phase 2 and Phase 3 (Final) findings.

The two in-process reviews were provided to assist Palisades in assessing the technical adequacy and to refine plans, if necessary, to ensure the technical requirements of the final fire PRA would meet the ASME/ANS PRA standard. Although the in process reviews were not conducted on a completed fire PRA, the reviews were conducted in strict accordance with the standard. "Not Met" or "Not Reviewed" was assigned if tasks needed to meet the standard requirements were not complete, depending on the degree of completion. In addition, the in process reviews identified actions necessary to achieve as a minimum Category II, where deemed appropriate.

A Final Peer review, of selected technical elements, was deemed necessary to meet the intent of the standard. The final report [16] provides the results of the Final Peer review and the in-process Peer reviews for those technical elements sufficiently reviewed during the in process reviews. Findings and observations from in-process Peer reviews were revisited by the Peer review team, but the finding descriptions were not eliminated or revised due to time constraints. For example, a number of supporting requirements with associated findings in the final report were categorized as meeting CC II (capability category) or greater. In other cases, every element as required by the standard is met, however, a singular refinement or enhancement is found to be needed and hence a finding would result.

There were no changes in applied methodology from the conduct of the "Final" Peer review on March 21, 2011 to the formal LAR submittal release on December 12, 2012.

Table 1, below illustrates the overall results presented in the summary table from the final report [16]. These results show that 94 supporting requirements meet the ASME standard CC II or greater, 58 supporting requirements (SRs) were not met, 3 met category I, and 14 were classified as not applicable. Four SRs had a final status of not reviewed after the Final peer review; these are presented in Table 3.

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Additional information is provided in Table 2, below to illustrate during which Peer review phase F&Os were identified and reviewed, as well as summary information from the final report to clarify the team’s conclusions for each ASME standard element in which a finding was noted. This table re-presents the information provided in LAR Attachment V, Table V-1, with the addition of three new columns, annotated in bold and italics, as shown below. The SR, Topic, Status, and Finding or Suggestion columns were not changed from Attachment V, Table V-1. The disposition description for several SRs was revised to clarify the basis for status of these requirements.

<i>SR Initial Peer Review Status</i>	<i>SR Subsequent Peer Review Status</i>	Disposition	<i>Supplemental Information</i>
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In the “*SR Initial Peer Review Status*” column, the status from when the supporting requirement (SR) was initially reviewed is provided.

In the “*SR Subsequent Peer Review Status*” column, the status from the Final Peer review for the SR is provided.

When a supporting requirement was categorized as “not met” this was the status at completion of the Final Peer review conducted during the week of March 21, 2011. If the supporting requirement was subsequently addressed prior to the LAR submittal in December 2012, it was categorized as “closed” in the status column (per the disposition discussion). In these cases the SR finding or suggestion has been fully addressed and the intent of Capability Category II has been met to properly support the LAR submittal.

In the “*Supplemental Information*” column, additional information is provided that supports the review for this supporting element was complete; especially if the F&O implies the work was not in a state that could be reviewed. This information was primarily obtained from the Summary of Review Results (Section 4) of the Final Peer review report [16].

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Table 1: Summary of Overall Results of the Palisades Fire PRA Peer Review										
Number of Supporting Requirements Meeting Each Capability Category										
Fire PRA Element	Not Met	Met	CC-I	CC-I/II	CC-II	CC-II/III	CC-III	Not Applicable (NA)	Not Reviewed (NR)	Total
PP	1	8				3				12
ES	9	2			1		1	1		14
CS	4	9			1		1	1		16
QLS		6						1		7
PRM	10	5						1	4	20
IGN	2	9				1	1	2		15
QNS*								6		6
CF	1	1				1				3
HRA	6	1	3		1		1			12
SF	6									6
FQ	4	5						1		10
FSS	13	16		3	9	6	2	1		50
UNC	2									2
Total	58	62	3	3	12	11	6	14	4	173
% of Total	34%	36%	2%	2%	7%	6%	3%	8%	2%	
% excluding NA or NR	37%	40%	2%	2%	8%	7%	4%	9%	3%	
*Palisades did not perform quantitative screening so the requirements of QNS are not applicable										

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Table 2: Supplemental Information to Table V-1

SR	Topic (ASME Standard Category II Text)	Status ²	Finding or Suggestion	<i>SR Initial Peer Review Status</i>	<i>SR Subsequent Peer Review Status</i>	Disposition	<i>Supplemental Information</i>
CS-A4-01 (Suggestion)	If additional cables are selected based on SR CS-A3, VERIFY that the adverse effects due to failure of the selected cables are included the Fire PRA plant response model.	Closed	The Fire PRA cable data is maintained in the SAFE software and an adjunct Excel spreadsheet. The data should be integrated into a single data set within the SAFE software to ensure proper long-term maintenance of the analysis.	Phase 1 (reviewed not met)	Phase 2/ Final (met)	Suggestion closed by documentation update. No impact to NFPA-805 analysis. Cable data from the adjunct Excel spreadsheet has been integrated into the SAFE database to ensure long-term maintenance of the analysis.	During the Phase 1 and Phase 2 reviews, this SR was classified as 'Not Met' During the Final Peer review in March 2011, additional reviews of the cable selection element were conducted to assess resolution of F&Os identified during the in-process reviews. The findings from Phase 1 and Phase 2 for this SR were resolved and this suggestion was identified during that review. Per the final Scientech report 17825-1, "The cable selection and location task is essentially complete. Future work will typically involve iterations to refine the Fire PRA." Specifically, the Phase 1 review identified 7 findings and 5 suggestions. The Phase 2 Peer review modified 8 F&Os and added 2 additional suggestions. The Final Peer review resulted in 4 findings, 2 suggestions, and 1 best practice; supporting the fact the work had transitioned satisfactorily from the first in-process Peer review.
CS-A9-01 (Finding)	INCLUDE consideration of proper polarity hot shorts on ungrounded DC circuits; requiring up to and including two independent faults could result in adverse consequences.	Open	PLP has conducted updates to the original cable selection to ensure multiple hot short failures are identified. It is not evident that the supplemental analysis work specifically looked for proper polarity hot shorts on ungrounded DC circuits.	Phase 1 (reviewed not met)	Phase 2/ Final (not met)	Finding open. Although the data gathering is complete, it was not fully implemented into the model used for the LAR. Cable data for the PLP FPRA was obtained from two separate sources: the SAFE database and NEXUS spreadsheets. The SAFE database was populated with the original Palisades Appendix R cable	A finding in this SR was identified during the Phase 1 Peer review. Cable Selection elements were subsequently reviewed in the Phase 2 and Final Peer reviews. The finding in this area was revised as part of the Final Peer review, but remains open as some minor numerical changes are anticipated once the Fire PRA model is updated to utilize the full set of cable data maintained in just one location (SAFE).

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						data, the cable data collected for offsite power components, and the initial set of components selected for cable analysis for the fire PRA. Subsequent efforts were performed to analyze additional components, refine previously collected cable data and to revisit vintage data using modern criteria including proper polarity dc hot shorts.	
CS-B1-01 (Finding)	ANALYZE all electrical distribution buses credited in the Fire PRA plant response model for proper overcurrent coordination and protection and IDENTIFY any additional circuits and cables whose failure could challenge power supply availability due to inadequate electrical overcurrent protective device coordination	Closed	The analysis and review of electrical overcurrent coordination and protection has been initiated but is not yet complete. The final analysis should address coordination for all Fire PRA electrical distribution buses. Refer to F&O CS-C4-01 for a related discussion on documentation of the coordination and protection analysis.	Phase 1 (reviewed not met)	Final (not met) ¹	<p>Finding resolved by documentation update. No impact to NFPA-805 analysis.</p> <p>Palisades has documented a complete breaker coordination study for all buses considered in the fire PRA as described in EA-APR-95-004, Ref (9).</p> <p>The following modifications will be performed to resolve the identified Electrical Coordination Challenges:</p> <ul style="list-style-type: none"> • The circuit breakers in MCC-3 buckets (Breakers 52-345 and 52-325) will be replaced. • Replacement of, or supplement the overcurrent protection in DC distribution panels, 11-1, 11-2, 11A, 21-1, 21-2, and 21A utilizing fuses to assure coordination at higher fault currents. • Replacement of the fuses 	<p>This Finding was noted during the initial Phase 1 Peer review. Cable selection elements were again reviewed by the Peer review as part of the Phase 2 and Final Peer reviews, but this finding had not been resolved. The breaker coordination study was subsequently completed and modifications identified to resolve the finding.</p> <p>The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.</p>

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						<p>currently installed in panels served by the Y01.</p> <ul style="list-style-type: none"> Adjustment of the breaker/relay settings in breakers 152-201, 152-115, 152-108. <p>Plant modifications will address all buses where electrical coordination could not be demonstrated. No impact to NFPA-805 analysis.</p>	
CS-C1-01 (Finding)	DOCUMENT the cable selection and location methodology applied in the Fire PRA in a manner that facilitates Fire PRA applications, upgrades, and Peer review.	Open	The cable selection and location methodology is documented in Section 4 the Model Development Report (0247-07-0005.03) and associated appendices. The methodology for completed work is documented in a manner consistent with this supporting requirement; however, the methodology for the supplemental cable selection review (Attachment 1) is not formally documented in a manner that ensures consistent interpretation for Fire PRA applications and upgrades. Additionally, the sample cable routing verification check is not formally documented in the	Phase 1 (reviewed not met)	Phase 2/ Final (not met)	<p>Finding is open because although the data verification is complete, the results have not been fully implemented into the model used for the LAR.</p> <p>Section 4 of the Model Development Report, Ref (3), has been updated in a manner that ensures consistent interpretation of Fire PRA applications.</p> <p>Additionally, the verification of Appendix R Non-Safe Shutdown Cable Routing to Support the Fire PRA has been separately documented in PLP-RPT-12-00134, Ref (10).</p>	This finding was identified during the Phase 1Peer review. The CS-C1 supporting requirement was subsequently reviewed during both the Phase 2 and Final Peer review. This finding remains open as some minor numerical changes are anticipated once the Fire PRA model is updated to utilize the full set of cable data maintained in just one location (SAFE).

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			Fire PRA Report or any other plant document, and thus does not lend itself to consistent treatment for future Fire PRA applications and upgrades.				
CS-C2-01 (Suggestion)	DOCUMENT cable selection and location results such that those results are traceable to plant source documents in a manner that facilitates Fire PRA applications, upgrades, and Peer review.	Closed	Appendix F of the Model Development Report (0247-07-0005.03) documents the process by which the cable data was compiled and organized for the PLP FPRA. However, to facilitate FPRA applications, upgrades, and Peer review, the consolidated cable dataset (combining the Nexus and SAFE databases) should be documented in such a format (including such information as cable ID, corresponding equipment ID, cable function, and cable fault consequences, etc.) that provides end-to-end data traceability.	Phase 1 (reviewed not met)	Phase 2/ Final (met)	Suggestion resolved by documentation update. No impact to NFPA-805 analysis. The sources of the cable data are documented in the Fire PRA Model Development Report, 0247-07-0005.03, Ref (03).	This SR was categorized as 'Not Met' by the Phase 1 Peer review. The finding was revised to a 'Suggestion' in the Final Peer review and subsequently resolved by documentation provided in the Model Development Report.
CS-C4-01 (Finding)	DOCUMENT the review of the electrical distribution system overcurrent coordination and protection analysis in a manner that facilitates Fire PRA applications, upgrades, and Peer	Closed	Unlike other elements of this Technical Element, the Fire PRA Report does not address the methodology, process, or criteria for the electrical coordination and	Phase 1 (reviewed not met)	Phase 2/ Final (not met) ¹	Finding resolved by documentation update. No impact to NFPA-805 analysis. Palisades has documented a complete breaker coordination study for all buses considered in	A finding in this SR was identified during the Phase 1 Peer review. The CS-C1 supporting requirement was subsequently reviewed during both the Phase 2 and Final Peer review. The finding was revised during the Phase 2

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	review.		protection analysis. This information will need to be included in final documents to satisfy this supporting requirement.			the fire PRA as described in EA-APR-95-004, Ref (9).	Peer review, but remained open following the Final Peer reviews as the breaker coordination study was incomplete. Subsequently this study was completed and the finding resolved prior to the LAR submittal.
ES-A2-01 (Finding)	REVIEW power supply, interlock circuits, instrumentation, and support system dependencies and IDENTIFY additional equipment whose fire-induced failure, including spurious actuation, could adversely affect any of the equipment identified per SR ES-A1.	Closed	<p>It is unclear at this point if all interlock / permissive circuits which may lead to specific consequential IEs have been properly captured for the functions being credited in the PRA. This may be particularly important where the function credited in the Appendix R analysis is different from the Fire PRA, or auto actuation of the component is required in the PRA but not in Appendix R.</p> <p>Need to document process by which all supporting equipment and interlocks have been addressed. The PRA team appears to recognize this deficiency exists at present and have plans in places to rectify once all auto actuation modeling issues are resolved.</p>	Phase 1 (reviewed not met)	Phase 2/ Final (not met) ¹	<p>Finding resolved by documentation and model update. No impact to NFPA-805 analysis.</p> <p>A complete review of Safety Injection Signal (SIS), Containment High Pressure (CHP), Containment High Radiation (CHR), Containment Isolation Signal (CIS) and Recirculation Actuation Signal (RAS) logic was performed to identify potential adverse component actuations that could occur due to a spurious signal from any of these sources.</p> <p>Logic was added for 45 PRA components to consider spurious operation from any of the automatic actuation circuits. Report 0247-07-0005.04, Ref (4), was updated to reflect these changes.</p> <p>These logic changes were addressed prior to the conduct of Phase 2.</p>	<p>This SR was designated as not met in the Phase 1 Peer review. The equipment selection (ES) element was fully reviewed during the Phase 2 Peer review and a limited scope review was performed during the Final Peer review.</p> <p>The final report summary for the ES element states:</p> <p><i>Extensive modeling changes have been made to explicitly represent both random and fire induced failures of interlock circuits, instrumentation and associated power supplies. When this effort is complete the modeling of this aspect should be among one of the most comprehensive in the industry.</i></p> <p>The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.</p>

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ES-A3-01 (Finding)	<p>INCLUDE equipment whose fire-induced failure, not including spurious operation, contributes to or causes</p> <p>(a) fire-induced initiating events treated in the Fire Safe Shutdown/Appendix R analysis</p> <p>(b) Internal Events PRA initiators as identified using the IE requirements in Part 2 (including any gradations across capability categories in that standard) as modified per 4-2.5, or</p> <p>(c) unique fire-induced initiating events not addressed or otherwise screened from the above two analyses if SR IE-C4 in Part 2 cannot be met</p>	Closed	<p>The review of initiating events considered in the internal events analysis is described in Report 0247-07-0005. 03 Appendix B. A rationale for re-examining the screening process to identify new IEs which may have been screened or subsumed in that analysis is discussed. No new initiating events or additional equipment were identified. However, the review process undertaken is not well documented. It is unclear, e.g., if multiple coincident pathways were addressed when identifying the size of LOCA that may be induced by fire and any potential success criteria conflicts which may arise in the mapping of the fire induced IE to the internal events IE. (e.g. very small LOCA, Small LOCA vs. medium LOCA). (Note the same concerns arise when addressing the screening process for Containment isolation pathways where such pathways were screened on the size of a single pathway.)</p>	Phase 1 (reviewed not met)	Phase 2/ Final (not met) ¹	<p>Finding resolved by documentation and model update. No impact to NFPA-805 analysis.</p> <p>Appendix B of Ref (3) was updated to provide additional detail as to how initiating events were screened as to their applicability for fire scenarios.</p> <p>The success criteria for consequential LOCA events and their associated pathways and sizes were updated in Section 5.0 of notebook NB-PSA-ETSC, Ref (11). The updated notebook details consequential LOCA events that may result from fire including: multiple primary coolant pump (PCP) seal failures, demands on the pressurizer safety valves, and spurious operation of the reactor head vent and letdown isolation valves. Additional detail was also added to report 0247-07-0005.04, Ref (4), for the PCP seal failures and chemical and volume control system (CVCS) pathways.</p> <p>The modeling approach for containment isolation pathways was updated as described in Attachment D of EA-PSA-FPIE-FIRE-12-04, Ref (12). Consequential ISLOCA events, potentially caused by fire, are specifically addressed in the XFR-ISLOCA event tree described in Section 5.6 of NB-PSA-</p>	<p>This SR was designated as not met in the Phase 1 Peer review. The equipment selection (ES) element was fully reviewed during the Phase 2 Peer review and a limited scope review was performed during the Final Peer review.</p> <p>The finding was not fully resolved for the Final Peer review, but was subsequently closed by fully documenting consequential LOCA event development in the event tree and success criteria notebook prior to the LAR submittal.</p>

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						ETSC, Ref (11).	
ES-A5-01 (Finding)	CONSIDER up to and including two spurious actuations of equipment alone or in combination with other fire-induced loss of function failures for the special case where fire-induced failures could contribute not only to an initiating event but also simultaneously either (a) affect the operability/functionality of that portion of the plant design to be credited in response to the initiating event in the Fire PRA (b) result in an initiating event where the mitigating function is not addressed in the Fire Safe Shutdown/Appendix R Analysis or (c) result in a loss of reactor coolant system integrity	Closed	A review of the MSO report 0247-07-0005-04 Appendix A found several deficiencies. These are indicated below. General: The MSO panel was convened in 2008. Westinghouse published the latest MSO report in April 2009 [WCAP-NP-16933]. The current MSO reference numbers and description in Appendix A do not match the list in WCAP-NP-16933. There are some new issues which are not covered by the current MSO panel report. Suggest a final reconciliation of the MSO panel results [either with a new panel meeting or a re-write of the report] with WCAP-NP-16933. PLP-1, PLP-2, PLP-3: The MSO descriptions in these WCAP issues are intended for Westinghouse plants which have 2 diverse methods of seal cooling. The MSO report states the issue is not-applicable to PLP. However, it is necessary to ensure that all failure combinations of loss of CCW	Phase 1 (reviewed not met)	Phase 2/ Final (not met) ¹	Finding resolved by documentation and model update. No impact to NFPA-805 analysis. The MSO expert panel was reconvened on 03/15/2011 at the Palisades site to address all additions, deletions and/or changes to the MSO assessment that have occurred due to post-expert panel reviews and in consideration of the most current information available from the PWROG Owner's Group. The results of this expert panel review are documented in 0247-07-0005.04, "Multiple Spurious Operations", Ref (4). PLP-1, PLP-2, and PLP-3 were updated in report 0247-07-0005.04. Palisades PCP seal LOCA model has been updated to be consistent with the latest industry guidance (WCAP-15749-P, Revision 1, Guidance for the Implementation of the CEOG Model for Failure of RCP Seals Given Loss of Seal Cooling (Task 2083), Combustion Engineering Owners Group (CEOG), December 2008). Further detail is provided in Appendix B of 0247-07-0005.04. PLP-10 was finalized as documented in 0247-07-0005.04	This SR was designated as not met in the Phase 1 Peer review. The equipment selection (ES) element was fully reviewed during the Phase 2 Peer review and a limited scope review was performed during the Final Peer review. The finding was not fully resolved for the Final Peer review, but was subsequently closed by incorporating modeling logic and updating the MSO report prior to the LAR submittal.

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			<p>seal cooling are included for PLP.</p> <p>PLP-10: Resolution not final.;</p> <p>PLP-11: WCAP issue misunderstood by MSO panel. Issue is for closure of both RWST suction valves and is applicable to PLP. Simultaneous spurious closure of CV3031 and CV3057 is this issue. ;</p> <p>PLP-12: Resolution not final ;</p> <p>PLP-14: In WCAP-NP-16933, issue 14 is applicable to Palisades. Issue 14 is CHP runout when RCS is depressurized. Palisades needs to look at pump runout possibility for all ECCS, CCW, AFW, and SWS pumps. ;</p> <p>PLP-18: Resolution for PLP-18 states RWST may drain, which is not considered in PRA. If RAS occurs and CV-3029 or CV03030 opens, RWST will not drain, because of check valve in sump line. Other possibilities involving deadhead / NPSH of ECCS pumps are not explored. If 3029/3030 open on a</p>			<p>Section 5.10. The PRA model was updated to include spurious valve failures to address this MSO.</p> <p>PLP-11 is correctly evaluated in report 0247-07-0005.04 Section 5.11. The MSO panel correctly understood the scenario. Simultaneous spurious closure of CV-3031 and CV-3057 does not isolate charging suction from the SIRWT as the charging suction is from a separate nozzle. Closure of these valves is addressed in MSO scenarios which impact the engineered safeguards pumps. MSO scenario PLP-10 considers spurious isolation of charging pump suction valves, including those which would isolate charging from the SIRWT.</p> <p>The resolution of MSO scenario PLP-12 was completed in Section 5.12 of 0247-07-0005.04. Spurious closure of MO-2087 due to fire was added to the PRA model.</p> <p>Evaluation of PLP-14 was updated in Section 5.14 of 0247-07-0005.04. The evaluation now describes how this scenario is addressed in the model.</p> <p>MSO scenario PLP-18 was updated. The evaluation describes model changes incorporated to explicitly address early drain down of the SIRWT in the PRA model and dead-</p>	

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			<p>spurious signal, CV3031/CV3057 and CV3027/3056 will receive a signal to close. Power is disabled to 3027/3056. Scenarios for insufficient NPSH include a) spurious SI; b) opening of 3029/3030; c) closure of 3031/3057. Possibilities for ECCS deadhead include: a) spurious SI; b) opening of 3029/3030; c) operator mistakenly restores power to 3027/3056 [based on false instruments] resulting in deadhead of ECCS pumps.</p> <p>PLP-19: Needs final resolution;</p> <p>PLP-27, PLP-34, PLP-35: MSO states SG-ADV does not need to be included because overcooling is not an issue at Palisades. However, need to consider other affects of SO ADV, which are: a) AFW pump runout; b) Faulted SG may be unsuitable for decay heat removal in the long term [i.e., not able to raise steam].; c) Heat removal is less than effective and condensate inventory makeup is required.</p> <p>PLP-39: Need better reason</p>			<p>heading of the ECCS pumps.</p> <p>PLP-19 was finalized per Section 5.19 of 0247-07-0005.04. This scenario involves early drain down of the SIRWT via containment spray and is addressed in the resolution to scenario PLP-18.</p> <p>Scenarios PLP-27, PLP-34, PLP-35 were revised address affects other than cooldown due to a stuck open atmospheric dump valve (ADV). The direct effects of a blowdown of a steam generator are modeled explicitly in the PRA in terms of the impact on steam supply to the turbine driven AFW pump. The resulting SI signal also has potentially negative effects such as load shed of bus 1E and isolation of the non-critical service water header (CV-1359) and on the shrink and swell of the PCS which could result in a potential demand on a pressurizer safety valve (ad described in scenario PLP-42). Appendix F was added to 0247-07-0005.04 to evaluate the potential for AFW pump runout on spurious full opening of the AFW flow control valves to a depressurized steam generator.</p> <p>Additional evaluation was performed to address MSO scenario PLP-39 and added as Appendix G to 0247-07-0005.04.</p>	

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			<p>to exclude blowdown valves as potential flow diversion rates appear to be significant. ;</p> <p>PLP-43: Resolution for pressurizer spray valves states that SO spray valve would lead to loss of subcooling. Loss of subcooling will lead to SI signal. Spurious spray valve opening will lead to SI in [on the order of] 5 minutes. Spray valve spurious should be included in Fire PRA as leading to SI signal.</p> <p>PLP-45: Basic events for pressurizer heaters could not be found in CAFTA as indicated in the resolution;</p> <p>PLP-47: Resolution not final.</p> <p>PLP-57 PLP-58: Effect of spurious operation of load sequencers not evaluated. Possible scenarios include 1) failure of cable causes spurious load shed on operating bus, 2) failure of cable causes load of DG on operating bus.</p> <p>PLP-60,PLP-80,PLP-84: Need final resolution.</p> <p>General: No indication of search for containment isolation failure pathways</p>			<p>This evaluation provides the basis for excluding the blowdown valves as a potential flow diversion path.</p> <p>Additional evaluation was performed to address MSO scenario PLP-43 and added as Appendix I to 0247-07-0005.04. This evaluation provides the basis for excluding spurious opening of the pressurizer spray valves from the PRA model.</p> <p>It was validated that the fault tree referred to in PLP-45 is correctly identified in the CAFTA model.</p> <p>The resolution of PLP-47 was finalized with the addition of evaluations in Appendices N and O of 0247-07-0005.04 to describe the treatment of boron dilution events in the PRA.</p> <p>MSO scenarios PLP-57 and PLP-58 have been finalized and incorporated into the PRA model as described in Sections 5.57 and 5.58 of 0247-07-0005.04.</p> <p>The evaluations for MSO scenarios PLP-60, PLP-80, and PLP-84 have been finalized.</p> <p>The modeling approach for containment isolation pathways was updated as described in Attachment D of EA-PSA-FPIE-FIRE-12-04, Ref (12). Consequential ISLOCA and containment bypass</p>	

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			which can contribute to LERF.			events, potentially caused by fire, are specifically addressed in the XFR-ISLOCA event tree described in Section 5.6 of NB-PSA-ETSC, Ref (11)	
ES-C1-01 (Finding)	IDENTIFY instrumentation that is relevant to the operator actions for which HFEs are defined or modified to account for the context of fire scenarios in the Fire PRA, per SRs HRA-B1 and HRA-B2.	Closed	Since the full complement of OMAs to be included in the fire PRA has yet to be identified instrument set is incomplete.	Phase 1 (reviewed not met)	Phase 2/ Final (not met) ¹	<p>Finding resolved by documentation and model update. No impact to NFPA-805 analysis.</p> <p>Instrumentation relevant to operator actions in fire scenarios were identified and validated by completion of Post-Initiator Operator Action Questionnaires (P-IOAQ).</p> <p>A copy of the Human Failure Event (HFE) Post-Initiator Calculation (P-IC) and P-IOAQ were provided to current SRO licensed on-shift Operations Department personnel and Training Department personnel for use in validating HFE information accuracy.</p> <p>HFEs were assigned to Operations Department Operating Crews and /or Operations training personnel for review. Their reviews included ensuring indications, procedure selection and use, and activity performance man-power and timing is correct. Training personnel reviews included ensuring procedure selection and use were consistent with current training expectations, and the</p>	<p>This SR was designated as not met in the Phase 1 Peer review. The equipment selection (ES) element was fully reviewed during the Phase 2 Peer review and a limited scope review was performed during the Final Peer review.</p> <p>With respect to this SR the Final Peer review report states:</p> <p><i>The identification of instrumentation to support operator actions of omission, carried over from the internal events PRA model, is complete and comprehensive. While additional post fire recovery actions may be identified during the refinement of the fire PRA model, it appears unlikely that significant additional instrumentation will be needed to support these actions.</i></p> <p>The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.</p>

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						<p>training type and frequency are accurate.</p> <p>The final set of operator manual actions (OMA), records of the current operating crews, and training personnel are provided in notebook NB-PSA-HR, Ref (13).</p>	
ES-C2-01 (Finding)	IDENTIFY instrumentation associated with each operator action to be addressed, based on the following: fire-induced failure of any single instrument whereby one of the modes of failure to be considered is spurious operation of the instrument, and fire-induced failure, including spurious indication, even if they are not relevant to the HFEs for which instrumentation is identified within the scope defined by ES-C1, if the failure could cause an undesired operator action related to that portion of the plant design credited in the analysis.	Closed	<p>Instruments which provide supporting cues for operator actions have been identified and are being explicitly modeled in the fire PRA together with their associated power supplies</p> <p>Undesired operator actions potentially occurring as a result of spurious plant monitoring and alarm instruments do not appear to have been addressed at the present time. Neither has a process for identifying, screening and modeling such occurrences been discussed. This should be addressed.</p>	Phase 1 (reviewed not met)	Phase 2/ Final (not met) ¹	<p>Finding resolved by documentation and model update. No impact to NFPA-805 analysis.</p> <p>A simulator exercise was performed with current Palisades' license holders in which several scenarios were evaluated to determine how Operators would respond given spurious or false instrument indications. The results of these exercises were considered in the HFE development process. The process and evaluation results are documented in NB-PSA-HR, Ref (13).</p>	<p>This SR was designated as not met in the Phase 1 Peer review. The equipment selection (ES) element was fully reviewed during the Phase 2 Peer review and a limited scope review was performed during the Final Peer review.</p> <p>With respect to this SR the Final Peer review report states:</p> <p><i>Phase 2: The identification of operator actions of commission arising due to fire induced spurious alarms has not been completed as yet. While this is can be a fairly extensive effort very few alarms typically remain unscreened and require explicit modeling.</i></p> <p><i>Final: Extensive effort has been conducted. Documentation is progressing.</i></p> <p>The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.</p>
ES-D1-01 (Suggestion)	DOCUMENT the identified equipment in a manner that facilitates Fire PRA applications, upgrades, and Peer review and is sufficient to support the other	Closed	Plant specific validation of the rationale for excluding fire induced failure of trip should be provided under	Phase 1 (reviewed not met)	Phase 2/ Final (not met) ¹	<p>Suggestion resolved by documentation and model update. No impact to NFPA-805 analysis.</p> <p>MSO Scenario PLP-38 was revised</p>	<p>This SR was designated as not met in the Phase 1 Peer review. The equipment selection (ES) element was fully reviewed during the Phase 2 Peer review and a limited scope review was performed during</p>

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	<p>Fire PRA tasks so that</p> <p>(a) it is clear which equipment will be associated with determining initiating events in the Fire PRA plant response model for the postulated fires</p> <p>(b) the equipment and its failures including spurious operation or indication can be modeled appropriately</p> <p>(c) cables associated with the equipment can be identified</p> <p>(d) failure modes of interest for the equipment are clear so as to support circuit analyses if required</p> <p>Justifications are provided with regard to equipment considered but screened out of the Fire PRA including when meeting SR ES-A3 relevant to meeting SR IE-C4 in Part 2 for initiating events, meeting SR ES-B6 for the mitigating equipment to be credited in the Fire PRA, and using the "exception" under SR ES-C2 for instrumentation considerations.</p>		MSO PLP38.			as documented in Section 5.38 of 0247-07-0005.04, Ref (4). The PRA model was updated to include spurious operation of the AFW pump low suction pressure trips.	<p>the Final Peer review.</p> <p>The suggestion was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.</p>
FQ-A4-01 (Finding)	<p>QUANTIFY the fire-induced CDF in accordance with HLR-QU-A and its SRs in Part 2 with the following clarification:</p> <p>(a) quantification is to include the fire ignition frequency (per the IGN requirements) and fire-</p>	Closed	<p>Many of the accident sequences involve a Fire initiator which goes straight to core damage [i.e., there is no success path]. This implies a single fire event can fail both trains of safe</p>	Phase 2 (reviewed not met)	Final (not met) ¹	<p>Finding resolved by documentation and model update. No impact to NFPA-805 analysis.</p> <p>Recovery actions and proposed modifications have been incorporated into the final version</p>	<p>The fire risk quantification (FQ) element was reviewed in detail in both the Phase 2 and Final Peer reviews.</p> <p>The finding in this SR was provided during the Final Peer review.</p> <p>With respect to the FQ element the Final</p>

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	specific conditional damage probability factors (per the FSS requirements) (b) QU-A4 in Part 2 is to be met based on meeting HLR-HRA-D in 4-2.10 and DEVELOP a defined basis to support the claim of nonapplicability of any of the requirements under HLR-QU-A in Part 2.		shutdown capability. The CDF is too high to accept so many individual sequences with no success path. There has not been sufficient investigation done to indicate whether recovery actions are truly not possible, or simply not modeled yet.			of the fire PRA model. The final model has no sequences with a conditional core damage probability of 1. Results are described in Appendix B of O247-07-0005.01, "Fire Risk Quantification and Summary," Ref (1).	report states: <i>Overall process is consistent with prevailing good practices. Results are not final and thus certain SRs cannot be demonstrated to have been met. Continuing the refinement in process and planned provides confidence this technical element will meet the Standard.</i> The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.
FQ-B1-01 (Finding)	PERFORM the quantification in accordance with HLR-QU-B and its SRs in Part 2 and DEVELOP a defined basis to support the claim of nonapplicability of any of the requirements under HLR-QU-B in Part 2.	Closed	QU-B3 requires demonstration of acceptable truncation value by an iterative convergence process. The PLP fire PRA does not have this process. Although there is no indication the current truncation value is not acceptable, the convergence process exercise was not done.	Phase 1 (met)	Final (met)	Finding resolved by documentation update. No impact to NFPA-805 analysis. The convergence process to determine acceptable truncation limits for the final fire PRA model were documented in Section 6 of O247-07-0005.01, Ref (1). The truncation levels are based on convergence calculations per the ASME PRA standard, which states that "convergence can be considered sufficient when successive reductions in truncation value of one decade result in decreasing changes in CDF or LERF, and the final change is less than 5%".	The fire risk quantification (FQ) element was reviewed in detail in both the Phase 2 and Final Peer reviews. The finding in this SR was initially noted during Final Peer review and subsequently resolved by documenting the convergence process to determine acceptable truncation limits.
FQ-C1-01 (Finding)	ADDRESS dependencies during the Fire PRA plant response model quantification in	Open	PRA document NB-PSA-HR-1, Rev 3 provides an HEP dependency analysis and	Phase 1 (not reviewed)	Final (reviewed not met)	This finding is considered open given that the procedure development, modification	The fire risk quantification (FQ) element was reviewed in detail in both the Phase 2 and Final Peer reviews.

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	accordance with HLR-QU-C and its SRs in Part 2 and DEVELOP a defined basis to support the claim of nonapplicability of any of the requirements under HLR-QU-C in Part 2.		develops adjustment factors to apply to the cutsets. Multiple HFE's are evaluated for dependencies using the EPRI HRA calculator. Dependency adjustment factors are developed and applied in the cutsets. However, the "Q" model [which was reviewed] does not incorporate this work. Therefore the F&O and the not met assessment.			detailed development, and operations reviews are ongoing. A dependency analysis was completed to identify combinations of human failure events (HFEs) in which dependencies between actions may contribute to an increase in core damage frequency (CDF) when compared to the CDF calculated when screening values for human error probabilities (HEPs) are used. Dependencies between actions were assigned based on sequence-specific evaluations of cues, timing, location, and available resources, and the HEPs adjusted if necessary to represent the level of dependence; the CDF was then recalculated using the modified HEPs. HFEs not explicitly evaluated for dependence were assigned HEPs of 1 (i.e., the represented operator actions are assumed to fail with a probability of unity), and thus the resulting CDF represents an upper bound for the potential impact of dependencies upon the results. Shared cues conservatively assumed 100% dependence. This approach has identified important HFEs for which the completion of detailed human reliability analyses may be beneficial.	This finding remains open as detailed HEPs cannot be developed until updated procedures and modification details are complete.

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						The fire PRA HRA dependency analysis is documented in NB-PSA-HR, Ref (13). Screening values are still applied for fire HEPs pending development of final procedures, modifications, and operations reviews.	
FQ-E1-01 (Finding)	IDENTIFY significant contributors in accordance with HLR-QU-D and HLR-LE-F and their SRs in Part 2 with the following clarifications: (a) SR QU-D5a and QU-D5b of Part 2 are to be met including identification of which fire scenarios and which physical analysis units (consistent with the level of resolution of the Fire PRA such as fire area or fire compartment) are significant contributors (b) SR QU-D5b of Part 2 is to be met recognizing that "component" in Part 2 is generally equivalent to "equipment" in this Standard (c) SR QU-D3 for comparison to similar plants is not applicable (d) SR LE-F3 including the "Note" for that SR of Part 2 is to be met (1) following HLR-QU-D of Part 2 with the clarifications above concerning SRs QU-D5a and QU-D5b. (2) but the uncertainty	Closed	The discussion of dominant results is not presented in the 0247-07-0005.01. The results are categorized and sorted in terms of the dominant contributors [as per FQ-E1], but there is no discussion as required by this SR.	Phase 1 (not reviewed)	Final (reviewed not met) ¹	Finding resolved by documentation update. No impact to NFPA-805 analysis. Section 6.0 of 0247-07-0005.01, "Fire Risk Quantification and Summary," Ref (1), was revised to include a discussion of the dominant results.	The fire risk quantification (FQ) element was reviewed in detail in both the Phase 2 and Final Peer reviews. The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.

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	requirement and reference to Table 2-2.7-6(e) in Part 2 does not apply here. See 4-2.13. and DEVELOP a defined basis to support the claim of nonapplicability of any of the requirements under these sections in Part 2.						
FSS-A1-01 (Finding)	IDENTIFY all risk-relevant ignition sources, both fixed and transient, in each unscreened physical analysis unit within the global analysis boundary	Closed	The treatment of MCC's is not properly justified. FSS document 0247-07-0005.06 includes the statement "All Motor Control Centers (MCC) have been treated as closed, sealed and robust in which damage beyond the ignition source will not be postulated." No documentation of inspections of the MCC's, including the top of the cabinets have been provided to justify not propagating fires outside the MCC.	Phase 1 (met)	Final (met)	Finding resolved by documentation update. No impact to NFPA-805 analysis. Section 6.1 of 0247-07-0005.06, Ref (6), has been revised to include a reference to the walkdown information and photographs which provide a basis for this statement.	During the Phase 2 review, work on the fire scenario selection and analysis (FSS) element was in progress. A detailed assessment of the FSS supporting requirements was performed during the Final Peer review. This finding was identified during the Final Peer review and resolved by subsequent documentation update. From the Final Peer review summary: <i>Significant progress has been made in support of the FSS technical elements (Mathcad, detailed analysis on areas such as PAU 4 (1C); documentation is in progress). This progress allowed the peer review team to conduct a review of the fire scenario selection analysis.</i> <ul style="list-style-type: none"> • All supporting requirements in FSS have been reviewed, which is evidence of all the work conducted over the last period. • The inconsistencies identified in earlier reviews have been generally addressed. • The comments generated from this

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							<i>review are for the most part directed to individual SRs and should not impact the overall technical strategy currently in place to meet the FSS requirements.</i>
FSS-A3-01 (Finding)	If the exact routing of a cable (or group of cables) has not been established (see SRs CS-A10 and CS-A11), ASSUME that those cables fail for any fire scenario that has a damaging effect on any raceway or conduit where the subject cable might reasonably exist.	Closed	The process of mapping and accounting for targets in the Fire PRA is not documented. Technical discussion during the review period indicates that targets with unknown routing are mapped to all the scenarios within a PAU unless it has been verified that the target is not in a specific scenario. However, this process was not clearly demonstrated during the review and is not documented in report 0247-07-0005.06.	Phase 1 (reviewed not met)	Final (not met) ¹	Finding resolved by documentation update. No impact to NFPA-805 analysis. In the event that a cable's plant location cannot be established, the process of crediting by assumed routing was performed. The process involved determining, with a high degree of confidence, locations in the plant that do not contain the cable in question. This is accomplished by considering the likely routing of a cable and was performed by experienced plant personnel. In many cases, this assessment was made by grouping components into an appropriate surrogate category (as described in section 5.3 of the Model Development Report # 0247-07-0005.03, Ref (3)). The results of this detailed assessment are provided in Appendix I of the Model Development Report 0247-07-0005.03.	During the Phase 2 review, work on the fire scenario selection and analysis (FSS) element was in progress. A detailed assessment of the FSS supporting requirements was performed during the Final Peer review. The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.
FSS-B1-01 (Finding)	DEFINE and JUSTIFY the conditions that are assumed to cause MCR abandonment and/or reliance on ex-control room	Open	The current Fire PRA does not consider abandonment of the main control room due to lack of	Phase 1 (met)	Final (not met)	Finding open. Control room abandonment scenarios with respect to environmental effects have been addressed. However,	During the Phase 2 review, work on the fire scenario selection and analysis (FSS) element was in progress. A detailed assessment of the FSS supporting

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	operator actions including remote and/or alternate shutdown actions.		equipment/control due to fire damage.			the current model does not specifically identify scenarios that result in abandonment due to equipment damage.	requirements was performed during the Final Peer review. Equipment damage leading to control room abandonment is addressed in the Fire PRA model; however, this finding remains open pending formal development of the list of equipment whose fire induced damage could cause control room abandonment. The model includes logic at the component level for operation of key equipment outside of the control room as prescribed for control room abandonment such as local operation of equipment at EC-150, and for other local actions such as local control of P-8B. These sequences are evaluated for all scenarios, not only scenarios where the control room abandonment event tree is employed (control room evacuation due to smoke or high temperature).
FSS-B2-01 (Finding)	SELECT one or more fire scenarios, either in the MCR or elsewhere, leading to MCR abandonment and/or a reliance on ex-control room operator actions including remote and/or alternate shutdown actions, consisting of a combination of an ignition source (or group of ignition sources), such that the selected scenarios provide reasonable assurance that the MCR abandonment fire risk	Closed	The CCDP quantification does not reflect the human error probabilities associated with control room abandonment and the fire impacted cables may not reflect the equipment/control that may or may not be available after abandonment.	Phase 1 (reviewed met)	Final (not met) ¹	Finding resolved by documentation and model update. No impact to NFPA-805 analysis. Main Control room abandonment scenarios have been postulated based on damage to equipment and controls. Postulated fires in the Control Room (CR) have the potential to challenge habitability or visibility due to smoke generation or excessive heat. An abandonment analysis (Attachment 1 of 0247-07-0005.06,	A finding was identified during the initial Peer review and modified as part of the Final Peer review. As indicated the identified issue was corrected. This is consistent with the Peer review team final assessment for FSS which indicated: <i>The comments generated from this review are for the most part directed toward individual SRs and should not impact the overall technical strategy currently in place to meet the FSS requirements.</i> The specific concern cited by the peer

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	contribution can be realistically characterized.					Ref (6)) was performed to determine the response of the CR envelope given a range of possible fire events. The analysis considered three different operating states of the CR mechanical ventilation system and three different configurations of the CR Door. Based on this assessment, three scenarios, each involving multiple cabinets, were implemented into the model. Human actions that could not be performed prior to the time control room abandonment was necessary were considered failed.	review team during the review was that only individual cabinet failures were considered for control room abandonment scenarios. The revised treatment considers three multiple cabinet failure groups which when combined encompass all the cabinets in the control room. The quantification for these three scenarios reflect the human error probabilities associated with control room abandonment and the fire impacted cables that are not available after abandonment.
FSS-C3-01 (Suggestion)	JUSTIFY the heat release rate profile stages included in the analysis (i.e., fire growth, steady burning, or decay stages).	Closed	The supporting requirement states that the growth stages included in the analysis should be justified. The justification is not included in the documentation.	Phase 1 (reviewed as not applicable)	Final (met)	Suggestion resolved by documentation update. No impact to NFPA-805 analysis The Model Development Report, Ref (3), was revised to include a discussion of the treatment for the growth stages of a fire's heat release rate.	During Phase 1 fire burnout times appear not to be a factor affecting the analysis results. Subsequent to the Phase 1 review, the fire growth stages were applied in the analysis. Hence, the Phase 1 not applicable determination changed to a "met", satisfying capability category II/III. This suggestion was closed prior to the LAR submittal.
FSS-C4-01 (Finding)	If a severity factor is credited in the analysis, ENSURE that (a) the severity factor remains independent of other quantification factors	Closed	The severity factor for hotwork fires of 0.01 is not properly justified. The documentation does not provide a description how	Phase 1 (reviewed not met)	Final (met)	Finding resolved by documentation and model update. No impact to NFPA-805 analysis. The 0.01 severity factor for hotwork is no longer applied in	During the Phase 2 review, work on the fire scenario selection and analysis (FSS) element was in progress. A detailed assessment of the FSS supporting requirements was performed during the

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	(b) the severity factor reflects the fire event set used to estimate fire frequency (c) the severity factor reflects the conditions and assumptions of the specific fire scenarios under analysis, and (d) a technical basis supporting the severity factor's determination is provided		the value was calculated and an explanation of why the value remains independent of the generic ignition frequency.			final fire PRA model. Severity factors are now based on NUREG/CR-6850. Section 8.3 of 0247-07-0005.06, Ref (6), was updated to reflect this change.	Final Peer review. This finding was identified during the Final Peer review and resolved by subsequent documentation and model update.
FSS-C5-01 (Finding)	JUSTIFY that the damage criteria used in the Fire PRA are representative of the damage targets associated with each fire	Closed	No scenario is evaluated for conditions where the target damage criteria is that of sensitive electronics.	Phase 1 (reviewed met)	Final (met)	Finding resolved by documentation update. No impact to NFPA-805 analysis. Section 5.2 of 0247-07-0005.06, Ref (6), was revised to provide further basis for excluding scenarios with the sensitive electronics criteria. The exclusion is based primarily on physical cabinet distances from fire ignition sources and that these targets are generally within an enclosure that provides some protection from the heat source.	This finding was identified during the Final Peer review. As indicated the identified issue was corrected. This is consistent with the Peer review team final assessment for FSS which indicated: <i>The comments generated from this review are for the most part directed toward individual SRs and should not impact the overall technical strategy currently in place to meet the FSS requirements.</i>
FSS-C7-01 (Finding)	If multiple suppression paths are credited, EVALUATE and PROPERLY MODEL dependencies among the credited paths including dependencies associated with recovery of a failed fire suppression system, if such recovery is credited.	Closed	No evaluation of independence of suppression paths has been included in the analysis.	Phase 1 (reviewed as not applicable)	Final (not met) ¹	Finding resolved by documentation update. No impact to NFPA-805 analysis. Section 10.1 of 0247-07-0005.06, "Fire Scenario Development", Ref (6), was revised to describe the treatment of dependence between suppression paths in the scenario	Suppression capabilities were initially not credited. Subsequent analysis identified the treatment of dependence between suppression paths in the scenario suppression event tree as described in the disposition column. The finding was not fully resolved for the

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SR	Topic (ASME Standard Category II Text)	Status ²	Finding or Suggestion	<i>SR Initial Peer Review Status</i>	<i>SR Subsequent Peer Review Status</i>	Disposition	<i>Supplemental Information</i>
						suppression event tree.	Final Peer review, but was subsequently closed prior to the LAR submittal.
FSS-C8-01 (Finding)	If raceway fire wraps are credited, (a) ESTABLISH a technical basis for their fire-resistance rating, and (b) CONFIRM that the fire wrap will not be subject to either mechanical damage or direct flame impingement from a high-hazard ignition source unless the wrap has been subject to qualification or other proof of performance testing under these conditions.	Closed	The report does not discuss the treatment of fire barriers credited in the analysis.	Phase 1 (reviewed as not applicable)	Final (not met) ¹	Finding resolved by documentation update. No impact to NFPA-805 analysis. Documentation was added to Section 2.2 of report 0247-07-0005.02, Ref (2), which discusses the treatment of fire barriers credited in the analysis. Credit for raceway fire barriers, thermal wraps or other localized protection features have not been credited in identifying a physical analysis unit. Additionally, as can be noted in the Fire Scenario Development Report (0247-07-0005.06, Ref (6)), no credit is taken for the presence of raceway fire wraps.	During the Phase 2 review, work on the fire scenario selection and analysis (FSS) element was in progress. A detailed assessment of the FSS supporting requirements was performed during the Final Peer review. The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.
FSS-D1-01 (Finding)	SELECT appropriate fire modeling tools for estimating fire growth and damage behavior considering the physical behaviors relevant to the selected fire scenarios.	Closed	Although in general appropriate fire models have been selected, the justification for the use of the selected tools needs to be improved. This finding is specifically applicable to the use of the time to damage models programmed in MathCAD, which are calculations that have not been documented and	Phase 1 (reviewed met)	Final (not met) ¹	Finding resolved by documentation update. No impact to NFPA-805 analysis. Appendix E of 0247-07-0005.06, "Fire Scenario Development," Ref (6), was updated to include further discussion on the applicability of the MathCAD tool for calculation of the non-suppression probability.	During the Phase 2 review, work on the fire scenario selection and analysis (FSS) element was in progress. A detailed assessment of the FSS supporting requirements was performed during the Final Peer review. The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.

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			reviewed by the industry.				
FSS-D2-01 (Finding)	USE fire models that have sufficient capability to model the conditions of interest and only within known limits of applicability	Closed	No fire detection analysis has been conducted in support of the activation of fixed suppression systems or the time to smoke detection.	Phase 1 (reviewed met)	Final (not met) ¹	Finding resolved by documentation update. No impact to NFPA-805 analysis. Section 10.1 of 0247-07-0005.06, "Fire Scenario Development," Ref (6), was revised to describe the treatment of automatic suppression system activation times on the suppression probability.	During the Phase 2 review, work on the fire scenario selection and analysis (FSS) element was in progress. A detailed assessment of the FSS supporting requirements was performed during the Final Peer review. The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.
FSS-D4-01 (Finding)	ESTABLISH a technical basis for fire modeling tool input values used in the analysis given the context of the fire scenarios being analyzed.	Closed	This finding is associated with treatment of transient fires. 1) Fire elevation for transient fires has been assumed to be on the floor. 2) the heat release rate for transient fires have been assumed to be characterized by electric motor fires. These are important input values for determining zone of influence.	Phase 1 (reviewed met)	Final (met)	Finding resolved by documentation update. No impact to NFPA-805 analysis. Section 7.0 of 0247-07-0005.06, "Fire Scenario Development," Ref (6), was revised to describe the treatment of fire elevation and heat release rate for transient fires. The transient heat release rate was increased to 317 kW; 98th percentile heat release rate for transient combustibles, in lieu of the value for electric motor fires.	This finding was identified during the Final Peer review. As indicated the identified issue was corrected. This is consistent with the Peer review team final assessment for FSS which indicated: <i>The comments generated from this review are for the most part directed toward individual SRs and should not impact the overall technical strategy currently in place to meet the FSS requirements.</i>
FSS-D7-01 (Finding)	In crediting fire detection and suppression systems, USE generic estimates of total system unavailability provided that (a) the credited system is installed and maintained in accordance with applicable codes	Closed	Items a, b, and c in the Cat II requirement are not explicitly address in the analysis.	Phase 1 (reviewed met CC I)	Final (met)	Finding resolved by documentation update. No impact to NFPA-805 analysis. Section 10.1 of 0247-07-0005.06, "Fire Scenario Development," Ref (6), was revised to describe the basis for availability of automatic	During the Phase 2 review, work on the fire scenario selection and analysis (FSS) element was in progress. A detailed assessment of the FSS supporting requirements was performed during the Final Peer review. This finding was identified during the Final

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	and standards (b) the credited system is in a fully operable state during plant operation, and (c) the system has not experienced outlier behavior relative to system unavailability					suppression systems and the impact on suppression probability, including a discussion of outlier behavior.	Peer review and resolved by subsequent documentation update.
FSS-D8-01 (Finding)	INCLUDE an assessment of fire detection and suppression systems effectiveness in the context of each fire scenario analyzed.	Closed	The Fire PRA currently does not include an assessment of the effectiveness of the fire suppression and detection systems credited in the analysis.	Phase 1 (reviewed not applicable)	Final (not met) ¹	Finding resolved by documentation update. No impact to NFPA-805 analysis. Section 10.1 of 0247-07-0005.06, "Fire Scenario Development," Ref (6), was revised to provide an assessment of the effectiveness of automatic suppression systems and the impact on suppression probability.	During the Phase 2 review, work on the fire scenario selection and analysis (FSS) element was in progress. A detailed assessment of the FSS supporting requirements was performed during the Final Peer review. The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.
FSS-E3-01 (Finding)	PROVIDE a mean value of, and statistical representation of, the uncertainty intervals for the parameters used for modeling the significant fire scenarios.	Open	A qualitative characterization of the parameters used in the fire modeling in significant fire scenarios have not been completed as the Fire PRA still needs detailed analysis to reduce the plant CDF. The qualitative discussion required to meet category 1 should be completed once key scenarios are identified.	Phase 1 (reviewed met CC I)	Final (not met)	Finding open as the characterization has not been completed. No impact to NFPA-805 analysis as the results are based on the point estimate values which approximate the mean values. A characterization of the parameters used in the fire modeling in significant fire scenarios has not been completed. However, it is not expected that refinement of the parameter uncertainty intervals will impact the fire PRA conclusions.	During the Phase 2 review, work on the fire scenario selection and analysis (FSS) element was in progress. A detailed assessment of the FSS supporting requirements was performed during the Final Peer review. This finding was identified during the Final Peer review and remains open, but as indicated this finding does not impact the point estimate values used in the NFPA 805 analysis.

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FSS-F1-01 (Finding)	DETERMINE if any locations within the Fire PRA global analysis boundary meet both of the following two conditions: (a) exposed structural steel is present (b) a high-hazard fire source is present in that location and If such locations are identified, SELECT one or more fire scenario(s) that could damage, including collapse, the exposed structural steel for each identified location.	Closed	The report 0247-07-0005.08, which documents structural steel analysis, does not describe what is a "high hazard fire". Consequently, it is not clear what specific fires were considered as high hazard during the walkdowns and analysis to conclude that a scenario should be quantified in the analysis.	Phase 1 (reviewed not met)	Final (met)	Finding resolved by documentation update. No impact to NFPA-805 analysis. The definition of a significant fire hazard was added to Section 2.0 of the "Exposed Structural Steel Analysis Report", 0247-07-0005.08, Ref (8): The following details have been added to the report, "For the purposes of this analysis, a significant fire hazard was defined as having at least the same or greater combustible loading equivalent to 50 gallons of fuel oil, which is in excess of a heat value of 7E+6 BTU [5]."	During the Phase 2 review, work on the fire scenario selection and analysis (FSS) element was in progress. A detailed assessment of the FSS supporting requirements was performed during the Final Peer review. The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.
FSS-F2-01 (Finding)	If, per SR FSS-F1, one or more scenarios are selected, ESTABLISH and JUSTIFY criteria for structural collapse due to fire exposure.	Closed	The criteria for identifying and analyzing fire scenarios associated with damage to structural steel is not clearly documented. The criteria utilized has been inferred from the analysis and is considered appropriate. The criteria includes 1) possibility of a high hazard fire, 2) exposed structural steel, and 3) a steel temperature of 1000 F.	Phase 1 (reviewed met CC 1)	Final (met)	Finding resolved by documentation update. No impact to NFPA-805 analysis. The appropriate criteria for fire damage to structural steel were added to Section 3.0 of the, "Exposed Structural Steel Analysis Report," 0247-07-0005.08, Ref (8). The following criteria guidelines have been added to "1) Presence of significant fire hazard (Section 2.0), 2) Presence of exposed structural steel, 3) Steel Surface temperature in excess of 1000°F for fire configuration" to clearly document the criteria used for	During the Phase 2 review, work on the fire scenario selection and analysis (FSS) element was in progress. A detailed assessment of the FSS supporting requirements was performed during the Final Peer review. The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.

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						identifying and analyzing fire scenarios associated with structural steel damage. The one thousand degree criteria is consistent with the statement provided in Reference 2 of the Structural Steel Analysis from NIST, "Fire Protection of Structural Steel in High – Rise Buildings."	
FSS-F3-01 (Finding)	If, per SR FSS-F1, one or more scenarios are selected, COMPLETE a quantitative assessment of the risk of the selected fire scenarios in a manner consistent with the FQ requirements, including collapse of the exposed structural steel.	Closed	The four scenarios selected for evaluation have been screened and therefore not included in the CDF calculation for the plant. The screening process for one of the scenarios is based on the frequency of such an event (PAU-23, turbine generator fire). The calculated frequency is not based on fire ignition frequencies documented in current Fire PRA EPRI guidance.	Phase 1 (reviewed not met)	Final (met)	Finding resolved by documentation update. No impact to NFPA-805 analysis. Section 3.2.2 of the Structural Steel Analysis Report, Ref (8), was revised using the frequencies found in NUREG/CR-6850 (Vol. 2) and EPRI TR 1016735 to calculate a new turbine-generator catastrophic fire frequency of 3.13E-6 /yr and 1.59E-6 /yr, respectively. Site Specific frequencies documents in the FIF and Plant Partitioning Report 0247-07-0005.02, Ref (2), were implemented in the quantitative assessment of the FPRA. Quantitative calculations and factors applied are also documented in section 3.2.2 of the Structural Steel Report.	During the Phase 2 review, work on the fire scenario selection and analysis (FSS) element was in progress. A detailed assessment of the FSS supporting requirements was performed during the Final Peer review. The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.
FSS-G2-01 (Finding)	DEFINE screening criteria for multicompartiment fire scenarios that provide reasonable	Closed	Elements of the qualitative criteria require further evaluation. Specifically,	Phase 1 (not reviewed)	Final (met)	Finding resolved by documentation update. No impact to NFPA-805 analysis.	During the Phase 2 review, work on the fire scenario selection and analysis (FSS) element was in progress. A detailed

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	assurance that the contribution of the screened physical analysis unit combinations are of low risk significance.		"exposing PAU is outdoors; no HGL postulated" and "exposed PAU has a sufficient volume that any hot gases that may enter PAU would dissipate before significant damage would occur." In the former, the qualitative assessment should include a discussion of yard transformer fires near turbine building walls. In the later, assessment of hot gas layer conditions should be quantitatively addressed.			The screening criteria in Table 3-1 of 0247-07-0005.07, "Multi-Compartment Analysis," Ref (7), were revised to add discussion of outdoor transformers near turbine building walls and hot gas layer. A quantitative definition for 'sufficient volume' was also provided. This latter criterion is only applied in two areas where it was subsequently verified that a hot gas layer could not form in less than 60 minutes.	assessment of the FSS supporting requirements was performed during the Final Peer review. The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.
FSS-G2-02 (Finding)	DEFINE screening criteria for multicompartment fire scenarios that provide reasonable assurance that the contribution of the screened physical analysis unit combinations are of low risk significance.	Closed	The quantitative screening criteria do not include consideration for the cumulative risk screened out due to multi compartment combinations. Currently, multi compartments are screened at a threshold of 1E-7, but there is no verification of the cumulative risk screened.	Phase 1 (not reviewed)	Final (met)	Finding resolved by documentation update. No impact to NFPA-805 analysis. Revised Section 3.5 of 0247-07-0005.07, "Multi-Compartment Analysis," Ref (7), to describe the cumulative impact of CDF screening at 1E-7. The total CDF impact from the screened areas is also less than 1E-7/yr.	During the Phase 2 review, work on the fire scenario selection and analysis (FSS) element was in progress. A detailed assessment of the FSS supporting requirements was performed during the Final Peer review. The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.
FSS-G4-01 (Finding)	If passive fire barriers with a fire-resistance rating are credited in the Fire PRA (a) CONFIRM that the allowed	Closed	The SR requires confirmation of allowed credit, assessment of effectiveness and reliability,	Phase 1 (not reviewed)	Final (not met) ¹	Finding resolved by documentation update. No impact to NFPA-805 analysis. Revised Appendix A of 0247-07-	During the Phase 2 review, work on the fire scenario selection and analysis (FSS) element was in progress. A detailed assessment of the FSS supporting

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	credit is consistent with the fire-resistance rating as demonstrated by conformance to applicable test standards (b) ASSESS the effectiveness, reliability, and availability of any passive fire barrier feature credited, and (c) EVALUATE the potential for fire-induced or random failure of credited passive fire barrier features		and evaluation of random failures of passive barriers. No analysis has been presented or documented addressing these requirements.			0005.07, Ref (7), to describe the applicability and basis for the random failure probability of passive fire barriers from NUREG/CR-6850 used in the multi-compartment analysis.	requirements was performed during the Final Peer review. The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.
FSS-G5-01 (Finding)	For any scenario selected per FSS-G3, if the adjoining physical analysis units are separated by active fire barrier elements, QUANTIFY the effectiveness, reliability, and availability of the active fire barrier element.	Closed	The SR requires quantification of effectiveness, reliability and availability of the active fire barriers. No analysis has been presented or documented addressing these requirements in addition of using the generic values in NUREG/CR-6850.	Phase 1 (not reviewed)	Final (not met) ¹	Finding resolved by documentation update. No impact to NFPA-805 analysis. Revised Appendix A of 0247-07-0005.07, Ref (7), to describe the applicability and basis for the random failure probability of active fire barriers from NUREG/CR-6850 used in the multi-compartment analysis (MCA). Table 3-4 of this document reflects the quantification of MCA interaction failures.	During the Phase 2 review, work on the fire scenario selection and analysis (FSS) element was in progress. A detailed assessment of the FSS supporting requirements was performed during the Final Peer review. The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.
FSS-G6-01 (Suggestion)	QUANTIFY the risk contribution of any selected multicompartment fire scenarios in a manner consistent with the FQ requirements.	Closed	LERF results are not reported in the multi compartment analysis report, but they have been calculated.	Phase 1 (not reviewed)	Final (met)	Finding resolved by documentation update. No impact to NFPA-805 analysis. Updated report 0247-07-0005.07, Ref (7), to report the LERF results from the final fire PRA model in Section 4.0 of the multi-	During the Phase 2 review, work on the fire scenario selection and analysis (FSS) element was in progress. A detailed assessment of the FSS supporting requirements was performed during the Final Peer review. The suggestion was not fully resolved for the Final Peer review, but was

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						compartment analysis.	subsequently closed prior to the LAR submittal.
FSS-H2-01 (Finding)	DOCUMENT a basis for target damage mechanisms and thresholds used in the analysis, including references for any plant-specific or target-specific performance criteria applied in the analysis.	Closed	The treatment of hydrogen fires is incorrectly documented in report 0247-07-0005.06.	Phase 1 (met CC I)	Final (met)	Finding resolved by documentation update. No impact to NFPA-805 analysis. The documentation for treatment of hydrogen fires in report 0247-07-0005.06, Ref (6), was updated to be consistent with approach applied in the fire model which complies with Appendix N of NUREG/CR-6850.	During the Phase 2 review, work on the fire scenario selection and analysis (FSS) element was in progress. A detailed assessment of the FSS supporting requirements was performed during the Final Peer review. The finding was closed to meet CC II prior to the LAR submittal.
FSS-H5-01 (Finding)	DOCUMENT fire modeling output results for each analyzed fire scenario, including the results of parameter uncertainty evaluations (as performed) in a manner that facilitates Fire PRA applications, upgrades, and Peer review.	Closed	The Fire PRA is in process. Fire modeling results are not complete. Documentation of output results should be consistent with current approach for scenarios analyzed while the fire PRA is completed.	Phase 1 (met)	Final (met)	Finding resolved by documentation update. No impact to NFPA-805 analysis. The final fire modeling output results for each analyzed fire scenario were documented in Section 6.0 of report 0247-07-0005.01, Ref (1). Additionally, Section 7.1 of Ref (1) was revised to include a statistical representation of the uncertainty intervals used for modeling the significant fire scenarios from the final fire PRA model.	This finding was identified during the Final Peer review because additional refinements were still anticipated following the Final Peer review. As indicated by the met status, however, the format of the existing results discussion was acceptable.
FSS-H9-01 (Finding)	DOCUMENT key sources of uncertainty for the FSS technical element.	Closed	Sources of uncertainty in the fire modeling analysis are not documented in 0247-07-0005.06.	Phase 1 (not reviewed)	Final (not met) ¹	Finding resolved by documentation update. No impact to NFPA-805 analysis. Sources of uncertainty in the fire scenario selection process were	This supporting requirement was not reviewed during the Phase 1 Peer review as the model progress was not sufficiently complete. This finding was identified during the Final Peer review, but was

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						documented in report 0247-07-0005.01, "Fire Risk Quantification and Summary," Ref (1).	subsequently addressed prior to the LAR submittal.
HRA-A2-01 (Finding)	For each fire scenario, IDENTIFY any new fire-specific safe shutdown actions called out in the plant fire response procedures (e.g., de-energizing equipment per a fire procedure for a specific fire location) in a manner consistent with the scope of selected equipment from the ES and PRM elements of this Standard, and in accordance with HLR-HR-E and its SRs in Part 2 with the following clarifications: (a) where SR HR-E1 discusses procedures, this is to be extended to procedures for responding to fires (b) where SR HR-E1 mentions "in the context of the accident scenarios," specific attention is to be given to the fact that these are fire scenarios (c) another source for SR HR-E1 is likely to be the current Fire Safe Shutdown/Appendix R analysis and DEVELOP a defined basis to support the claim of nonapplicability of any of the requirements under HLR-HR-E in	Closed	The identification of fire response actions is not yet complete. Additional fire safe shutdown actions are still being identified as the Fire PRA analysis continues to be refined.	Phase 1 (reviewed not met)	Final (met)	Finding resolved by documentation and model update. No impact to NFPA-805 analysis. The final identification of fire response actions was completed and documented in notebook NB-PSA-HR-1, Ref (13). These actions were incorporated into the final fire PRA model where appropriate.	During the Phase 2 review, work on the human reliability analysis (HRA) element was in progress. A detailed assessment of the HRA supporting requirements was performed during the Final Peer review. The Final Peer review summary report noted: <i>The review did not identify issues with the fundamental approaches being used [for] the completed portion of the HRA assessment.</i>

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HRA-A3-01 (Finding)	For each fire scenario, IDENTIFY any new, undesired operator action that could result from spurious indications resulting from failure of a single instrument, per SR ES-C2 (e.g., due to verbatim compliance with the instruction in an alarm response procedure, when separate confirmation is not available or required).	Closed	Section 6.3 of the HRA Notebook discusses the review that was performed with the licensed operators for the identification of the new, undesired operator actions in response to spurious indications. However, the detailed documentation for the evaluation process and the justifications for the conclusion that no undesired operator actions will be taken in these instrumentation failure conditions was not yet completed for the reviewers to confirm the conclusion that no undesired operator actions need to be considered.	Phase 1 (met CC I)	Final (met CC I) ¹	Finding resolved by documentation and model update. No impact to NFPA-805 analysis. A simulator exercise was performed with current Palisades' license holders in which several scenarios were evaluated to determine how Operators would respond given spurious or false instrument indications. The results of these exercises were considered in the HFE development process. The process and evaluation results are documented in NB-PSA-HR, Ref (13).	During the Phase 2 review, work on the human reliability analysis (HRA) element was in progress. A detailed assessment of the HRA supporting requirements was performed during the Final Peer review. The Final Peer review summary report noted: <i>The review did not identify issues with the fundamental approaches being used [for] the completed portion of the HRA assessment.</i> The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.
HRA-A4-01 (Finding)	TALK THROUGH (i.e., review in detail) with plant operations and training personnel the procedures and sequence of events to confirm that interpretation of the procedures relevant to actions identified in SRs HRA-A1, HRA-A2, and HRA-A3 is consistent with plant operational and training	Open	As the fire scenario refinement continues, additional fire response actions will be identified and evaluated, which will require the performance of additional operator interviews. As such, this task is not fully completed yet. Also, operator interviews for	Phase 1 (reviewed not met)	Final (not met)	Finding open, given that the procedures, modification detail, operations review, and detailed HRA model development are not yet complete. A copy of the Human Failure Event (HFE) Post-Initiator Calculation (P-IC) and associated Post-Initiator Operator Action Questionnaire (P-IOAQ) were provided to current	During the Phase 2 review, work on the human reliability analysis (HRA) element was in progress. A detailed assessment of the HRA supporting requirements was performed during the Final Peer review. The Final Peer review summary report noted: <i>The review did not identify issues with the fundamental approaches being used [for] the completed portion of the HRA</i>

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	practices.		<p>those fire response actions that are still using screening values (e.g., ACP-DGOT-B5B-DG, ACP-PMOE-383-11A, ACP-PMOE-383-12A, AFW-PMOA-P8B-CRAB, etc.) may not have been completed.</p> <p>(Note: Specific HEP basic event identifiers cited by the Peer review team may have been subsequently renamed or removed from the model as part of the F&O resolution process.)</p>			<p>SRO licensed on-shift Operations Department personnel and Training Department personnel for use in validating HEP information accuracy.</p> <p>HFEs were assigned to Operations Department Operating Crews and /or Operations training personnel for review. Their reviews included ensuring indications, procedure selection and use, and activity performance man-power and timing is correct. Training personnel reviews included ensuring procedure selection and use were consistent with current training expectations, and the training type and frequency are accurate.</p> <p>Operator comments were reviewed and discussed with PRA personnel and proposed resolutions forwarded to the comment initiator for further comment or acceptance. Comment acceptance is documented by their initialing the HFE Validation form.</p> <p>Significant HFEs were evaluated and developed in further detail. Screening values are still applied for fire HEPs pending development of final procedures, modifications, and operations reviews.</p> <p>The records of the current operating crews and training</p>	<p><i>assessment.</i></p> <p>This finding remains open as indicated in the Disposition column.</p>

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						personnel are provided in notebook NB-PSA-HR, Ref (13).	
HRA-B2-01 (Finding)	INCLUDE new fire-related safe shutdown HFEs corresponding to the actions identified per SR HRA-A2 in the Fire PRA plant response model in a manner consistent with 4-2.2 and Section 4-2 and in accordance with HLR-HR-F and its SRs in Part 2 and DEVELOP a defined basis to support the claim of nonapplicability of any of the requirements under HLR-HR-F in Part 2.	Closed	Identification of new, fire response actions and incorporation of the identified fire response actions into the Fire PRA model are not completed.	Phase 1 (reviewed not met)	Final (not met) ¹	Finding resolved by documentation and model update. No impact to NFPA-805 analysis. The final identification of fire response actions was completed and documented in notebook NB-PSA-HR-1, Ref (13). These actions were incorporated into the final fire PRA model where appropriate.	During the Phase 2 review, work on the human reliability analysis (HRA) element was in progress. A detailed assessment of the HRA supporting requirements was performed during the Final Peer review. The Final Peer review summary report noted: <i>The review did not identify issues with the fundamental approaches being used [for] the completed portion of the HRA assessment.</i> The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.
HRA-B3-01 (Finding)	COMPLETE the definition of the HFEs identified in SRs HRA-B1 and HRA-B2 by specifying the following, taking into account the context presented by the fire scenarios in the Fire PRA: (a) accident sequence specific timing of cues, and time window for successful completion (b) accident sequence specific procedural guidance (e.g., AOPs, EOPs) (c) the availability of cues or other indications for detection and evaluation errors (d) the specific high-level tasks	Open	The impact of loss of all redundant/diverse instrumentation on HEPs has been modeled by OR-ing the instrumentation logic with its associated HEP. Thus, in cases where total instrument failure (by hardware fault or fire) occurs (including the failure of the only instrument available), the HEP is appropriately failed. However, the failure impact of partial instrumentation on an HEP has not yet been	Phase 1 (reviewed not met)	Final (not met)	Finding open, given that the procedures, modification detail, operations review, and detailed HRA model development are not yet complete. The simulator exercise performed with current Palisades' license holders evaluated operator response to several scenarios with false, partial or total loss of instrument indications. The results of these exercises were considered in the HFE development process for purposes of developing timing of cues and time windows. The final developed fire HFEs	During the Phase 2 review, work on the human reliability analysis (HRA) element was in progress. A detailed assessment of the HRA supporting requirements was performed during the Final Peer review. The Final Peer review summary report noted: <i>The review did not identify issues with the fundamental approaches being used [for] the completed portion of the HRA assessment.</i> This finding remains open as indicated in the Disposition column.

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	(e.g., train-level) required to achieve the goal of the response.		implemented. There are cases in the model where multiple instruments provide cues to the operators to perform actions. Operator actions based on false indication have not been considered. In addition, HFEs modeled using screening values (for some of the fire response actions identified; e.g., ACP-DGOT-B5B-DG, FPS-PMOE-START-L, ACP-PMOE-383-12A, ACP-PMOE-383-11A, etc.) and those fire response actions that will be identified as the fire scenario refinement continues have not yet accounted for the scenario context including timing, procedural guidance, instrumentation, task complexity, etc. Also, HRA Calculator evaluation sheets cannot be located for PCP-PMOF-P-50X-LOC and EDG-PMOE-PORT-PUMP, and AFW-AVOA-CV-2010-D, SWS-AVOA-CV-0823-26, and SWS-AVOB-CV-082447M still need to be modified for fire related conditions.			incorporate task complexity and procedural guidance as documented in the Post-Initiator Operator Action Questionnaire (P-IOAQ) provided to current SRO licensed on-shift Operations Department personnel and Training Department personnel for use in validating HFE information accuracy. Significant HFEs were evaluated and developed in further detail. Screening values are still applied for fire HEPs pending development of final procedures, modifications, and operations reviews. The final list of fire HFEs and their associated documentation are provided in NB-PSA-HR, Ref (13).	

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HRA-C1-01 (Finding)	For each selected fire scenario, QUANTIFY the HEPs for all HFEs and ACCOUNT FOR relevant fire-related effects using detailed analyses for significant HFEs and conservative estimates (e.g., screening values) for nonsignificant HFEs, in accordance with the SRs for HLR-HR-G in Part 2 set forth under at least Capability Category II, with the following clarification: (a) Attention is to be given to how the fire situation alters any previous assessments in nonfire analyses as to the influencing factors and the timing considerations covered in SRs HR-G3, HR-G4, and HR-G5 in Part 2 And (b) DEVELOP a defined basis to support the claim of nonapplicability of any of the requirements under HLR-HRG in Part 2.	Open	Fire response HFEs modeled with screening values have not yet been evaluated in a manner accounting for relevant PSFs (e.g., ACP-DGOT-B5B-DG, FPS-PMOE-START-L, ACP-PMOE-383-11A, ACP-PMOE-383-12A, etc.). Also, HRA Calculator evaluation sheet cannot be located for PCP-PMOF-P-50X-LOC and EDG-PMOE-PORT-PUMP, and AFW-AVOA-CV-2010-D, SWS-AVOA-CV-0823-26, and SWS-AVOB-CV-082447M still need to be modified for fire related conditions. This task is not completed.	Phase 1 (reviewed not met)	Final (met CC I)	Finding open, given that the procedures, modification detail, operations review, and detailed HRA model development are not yet complete. Significant HFEs were evaluated and developed in further detail as documented in NB-PSA-HR, Ref (13). Screening values are still applied for fire HEPs pending development of final procedures, modifications, and operations reviews.	During the Phase 2 review, work on the human reliability analysis (HRA) element was in progress. A detailed assessment of the HRA supporting requirements was performed during the Final Peer review. The Final Peer review summary report noted: <i>The review did not identify issues with the fundamental approaches being used [for] the completed portion of the HRA assessment.</i> This finding remains open as indicated in the Disposition column.
HRA-D1-01 (Finding)	INCLUDE operator recovery actions that can restore the functions, systems, or components on an as-needed basis to provide a more realistic evaluation of significant accident sequences.	Closed	Identification and evaluation of recovery actions for risk significant scenarios are expected to continue as the refinement of fire scenario analysis continues. Currently, some of the top core damage fire scenarios still do not account for	Phase 1 (reviewed not met)	Final (not met) ¹	Finding resolved by documentation and model update. No impact to NFPA-805 analysis. The final identification of fire response actions was completed and documented in notebook NB-PSA-HR-1, Ref (13). These actions were incorporated into the final fire PRA model where appropriate.	During the Phase 2 review, work on the human reliability analysis (HRA) element was in progress. A detailed assessment of the HRA supporting requirements was performed during the Final Peer review. The Final Peer review summary report noted: <i>The review did not identify issues with the fundamental approaches being used [for]</i>

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			realistic recovery actions. This task is not completed yet.				<i>the completed portion of the HRA assessment.</i> The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.
HRA-D2-01 (Finding)	INCLUDE operator recovery actions that can restore the functions, systems, or components on an as-needed basis to provide a more realistic evaluation of significant accident sequences (same as HRA-D1-01).	Open	Many of the operator recovery actions associated with fire response are still modeled with screening values; i.e., not accounting for all of the relevant PSFs. Dependency analysis has been performed for the current set of fire scenarios and operator actions in the "T" model. The results generated from the "Q" model did not incorporate the dependency analysis. The dependency analysis needs to be re-analyzed before finalization of the Fire PRA model. This task is not complete yet. Also, HRA Calculator evaluation sheets cannot be located for PCP-PMOF-P-50X-LOC and EDG-PMOE-PORT-PUMP, and AFW-AVOA-CV-2010-D, SWS-AVOA-CV-0823-26, and SWS-AVOB-CV-082447M still need to be modified for fire related conditions	Phase 1 (reviewed not met)	Final (not met)	This finding open is treated as open since screen values were used as recovery values. This is a result given that the procedures, modification detail, operations review, and detailed HRA model development are not yet complete. Screening values are still applied for fire HEPs. A dependency analysis was completed to identify combinations of human failure events (HFEs) in which dependencies between actions may contribute to an increase in core damage frequency (CDF) when compared to the CDF calculated when nominal screening values for human error probabilities (HEPs) are used. Dependencies between actions were assigned based on sequence-specific evaluations of cues, timing, location, and available resources, and the HEPs adjusted if necessary to represent the level of dependence; the CDF was then recalculated using the modified HEPs. HFEs not explicitly evaluated	During the Phase 2 review, work on the human reliability analysis (HRA) element was in progress. A detailed assessment of the HRA supporting requirements was performed during the Final Peer review. The Final Peer review summary report noted: <i>The review did not identify issues with the fundamental approaches being used [for] the completed portion of the HRA assessment.</i> This finding remains open as indicated in the Disposition column.

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						<p>for dependence were assigned HEPs of 1 (i.e., the represented operator actions are assumed to fail with a probability of unity), and thus the resulting CDF represents an upper bound for the potential impact of dependencies upon the results. Shared cues conservatively assumed 100% dependence. This approach has identified important HFEs for which the completion of detailed human reliability analyses may be beneficial; those analyses have not been completed.</p> <p>The fire PRA HRA dependency analysis is documented in NB-PSA-HR, Ref (13).</p>	
HRA-E1-01 (Finding)	DOCUMENT the Fire PRA HRA including (a) those fire-related influences that affect the methods, processes, or assumptions used as well as the identification and quantification of the HFEs/HEPs in accordance with HLR-HR-I and its SRs in Part 2, and DEVELOP a defined basis to support the claim of nonapplicability of any of the requirements under HLR-HR-I in Part 2, and (b) any defined bases to support the claim of nonapplicability of	Open	Documentation for HFEs associated with selected fire response HFEs (e.g., FPS-PMOE-START-L, ACP-PMOE-383-11A, ACP-PMOE-383-12A, etc.) in the risk significant fire scenarios need to be provided. Also, HRA Calculator evaluation sheets cannot be located for PCP-PMOF-P-50X-LOC, EDG-PMOE-PORT-PUMP, and PULLFUSE; AFW-PMOT-P-8B-LOC seems to have been changed to AFW-PMOT-P-8B-SBO in HRA notebook	Phase 1 (reviewed not met)	Final (not met)	<p>Finding open, given that the procedures, modification detail, operations review, and detailed HRA model development are not yet complete. Screening values are still applied for fire HEPs pending development of final procedures, modifications, and operations reviews.</p>	<p>During the Phase 2 review, work on the human reliability analysis (HRA) element was in progress. A detailed assessment of the HRA supporting requirements was performed during the Final Peer review. The Final Peer review summary report noted:</p> <p><i>The review did not identify issues with the fundamental approaches being used [for] the completed portion of the HRA assessment.</i></p> <p>This finding remains open as indicated in the Disposition column.</p>

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	any of the referenced requirements in Part 2 beyond that already covered by the clarifications in this Part		(but not changed in Fire PRA model); and AFW-AVOA-CV-2010-D, SWS-AVOA-CV-0823-26, and SWS-AVOB-CV-082447M still need to be modified for fire related conditions. This task is not complete.				
IGN-A10-01 (Finding)	PROVIDE a mean value of, and a statistical representation of, the uncertainty intervals for significant fire ignition frequencies.	Closed	The characterization of uncertainties in the fire ignition frequencies has not been addressed in the report qualitatively or quantitatively.	Phase 1 (reviewed not met)	Final (not met) ¹	<p>Finding resolved by documentation update. No impact to NFPA-805 analysis.</p> <p>The characterization of uncertainties in the fire ignition frequencies have been addressed in Report 0247.07.005.01, Ref (1). The change in ignition frequency has a direct impact on CDF since ignition frequency is included in the calculation of CDF for every scenario. The report describes the sensitivities run by changing the bin ignition frequencies to the 5th and 95th percentile values of the original frequencies for both EPRI and NUREG/CR-6850 values. Calculating the 5th and 95th percentiles was done so using the GAMMADIST function in Excel for the EPRI frequencies and provided as BART output for the NUREG/CR-6850 frequencies. This sensitivity provides an adequate upper and lower bound of the final CDF which used the mean frequencies.</p>	<p>Review of the ignition frequency (IGN) element was completed during the Phase 2 Peer review. From the final report:</p> <p><i>Technical work completed and reviewed in August 2010; No additional review in March 2011.</i></p> <p>The finding was closed prior to the LAR submittal.</p>

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IGN-A6-01 (Suggestion)	When combining evidence from generic and plant-specific data, USE a Bayesian update process or equivalent statistical process. JUSTIFY the selection of any informative prior distribution used on the basis of industry experience.	Closed	The Bayesian update process used to update generic ignition frequencies to plant specific is not documented. A question was submitted during the Peer review activities and the response suggests that the Bayesian approach is documented and will be added to the report.	Phase 1 (met)	Final (met)	<p>Suggestion resolved by documentation update. No impact to NFPA-805 analysis.</p> <p>The Bayesian update process used to update the generic frequencies to plant specific frequencies is documented in Section 4.2 of the "Fire Ignition Frequency and Plant Partitioning", report 0247-07-0005.02, Ref (2). Section 4.2.1 of the report identifies the Bayesian statistical update of the EPRI TR 1016735 generic frequencies that was performed using PLP specific fire events data. The revised fire ignition frequencies, including the frequencies calculated in Appendix G of Report 0247-07-0005.02, have gamma uncertainty distributions. Therefore, the prior data provided included: the mean, alpha, and beta factors. The Bayesian analysis was performed in a manner consistent with the assertion that the bin ignition frequencies were gamma distributions.</p> <p>Section 4.2.2 of the report 0247.07-0005.02 identifies the Bayesian statistical update of the NUREG/CR-6850 generic frequencies was performed using PLP specific fire events data. NUREG/CR-6850 provides the</p>	<p>Review of the ignition frequency (IGN) element was completed during the Phase 2 Peer review. From the final report:</p> <p><i>Technical work completed and reviewed in August 2010; No additional review in March 2011.</i></p>

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						mean, 5th, 50th, and 95th percentiles, and standard deviation for each bin ignition frequency. The Bayesian analysis assumes the NUREG/CR-6850 bin ignition frequencies are lognormal distributions. Frequencies for Bins 16a, 16b, 16c, and 16d are provided in FAQ 06-0017 and FAQ 07-0035. The generic frequency distributions along with the plant evidence discussed in Section 4.2 of Report 0247-07-0005.02 were input into the Bayesian software tool BART, and the new bin frequencies developed. Table 4-5 of Report 0247-07-0005.02 provides the posterior mean, 5th percentile, 95th percentile, median, and range factor values associated with each bin for use in future update.	
IGN-A7-01 (Finding)	USE a plant-wide consistent methodology based on parameters that are expected to influence the likelihood of ignition to apportion high-level ignition frequencies (e.g., plant-wide values) to estimate physical analysis unit or ignition source level frequencies.	Closed	Page 3-1 of report 0247-07-0005.02 appears to suggest that no frequency for miscellaneous hydrogen fires has been assigned to applicable physical analysis units. This may affect the PAU level quantification by reducing the fire ignition frequency assigned to the applicable plant locations.	Phase 1 (met)	Final (met)	Finding resolved by documentation update. No impact to NFPA-805 analysis. Report 0247.07-07-0005.02, Ref (2), and Fire Ignition Frequency calculation databases have been updated to assign miscellaneous hydrogen fires to all applicable Physical Analysis Units (PAUs). As noted in Section 4 of report 0247-07-0005.02, the frequency associated with Bin 19,	Review of the ignition frequency (IGN) element was completed during the Phase 2 peer review. From the final report: <i>Technical work completed and reviewed in August 2010; No additional review in March 2011.</i>

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						Miscellaneous Hydrogen Fires, has been allocated based on linear feet, valve location and tank location in PAUs where hydrogen equipment exists. Applying these criteria has apportioned miscellaneous hydrogen frequency to the following PAUs: 04 (1C Switchgear Room), 13 (Reactor Building), and 23 (Turbine Building).	
IGN-A9-01 (Suggestion)	POSTULATE the possibility of transient combustible fires for all physical analysis units regardless of the administrative restrictions.	Closed	The report 0247-07-0005.02 does not list the transient or fixed ignition source frequencies in each fire zone. The report appears to only list the total frequency.	Phase 1 (met)	Final (met)	Suggestion resolved by documentation update. No impact to NFPA-805 analysis. Report 0247.07-0005.02, Ref (2), has been updated to include transient and fixed ignition source frequencies for each PAU (fire zone). Appendix E and F of Report 0247-07-0005.02 includes frequencies on a PAU basis broken down into Transient, Fixed and Total for each. Each Appendix provides a detailed Ignition Source Datasheet (ISDS) of frequencies by bin and PAU for the corresponding frequency. The ISDS utilizes data from the counting walkdowns, the transient and cable weighting factors, location weighting factors, and the Bayesian updated fire ignition frequencies to calculate the Fire Frequency for each Physical Analysis Unit.	Review of the ignition frequency (IGN) element was completed during the Phase 2 Peer review. From the final report: <i>Technical work completed and reviewed in August 2010; No additional review in March 2011.</i>

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						The ISDS provides the Physical Analysis Unit identification and description, the generic location categories (fixed and transient source) weighting factors and count summary necessary to calculate the fire frequency in accordance with the equations provided in the body of this notebook in accordance with the guidelines established in NUREG/CR-6850.	
IGN-B2-01 (Suggestion)	DOCUMENT references for fire events and fire ignition frequency sources used.	Closed	The report 0247-07-0005.02 does not reference plant specific fire events used to update fire ignition frequencies.	Phase 1 (met)	Final (met)	Suggestion resolved by documentation update. No impact to NFPA-805 analysis. Report 0247-07-005.02, Ref (2), has been updated to document the plant specific fire events that were used to update the fire ignition frequencies in Appendix A of the report. The appendix documents the review of all fire events at PLP for the dates of January 1, 2001 through December 31, 2011. This review was performed to determine if any fire events were classified as potentially challenging in accordance with NUREG 6850. Fire events that are identified as potentially challenging required the updating of the generic fire frequencies provided in NUREG/CR-6850 and EPRI TR 1016735 for use in the plant	Review of the ignition frequency (IGN) element was completed during the Phase 2 Peer review. From the final report: <i>Technical work completed and reviewed in August 2010; No additional review in March 2011.</i>

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						specific fire PRA.	
IGN-B4-01 (Suggestion)	DOCUMENT the plant-specific frequency updating process. INCLUDE in the documentation (a) the selected plant-specific events (b) the basis for the selection and or exclusion of events (c) the analysis supporting the plant-specific reactor-years, and (d) the Bayesian process for updating generic frequencies	Closed	The report 0247-07-0005.02 does not clearly describe the process for classifying fire events as potentially challenging or not challenging. The report does provide a table indicating which portion of the criteria was met. However, the report should describe how this table was populated. It is not evident from the table how the criteria was met/not met from the information provide in the event description column.	Phase 1 (met)	Final (met)	Suggestion resolved by documentation update. No impact to NFPA-805 analysis. The 0247-07-0005.02, Ref (2), report documents the process of classifying fire events as potentially challenging or not challenging in Appendix A. Fire event reports were obtained from plant personnel for the station covering the period of January 1, 2001 through December 31, 2011. Plant personnel made an extensive search of their "condition report" and "Ideas" databases for fire incident reports. The search criteria included "dates 1/1/01 through 12/31/11" and key words "fire", "heat", and "smoke". This search revealed thousands of hits but a review of each identified only a total of eleven (11) fire incidents within the protected area and in areas included in the global analysis boundary. Each of these reports was reviewed, summarized, categorized and classified as either potentially challenging or not potentially challenging. The criteria for a fire to be deemed potentially challenging are provided in NUREG 6850.	Review of the ignition frequency (IGN) element was completed during the Phase 2 Peer review. From the final report: <i>Technical work completed and reviewed in August 2010; No additional review in March 2011.</i>

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						Appendix C in 6850, Section C.3.3.1 provides criteria for classifying a fire event as "potentially challenging."	
MU-A1-01 (Finding)	The PRA configuration control process shall include monitoring of changes in design, operation, and maintenance that could affect the PRA. Such changes shall include operating procedures, design configuration, initiating event frequencies, unavailabilities, and component failure rate data.	Closed	The Palisades PRA Model Update procedure includes maintenance and upgrades to the PRA to be consistent with the as-built, as-operated plant. Resolution of the Full Power Internal Events (FPIE) Peer Review F&Os and incorporation of design and operational information relevant to a Fire PRA should result in meeting the Standard.	Phase 1 (reviewed not met)	Final (not met) ¹	Finding resolved by documentation update. No impact to NFPA-805 analysis. Section 3.3 of the configuration control notebook, NB-PSA-CC, Ref (14), has been revised to include a requirement for a Peer review against the ASME standard for PSA model upgrades.	The finding was resolved prior to the conduct of the Final Peer review. This SR was not re-examined during the Final Peer review. The final report is inconsistent and does not reflect resolution of this finding.
PP-A1-01 (Finding)	INCLUDE within the global analysis boundary all fire areas, fire compartments, or locations within the licensee-controlled area where a fire could adversely affect any equipment or cable item to be credited in the Fire PRA plant response model including those locations of a sister unit that contain shared equipment credited in the Fire PRA.	Closed	Requirement PP-A01 includes Note PP-A1-2 which clarifies that the intent of the requirement is to include plant locations with no credited plant equipment that may affect locations with credited plant equipment in multi compartment fire scenarios. With respect to the multi compartment analysis, the report 0247-07-0005.02 makes no mention on the treatment of qualitatively screened buildings or plant	Phase 1 (met)	Final (met)	Finding resolved by documentation update. No impact to NFPA-805 analysis. At the completion of Task 1 (Plant Partitioning) a set of PAUs were established for the fire PRA. These PAUs are evaluated and undergo the screening process outlined in Section 2.1 of report 0247-07-0005.02, Ref (2). The screening analysis qualitatively determines the fire risk associated with each PAU. The results of the Task 4 screening are used in Task 6 (Fire Ignition Frequency), where fire frequencies are estimated for each	Review of the plant partitioning (PP) element was completed during the Phase 2 Peer review. From the final report: <i>Technical work completed and reviewed in August 2010; No additional peer review in March 2011.</i>

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			locations.			<p>of the unscreened fire compartments.</p> <p>Qualitative screening as described in Task 4 (Qualitative Screening) of NUREG/CR-6850 is intended to identify those fire compartments where, according to pre-determined criteria, the fire risk is expected to be relatively low or nonexistent compared to others. This task assumes that the risk (i.e. CDF and/or LERF) associated with the fire scenarios where a controlled manual plant shutdown may be attempted as a precautionary measure and no other fire PRA components are affected is low. If a compartment's exclusion from the fire PRA is uncertain (for instance, whether an automatic or manual plant trip will occur may not be known with certainty), that compartment should be retained for quantitative analysis to better determine its contribution, if any, to the overall fire risk.</p> <p>In the Palisades fire PRA there were two PAUs qualitatively screened. The qualitative screening process and criteria are described in Section 2 of report 0247-07-0005.02.</p>	
PP-B1-01	DEFINE Fire PRA physical analysis	Closed	The plant partitioning report	Phase 1	Final	Suggestion resolved by	Review of the plant partitioning (PP)

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(Suggestion)	units based on a combination of plant fire areas as defined in the plant's fire protection program and physical analysis units where each physical analysis unit represents a subdivision of a fire area, and If any fire area is subdivided into two or more physical analysis units, ENSURE that the physical analysis unit definitions comply with the balance of the PP-B SRs (PP-B2 through PP-B7).		does not describe cable trenches, duct banks, manholes, etc. that may be present in the yard. The Fire PRA should have a disposition for these areas as to why there may/may not be the need for postulating fire scenarios and where in the yard the scenarios may be postulated.	(met)	(met)	documentation update. No impact to NFPA-805 analysis. Physical analysis units for the Palisades fire PRA correspond to Fire Areas defined in the Fire Protection Program. Confirmatory walkdown notes have been documented in Attachment 3 of Report 0247-07-0005.02, Ref (2). Six plant locations were identified that were not specifically addressed in the FHA and new physical analysis units were created for use in the fire PRA. These fire locations were the Cooling Tower Pump House, Feedwater Purity Building, Yard Area, Switchyard, Administration Building, and Service Building. The boundary requirements for a fire risk assessment were sufficiently met by the boundaries of the Feedwater Purity Building and Cooling Tower Pump House. The Yard Area and Switchyard were outdoor areas and therefore did not have any fire rated barriers except for the separations from the indoor analysis units. Spatial separation has been inherently credited with the use of current Fire Protection Program fire boundaries. Spatial separation is present between the following PAUs boundaries: Component Cooling Pump Water Rooms and	element was completed during the Phase 2 Peer review. From the final report: <i>Technical work completed and reviewed in August 2010; No additional peer review in March 2011.</i>

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						<p>Turbine Building, Auxiliary Building and Radwaste Addition- VRS, and lastly East Engineered Safeguards Rooms and Auxiliary Building. These boundaries have been documented and referenced in the current Fire Hazards Analysis to meet the requirements of this fire risk assessment.</p> <p>The switchyard is located approximately a quarter mile outside of the protected area but within the Owner Controlled Area. The Yard Area is defined as all outside areas within the protected area fencing. The Fire Scenario Development Report, 0247-07-0005.02 accounts for the presence of cables, bus ducts, etc. in the development of the postulated fire scenarios in the yard area.</p>	
PP-B2-01 (Suggestion)	If partitioning credits wall, ceiling, or floor elements that lack a fire-resistance rating, JUSTIFY the judgment that the credited element will substantially contain the damaging effects of fires given the nature of the fire sources present in each compartment separated by the nonrated partitioning element.	Closed	Report 0247-07-0005.02 does not provide adequate justification for crediting barriers when outside the fire protection program.	Phase 1 (met)	Final (met)	<p>Suggestion resolved by documentation update. No impact to NFPA-805 analysis.</p> <p>Physical analysis units for the Palisades fire PRA correspond to Fire Areas defined in the Fire Protection Program. Confirmatory walkdown notes have been documented in Attachment 3 of report 0247-07-0005.02, Ref (2). Credit for raceway fire barriers, thermal wraps or other localized protection features have not been</p>	<p>Review of the plant partitioning (PP) element was completed during the Phase 2 peer review. From the final report:</p> <p><i>Technical work completed and reviewed in August 2010; No additional peer review in March 2011.</i></p>

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						credited in identifying a physical analysis unit.	
PP-B3-01 (Suggestion)	If spatial separation is credited as a partitioning feature, JUSTIFY the judgment that spatial separation is sufficient to substantially contain the damaging effects of any fire that might be postulated in each of the fire compartments created as a result of crediting this feature.	Closed	Report 0247-07-0005.02 does not clearly discuss the credit for spatial separation. There are two areas noted that do rely on spatial separation: the Switchyard and Yard Area which are outdoors and thus have no rated fire barriers. F/O related to the yard has been documented under a different SR and may address the concern of spatial separation.	Phase 1 (met)	Final (met)	<p>Suggestion resolved by documentation update. No impact to NFPA-805 analysis.</p> <p>Report 0247-07-0005.02, Ref (2), has been updated to discuss the credit of spatial separation in Section 2.2.</p> <p>The physical analysis units used for the fire risk assessment correlate to fire areas used for the Fire Protection Program. This approach allowed the fire risk assessment to rely on the existing programmatic controls and design requirements for maintaining the integrity of the associated physical analysis unit boundaries. Based on the documentation provided in the Fire Hazards Analysis (FHA), the boundaries for these PAUs had fire withstand ratings consistent with the requirements of the Fire Protection Program. The test and maintenance requirements of the Fire Protection Program were sufficient to satisfy the boundary requirements for the fire risk assessment.</p> <p>In addition, utilization of the area boundaries established by the Fire</p>	<p>Review of the plant partitioning (PP) element was completed during the Phase 2 Peer review. From the final report:</p> <p><i>Technical work completed and reviewed in August 2010; No additional peer review in March 2011.</i></p>

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						<p>Protection Program allows the use of previously gathered equipment and cable location data and facilitates the verification and control of the boundaries.</p> <p>Walkdowns were conducted to confirm that accessible boundaries of each physical analysis unit were of substantial construction, and that physical openings in the barriers were noted. Physical analysis units for the Palisades fire PRA correspond to Fire Areas defined in the Fire Protection Program. Confirmatory walkdown notes have been documented in Attachment 3 of 0247-07-0005.02. Credit for raceway fire barriers, thermal wraps or other localized protection features have not been credited in identifying a physical analysis unit.</p> <p>The switchyard is located approximately a quarter mile outside of the protected area but within the Owner Controlled Area. The Yard Area is defined as all outside areas within the protected area fencing.</p>	
PP-B4-01 (Suggestion)	DO NOT CREDIT raceway fire barriers, thermal wraps, fire-retardant coatings, radiant energy shields, or any other localized cable or equipment	Closed	Report 0247-07-0005.02 does not discuss crediting of raceway fire barriers.	Phase 1 (met)	Final (met)	Suggestion resolved by documentation update. No impact to NFPA-805 analysis. Report 0247-07-0005.02, Ref (2), has been updated to reflect that	Review of the plant partitioning (PP) element was completed during the Phase 2 Peer review. From the final report: <i>Technical work completed and reviewed in August 2010; No additional peer review in</i>

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	protection feature as partitioning elements in defining physical analysis units.					<p>raceways fire barriers have not been credited in the fire PRA analysis.</p> <p>The physical analysis units used for the fire risk assessment correlate to fire areas used for the Fire Protection Program. This approach allowed the fire risk assessment to rely on the existing programmatic controls and design requirements for maintaining the integrity of the associated physical analysis unit boundaries. Based on the documentation provided in the Fire Hazards Analysis (FHA), the boundaries for these PAUs had fire withstand ratings consistent with the requirements of the Fire Protection Program. The test and maintenance requirements of the Fire Protection Program were sufficient to satisfy the boundary requirements for the fire risk assessment.</p> <p>In addition, utilization of the area boundaries established by the Fire Protection Program allows the use of previously gathered equipment and cable location data and facilitates the verification and control of the boundaries.</p> <p>Walkdowns were conducted to confirm that accessible boundaries of each physical analysis unit were of substantial construction, and</p>	March 2011.

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						that physical openings in the barriers were noted.	
PP-B5-01 (Suggestion)	DEFINE AND JUSTIFY the basis and criteria applied when active fire barrier elements (such as normally open fire doors, water curtains, and fire dampers) are credited in partitioning.	Closed	Report 0247-07-0005.02 does not discuss crediting active fire barriers.	Phase 1 (met)	Final (met)	<p>Suggestion resolved by documentation update. No impact to NFPA-805 analysis.</p> <p>Report 0247-07-0005.02, Ref (2), has been updated to discuss the credit of active fire barriers.</p> <p>The report notes that the Physical analysis units for the Palisades fire PRA correspond to Fire Areas defined in the Fire Protection Program. Additionally, confirmatory walkdown notes have been documented in Attachment 3 of 0247-07-0005.02. Credit for raceway fire barriers, thermal wraps or other localized protection features have not been credited in identifying a physical analysis unit.</p>	<p>Review of the plant partitioning (PP) element was completed during the Phase 2 Peer review. From the final report:</p> <p><i>Technical work completed and reviewed in August 2010; No additional peer review in March 2011.</i></p>
PP-B7-01 (Suggestion)	CONDUCT a confirmatory walkdown of locations within the global analysis boundary to confirm the conditions and characteristics of credited partitioning elements.	Closed	Walkdown forms are referenced in report 0247-07-0005.02 but walkdown results are not attached or available. A question on this topic was submitted during the Peer review and the response to the question clarified the concern of lack of documentation for the walkdowns.	Phase 1 (reviewed not met)	Final (not met) ¹	<p>Suggestion resolved by documentation update. No impact to NFPA-805 analysis.</p> <p>Walkdowns were conducted to confirm that accessible boundaries of each physical analysis unit were of substantial construction, and that physical openings in the barriers were noted. These walkdowns are documented in Attachment 3 of Report 0247-07-0005.02, Ref (2).</p>	<p>Review of the plant partitioning (PP) element was completed during the Phase 2 Peer review. Although listed in Table 4-16 as “not met” from the final report:</p> <p><i>Technical work completed and reviewed in August 2010; No additional peer review in March 2011.</i></p> <p>The finding was verified closed prior to the LAR submittal.</p>

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PP-C2-01 (Finding)	JUSTIFY the exclusion of any locations within the licensee-controlled area that are not included in the global analysis boundary by demonstrating that they do not satisfy the selection criteria as defined per PP-A1.	Closed	It is not entirely clear how some excluded areas listed in Section 2.1.2.2 of Report 0247-07-0005.02 satisfy the exclusion criteria, namely the Service Building and Administrative building. These buildings appear to share a common boundary with the Auxiliary Building. For example, would not a major fire in the Service building be designated a challenging fire requiring a plant shutdown? The report states that fires within the Administration Building, Service Building, and Service Building Addition were not expected to propagate to the included physical analysis units, cause a plant transient, or require plant shutdown. Are excluded buildings permanently excluded, or are they considered during multi-compartment evaluations?	Phase 1 (met)	Final (met)	Finding resolved by documentation update. No impact to NFPA-805 analysis. Report Section 2.1.2.2 of Report 0247-07-0005.02, Ref (2), has been updated to satisfy the exclusion criteria of the Service Building and Administrative Building. The buildings common boundary with the Auxiliary Building has been detailed and the PAUs are retained for MCA analysis.	Review of the plant partitioning (PP) element was completed during the Phase 2 Peer review. From the final report: <i>Technical work completed and reviewed in August 2010; No additional peer review in March 2011.</i>
PRM-B11-01 (Finding)	MODEL all operator actions and operator influences in accordance with the HRA element of this Standard.	Open	Complete work	Phase 1 (reviewed not met)	Final (not met)	Finding open, given that the procedures, modification detail, operations review, and detailed HRA model development are not yet complete.	Review of the fire PRA plant response model (PRM) technical element was mostly complete during the Phase 1 review. A limited review was conducted during the Final.

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						Screening values are still applied for fire HEPs pending development of final procedures, modifications, and operations reviews.	From the Final Peer review summary: <i>The Fire PRA plant response model was reviewed with very few findings. There were no technical F&O's on the scope or content of the PRM model itself. The F&O's assigned to PRM were either a) cross-referenced from other tasks [HRA and ES] or b) were for incomplete documentation.</i> This HRA related finding remains open.
PRM-B3-01 (Finding)	IDENTIFY any new initiating events arising from the considerations of the ES and CS technical elements that might result from a fire event that were not included in the Internal Events PRA including those arising from the consideration of spurious actuation.	Closed	The fault tree model development omitted the DC power dependency requirement for the RCP breaker trip function.	Phase 1 (reviewed not met)	Final (not met) ¹	Finding resolved by documentation and model update. No impact to NFPA-805 analysis. The fault tree model applied to the fire PRA was updated to include the DC power dependency for the primary coolant pump breaker trip function. This logic was added at model gates PCP-SEALS-SW-20, PCP-SEALS-SW-22, PCP-SEALS-SW-21, and PCP-SEALS-SW-23 for each of the four primary coolant pumps.	Review of the fire PRA plant response model (PRM) technical element was mostly complete during the Phase 1 review. A limited review was conducted during the Final. From the Final Peer review summary: <i>The Fire PRA plant response model was reviewed with very few findings. There were no technical F&O's on the scope or content of the PRM model itself. The F&O's assigned to PRM were either a) cross-referenced from other tasks [HRA and ES] or b) were for incomplete documentation.</i> The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.
PRM-B3-02 (Finding)	IDENTIFY any new initiating events arising from the considerations of the ES and CS technical elements that might result from a fire event that were not included in the Internal Events PRA including those	Closed	Spurious SI is not included as a potential initiating event	Phase 1 (reviewed not met)	Final (not met) ¹	Finding resolved by documentation and model update. No impact to NFPA-805 analysis. A complete review of Safety Injection Signal (SIS), Containment High Pressure (CHP), Containment	Review of the fire PRA plant response model (PRM) technical element was mostly complete during the Phase 1 review. A limited review was conducted during the Final. From the Final Peer review summary:

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	arising from the consideration of spurious actuation.					<p>High Radiation (CHR), Containment Isolation Signal (CIS) and Recirculation Actuation Signal (RAS) logic was performed to identify potential adverse component actuations that could occur due to a spurious signal from any of these sources.</p> <p>Logic was added for 45 PRA components to consider spurious operation from any of the automatic actuation circuits. Report 0247-07-0005.04, Ref (4), Section 5.71 was updated to reflect these changes.</p>	<p><i>The Fire PRA plant response model was reviewed with very few findings. There were no technical F&O's on the scope or content of the PRM model itself. The F&O's assigned to PRM were either a) cross-referenced from other tasks [HRA and ES] or b) were for incomplete documentation.</i></p> <p>The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.</p>
PRM-B5-01 (Finding)	<p>For those fire-induced initiating events included in the Internal Events PRA model, REVIEW the corresponding accident sequence models and</p> <p>(a) IDENTIFY any existing accident sequences that will require modification based on unique aspects of the plant fire response procedures in accordance with HLR-AS-A and HLR-AS-B of Part 2 and their supporting requirements</p> <p>And</p> <p>(b) IDENTIFY any new accident sequences that might result from a fire event that were not included in the Internal Events PRA in accordance with HLR-AS-A</p>	Closed	The MSO expert panel issues have not been completely resolved and incorporated into the PRA model. Thus, all modeling work associated with MSO incorporation has not been done at this time.	Phase 1 (reviewed not met)	Final (not met) ¹	<p>Finding resolved by documentation and model update. No impact to NFPA-805 analysis.</p> <p>All MSO expert panel issues have been resolved and integrated into the final PRA fire model as appropriate. All MSO scenario dispositions are documented in the final MSO report 0247-07-0005.04, Ref (4).</p>	<p>Review of the fire PRA plant response model (PRM) technical element was mostly complete during the Phase 1 review. A limited review was conducted during the Final.</p> <p>From the Final Peer review summary:</p> <p><i>The Fire PRA plant response model was reviewed with very few findings. There were no technical F&O's on the scope or content of the PRM model itself. The F&O's assigned to PRM were either a) cross-referenced from other tasks [HRA and ES] or b) were for incomplete documentation.</i></p> <p>The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.</p>

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	and HLR-AS-B of Part 2 and their supporting requirements.						
PRM-B9-01 (Finding)	For any cases where new system models or split fractions are needed, or existing models or split fractions need to be modified to include fire-induced equipment failures, fire-specific operator actions, and/or spurious actuations, PERFORM the systems analysis portion of the Fire PRA model in accordance with HLR-SY-A and HLR-SY-B and their SRs in Part 2 with the following clarifications, and DEVELOP a defined basis to support the claim of nonapplicability of any of these requirements in Part 2: All the SRs under HLR-SY-A and HLR-SY-B in Part 2 are to be addressed in the context of fire scenarios including effects on system operability/functionality accounting for fire damage to equipment and associated cabling.	Closed	Failure to trip Pressurizer heaters is not explicitly addressed	Phase 1 (reviewed not met)	Final (not met) ¹	Finding resolved by documentation and model update. No impact to NFPA-805 analysis. Fault tree PZR-SPUR-HTR-FT(45) was added to the fire PRA to model spurious operation of pressurizer heaters and failure of pressurizer spray. Failure of this fault tree results in a potential stuck open pressurizer safety valve, or valves. Section 5.45 of report 0247-07-0005.04, "Multiple Spurious Operation Report," Ref (4), was updated to reflect this change.	Review of the fire PRA plant response model (PRM) technical element was mostly complete during the Phase 1 review. A limited review was conducted during the Final. From the Final Peer review summary: <i>The Fire PRA plant response model was reviewed with very few findings. There were no technical F&O's on the scope or content of the PRM model itself. The F&O's assigned to PRM were either a) cross-referenced from other tasks [HRA and ES] or b) were for incomplete documentation.</i> The finding was not fully resolved for the Final Peer review, but was subsequently closed prior to the LAR submittal.
QLS-B2-01 (Finding)	DOCUMENT the disposition of each physical analysis unit defined by the plant partitioning analysis as either "screened out" or "retained for quantitative analysis" and in a manner that	Closed	See PP-C2-01.	Phase 1 (reviewed not applicable)	Final (met)	Finding resolved by documentation update. No impact to NFPA-805 analysis. Section 2.1.2.2 of Report 0247-07-0005.02, Ref (2), has been updated to satisfy the exclusion criteria of	Review of the qualitative screening (QLS) element was completed during the Phase 2 Peer review. From the final report: <i>Technical work was completed and reviewed in August 2010; No additional review in March 2011.</i>

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SR	Topic (ASME Standard Category II Text)	Status ²	Finding or Suggestion	SR Initial Peer Review Status	SR Subsequent Peer Review Status	Disposition	Supplemental Information
	facilitates Fire PRA applications, upgrades, and Peer review.					the Service Building and Administrative Building. The buildings common boundary with the Auxiliary Building has been detailed and the PAUs are retained for MCA analysis.	
SF-A1-01 (Finding)	For those physical analysis units within the Fire PRA global analysis boundary, (a) LOOK for fire ignition source scenarios that might arise as the result of an earthquake that would be unique from those postulated during the general analysis of each physical analysis unit, and (b) PROVIDE a qualitative assessment of the potential risk significance of any unique fire ignition source scenarios identified	Open	The current seismic fire interactions analysis relies on the IPEEE study. The report needs to demonstrate that the scope of that work meets the objectives of the Standard and that plant changes since the work was performed do not compromise the conclusions.	Phase 1 (reviewed not met)	Final (not met)	Finding open. No impact to NFPA-805 quantified results. Report 0247-07-0005.05, "Seismic-Fire Interaction," Ref (5), evaluates Palisades with respect to NUREG/CR-6850 Task 13, Seismic-Fire Interactions Assessment. . The seismic fire interactions analysis has not been updated. However, since the Standard only requires a qualitative analysis, there is no impact on the quantified results in fire PRA model.	Review of the seismic fire (SF) element was completed during the Phase 1 Peer review. From the final report: <i>Completed in January 2010 and not re-reviewed in August 2010 or March 2011.</i> This finding remains open, but this has no impact on the quantified results.
UNC-A1-01 (Finding)	PERFORM the uncertainty analysis in accordance with HLR-QU-E and its SRs in Part 2 as well as SRs LE-F2 and LE-F3 under HLR-LE-F in Part 2 and DEVELOP a defined basis to support the claim of non-applicability of any of the requirements under these sections in Part 2.	Closed	Only a limited number of parameter and modeling uncertainties and associated assumptions have been identified. The list is incomplete and not defined in sufficient detail to support a reasonable characterization or evaluation. Uncertainties have been propagated	Phase 1 / Phase 2 (not reviewed)	Final (not met) ¹	Finding resolved by documentation update. No impact to NFPA-805 analysis. Section 7.1 of the fire risk summary report, 0247-07-0005.01, Ref (1), was revised to include additional discussion and evaluation of the state-of-knowledge-correlation and the impact of uncertainty associated with severity factors and non-	The uncertainty and sensitivity supporting requirements were not reviewed during the Phase 1 and Phase 2 Peer reviews as the model progress was not sufficiently complete. This finding was identified during the Final Peer review, but was subsequently addressed prior to the LAR submittal.

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			through a Monte Carlo approach. However, correlation of state of knowledge uncertainties has not been addressed, i.e. all initiators have been treated as independent variables, Severity Factor (SF) and Non Suppression Probabilities (NSP) and spurious actuation probabilities are not correlated. (Uncertainties carried over from the internal events analysis are correlated). This approach has led to unrealistically narrow predictions of CDF and LERF distributions (error factor of 2) and the potential underestimation of the mean values for scenarios which are quantified based on the product of like distributions (e.g. multiple spurious actuation probabilities).			suppression probability. The discussion indicated that the distributions might be more broad if a more detailed parametric uncertainty assessment were to be performed.	
UNC-A2-01 (Finding)	INCLUDE the treatment of uncertainties, including their documentation, as called out in SRs PRM-A4, FQ-F1, IGN-A10, IGN-B5, FSS-E3, FSS-E4, FSS-H5, FSS-H9, and CF-A2 and that required by performing Part 2 referenced requirements	Open	The uncertainty intervals assigned to Fire IEs, Severity Factors and Non Suppression Probabilities are not based on acceptable systematic methods. 1) Uncertainty distributions for fire IEs have been	Phase 1 / Phase 2 (not reviewed)	Final (not met)	Finding open as the approach for performing the parametric uncertainty evaluation has not yet been updated. No impact to NFPA-805 analysis as the results are based on the point estimate values which	The uncertainty and sensitivity supporting requirements were not reviewed during the Phase 1 and Phase 2 Peer reviews as the model progress was not sufficiently complete. This finding was identified during the Final Peer review, but as indicated this does not impact the point estimate values used in the NFPA-805

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	throughout this Standard.		<p>assigned the same error factor of 10 rather than using posterior distributions from Bayesian update</p> <p>2) SF distributions have been assigned without an underlying basis.</p> <p>3) NSP uncertainty distribution has been derived on the basis of NUREG/CR 1278. This provides guidance on HEP uncertainty assessment. However, NSP terms are an output of a combination of fire growth and suppression modeling and guidance in NUREG/CR 1278 has therefore little relevance. A valid approach would be to address the uncertainties in damage times in combination with uncertainties in suppression probabilities based on specific contributing factors.</p> <p>4) Uncertainties associated with spurious actuation probabilities have been characterized according to a set of rules defined for severity factors. In this case spurious actuation probabilities with a failure probability of > 0.25 are assigned an error factor of</p>			<p>approximate the mean values. The parametric uncertainty analysis is presented in Section 7.1 of the fire risk summary report, 0247-07-0005.01, Ref (1). The issues identified have not been fully addressed, but this primarily impacts the potential range of the uncertainty distribution and does not have a significant impact on the mean value; and has no impact on the point estimate mean values used in the analysis.</p>	<p>analysis.</p> <p>This finding remains open.</p>

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			1.0. In contrast NUREG/CR 6850 recommend use of a uniform distribution with the following limits Cables with 15 or less conductors: +20% Cables with more than 15 conductors: +50% Alternatively the values included in tables 10-1 to 10-5 NUREG/CR 6850 could be used where limits appear to be wider. The Palisades analysis has not accounted for larger uncertainties associated with cables with > 15 conductors.				
<p>1) The supporting requirement was categorized as “not met” at completion of the Final Peer review conducted during the week of March 21, 2011. The supporting requirement was subsequently addressed and categorized as “met/closed” (per the disposition discussion), prior to the LAR submittal in December 2012.</p> <p>2) Status ‘Closed’ implies F&O disposition is sufficient to meet Category II.</p>							

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Table 3: Supporting Requirements with Status of Not Reviewed

SR	Topic (ASME Standard Category II Text)	Status	Peer Review Basis for Assessment	Disposition
PRM-A3	CONSTRUCT the Fire PRA plant response model so that it is capable of determining the significant contributors to the fire-induced risk with 4-2.7.12.	Not Reviewed	This SR is not reviewed because the sequence infrastructure to provide this capability is not available at this time. The capability to calculate risk importance in a single scenario is available at the present time. The internal events PRA provides an acceptable method for development of risk importance. Palisades uses SAPHIRE for quantification, which claims to be able to integrate all fire scenarios into a global core damage equation and calculate global importance using replacement events for basic events that have different probabilities in different rooms. Palisades claims this has been done in internal flooding, which has the same multiple-event quantification challenges. If this method is successful, Palisades would be an industry leading plant in the development of global importance.	<p>This supporting requirement is meant to refer to the Fire Risk Quantification supporting requirements in Section 4-2.12 (as there is no Section 4-2.7.12 in the PRA standard). Since the Fire Risk Quantification SRs were fully reviewed during the Phase 2 and Final Peer reviews, the PRM-A3 supporting requirement was implicitly reviewed during that process as the model had to be constructed to determine the significant contributors to perform the FQ review. For the final Peer review, FRANC was used to quantify the Palisades Fire PRA. FRANC provides CCDP and CLERP results on a fire scenario basis and, when combined with the scenario fire frequencies, calculates and displays CDF and LERF. These results were presented to the fire PRA peer review team in the initial issue of the completed Fire Risk and Quantification Summary Report, 0247-07-0005.01 (Rev. 0 [17], March 2011).</p> <p>Additionally, the dispositions for the findings of the FQ element in Table 2 are applicable to PRM-A3.</p> <p>The fire risk quantification (FQ) element was reviewed in detail in both the Phase 2 and Final Peer reviews.</p> <p>With respect to the FQ element the Final report states:</p> <p><i>Overall process is consistent with prevailing good practices. Results are not final and thus certain SRs cannot be demonstrated to have been met. Continuing the refinement in process and planned provides confidence this technical element will meet the Standard.</i></p>
PRM-B2	VERIFY the peer review exceptions and deficiencies for the Internal Events PRA are dispositioned, and the disposition does not adversely affect the development of the Fire PRA plant response model.	Not Reviewed	Not completed yet because the final Internal Events PRA Peer Review has not been provided to Palisades	<p>The fire Peer review team did not formally review the resolution of the full power internal events findings and observations. The resolutions are discussed in Attachment U of the LAR and their impacts on the fire PRA are noted. None of the open items impact the NFPA 805 submittal.</p> <p>The full power internal events (FPIE) peer review report, dated March 12, 2010 was received between the Phase 1 and Phase 2 fire PRA peer reviews. Resolution of findings from this report were in progress during the Phase 2 and Final fire peer reviews.</p> <p>With respect to the internal events model, the Final report states:</p> <p><i>The Fire PRA and Internal Events PRA use the same model, thus the fidelity between the two is good. The internal events PRA underwent a RG 1.200 peer review in October 2009. The F&Os have been formally addressed and incorporated into the Fire PRA model.</i></p>

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Table 3: Supporting Requirements with Status of Not Reviewed

SR	Topic (ASME Standard Category II Text)	Status	Peer Review Basis for Assessment	Disposition
PRM-B4	<p>MODEL any new initiating events identified per SR PRM-B2 in accordance with HLR-IE-A, HLR-IE-B, and HLR-IE-C and their SRs in Part 2 with the following clarifications:</p> <p>(a) All SRs under HLR-IE-A and HLR-IE-B, and SRs IE-C4, IE-C6, IE-C7, IE-C8, IE-C9, and IE-C12 in Part 2 are to be addressed in the context of a fire inducing the initiating events excluding initiating events that cannot be induced by a fire</p> <p>and</p> <p>(b) DEVELOP a defined basis to support the claim of nonapplicability of any of these requirements in Part 2.</p>	Not Reviewed	No new initiating events were identified, so this SR was not required. However, PRM-B3 indicates spurious SI should be considered, so that the SR must be completed.	<p>As stated in the peer review assessment, no new initiating events were identified so this SR was not required.</p> <p>Two findings were noted in the PRM-B3 SR and were closed as described in Table 2 above.</p> <p>Review of the fire PRA plant response model (PRM) technical element was mostly complete during the Phase 1 review. A limited review was conducted during the Final.</p> <p>From the Final Peer review summary:</p> <p><i>The Fire PRA plant response model was reviewed with very few findings. There were no technical F&O's on the scope or content of the PRM model itself. The F&O's assigned to PRM were either a) cross-referenced from other tasks [HRA and ES] or b) were for incomplete documentation.</i></p> <p>The PRM-B3 findings were not fully resolved for the Final Peer review, but were subsequently closed prior to the LAR submittal.</p>
PRM-B14	IDENTIFY any new accident progressions beyond the onset of core damage that would be applicable to the Fire PRA that were not addressed for LERF estimation in the Internal Events PRA.	Not Reviewed	LERF analysis did not look for any LERF phenomena applicable to the fire PRA which were not included in the internal events PRA. F&O was not written. The reviewers are not aware of any Fire PRA which looked for "beyond internal events" LERF phenomena.	There are no open F&Os associated with the LERF element from the internal events PRA. No new LERF phenomena were identified for the Palisades fire PRA.

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References for Question 1 Response

- 1) Report 0247-07-0005.01 Rev. 1, "Palisades Fire Probabilistic Risk Assessment Fire Risk Quantification and Summary".
- 2) Report 0247-07-0005.02 Rev. 1, "Palisades Fire Probabilistic Risk Assessment Plant Partitioning and Fire Ignition Frequency Development".
- 3) Report 0247-07-0005.03 Rev. 1, "Palisades Fire Probabilistic Risk Assessment Model Development Report".
- 4) Report 0247-07-0005.04 Rev. 1, "Palisades Fire Probabilistic Risk Assessment Multiple Spurious Operations Report".
- 5) Report 0247-07-0005.05 Rev. 1, "Palisades Fire Probabilistic Risk Assessment Seismic/Fire Interaction Report".
- 6) Report 0247-07-0005.06 Rev. 1, "Palisades Fire Probabilistic Risk Assessment Fire Scenario Development Report".
- 7) Report 0247-07-0005.07 Rev. 1, "Palisades Fire Probabilistic Risk Assessment Multi-Compartment Analysis".
- 8) Report 0247-07-0005.08 Rev. 1, "Palisades Fire Probabilistic Risk Assessment Exposed Structural Steel Analysis".
- 9) EA-APR-95-004 Rev. 5, "10 CFR 50 Appendix R Safe Shutdown Associated Circuits Analysis for Common Power Supply and Common Enclosure".
- 10) PLP-RPT-12-00134 Rev. 0, "Validation of Appendix R Non-Safe Shutdown Cable Routing to Support the Fire PRA".
- 11) Palisades Probabilistic Safety Assessment Notebook NB-PSA-ETSC Rev. 3, "Event Trees and Success Criteria".
- 12) EA-PSA-FPIE-FIRE-12-04 Rev. 0, "Palisades Full Power Internal Events and Fire Model".
- 13) Palisades Probabilistic Safety Assessment Notebook NB-PSA-HR Rev. 4, "Human Reliability Analysis Notebook Volume 1 (Post Initiator Operator Actions)".
- 14) Palisades Probabilistic Safety Assessment Notebook NB-PSA-CC Rev. 1, "PSA Model Configuration Control".
- 15) 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", 2009.
- 16) SCIENTECH report 17825-1, "Palisades Fire PRA Peer Review to Requirements in Part 4 of the ASME/ANS Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessments for Nuclear Power Plant Applications".

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- 17) Report 0247-07-0005.01 Rev. 0, "Palisades Fire Probabilistic Risk Assessment Fire Risk Quantification and Summary".

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2. *There is no indication which Supporting Requirements were ranked below Capability Category II by the Peer Review Team (i.e., no Table V-2,) provide Table V-2.*

ENO Response

2. Table V-2 is provided below:

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Table V-2 Fire PRA - Category I Summary

SR	Topic (ASME Standard Category II Text)	Status ¹	Finding or Suggestion	Disposition
HRA-A3	For each fire scenario, IDENTIFY any new, undesired operator action that could result from spurious indications resulting from failure of a single instrument, per SR ES-C2 (e.g., due to verbatim compliance with the instruction in an alarm response procedure, when separate confirmation is not available or required).	Closed	Section 6.3 of the HRA Notebook discusses the review that was performed with the licensed operators for the identification of the new, undesired operator actions in response to spurious indications. However, the detailed documentation for the evaluation process and the justifications for the conclusion that no undesired operator actions will be taken in these instrumentation failure conditions was not yet completed for the reviewers to confirm the conclusion that no undesired operator actions need to be considered.	Finding resolved by documentation and model update. No impact to NFPA-805 analysis. A simulator exercise was performed with current Palisades' license holders in which several scenarios were evaluated to determine how Operators would respond given spurious or false instrument indications. The results of these exercises were considered in the HFE development process. The process and evaluation results are documented in the Palisades Probabilistic Safety Assessment Notebook NB-PSA-HR, "Human Reliability Analysis Notebook Volume 1 (Post Initiator Operator Actions), Rev. 4."
HRA-B4	INCLUDE HFEs for cases where fire-induced instrumentation failure of any single instrument could cause undesired operator action, consistent with HLR-ES-C of this Part and in accordance with HLR-HR-F and its SRs in Part 2 and DEVELOP a defined basis to support the claim of nonapplicability of any of the requirements under HLR-HR-F Part 2.	Closed	Same as HRA-A3-01. This SR was assigned CC I based on the related finding HRA-A3-01.	Finding resolved by documentation and model update. No impact to NFPA-805 analysis. A simulator exercise was performed with current Palisades' license holders in which several scenarios were evaluated to determine how Operators would respond given spurious or false instrument indications. The results of these exercises were considered in the HFE development process. The process and evaluation results are documented in the Palisades Probabilistic Safety Assessment Notebook NB-PSA-HR, "Human Reliability Analysis Notebook Volume 1 (Post Initiator Operator Actions), Rev. 4."
HRA-C1	For each selected fire scenario, QUANTIFY the HEPs for all HFEs and ACCOUNT FOR relevant fire-related effects using detailed analyses for significant HFEs and conservative estimates (e.g., screening values) for nonsignificant HFEs, in accordance with the SRs for HLR-HR-G in Part 2 set forth under at least Capability Category II, with the following clarification: (a) Attention is to be given to how the fire situation alters any previous assessments in nonfire analyses as to the influencing factors and the timing considerations covered in SRs HR-G3, HR-G4, and HR-G5 in Part 2 And (b) DEVELOP a defined basis to support the claim of nonapplicability of any of the requirements under HLR-HRG in Part 2.	Open	Fire response HFEs modeled with screening values have not yet been evaluated in a manner accounting for relevant PSFs (e.g., ACP-DGOT-B5B-DG, FPS-PMOE-START-L, ACP-PMOE-383-11A, ACP-PMOE-383-12A, etc.). Also, HRA Calculator evaluation sheet cannot be located for PCP-PMOF-P-50X-LOC and EDG-PMOE-PORT-PUMP, and AFW-AVOA-CV-2010-D, SWS-AVOA-CV-0823-26, and SWS-AVOB-CV-082447M still need to be modified for fire related conditions. This task is not completed.	Finding open, given that the procedures, modification detail, operations review, and detailed HRA model development are not yet complete. Significant HFEs were evaluated and developed in further detail as documented in the Palisades Probabilistic Safety Assessment Notebook NB-PSA-HR, "Human Reliability Analysis Notebook Volume 1 (Post Initiator Operator Actions), Rev. 4." Screening values are still applied for fire HEPs pending development of final procedures, modifications, and operations reviews.
1) Status 'Closed' implies F&O disposition is sufficient to meet Category II.				

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3. *Individual VFDRs and the associated disposition are documented for each fire area in LAR Attachment C. However, the dispositions of the VFDRs in Attachment C state no modifications are required and the fire area Risk Summary in Attachment C contains the following generic statement: “There were no additional modifications identified that are specific to a given VFDR resolution in this fire area.” However, LAR Attachment S, Table S-2, contains modifications that are described as resolving VFDRs. Clarify the discrepancy in Attachment S wherein certain modifications are identified as resolving VFDRs and Attachment C where no VFDRs are identified as being resolved by modifications.*

ENO Response

3. Based on plant knowledge and risk analysis insights, it was decided to identify and evaluate modifications for overall plant fire risk reduction, prior to an evaluation of specific variances from deterministic requirements (VFDRs). These plant modifications were developed independently of whether or not specific VFDRs may or may not have been resolved. Modifications identified with this approach, in combination with modifications identified to resolve code-compliance issues, lowered overall plant fire risk and eliminated the need for any additional modifications to be postulated to address specific VFDRs during the fire risk evaluation process.

In the Palisades LAR, Attachment C was meant to communicate that no additional modifications were required – beyond the set of modifications identified in Attachment S – to address any residual risk from any given VFDR. Attachment S indicated whether a modification explicitly modeled in the PRA resolved any VFDRs, but did not identify the specific VFDRs resolved or distinguish between partial and full resolution. Attachment S therefore designated modifications that partially resolve VFDRs as modifications required for compliance. Modifications that partially resolve VFDRs are considered required (necessary) but not alone sufficient for compliance.

The tables below provide the correlation of each modification to specific VFDRs resolved, either partially or fully. The first column, “Item,” contains a modification identifier corresponding to the modification identifier in Attachment S. The second column contains the set of VFDRs by fire area (if any) that are fully or partially resolved by the modification. The third column contains additional clarifying comments.

As discussed above, not all modifications were designed to resolve VFDRs: some were designed for overall plant fire risk reduction (and intentionally, risk

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reduction with respect to other hazards), while others were purely code-compliance type modifications. Likewise, not all VFDRs are fully or partially resolved by a modification.

The residual risk of all VFDRs not resolved fully by modification has been evaluated as acceptable, either with or without credit for recovery actions, as indicated in the Palisades LAR, Attachments G and W.

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Additional Information for Table S-1: Plant Modifications Completed		
Item	VFDRs Resolved / *Partially Resolved	Comments
S1-1	None	Completed modification resolved an Appendix R non-compliance issue.
S1-2	None	Completed modification resolved an NFPA code non-compliance issue.
S1-3	FA-01: VFDR-0231/ENP-1270* FA-02: VFDR-0232/ENP-1269* FA-04: VFDR-0177/ENP-1177* FA-09: VFDR-0091/ENP-1348* FA-23: VFDR-0218/ENP-1195*	<p>Completed modification resolved an Appendix R non-compliance issue.</p> <p>Modification does not eliminate need for ex-primary control station actions to align fire protection pumps for long term AFW supply.</p> <p>Therefore, no VFDRs are fully resolved by this modification. Modification ensures survivability of fire pump such that ex-primary control station action remains feasible.</p> <p>However, since modification partially resolves the indicated VFDRs it is considered a modification required for compliance.</p>

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Additional Information for Table S-2: Plant Modifications Committed		
Item	VFDRs Resolved / *Partially Resolved	Comments
S2-1	None	Modification provides overall plant risk reduction for combinations of failures of recovery actions, fire-induced failures and random failures in secondary side decay heat removal.
S2-2	FA-03: VFDR-0146/ENP-1092* VFDR-0343/ENP-1408* FA-04: VFDR-0350/ENP-1417*	Modification addresses some but not all conditions that require ex-primary control station actions for EDG alignment to safety-related 2400 VAC buses. Therefore, no VFDRs are fully resolved by this modification. However, since modification partially resolves the indicated VFDRs it is considered a modification required for compliance.
S2-3	FA-03: VFDR-0146/ENP-1092* VFDR-0343/ENP-1408* FA-04: VFDR-0350/ENP-1417*	Modification addresses some but not all conditions that require ex-primary control station actions for EDG alignment to safety-related 2400 VAC buses. Therefore, no VFDRs are fully resolved by this modification. However, since modification partially resolves the indicated VFDRs it is considered a modification required for compliance.
S2-4	FA-01: VFDR-0323/ENP-1387 FA-02: VFDR-0330/ENP-1394 FA-03: VFDR-0134/ENP-1078	Modification fully resolves the indicated VFDRs.
S2-5	FA-01: VFDR-0086/ENP-1051 FA-02: VFDR-0055/ENP-1007 FA-03: VFDR-0154/ENP-1100 FA-04: VFDR-0188/ENP-1128 FA-06: VFDR-0364/ENP-1470 FA-13: VFDR-0362/ENP-1467 FA-14: VFDR-0247/ENP-1210 FA-21: VFDR-0363/ENP-1468 FA-23: VFDR-0216/ENP-1193	Modification fully resolves the indicated VFDRs.
S2-6	FA-03: VFDR-0128/ENP-1071*	Modification addresses some but not all conditions that require ex-primary control station actions for AFW pump operation.

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Additional Information for Table S-2: Plant Modifications Committed		
Item	VFDRs Resolved / *Partially Resolved	Comments
	FA-04: VFDR-0166/ENP-1138* FA-13: VFDR-0266/ENP-1256*	Therefore, no VFDRs are fully resolved by this modification. However, since modification partially resolves the indicated VFDRs it is considered a modification required for compliance.
S2-7	FA-13: VFDR-0272/ENP-1262*	Modification addresses some but not all conditions that require ex-primary control station actions to align and support HPSI pump operation for inventory control. Therefore, no VFDRs are fully resolved by this modification. However, since modification partially resolves the indicated VFDR it is considered a modification required for compliance.
S2-8	None	Modification ensures additional time margin is available for ventilation alignment for EDG room cooling.
S2-9	FA-04: VFDR-0350/ENP-1417*	Modification addresses some but not all conditions that require ex-primary control station actions for EDG alignment to safety-related 2400 VAC buses. Therefore, no VFDRs are fully resolved by this modification. However, since modification partially resolves the indicated VFDR it is considered a modification required for compliance.
S2-10	FA-01: VFDR-0231/ENP-1270 VFDR-0307/ENP-1351 FA-02: VFDR-0232/ENP-1269 VFDR-0308/ENP-1352 FA-03: VFDR-0151/ENP-1097 FA-04: VFDR-0177/ENP-1177 VFDR-0309/ENP-1353 FA-05: VFDR-0097/ENP-1107 FA-06: VFDR-0108/ENP-1150 FA-07: VFDR-0189/ENP-1154 FA-08: VFDR-0191/ENP-1156 FA-09: VFDR-0091/ENP-1348 FA-10: FA-22: VFDR-0197/ENP-1184 FA-23: VFDR-0218/ENP-1195 VFDR-0306/ENP-1350 FA-24: VFDR-0202/ENP-1199 FA-25: VFDR-0208/ENP-1236 FA-26: VFDR-0234/ENP-1205 FA-27: VFDR-0195/ENP-1203 FA-28: VFDR-0235/ENP-1208 FA-29: VFDR-0275/ENP-1220 FA-30: VFDR-0276/ENP-1221 FA-31: VFDR-0278/ENP-1223 FA-32:	Modification fully resolves the indicated VFDRs.

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Additional Information for Table S-2: Plant Modifications Committed			
Item	VFDRs Resolved / *Partially Resolved	Comments	
	VFDR-0209/ENP-1160 FA-11: VFDR-0290/ENP-1271 FA-12: VFDR-0292/ENP-1272 FA-13: VFDR-0263/ENP-1253 FA-14: VFDR-0243/ENP-1212 FA-15: VFDR-0221/ENP-1161 FA-16: VFDR-0212/ENP-1171 FA-17: VFDR-0112/ENP-1158 FA-18: VFDR-0116/ENP-1174 FA-19: VFDR-0211/ENP-1175 FA-21: VFDR-0118/ENP-1178	VFDR-0125/ENP-1266 FA-33: VFDR-0200/ENP-1267 FA-34: VFDR-0282/ENP-1227 FA-35: VFDR-0284/ENP-1229 FA-36: VFDR-0285/ENP-1230 FA-38: VFDR-0286/ENP-1231 FA-39: VFDR-0287/ENP-1232 FA-40: VFDR-0288/ENP-1233 FA-41: VFDR-0289/ENP-1234 FA-56: VFDR-0359/ENP-1469	
S2-11	FA-01: VFDR-0088/ENP-1054* FA-02: VFDR-0058/ENP-1010* FA-03: VFDR-0143/ENP-1089 VFDR-0144/ENP-1090* VFDR-0361/ENP-1464* FA-04: VFDR-0180/ENP-1120 FA-05: VFDR-0101/ENP-1111 FA-06: VFDR-0109/ENP-1151* FA-13: VFDR-0257/ENP-1247 FA-16: VFDR-0026/ENP-0975* FA-21: VFDR-0193/ENP-1268*	<p>Modification fully resolves the VFDRs that involve charging pump spurious actuation / loss of control only (i.e., those without asterisks).</p> <p>Modification addresses some but not all conditions that require ex-primary control station actions to eliminate spurious charging pump operation and support inventory control.</p> <p>Therefore, only some VFDRs (those without asterisk) are fully resolved by this modification.</p> <p>Since the modification partially resolves the VFDRs indicated with asterisk and fully resolves VFDRs without asterisks it is considered a modification required for compliance.</p>	
S2-12	None	Modification provides overall plant risk reduction by supporting steam generator depressurization to provide alternate means of secondary side decay heat removal.	
S2-13	FA-13: VFDR-0272/ENP-1262*	<p>Modification addresses some but not all conditions that require ex-primary control station actions to align and support HPSI pump operation for inventory control.</p> <p>Therefore, no VFDRs are fully resolved by this modification.</p>	

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Additional Information for Table S-2: Plant Modifications Committed		
Item	VFDRs Resolved / *Partially Resolved	Comments
		However, since modification partially resolves the indicated VFDR it is considered a modification required for compliance.
S2-14	None	Modification provides overall plant risk reduction by preventing spurious isolation of CCW to containment due to fire-induced valve-related cable faults.
S2-15	FA-01: VFDR-0322/ENP-1386 FA-02: VFDR-0329/ENP-1393 FA-03: VFDR-0156/ENP-1102 FA-04: VFDR-0176/ENP-1116 FA-14: VFDR-0248/ENP-1211 FA-26: VFDR-0241/ENP-1207 FA-34: VFDR-0280/ENP-1225	Modification fully resolves the indicated VFDRs.
S2-16	None	Modification increases availability of a Non-Power Operation credited component under certain conditions.
S2-17	None	Modification increases availability of a Non-Power Operation credited component under certain conditions.
S2-18	None	Modification resolves an NFPA code non-compliance issue.
S2-19	None	Modification extends operation of EC-150 panel under certain conditions.
S2-20	None	Modification resolves an NFPA code non-compliance issue.
S2-21	FA-01: VFDR-0077/ENP-1044* FA-02: VFDR-0042/ENP-0994* FA-03: VFDR-0140/ENP-1086* FA-04: VFDR-0165/ENP-1137* FA-06: VFDR-0104/ENP-1146* FA-11: VFDR-0006/ENP-0951* FA-15: VFDR-0224/ENP-1164* FA-21: VFDR-0122/ENP-1182*	Modification does not eliminate need for ex-primary control station actions to align charging suction from the SIRWT. Therefore, no VFDRs are fully resolved by this modification. Modification ensures survivability of valve such that ex-primary control station action remains feasible. However, since modification partially resolves the indicated VFDRs it is considered a modification required for compliance.

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Additional Information for Table S-2: Plant Modifications Committed		
Item	VFDRs Resolved / *Partially Resolved	Comments
S2-22	None	Modification resolves an NFPA code non-compliance issue.
S2-23	None	Modifications prevent overall plant risk increase by ensuring electrical coordination remains consistent with PRA assumptions.
S2-24	None	Modification resolves an NFPA code non-compliance issue.
S2-25	None	Modification resolves an NFPA code non-compliance issue.
S2-26	FA-01: VFDR-0070/ENP-1037 VFDR-0071/ENP-1038 FA-02: VFDR-0050/ENP-1002 VFDR-0051/ENP-1003 FA-05: VFDR-0095/ENP-1105 FA-11: VFDR-0008/ENP-0954 FA-12: VFDR-0012/ENP-0962 FA-21: VFDR-0360/ENP-1463	Modification resolves VFDRs that exist during cross-train charger alignment only. Cross-train alignment is not the standard alignment modeled in the PRA.
S2-27	None	Modification resolves an NFPA code non-compliance issue.
S2-28	None	Modification resolves an NFPA code non-compliance issue.
S2-29	None	Modification resolves an NFPA code non-compliance issue.
S2-30	None	Modification resolves an NFPA code non-compliance issue.
S2-31	None	Modification resolves an NFPA code non-compliance issue.
S2-32	None	Modification resolves an NFPA code non-compliance issue.
S2-33	None	Modification eliminates 3-phase proper polarity hot short potential for FOGG valves.
S2-34	None	Modification resolves an NFPA code non-compliance issue.
S2-35	None	Modification resolves an NFPA code non-compliance issue.
S2-36	None	Modification resolves an NFPA code non-compliance issue.

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Additional Information for Table S-2: Plant Modifications Committed		
Item	VFDRs Resolved / *Partially Resolved	Comments
S2-37	None	Modification resolves an NFPA code non-compliance issue.
S2-38	FA-32: VFDR-0123/ENP-1264 VFDR-0124/ENP-1265	Modification resolves an NFPA code non-compliance issue, and in addition modification fully resolves the indicated VFDRs.
S2-39	None	Modification resolves an NFPA code non-compliance issue.
S2-40	None	Modification resolves an NFPA code non-compliance issue.
S2-41	None	Modification resolves an NFPA code non-compliance issue.
S2-42	None	Modification resolves an NFPA code non-compliance issue.

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4. *LAR Attachment F describes the process for evaluating MSOs at Palisades, including use of the expert panel approach per FAQ 07-0038, Revision 3. In the “Results of Step 1” section, generic industry sources of information used for both MSO reviews are cited but no plant-specific sources are cited. Describe how plant-specific insights were used to identify and evaluate MSOs at Palisades.*

ENO Response

4. Experienced, multi-disciplined expert panel review teams at Palisades utilized the following types of plant-specific knowledge bases to postulate possible fire damage scenarios and brainstorm possible plant consequences involving multiple spurious operations:
- first-hand operating experience,
 - typical and off-normal equipment performance,
 - original and as-modified plant design,
 - actual and potential plant consequences resulting from upset conditions,
 - thermal-hydraulic/neutronic licensing basis safety analysis, boundary conditions and assumptions, and
 - integrated plant and operator response experience.

The expert panel included personnel with extensive Palisades-specific expertise in:

- Operations,
- Fire Fighting (Fire Marshall),
- Design Engineering,
- Electrical Engineering,
- System Engineering,
- Safe Shutdown Analysis,
- Circuit Analysis,
- Thermal-Hydraulic Analysis,
- Neutronics Analysis, and
- Probabilistic Risk Assessment

The expert panel and/or multiple spurious operation (MSO) development teams included many of the same plant individuals that developed detailed logic models, containment analysis, and source term modeling supporting historic licensing basis activities, such as a 1982 SEP issue. The expert panel and/or MSO development teams also included individuals responsible for several areas

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of the FSAR Chapter 14 licensing analysis and basis, Appendix R, and Fire Protection safety reviews.

Plant specific data sources included:

- piping and instrumentation diagrams (P&IDs),
- electrical single line and circuit drawings,
- training documents,
- internal and external events PRA models and insights,
- safe shutdown equipment list,
- safe shutdown logic diagrams,
- post-fire safe shutdown analysis (SSA),
- plant operating procedures (normal, emergency, post-fire and abnormal operating procedures),
- self-assessment results,
- operating experience, and
- walk-down notes and pictures.

These information sources provided insights that were used in conjunction with the expertise of the team and generic industry information sources to identify potential MSO scenarios of concern for Palisades. Plant-specific and generic industry information sources are explicitly referenced in Report #: 0247-07-0005.04, "Multiple Spurious Operations (MSO) Report", which was authored by plant personnel.

The effort to identify and evaluate potential MSOs did not end with the conclusion of the expert panel. NFPA 805 project staff continually evolved and refined the MSO work during NFPA 805 model development and analysis. The expert panel was re-convened at the conclusion of the work to ensure concurrence with any new MSOs, insights and evaluations, as documented in Report #: 0247-07-0005.04.

This report was then used to identify component MSO failure combinations to be included in the safe shutdown analysis to develop VFDRs and ensure the nuclear safety capability assessment also identified these MSO conditions. The results of this work are outlined in PLP-RPT-12-00110, "Multiple Spurious Operation (MSO) Identification and Evaluation."