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Florida Power & Light Company, 9760 S.W. 344 Street, Florida City, FL 33035

September 19, 2012
10 CFR 50.90
L-2012-354

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555-0001

Re: Turkey Point Nuclear Generating Station Units 3 and 4
Docket Nos. 50-250 and 50-251
Supplemental Information Regarding License Amendment Request No. 216
Transition to 10 CFR 50.48(c) - NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants (2001 Edition)

By FPL letter L-2012-092 dated June 28, 2012, in accordance with the provisions of 10 CFR 50.90, "Application of License or Construction Permit," Florida Power and Light Company (FPL) requested an amendment to the Renewed Facility Operating License (RFOL) for Turkey Point Nuclear Generating Station Units 3 and 4. The license Amendment Request (LAR) will enable FPL to adopt a new fire protection licensing basis which complies with the requirements in 10 CFR 50.48(a) and (c) and the guidance in Revision 1 of Regulatory Guide (RG) 1.205.

On September 5, 2012, the NRC Staff requested supplemental information regarding the LAR. The attachments to this letter provide the requested supplemental information.

The supplemental information does not impact the 10 CFR 50.92 evaluation of "No Significant Hazards Consideration" previously provided in FPL letter L-2012-092.

This letter makes no new commitments or changes to any existing commitments.

If you should have any questions regarding this application, please contact Robert Tomonto, Licensing Manager, at 305-246-7327.

A006
NRR

I declare under penalty of perjury that the foregoing is true and correct.

Executed on September 19, 2012.

Michael Kiley
Vice President
Turkey Point Nuclear Generating Station

Attachments

cc: Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point
USNRC Project Manager for Turkey Point
Mr. W. A. Passetti, Florida Department of Health

Attachment 1

Florida Power and Light Company

Turkey Point Nuclear Generating Station Units 3 and 4

Supplemental Information Regarding License Amendment Request No. 216

Transition to 10 CFR 50.48(c) - NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2001 Edition

NRC Question #1

Florida Light and Power Company's review against the criteria in NEI 00-01 Section 3.2.1.2, Fire Damage to Mechanical Components, states that brazed components were assumed not to fail as a result of a fire in this analysis. This is contrary to the NEI 00-01 guidance. Provide justification for this assumption by discussing the extent of use of brazed components at Turkey Point and the significance of this assumption to the analysis results.

Response:

The only instance in which fire damage to brazed tubing was excluded was for the Atmospheric Dump Valve (ADV) controls. The ADV control is via digital controllers with I/P converters in the control room (fire area MM/106). These digital controllers are analyzed as part of the safe shutdown analysis. The output pneumatic signal from the converters is transmitted to the valve operators located at fire areas OD-115 [Unit 3] and OD-114 [Unit 4] via copper tubing. The copper tubing from the control room to the valves is routed in fire areas OD-078, OD-079, OD-080, OD-083, OD-084, OD-105 and HH/098. The failure of copper tubing would result in the inability to open the ADV from the control room. Any action required to mitigate this is a longer term action required to cool down the plant.

The above outdoor areas have no potential for a hot gas layer development. Additionally, the tubing is located at large distances from ignition sources. The zone of influence consideration for Turkey Point is based on thermoplastic cables. Potential failure of the copper tubing would be at a higher temperature than thermoset cables, which have higher failure temperature than the thermoplastic cables. The location of copper tubing is not within the zone of influence of any significant ignition sources. Therefore, the possibility of failed brazed joints is negligible. All above outdoor fire areas are transitioning as performance based and these areas are relatively low risk further minimizing any potential effect of a failed brazed joint. Further, the loss of ADV control capability, even when assumed to occur in all scenarios in these fire zones [OD-078, OD-079, OD-080, OD-083, OD-084 and OD-105], has a minimal impact on the associated scenario risk and will not impact meeting the acceptance criteria in Regulatory Guide 1.174.

Fire area HH/098 is the Cable Spreading Room, which is one of the alternate shutdown [ASD] fire areas. Redundant control for the ADVs is provided at the Alternate Shutdown Panel [ASP]. This control is an electrical signal to local I/P converters at the ADVs. The pneumatic signals from the ASD fire areas are isolated from the ASP. Therefore, control of the ADVs is ensured independent of any potential fire impact on instrument air in the alternate shutdown fire areas.

The revalidated Appendix R SSA and the NFPA 805 NSCA analyses assumed instrument air would be lost in any area where an instrument air component or an end device (e.g., air operated valve or pressure regulator) is located. It is assumed that fire damage to the end device would cause a large enough air leakage to depressurize the entire air header for that unit if adequate makeup capacity is not available. Because brazing may only occur in the copper tubing in the instrument air system and not in piping (which has threaded connections), and because the instrument air system typically transitions from piping to tubing only in the vicinity of end devices, there would not be any brazed tubing in the areas where end devices are not located. In addition, the majority of the copper tubing is constructed with mechanical joints (compression fittings). Tubing cables are installed to transmit pneumatic signals between remote devices. The joining of ADV tubing cables, when required, is performed inside tubing junction boxes with compression fittings. Brazing is not used to join two sections of tubing cables. It has, however, been assumed that the tubing cable vendor may have randomly brazed two individual sections of tubing within a tubing cable during manufacturing process. Since the non-existence of brazed tubes within control tubing cables can not be field verified, the above conservative treatment of the copper tubing was deemed appropriate.

The only systems at Turkey Point that allow brazed copper pipes are the potable water and the breathing air systems. One system that allows the replacement of galvanized piping with brazed copper piping is the service water system. None of these systems are required for safe shutdown after a fire. The only other potential for brazed joints would be in air conditioning systems. Since these systems are failed on location and the brazed joints are local to these systems there is no impact on the analyses supporting NFPA 805.

Based on the above, there is no significance to the use of the assumption that brazed connections will not fail due to the effects of a fire. Therefore, the exclusion of the potential for an exposure fire to damage mechanical components at PTN does not affect the ability of the plant to safely shutdown.

The above information has been added to the corrective action program and will be incorporated into the analysis. After incorporation the analysis will comply with NEI 00-01 Section 3.2.1.2

NRC Question #2

Attachment V describes a UAM regarding electrical panel factors and provides the results of a sensitivity analysis against a NUREG/CR-6850 method as being an increase in CDF/LERF of 15 to 35% for affected fire zones. The NRC's position on this method is explained in a June 21, 2012 letter to NEI (ML12171A583). Please use an NRC accepted method which removes the panel factors and provide revised results for affected aspects of the application (CDF, LERF, ΔCDF, ΔLERF).

Response:

A simplified and bounding approach was used to prepare an initial sensitivity study as reported in the LAR. That simplified approach consisted of removing the applied factors for the fire scenarios listed in Attachment W. That removal effectively changes the applied severity factor to 1.0. The results represent an upper bound. The results of this sensitivity study have already been provided in the LAR as a percentage increase for the baseline CDF and LERF for Units 3 and 4. As requested, the same sensitivity study results for the ΔCDF and ΔLERF are 20 to 90% higher for affected fire zones.

Incorporation of the above increases in risk and delta risk, in conjunction with a reduction in the credit taken for the risk offset associated with control room incipient detection credit, result in total risk (CDF and LERF) within the Regulatory Guide 1.174 acceptance criteria, with the exception of select LERF results which are overpredicted.

NRC Question #3

Several of the Findings from the 2010 peer review F&Os identified in Table V-3 identified deviations from NUREG/CR-6850 (e.g., Finding 1-28 regarding propagation of fires outside of electrical cabinets, Finding 3-10 regarding use of lower HRRs for transient fires, and Finding 10-22 regarding "qualitative" disposition of sensitive electronics). Table V-3 subsequently dispositions these items as "This F&O has been closed. The action taken to address this item was specifically included in the focused-scope Peer Review." This response does not provide any information about how the item is currently addressed in your fire PRA. Please describe how the item was dispositioned and, for those F&O's that identify a deviation from NRC accepted methods that has been retained, provide a sensitivity evaluation (total and ΔCDF/LERF) replacing the method with an accepted method.

Response:

The Peer Review history for the Turkey Point Fire PRA (FPRA) included both a full-scope Peer Review in 2010 and a focused scope Peer Review in 2012. The scope and extent of the Peer Review in 2012 included all of the supporting requirements associated with Technical Elements FSS, HRA, and PRM. The results of the focused scope Peer Review found that changes to the Fire PRA that had been implemented were sufficient to satisfy many of the Supporting Requirements (SRs) and also sufficient to close related Facts and Observations (F&Os) from the 2010 Peer Review. In all cases but one, the methods that were used are consistent with NRC accepted methods and did not involve the use or credit of any Unreviewed Analysis Methods (UAMs). The only instance in the Turkey Point fire PRA where a method not accepted by the NRC has been used is that associated with NRC Question 2.

In some instances, the updated analysis was insufficient to fully satisfy the SR. In such cases the F&O from the 2010 Peer Review was superseded by a new F&O. It was the intent of Florida Power & Light to include in Table V-3, only those F&Os from the 2010 Peer Review that either remained open or were superseded by the 2012 Peer Review. Inadvertently, a number of F&O from the 2010 Peer Review was included in Table V-3. These entries were dispositioned using the phrase 'This F&O has been closed. The action taken to address this item was specifically included in the focused scope Peer Review'.

The disposition of each F&O in Table V-3 associated with a finding that was not superseded by a focused scope peer review finding provides the action taken to disposition the associated F&O.

A revised Table V-3 is attached to this response with changes which delete those F&Os closed by the focused scope peer review or which are superseded by the focused scope peer review. A marked-up version of Table V-3 is provided as Attachment 2. A revised version of Table V-3 with the F&Os deleted is provided as Attachment 3 and replaces the entire Table V-3 of LAR 216 submitted by FPL letter L-2012-092.

The table below provides the basis for deletion of each of these Table V-3 F&Os including the F&O number from the focused scope peer review which superseded the initial peer review F&O. The disposition of the closed/superseded F&Os from the Focused Scope peer review is also provided in this table.

A column is provided in the table below identifying those F&Os where the focused scope peer review closed an F&O without a revision to the associated documentation. Only two instances have been identified where an F&O was closed by the focused scope peer review without a documentation revision, these are associated with F&Os 1-28 and 6-16. In both of these cases the focused scope peer review determined that the existing documentation met the ASME/ANS standard requirement and/or an applicable FAQ. A discussion of these F&Os is provided in the Table below.

F&O	**Disposition by Focused Scope Peer Review**	**F&O Dispositions Table 4-4**	**Closed Without a Document Revision (Y/N)**
1-11	Closed. Can be removed from Table V-3.	The team reviewed PTN-FPER-11-001, Revision 0, "Turkey Point Nuclear Power Plant Units 3 and 4 Information Notice (IN) 92-18 Review (NFPA 805)." This evaluation supports the availability of the components recovered via the altered events process and is	N

F&O	Disposition by Focused Scope Peer Review	F&O Dispositions Table 4-4	Closed Without a Document Revision (Y/N)
		considered sufficient to disposition this F&O.	
1-22	Superseded by Focused Scope Peer Review F&O 7-6. Can be removed from the Table V-3.	N/A	N/A
1-24	Closed. Can be removed from Table V-3.	Subsequent to the 2010 Peer Review, changes were made to set the altered events to nominal values rather than zero. This was reviewed and is considered sufficient to disposition this F&O.	N
1-26	Closed. Can be removed from Table V-3.	Subsequent to the 2010 Peer Review, changes were made to set the altered events to nominal values rather than zero. This was reviewed and is considered sufficient to disposition this F&O.	N
1-28	Closed. Can be removed from Table V-3.	The approach utilized is consistent with Final approved FAQ 08-0042. As such this F&O is considered closed.	Y (Focused Scope Peer Review confirmed the analysis was consistent with the issued FAQ).
1-29	Closed. Can be removed from Table V-3.	MCR evaluations no longer use a 0.1 assumed CCDP. This was reviewed and is considered sufficient to disposition this F&O.	N

F&O	Disposition by Focused Scope Peer Review	F&O Dispositions Table 4-4	Closed Without a Document Revision (Y/N)
1-30	Superseded by Focused Scope Peer Review F&O 10-1. Can be removed from the Table V-3.	N/A	N/A
1-31	Superseded by Focused Scope Peer Review F&O 10-11. Can be removed from the Table V-3.	N/A	N/A
1-32	Superseded by Focused Scope Peer Review F&O 10-11. Can be removed from the Table V-3.	N/A	N/A
1-33	Superseded by Focused Scope Peer Review F&O 10-9. Can be removed from the Table V-3.	N/A	N/A
1-35	Superseded by Focused Scope Peer Review F&O 9-4. Can be removed from the Table V-3.	N/A	N/A
1-36	Superseded by Focused Scope Peer Review F&O 7-8. Can be removed from the Table V-3.	N/A	N/A
1-4	Superseded by Focused Scope Peer Review F&O 7-1. Can be removed from the Table V-3.	N/A	N/A

F&O	Disposition by Focused Scope Peer Review	F&O Dispositions Table 4-4	Closed Without a Document Revision (Y/N)
1-41	Superseded by Focused Scope Peer Review F&O 7-6. Can be removed from the Table V-3.	N/A	N/A
1-44	Superseded by Focused Scope Peer Review F&O 8-10. Can be removed from the Table V-3.	N/A	N/A
1-45	Closed. Can be removed from Table V-3.	Transients now only use floor area ratio. Transients no longer apply SF and NSP factors which may have resulted in non-conservative results. This was reviewed and is considered sufficient to disposition this F&O.	N
1-46	Superseded by Focused Scope Peer Review F&O 10-12. Can be removed from the Table V-3.	N/A	N/A
1-5	Closed. Can be removed from Table V-3.	Subsequent to the 2010 peer review the model was changed to remove the events referenced in this F&O. This was reviewed and is considered sufficient to disposition this F&O.	N
1-6	Closed. Can be removed from Table V-3.	Subsequent to the 2010 peer review Table A-1 was modified to indicate credited instrumentation in bold test. This is considered sufficient to address the issues raised and disposition this F&O.	N

F&O	Disposition by Focused Scope Peer Review	F&O Dispositions Table 4-4	Closed Without a Document Revision (Y/N)
1-9	Closed. Can be removed from Table V-3.	Since the 2010 peer review, valve 114A and emergency cooler V30A/B cable routing were incorporated via excluded events based on RFI 0274 routing data. No other exclusion/altered events representing other components were credited in the analysis and no additional issues were noted during this review. The resolution is considered sufficient to disposition this F&O.	N
2-10	Closed. Can be removed from Table V-3.	Subsequent to the 2010 peer review, the values specified in the recovery rules were reviewed and the evaluation of combination events was revised to use the HRA calculator to identify combination events values. This is documented in internal events PRA documentation. No additional examples of inappropriate application of HEP values in the recovery rules were noted during this review. This is considered sufficient to disposition this F&O.	N
2-12	Closed. Can be removed from Table V-3.	The process used for adjusting HEP values carried over from the internal events HRA is documented in Report 0493060006.002, Revision 1. This was reviewed and considered sufficient to disposition this F&O.	N
2-14	Closed. Can be removed from Table V-3.	Subsequent to the 2010 Peer Review, top contributors have been reviewed	N

F&O	Disposition by Focused Scope Peer Review	F&O Dispositions Table 4-4	Closed Without a Document Revision (Y/N)
		and the mapping of fire-induced failures refined. The specific issues noted in this F&O were not observed in the current review. This is considered sufficient to disposition this F&O.	
2-15	Closed. Can be removed from Table V-3.	Changes made to the model to incorporate fire impacts are addressed in the PTN PSA Model Update Calculation, PTN-BFJR-00-001, Revision 9. The documentation provided is consistent with the process normally used for PSA model updates and is considered sufficient to disposition this F&O.	N
2-16	Closed. Can be removed from Table V-3.	Subsequent to the 2010 Peer Review, the PRA model was changed to incorporate modeling of power circuits required to support tripping of the RCPs.. This allows fire-impacts on the equipment required to support the operator action to be captured. However, the changes were not made in the most logical location and could cause confusion during model review and maintenance. F&O 2-16 is considered closed, but a new suggestion F&O (7-2) was generated to recommend relocation of the added gates.	N
2-18	Superseded by Focused Scope Peer Review F&O 7-3. Can be removed from	N/A	N/A

F&O	Disposition by Focused Scope Peer Review	F&O Dispositions Table 4-4	Closed Without a Document Revision (Y/N)
	the Table V-3.		
2-19	Closed. Can be removed from Table V-3.	Subsequent to the 2010 peer review the updated LERF model has been completed and is documented in FPL Calculation PTN-BJFR-99-010, Revision 1. This is the model used in the fire PRA. This was reviewed and is considered sufficient to disposition this F&O.	N
2-22	Superseded by Focused Scope Peer Review F&O 10-14. Can be removed from the Table V-3.	N/A	N/A
2-26	Superseded by Focused Scope Peer Review F&O 9-6. Can be removed from the Table V-3.	N/A	N/A
2-29	Superseded by Focused Scope Peer Review F&O 9-8 (Suggestion F&O, not included in Table V-3). F&O 2-29 can be removed from the Table V-3.	N/A	N/A
2-31	Superseded by Focused Scope Peer Review F&O 8-8. Can be removed from the Table V-3.	N/A	N/A
2-37	Superseded by Focused Scope Peer Review F&O 7-3. Can be removed from	N/A	N/A

F&O	Disposition by Focused Scope Peer Review	F&O Dispositions Table 4-4	Closed Without a Document Revision (Y/N)
	the Table V-3.		
2-38	Superseded by Focused Scope Peer Review F&O 7-3. Can be removed from the Table V-3.	N/A	N/A
2-39	Superseded by Focused Scope Peer Review F&O 7-3. Can be removed from the Table V-3.	N/A	N/A
2-4	Superseded by Focused Scope Peer Review F&O 8-8. Can be removed from the Table V-3.	N/A	N/A
2-40	Closed. Can be removed from Table V-3.	FPL Calculation PTN-BJFR-99-010, Revision 1 documents only 2 HEPs associated with the LERF model. These are addressed in the TURKEY POINT UNITS 3 & 4 FIRE PROBABILISTIC RISK ASSESSMENT HUMAN FAILURE EVALUATION REPORT (Report 0493060006.002 Revision 1). This is considered sufficient to disposition this F&O.	N
2-42	Superseded by Focused Scope Peer Review F&O 7-3. Can be removed from the Table V-3.	N/A	N/A
2-43	Superseded by Focused Scope Peer Review F&O	N/A	N/A

F&O	Disposition by Focused Scope Peer Review	F&O Dispositions Table 4-4	Closed Without a Document Revision (Y/N)
	7-3. Can be removed from the Table V-3.		
2-6	Superseded by Focused Scope Peer Review F&O 7-6. Can be removed from the Table V-3.	N/A	N/A
2-7	Closed. Can be removed from Table V-3.	Changes made to the model to incorporate fire impacts are addressed in the PTN PSA Model Update Calculation, PTN-BFJR-00-001, Revision 9. The documentation provided is consistent with the process normally used for PSA model updates and is considered sufficient to disposition this F&O.	N
3-10	Superseded by Focused Scope Peer Review F&O 10-10 (Suggestion F&O, not included in Table V-3). F&O 3-10 can be removed from the Table V-3.	N/A	N/A
3-11	Superseded by Focused Scope Peer Review F&O 9-5. Can be removed from the Table V-3.	N/A	N/A
3-13	Superseded by Focused Scope Peer Review F&O 10-16. Can be removed from the Table V-3.	N/A	N/A

F&O	Disposition by Focused Scope Peer Review	F&O Dispositions Table 4-4	Closed Without a Document Revision (Y/N)
3-14	Superseded by Focused Scope Peer Review F&O 10-17. Can be removed from the Table V-3.	N/A	N/A
3-9	Superseded by Focused Scope Peer Review F&O 10-4. Can be removed from the Table V-3.	N/A	N/A
4-10	Superseded by Focused Scope Peer Review F&O 10-3. Can be removed from the Table V-3.	N/A	N/A
4-11	Closed. Can be removed from Table V-3.	Subsequent to the 2010 peer review, transient fire modeling and section 8.1 to Fire Scenario Report 0493060006.004 has been revised to remove the separate transient fire location factors, and the approach is now consistent with industry approved methods. Therefore this F&O is closed.	N
4-12	Closed. Can be removed from Table V-3.	Parametric uncertainty analysis has been performed for Unit 4 (to be performed on Unit 3 using same methodology). This was reviewed and is considered sufficient to disposition this F&O.	N
4-13	Closed. Can be removed from Table V-3.	Cable with previously unknown routing which are credited in the FPRA have been traced via RFI-0279.	N

F&O	Disposition by Focused Scope Peer Review	F&O Dispositions Table 4-4	Closed Without a Document Revision (Y/N)
		This was reviewed and is considered sufficient to disposition this F&O.	
4-14	Closed. Can be removed from Table V-3.	This F&O concerned completion of the MCA. MCA analysis was completed (with some new F&Os on the analysis.) This was reviewed and is considered sufficient to disposition this F&O.	N
4-15	Superseded by Focused Scope Peer Review F&O 10-6. Can be removed from the Table V-3.	N/A	N/A
4-19	Superseded by Focused Scope Peer Review F&O 7-6. Can be removed from the Table V-3.	N/A	N/A
4-23	Superseded by Focused Scope Peer Review F&O 7-6. Can be removed from the Table V-3.	N/A	N/A
4-24	Superseded by Focused Scope Peer Review F&O 7-6. Can be removed from the Table V-3.	N/A	N/A
4-25	Superseded by Focused Scope Peer Review F&O 7-6. Can be removed from the Table V-3.	N/A	N/A

F&O	Disposition by Focused Scope Peer Review	F&O Dispositions Table 4-4	Closed Without a Document Revision (Y/N)
4-4	Superseded by Focused Scope Peer Review F&O 8-3. Can be removed from the Table V-3.	N/A	N/A
4-5	Closed. Can be removed from Table V-3.	Changes made to the model to incorporate fire impacts are addressed in the PTN PSA Model Update Calculation, PTN-BFJR-00-001, Revision 9. The documentation provided is consistent with the process normally used for PSA model updates and is considered sufficient to disposition this F&O.	N
4-6	Closed. Can be removed from Table V-3.	Closed out based on evidence that circuit failure modes were used as evidenced the application of spurious operation probabilities via the altered events table.	N
4-8	Closed. Can be removed from Table V-3.	Subsequent to the 2010 peer review, additional fire modeling analysis for the rooms and scenarios identified has been performed and is documented in Fire Scenario Report 0493060006.004. The issue is considered closed.	N
4-9	Closed. Can be removed from Table V-3.	Subsequent to the 2010 peer review, Appendix A to Fire Scenario Report 0493060006.004 has been updated to reconcile inconsistent use of severity factors between the Fire Scenario Report and the FRANC model.	N

F&O	Disposition by Focused Scope Peer Review	F&O Dispositions Table 4-4	Closed Without a Document Revision (Y/N)
		Appendix H has been added to the Fire Scenario Report to document basis for ignition frequencies. The issue is considered closed.	
5-16	Superseded by Focused Scope Peer Review F&O 10-2. Can be removed from the Table V-3.	N/A	N/A
5-3	Closed. Can be removed from Table V-3.	Subsequent to the 2010 Peer Review, additional MSO Expert Panel sessions were conducted and are documented in the Expert Panel for Addressing Multiple Spurious Operations Report (0027-0003-003-001, Revision 1). The document now includes a description of how the MSO impact is incorporated in the model. In addition, PTN PSA Model Update Calculation, PTN-BFJR-00-001, Revision 9 specifically references those changes that are related to an MSO scenario. This is considered sufficient to disposition this F&O.	N
5-5	Superseded by Focused Scope Peer Review F&O 7-5 (Suggestion F&O, not included in Table V-3). F&O 5-5 can be removed from the Table V-3.	N/A	N/A
6-1	Superseded by Focused Scope Peer Review F&O 8-4 (Suggestion F&O, not	N/A	N/A

F&O	Disposition by Focused Scope Peer Review	F&O Dispositions Table 4-4	Closed Without a Document Revision (Y/N)
	included in Table V-3). F&O 6-1 can be removed from the Table V-3.		
6-11	Superseded by Focused Scope Peer Review F&O 7-6. Can be removed from the Table V-3.	N/A	N/A
6-12	Superseded by Focused Scope Peer Review F&O 7-6. Can be removed from the Table V-3.	N/A	N/A
6-13	Superseded by Focused Scope Peer Review F&O 7-6. Can be removed from the Table V-3.	N/A	N/A
6-15	Superseded by Focused Scope Peer Review F&O 7-6. Can be removed from the Table V-3.	N/A	N/A
6-16	Closed. Can be removed from Table V-3.	The issues raised in this F&O are based on good practices from NUREG-1792 which is not directly referenced in the ASME/ANS PRA Standard as the basis for any SR. The practice being employed by FPL for the PTN fire PRA is consistent with that observed in recent internal events peer reviews using the HRA calculator. While there are still dependency issues to be addressed as documented in F&O 7-8, this F&O is	Y (Focused Scope Peer Review determined that the requirements of the ASME/ANS standard were met and the requirement of the

F&O	Disposition by Focused Scope Peer Review	F&O Dispositions Table 4-4	Closed Without a Document Revision (Y/N)
		considered to represent reviewer opinion and not compliance with the requirements of the standard. Therefore, F&O 6-3 is considered closed.	referenced NUREG is not a requirement of the SR. The reviewer also indicated that the PTN approach is consistent with the method applied in other recent internal events peer reviews)
6-3	Superseded by Focused Scope Peer Review F&O 7-3. Can be removed from the Table V-3.	N/A	N/A
6-4	Superseded by Focused Scope Peer Review F&O 8-1 (Suggestion F&O, not included in Table V-3). F&O 6-4 can be removed from the Table V-3.	N/A	N/A

NRC Question #4

The impact on the PRA results of implementing incipient detection (very early warning fire detection system - VEWFDS) in the Main Control Room is presented in Attachment W as a risk reduction of about 7E-4/yr for CDF and 1E-04/yr for LERF, which implies current risk levels at or above these values. How was this risk reduction calculated? If the licensee determines that these results are correctly presented, please describe what additional compensatory actions have been implemented to lower the risks to acceptable ranges prior to the installation of the incipient detection system.

Response:

The review of the calculation used to generate the risk reductions reported in the LAR was found to contain an error. That error resulted in the risk increase factor of 50 (reciprocal of 2E-2) being incorrectly applied to all of the main control room panels instead of only those for which the incipient credit was relied upon for a risk reduction. The calculation for this risk reduction has been corrected and the corrected values for the risk reductions are as follows:

1.29E-5/rx-yr for Unit 3 CDF
1.82E-5/rx-yr for Unit 4 CDF

No credit is taken for incipient detection offset for LERF quantification.

The error associated with the control room incipient detection credit has been determined to be applicable only to the control room and therefore does not impact the risk quantification for any other fire areas.

ATTACHMENT 2 TO L-2012-354

MARKED-UP TABLE V-3 of L-2012-092

Florida Power and Light Company
Turkey Point Nuclear Generating Station Units 3 and 4
License Amendment Request No. 216
Transition to 10 CFR 50.48(c) - NFPA 805
Performance-Based Standard for Fire Protection for
Light Water Reactor Electric Generating Plants, 2001 Edition

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
1-1	In numerous significant scenarios, the spurious operation probability is assumed to be 1.0 (true) for any events where spurious operation can occur. For example, in scenario 79ALA (one of the top 5 scenarios in unit 3), three events are set to true affecting the top cutsets; GMM0GE100 (MOVs 878A or B spuriously operate), MAVK3CV303A, OHTX3CNTRL. Capability Category I requires setting spurious operation probabilities to industry accepted values. It appears most of the events set to true would be either MOVs (0.33) or AOVs (0.62) or similar, and should not be set to true for significant fire scenarios. Analysis using the specific circuit configuration for each significant spurious operation would be required for CC II, and may lead to different results than the generic values, depending on the circuit design and cable affected.	CF-A1	The overall Fire PRA results appear to be greatly impacted by setting spurious operation probabilities to 1.0. Scenario 79ALA, which is presently 8E-06 would be reduced by at least an order of magnitude by assigning spurious operation probabilities to several events. Similarly, with 79AKA, and 79AJA also at 8E-06. Perform Circuit Failure Probability Analysis for significant spurious operations events, and modify the FRANC model to assign a Perform Circuit Failure Probability Analysis for significant spurious operations events, and modify the FRANC model to assign a probability for the event in the cutsets. In order to meet CCII, the spurious operation probability should be based on the specific circuit configuration for each significant spurious operation.	This F&O has been resolved. At the time of the Peer Review, the FPRA had only a very limited credit for fire induced spurious actuation probability. The specific instance identified in the F&O was updated. The resolution of this F&O also included a review of significant fire initiating events and additional credit for hot short induced spurious operation was applied in the analysis as appropriate. In all cases, the application of the spurious actuation factor is consistent with the guidance in NUREG/CR-6850 and FAQ 08-0047.
1-10	Transient Fires are postulated in all fire compartments, as listed in Appendix B and Table 3-6 of the Ignition Frequency Report. All factors affecting the fire frequency were assessed based upon a slightly modified NUREG/CR-6850 approach. However, the rankings that were provided do not appear to be consistent with the methods in NUREG/CR-6850, result in an underestimate for fire frequencies in some areas, and an over estimate in other areas. One F&O is provided on this SR. In particular: a) Areas were ranked as zero in maintenance, occupancy, or storage even though entrance to the areas is physically possible, b) Areas were ranked as 1, even though activities were not prohibited by plant procedure.	IGN-A9	Systematic issue. Appears as if numerous compartment transient frequencies were underestimated, while others would have been slightly over estimated as a result. Initial review was confirmed by walkdown of 5 areas. The ranking on all 5 areas did not appear to match the walkdown teams estimate for each area. Re-assess the transient fire rankings per the Guidance in NUREG/CR-6850. Confirm the rankings by walkdown of each area, taking into account the actual condition.	This F&O has been resolved. A sensitivity evaluation was performed that involved increasing the weighting factor for occupancy and storage from 'low' to 'medium' for all instances where such a condition could reasonably be expected to occur. The results of this sensitivity found that the impact on the calculated CDF for each unit was less than 1E-7. Given this small impact, the existing analysis is adequate for the application.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	In areas where the room is sealed during operation (roof plugs), transients could have been left in the room prior to sealing, so the ranking on this factor should not be zero - per the 6850 guidance. During the walkdown, Compartments 70 and 71 both had permanently stored breaker grounding devices, with poly-covers, and 71 had a temporary transformer for the polar crane (operating). Both should be ranked as 'medium' for storage. Similarly, the cable room had storage of 3 temporary fans, cables and blankets and should be marked as medium for storage. This room also appears to include numerous components that will likely be worked on during power, (ranking moderate for non-hot work), and numerous people were present during our limited walkdown. Compartment 88, an open area in front of the switchgear room, had numerous combustibles stored and located, and should probably be marked as medium or high (presently marked as low). Both area 85 and 88 have frequent foot traffic, and should be marked as medium for occupancy. 85 appears as if it should be moderate for storage (no controls). Similarly; no controls appear to be in place for 116. The above are samples of identified issues, based on our limited walkdown. It appears there will be similar issues with other areas in the plant. We looked at other areas adjacent to the areas we were in (compartments 87, 84, etc), and expect similar problems with the present rankings. (This F&O originated from SR IGN-A9)			
~~1-11~~	~~Events in the altered events table are recovered with a 0.1 failure probability (generally) that include opening of valves,~~	~~CS-A11~~ ~~CS-C3~~	~~Affects multiple recoveries in numerous compartments~~ ~~Perform 92-18 reviews on all recovered~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused scope~~

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~etc. However, these components have not been confirmed as available and are unaffected by spurious operation failing the valve (92-18 concern). (This F&O originated from SR CS-A11)~~	~~HRA-D2 PRM-B9~~	~~components in the Altered Events Report. Consider also that some recovery events may involve the manual operation of more than one component.~~	~~Peer Review.~~
1-17	Table 3-2 includes uncertainty values (EF) for prior and posterior values. However, Error Factors are not propagated to the compartment specific ignition frequencies. The other parameters, such as conditional failure probabilities for circuit failures, do not have uncertainty intervals. The lack of uncertainty intervals would not generate meaningful uncertainty interval of the CDF/LERF results. (This F&O originated from SR IGN-A10)	IGN-A10 QU-E3 UNC-A1 UNC-A2	Systematic Issue. Estimate EFs for significant fire compartments. ESTIMATE the uncertainty interval of the CDF results. ESTIMATE the uncertainty intervals associated with parameter uncertainties (DA-D3, HR-D6, HR-G8, IE-C15), taking into account the state-of-knowledge correlation.	This F&O has been resolved. The quantitative uncertainty analysis was prepared subsequent to the peer review. A parametric uncertainty evaluation that considers fire ignition frequency as well as other variables was performed that uses a Monte Carlo sampling process. The results of the analysis showed a mean that was slighter higher than the calculated results which was expected.
1-18	During walkdowns, several key areas appeared to have ignition sources not included on the ISDS. For example, in the cable spreading room, 2 transformers were in the compartment (3X033 - 75KVA, 3X130 - 45KVA), both within the screening distance of targets. Also in the compartment is CP-600 spectralink cabinet, an open cabinet, the RCP Vibration Monitoring Cabinet, 4P21 and 4P09 instrument AC panel. Note; we did not do a 100% review of the CS room, so additional cabinets may be missing. See also F&O 1-19. (This F&O originated from SR IGN-A7)	IGN-A7	Appears to be missing components in numerous areas, based on a limited sampling during walkdown. Perform a re-verification of the ISDS for significant fire areas in the FPRA. Add missing components to each ISDS, where applicable.	This F&O has been resolved. The specific instances identified in the F&O were reviewed and the analysis updated accordingly. In addition, the supplemental walkdowns that were performed as part of ongoing analysis refinements efforts for the significant fire areas did not identify any other omissions.
1-19	It appears the Ignition Source Counting did not count Lighting Panels or other similar panels. For example, there were at least 8 lighting panels in the cable spreading room that were not on the ISDS. Additional similar panels are located in most electrical rooms we walked down, such as the switchgear	IGN-A7	Appears to be a systematic issue in the FPRA. Include unsealed lighting panels and similar electrical cabinets in the ISDS as potential ignition sources.	This F&O has been resolved. A re-assessment of the lighting panels was performed. The re-assessment focused on the need for treatment as a fire initiating event. No effort was undertaken to alter the population of electrical cabinets considered in the fire frequency development.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	rooms and other electrical rooms. Based on our walkdowns, many of the lighting panels should be included in the ISDS, based on guidance in 6850 and the subsequent FAQ on sealed cabinets. A review of the generic guidance provided for ignition counting did list the screening of small, wall mounted cabinets (sealed). However, the lighting panels do not appear to meet the criteria listed in the procedure (not sealed, numerous switches/breakers), etc. Many of the cabinets are located close to cable trays or other intervening combustibles, so a small fire could result in a larger fire due to spreading. (This F&O originated from SR IGN-A7)			Therefore, the existing values potentially have a conservative bias. The assessment did not identify any instances were explicit treatment as a fire initiating event was needed.
1-2	Section 4.1of the Component Selection Report mentions: "Since the FPRA quantification calculates a fire CCDP and the initiating event frequency for each zone is based on the fire ignition frequency, the initiating event faults are not required to be used for FPRA quantification." Fault tree initiating events were not impacted by the component mapping, and are therefore not changed by fire damage. As a result, equipment associated with Fault Tree initiating events were not identified as components potentially causing a fire-induced initiating event. 163 events are screened in Table A of the Equipment Selection Analysis based on being associated a fault tree initiating event. Most are modeled in other system models. However, Several were found to not be modeled in the rest of the model: CPSD3PC611, CPSD4PC611 and 2 related failures. A few others (Cooling units) do not appear to be modeled	AS-B1 ES-A1 ES-A3 ES-A4 FQ-A2	The significance of not identifying components as causing initiating events is basically that the assumed model impact is accurate by modeling a reactor trip with a subsequent failure of the function, rather than modeling the initiating event itself. In some cases, this impact is a matter of timing for operator actions. In the case of this FPRA, the HEPs have been conservatively set assuming a loss of MFW as a starting point. However, the fault tree initiating events include loss of CCW, loss of HVAC and others. It is not clear that the present model accurately determines CDF/LERF results for systems impacted which may cause a complicated reactor trip (special initiating event). Modify FPRA to model the fire impact to Fault Tree Initiating Events, and analyze the FPRA assuming a fault tree initiating event for those areas where the initiating event can occur.	This F&O has been resolved. The FPRA assumes each postulated fire results in at least a reactor trip. Logic is included in the model so that appropriate event tree is quantified if the fire induces a different type of event (event tree). The overall structure of the FPRA model was reviewed to address the specific item identified in the F&O and to confirm appropriateness of overall treatment. The only change that was required was related to biasing the application of recovery actions so that they were based on an assumed loss of MFW.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	elsewhere. (This F&O originated from SR ES-A1)			
~~1-22~~	~~Events DACF3ECCB & DACF3ECCA are anded under the containment cooler Fault Tree Logic. Each are applied with a screening value recover of 0.1, resulting in a combined recovery of 0.01 Similarly, AAVK3-2831 and 2832 combine under an AND gate, resulting in a combined recovery of 0.01. The above are only examples, based on a random review of two fire areas, and a few HEPs for each. Two events in about 15 were found to have the above problem. (This F&O originated from SR HRA-C1)~~	~~HRA-C1~~	~~A review of the Altered Events Report indicates there are likely numerous combinations of scoping HEPs (0.1 in the altered events report.~~ ~~Review the altered events report for significant fire areas, and determine the combined HEPs where they occur under an AND gate. Use a single recovery for these events, or set only one of the events to 0.1 in the altered events report.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused scope Peer Review.~~
~~1-24~~	~~Event EREE3286G3F is listed as 0.0 probability in the altered events report for 2 areas, even though the description says set to .1. A query of the Altered Events Table comes up with 146 entries, where the probability is set to 0.0, but the description says to set the event to 0.1 A question was asked on this issue, and the response was that these were set to 0.0 and another event was set to 0.1. However, there is no way to verify, track or repeat these settings. In reviewing a few events, there was no easy way to determine that there is a corresponding 0.1 event that recovers the failure. (This F&O originated from SR HRA-C1)~~	~~HRA-C1~~ ~~PRM-B11~~	~~Multiple discrepancies in the altered events table. Some may be documentation issues (incorrect description). However, many appear to be errors in the probability for these events. Setting the events to 0.0 results in the events being screened from the PRA results. However, many may be as a result of setting other related events to 0.1. In this case, the documentation associated with the reason/description needs to be updated.~~ ~~Correct Altered Events Table, where applicable. Additionally, when events are set to zero, provide a traceable method to determine that a corresponding event is set to 0.1 or another value.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused scope Peer Review.~~
1-25	There does not appear to be a review of non-significant cutsets in the PRA documentation. (This F&O originated from SR QU-D5)	FQ-E1 QU-D5	Requirement of QU-D5 as called for by FQ-E1 Perform a review of non-significant cutsets and accident sequences, as discussed in QU-D5 for the FPRA.	This F&O has been resolved. Review of non-significant cutsets performed and documented.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
~~1-26~~	~~By using the altered events table, and setting recovered events to 0.1 (scoping) and the other events in the fault tree to zero, random failures that may fail the HEP are not included in the results. If the random events are greater than 2 orders of magnitude below the top or contribute to 1% of the system failure rate, they should be included based on SY-A15. (This F&O originated from SR SY-A15 and PRM-A2)~~	~~PRM-A2~~ ~~SY-A11~~ ~~SY-A15~~	~~Given the large number of events set to zero in the altered events report (2764), and the large number of basic events greater than 1E-03 in the PRA, there are likely numerous events not included in the model.~~ ~~Review the values set to 0.0 in the altered events report and modify the solution to include the random failures in the results, when applicable.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
1-27	Significant fire compartment contributors to LERF are documented in Appendix C of the summary report. However, the contribution from plant damage states is not provided or the contributors from LEB SRs. Sources of uncertainty, including sensitivity analysis performed, are not evaluated for LERF. (This F&O originated from SR LE-F1)	FQ-E1 LE-F1 LE-F2 LE-F3 UNC-A1	Requirement of LE-F1, F3. Document the contributors to LERF based on the requirements of LE-F1 of the internal events section of the standard, as required by FE-Q1. Document the Sources of uncertainty, including sensitivity analysis performed for CDF in Appendix D of the Summary Report.	This F&O has been resolved. Added LERF top cutsets and importances run as well as sensitivity analysis in Summary Report. Also performed and documented the uncertainty evaluation for LERF.
~~1-28~~	~~It appears in the analysis that MCC fires for un-vented MCC fires are not considered to damage targets outside the selected MCC. See Scenario 058C-A. The original draft of FAQ-42 included discussion on MCC fires, and provide a probability of the fire propagating outside the MCC. This recommended approach was not included in the final FAQ, and as a result, the treatment of MCC fires does not meet the guidance in the FAQ for a sealed cabinet. The end result is that the FPRA should consider MCCs as unsealed, due to the possibility of energetic fires resulting in the MCC door being opened, or as a result of maintenance on the MCC being the cause of the fire (actual events) when the door is open at the start of the fire. It is our understanding that the NRC Fire PRA folks also do not consider MCCs to~~	~~FSS-A4~~	~~See FAQ 042. Scenario 058C-A showed a CDF of 1E-05 prior to screening.~~ ~~Include in the model large MCC fires propagating outside of sealed MCCs~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~be sealed cabinets. The proposed industry approach basically summarizes to the following: MCCs open at the top are considered unsealed, but MCCs that are sealed at the top have around a 0.1 probability of propagation. The data analysis for this value was not validated, but was considered conservative at the time of the proposal, since several fires where it was not clear if they came outside of the MCC were assumed unknown (1/2 an event). (This F&O originated from SR FSS-A4)~~			
~~1-29~~	~~The control room abandonment scenario 106-A, uses a CCDP of 0.1 (scoping value). However, the scenario is one of the top CDF scenarios. (This F&O originated from SR FSS-B2)~~	~~FSS-B2~~	~~The 0.1 scoping analysis is not based on analysis of plant specific procedures or analysis. The HEP may be higher or lower, depending on procedures. Additionally, the circuit analysis may show the Remote Shutdown Panel may not function for some scenarios due to MSOs.~~ ~~Provided detailed analysis for MCR abandonment CCDP.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
1-3	The internal events PRA model has numerous locations in the model where the specific initiating event results in a model impact. For example, under gate U3QT07; initiating events that can cause a PORV or SRV to lift are ANDed with the failure to reclose the PORV or SRV. In this case, special initiator %ZZIP6U3 is identified as an initiating event that will cause a PORV lift, along with %ZZT2U3. Equipment that can cause each are not mapped or modeled in the Fire PRA. As a result of a previous review, the modeling of Feed-and-Bleed was changed to assume a loss of feedwater (low SG level) occurred. The shorter time results in a higher HEP for feed-and-bleed in all scenarios, regardless of whether a loss of	AS-B1 ES-A1 ES-A3 ES-A4 FQ-A2	As a result of assuming a reactor trip and not mapping components/equipment to modeled internal initiating events; the risk can be under-estimated. In this case, since the general approach used is systematic, this problem is difficult to determine without significant effort to combine the impact of each modeled impact. In most cases, the modeling results in non-conservatism in the result. However, the fix for feed-and-bleed resulted in conservatism for most of the scenarios where FW is not initially lost. In either case; whether modeled conservatively or nonconservatively, the standard requirements in this area are to model the impact of the FPRA accurately.	This F&O has been resolved. The issues and concerns identified in the F&O related to the fire-induced initiating events were reviewed. The review found several instances where a change to the modeling was required to allow the existing treatment methodology to be retained. The review did not identify any instances where specific fire initiating event logic beyond that already in the model was needed.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	FW occurred. However, numerous other modeling impacts can occur, that are not modeled. Under gate I62115, logic for HVAC unit 3S230 failure to start is included when a Loss of offsite power would occur. This logic is applicable only for when a LOOP occurs, and not applicable for non-LOOP events. This type of logic is contained throughout the internal events PRA modeling. Another example is under gate E1104A, where loss of DC power results in lockout relay failures. There are many other examples throughout the PRA. Additionally, the identification of the specific initiating event for quantification was not performed per the requirements of FQ-A2. For quantification, the modeled initiating event is assumed to be a reactor trip in all cases. This treatment does not meet the intent of SR FQ-A2, where the quantified model should encompass the risk contribution from all applicable initiating events.		Map all identified internal events initiating events to the specific components that can cause the event, and modify the FPRA to determine the CCDP based on the fire-induced initiating event that results.	
~~1-30~~	~~Fire modeling was conducted via generic fire modeling from which Zones-Of-Influence (ZOI) for specific initiator types was generated. The ZOIs were used to define bounding fire characteristics for each fire scenario. Characteristics that are used to bound potentially risk contributing fire events are identified in Attachment B of the Fire Scenario Report, (Report 0493060006.004). Based on the use of a bounding approach this SR is judged to be met at CC I. Significant fire scenarios should be developed with 2-point fire modeling. (This F&O originated from SR FSS-C1)~~	~~FSS-C1~~ ~~FSS-G1~~	~~The present analysis provides a bounding approach for fire severity in most cases.~~ ~~Perform 2-point fire modeling, when applicable, for significant fire scenarios.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
~~1-31~~	~~Fire scenario evaluation tools were developed based on the Generic Fire Modeling Treatments (Project Number SPH02902.030). These walkdown/evaluation tools are based on bounding fires that are assumed to cause target damage at a height above the base fire with the fire burning at peak intensity. Because these tools assume a fire burning at peak intensity this SR is considered met at CC I. (This F&O originated from SR FSS-C2)~~	~~FSS-C2~~ ~~FSS-G1~~	~~Significant scenarios are not developed considering fire growth. The current approach is conservative.~~ ~~Include fire growth times for significant fires, where growth time is available in NUREG/CR-6850 or FAQ-052 for transient fires. .~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~1-32~~	~~No evidence was identified that suggests that fires were assumed to burnout over a period of time. Evaluation/scoping was estimated using a peak heat release rate as dictated in Attachment B of the Fire Scenario Report, (Report 0493060006.004). Accordingly this SR is considered not met for CCII/III. (This F&O originated from SR FSS-C3)~~	~~FSS-C3~~ ~~FSS-G1~~	~~Significant scenarios do not consider decay.~~ ~~Include growth and decay for significant fire scenarios in the FPRA.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~1-33~~	~~Except for the MCR fire scenarios, no other fire scenario has used the Non-Suppression Probability (NSP) in PTN fire model at this time. (This F&O originated from SR FSS-D8)~~	~~FSS-D8~~	~~Systematic.~~ ~~Apply non-suppression factors for significant fire scenarios, when applicable.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
1-34	No evidence was found that supported confirmation of conformance of fire rated barrier segments to applicable test standards. Additionally, the effectiveness, reliability, and availability of any passive fire barrier feature credited does not appear to be performed. (This F&O originated from SR FSS-G4)	FSS-G4	Systematic issue. Provide the documentation that supports confirmation of conformance of fire rated barrier segments to applicable test standards, and the barrier effectiveness, reliability and availability.	This F&O has been resolved. The treatment of barriers in the MCA is based on information in the Fire Hazards Analysis and supplemented with walkdown observations. The analysis documentation was updated to provide this information. The MCA was modified as needed to incorporate the results of this effort.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
~~1-35~~	~~The multi-compartment analysis assumes a bounding value of 7.4E-3 for evaluation of active fire barrier elements. Actual fire barrier elements are not considered instead the failure probability of a fire door is assumed for active barrier element failure because this failure probability represents the highest single probability of a barrier failure. Accordingly this analysis provides a qualitative bounding assessment fire barrier feature failure probability. (This F&O originated from SR FSS-G5)~~	~~FSS-G5~~	~~Systematic issue~~ ~~For any scenario selected if the adjoining physical analysis units are separated by active fire barrier elements, UANTIFY the effectiveness, reliability, and availability of the active fire barrier element.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~1-36~~	~~HFEs included in the altered events report are not treated under dependency evaluations Even though the values are screening values, the dependency evaluation may result in a higher HEP, especially if more than 2 events are in a single cutset. The sensitivity study case 3 documented in Appendix D of FPRA Summary Report 0493060006.005 shows that doubling all non-recovery HEPs using multipliers greater than 1 yields a delta CDF increase of 6.60E-5, or 24.7% of the base fire CDF. Furthermore, if doubling the HEPs increased CDF by ~25%, it stands to reason that halving the same set of HEPs would decrease the CDF by a similar amount. It is reasonable to assume that a detailed analysis could reduce most of these screening HEPs by at least half, and in many cases by much more. (This F&O originated from SR FQ-C1)~~	~~FQ-C1~~ ~~HRA-C1~~ ~~HRA-D2~~ ~~HR-H3~~ ~~QU-C1~~ ~~QU-C2~~	~~Systematic Issue~~ ~~Perform dependency analysis for HFEs in the Altered Events Table, and provide a quantification process that incorporates the new HFE dependency.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
1-37	Significant contributors to Fire PRA results are included in Section 4.3 and the appendices of the Summary Report. This includes a list of operator actions that contribute to CDF. However, no importance measures are provided for CDF or LERF. (This F&O originated from SR QU-D7)	FQ-E1 QU-D7	Requirement of QU-D7 Provide importance measures as required by QU-D7 and FQ-E1	This F&O has been resolved. Importance measures for CDF and LERF have been determined and added to the Summary Report.
1-38	Results of the Fire PRA did not include the following: (e) the total plant CDF and contributions from the different initiating events and accident classes (i) the uncertainty distribution for the total CDF (j) importance measure results (l) asymmetries in quantitative modeling to provide application users the necessary understanding of the reasons such asymmetries are present in the model (m) the process used to illustrate the computer code(s) used to perform the quantification will yield correct results process. Some of these issues are listed in other F&Os. However, item e(accident classes), l (asymmetries) and m (validation of computer codes) is not covered elsewhere. (This F&O originated from SR QU-F2)	FQ-F1 QU-F2 UNC-A2	Systematic Issue Provide required documentation per QU-F2 and FQ-F1.	This F&O has been resolved. The documentation of the analysis results has been expanded to include the information noted in the F&O. These results were also reviewed for reasonableness and no issues or concerns were identified.
~~1-4~~	~~Fire-Induced Spurious PORV opening is modeled under Gate 3S2ORFIREEQUIV (2/6 gate). However, this small LOCA impact is only added to three locations in the PRA model, while small LOCA is located in 11 locations in the CAFTA Model. For example, the fire-induced small-loca logic is not included under gate GHL01 or 7 other locations. For small-small LOCA, the PORV. Similarly, small-small LOCA is included in 9 locations in the PRA model, while the Fire-Induced PORV logic (and other small-small logic) is only included in 3 locations. The~~	~~ES-B3~~ ~~PRM-A4~~ ~~PRM-B9~~	~~Systematic issue of how the PORV, other small-small LOCA initiating events and small LOCA IEs are modeled in the PRA.~~ ~~For any fire-induced initiating events, including PORV opening and other small LOCA initiating events, ensure the newly developed logic is added to all locations in the PRA model to ensure the PRA model solves correctly. Move this F&O to PRM, when evaluated. Also affects the equipment selection, only with regard to the impact of the equipment on the modeled initiating~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused scope Peer Review.~~

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DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~above are examples for two of the reviewed added logic. The fire-induced initiator event fault trees have been added into the PRA model. The consistency of the model changes have been reviewed. One question about the changes is that the fire risk could be potentially underestimated. For example, gate 3FIRES2 has been added to simulate the small LOCAs induced by fires. Under gate 3S2ORFIREEQUIV, gate 3FIRES2 and internal event small LOCA initiator %ZZS2U3 are ORed, which seems to be appropriate. However, %ZZS2U3 is under 11 parent gates, while 3FIRES2 only has one parent gate. If the intended fire damage is small LOCA, all system functions affected by small LOCAs should be affected. (This F&O originated from SR ES-B3)~~		~~event.~~	
1-40	The quantification of significant basic events, cutsets and accident sequences is not provided. Additionally, the definitions used for significant basic event, significant cutset, and significant accident sequence are not provided. (This F&O originated from SR QU-F6)	FQ-F1 QU-F6 UNC-A2	Requirement of QU-F6 and FQ-F1. Provide the quantification of significant basic events, cutsets and accident sequences, and the definition used for significant basic event, significant cutset, and significant accident sequence	This F&O has been resolved. The Summary Report has been updated to provide the importance measures of the model basic events, top 90% of all plant cutsets, and a review of the scenarios contributing more than 1% of the total risk.
~~1-41~~	~~The HRA does not look at the Fire Specific factors affecting: (a) quality [type (classroom or simulator) and frequency] of the operator training or experience (b) quality of the written procedures and administrative controls (c) availability of instrumentation needed to take corrective actions (d) degree of clarity of cues/indications (e) human-machine interface (f) time available and time required to complete the response (g) complexity of the required response (h) environment (e.g., lighting, heat, radiation) under which the operator is working (i)~~	~~HRA-D2 HR-H2 PRM-B11~~	~~The simplified factors included in the HEP modifier approach does not provide the equivalent of a detailed HRA. Provide a detailed HRA for significant HEPs in the FPRA results. Detailed HRA should account for the Fire Specific factors as listed above. The present multiplier method does not appear to meet the requirements of the standard for detailed HRA.~~	~~This F&O has been closed. The action taken to address this item was specifically included in the focused scope Peer Review.~~

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~accessibility of the equipment requiring manipulation (j) necessity, adequacy, and availability of special tools, parts, clothing, etc. As a result, the HRA does not appear to meet the PRA standard requirements for a detailed HRA. (This F&O originated from SR HR-H2)~~			

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
~~1-44~~	~~The FPRA models 0.1 HEP values for several recovery actions that are not in the SSA and are not in the fire safe shutdown procedures (See F&O 6-11). These recovery actions are input into the PRA model by adjusting the random independent failure probability for the recovered component to 0.1 and the logical true setting for components that prompted the recovery to 0.0. This approach introduces several issues, including the following: The use of 0.0 values that are intended to account for recovered equipment eliminates the 0.1 recovery HEPs altogether in several instances. For compartment 070-AB, basic event EC8R330303 is set to 0.1 for recovery of alternate feed to load center 3H, but this recovery feeds into AND gate E3013H. This AND gate appears to be nullified, however as the second input to the gate is false due to the 0.0 values present in altered events (based on visualization of settings from the altered events file for 070-AB in CAFTA). A quantification of 070-AB produced 10,000 cutsets and no instance of EC8R330303 was present. A further review of the 070-AB quantification indicated the following events placed in the altered events table as recoveries do not appear in the final cutsets: ATPXPUMPASTRT, EB2F33003H, ECBR33AA15, FAVC3-1606, MAVX3-311, MSVR3-311. Further review of other areas and other recovery values (0.1 and 0.0 values in the altered events report) appears to indicate similar problems will occur. The above are examples (potential issues), which appear to be logic problems resulting from the use of 0.0 and 0.1 inputs in the altered events report. Additional problems are likely for other events. (This F&O originated from SR HRA-C1)~~	~~HRA-C1~~ ~~PRM-B11~~	~~Appears to be a significant non-conservative impact to PRA results. Given the actions in the altered events report are being added to the model as needed recoveries in order to ensure risk is low, and given the resulting recovery actions do not show up in the results in most cases, there appears to be a disconnect between the addition of new actions to the procedures and the quantification of these actions in the FPRA. It appears part of the disconnect is that the logic modeling, as modified by the altered events table, results in the recovery values being screened from the results.~~ ~~Revise the approach described for assigning recovery HEPs via the altered events table and ensure the quantification produces the intended results.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
~~1-45~~	~~The method and calculations for transient fire severity factors (SF) are not clearly documented and several SF values in FRANC model are not consistent with the ones listed in the FSS report. For example, fire scenarios 079A-J/K/L in Appendix A of FSS report have an SF value of 3.05E-2, which is used in the FRANC model, but is not consistent with the 8E-2 value included in FSS report section 8.4, GENERAL TRANSIENT SEVERITY FACTORS. FPL/ERIN staff reviewed this issue and stated that the SF is calculated based on a floor area factor (FSS report section 8.3) times the 8E-2 transient ignition frequency adjustment factor (FSS report section 8.4). For 079A-J/K/L, this method results in a factor of 1.52E-2. A factor of 3.05E-2 was used in FRANC. The above points to the following: a) The severity factors used are not well documented, traceable, or consistent with what is provided in the text of the FSS report. B) The two severity factors basically double count the area severity factor. For the last case (B), the 8E-02 already includes a consideration, based on experience, that the fire that occurred is near a target (component). As a result, the 6 events listed just happened to not be near any components, resulting in a low probability of damage. To put this another way, it can not be demonstrated that the 8E-02 factor is due to the small size of the transient fires rather than being due to the fire being in a location not near a component. A review of the control/aux bld transient fires was performed. The first event caused an automatic suppression system actuation, which indicates a fairly large fire occurred. It takes a pretty good size fire to~~	~~FSS-D3~~	~~The Severity factors used are in significant fire scenarios in the FPRA.~~ ~~Document the severity factors used for each scenario including the basis. Revise the transient severity factors to remove double counting of the area factor included in both the square footage of the compartment, and the 8E-02 calculated in Section 8.4 of the FSS report.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~raise the fire detectors up to 160+ degrees. A second event is described as "A leaking regulator ignited leaking propane." This can obviously be a larger fire. Since the location/area of the originating fire is in the 8E-02 factor, and in the "area" factor, the double counting results in an underestimation of the likelihood of fire damage for a transient fire. (This F&O originated from SR FSS-D3)~~			
~~1-46~~	~~The PTN FPRA methodology generally does not include postulation or evaluation of smoke damage. Additional review shows that the smoke issues do not affect the FPRA results significantly. However, the FPRA does not include a qualitative evaluation of smoke damage to FPRA equipment. (This F&O originated from SR FSS-D9)~~	~~FSS-D9~~	~~Requirement of FSS-D9~~ ~~Perform a qualitative evaluation of smoke damage to FPRA equipment per the requirements of FSS-D9.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~1-5~~	~~HEP EHFCLR3BH is included in the FPRA model, without specific analysis in the task 12 report. This is a modified HEP from the internal events PRA. Additionally, MHFP3BAMT is included in the model as a screening value without documentation in Task 12. (This F&O originated from SR HRA-C1)~~	~~HRA-C1~~	~~Completeness issue in the documentation of the HRA.~~ ~~Ensure documentation of all HEPs is provided in the HFE report.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~1-6~~	~~Although many of the instruments affecting operator actions are included in Table A-1 of the HRA report, and many are traced, none of the instruments reviewed (partial review) appear to have been tagged as FPRA affecting. As a result, the instruments do not appear to be in the FPRA equipment selection process or equipment list. For example, under GHFPS1RCRC, FI-3-943 is listed and included in the SSA. However,~~	~~ES-C1~~ ~~HRA-A3~~	~~Systematic issue. As a result of this, the equipment list for the FPRA (considered separate for this review) does not include any of the identified instruments in Table A-1 of the HRA.~~ ~~Include needed Instruments in the PRA equipment list, for later modeling of the impact on the FPRA HEPs.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~this is listed as non-PRA affecting as is not in the TAGBE, UNL table or other associated table.~~ ~~(This F&O originated from SR ES-C1).~~ ~~Additionally, when new equipment is added that are not in the SSE (for example; LOCAL CHARGING PUMP HYDRAULICA COUPLING TEMPERATURE TI-3/4-6716/6717/6718), these do not appear to be traced or included in the PRA equipment list. Most of the PRA (non-SSE) instruments are not identified by number.~~			
~~1-9~~	~~Recovery to the Charging Pump Suction valve 114A and the associated components is provided through the excluded events table and the altered events table. However, the recovery is actually crediting flow through MOV 3-350. This flow path is not included in the FPRA model. Similarly, the Normal Containment Coolers are not modeled in the FPRA, but recovered in the altered events table through G174 0.1 recovery. The above are examples. The entirety of the altered events table has not been reviewed for recoveries that may be bringing in additional components not in the FPRA or FPRA Equipment List (This F&O originated from SR CS-A11)~~	~~CS-A11~~ ~~CS-C3~~ ~~LE-A2~~ ~~PRM-B15~~	~~1st item does not appear to be significant. SSA verifies MOV 350 is available, but the documentation is very difficult to follow. However, the MOV and the associate components do not show up in the Equipment List for the PRA, nor will it show up in the importance lists, results, etc. The surrogate event (0.1 applied to 114A) does not represent what is in the model. Additionally, since the flow path was not modeled, the FPRA considerations may not all be considered. 2nd item: This one may be significant, since the containment cooler can be complicated, and a likely mismatch between the SSA and the modeled FPRA logic could result in significant differences.~~ ~~Add the MOV 3-350 and the associated flow path to the PRA model, normal containment coolers. Additionally, review the altered events report to determine if additional credited flow paths are modeled, where the actual components and support logic is not in the FPRA.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused scope Peer Review.~~
2-1	The plant partitioning task does not include detailed discussion with respect to this SR PP-B7. The manholes are modeled as	PP-B1 PP-B7	Section 3.11.5 of FHA states that man-hole covers are justified as three-hour fire boundary although they need not to be	This F&O has been resolved. Walkdowns of fire zone boundaries were

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	separate fire compartments. However, no walkdown for these manholes has been performed. No justification for the modeling approach has been provided except being briefly mentioned in Section 2.2 of Report PTN-PSA-7.01 Revision 2. Walkdowns were also not documented for spatial separation or other boundaries that are not fire rated but was credited in the FPRA. (This F&O originated from SR PP-B7)		specifically rated as fire barrier. Therefore, the modeling of manhole as fire compartments is considered acceptable although no walkdown has been performed for the manholes. Other credited barriers are discussed in PP-B2-4 above Consider adding justification for the modeling of manholes according to the requirements in SR PP-B7. Consider performing walkdown for manholes with significant risk contribution. Also, document walkdowns on all credited, nonrated barriers credited in the FPRA.	performed and documented in support of a review of the Fire Hazards Analysis update. Additional discussion regarding the basis for the ignition frequency for the manholes was added to the documentation.
~~2-10~~	~~A review of the HRA report and the recovery rule file used in the FRANC model shows that the majority of the HEPs and HFE combinations were treated properly in the PTN fire PRA model. However, isolated cases indicate the following issues: 1. Some HEPs were not applied (or documented) properly. For example, EHFPDOSTXT, Failure to cross-connect unit diesel oil storage tanks to extend availability of fuel for EDG, was supposed to be set to 1.0 per Table A-2 in HRA report page A-19. However, it is set to 2.3E-2 in the recovery rule (in both the HRA report and actual rule file). A review by FPL/ERIN staff showed that the example HEP was included in the UNL table (failed for all scenarios), however, it was also included in the Excluded Events table for multiple fire scenarios. Since this HFE has no cue in the main control room, it was intended to fail this HEP for all fire scenarios. Therefore, the Excluded Events table should be updated. 2. A review of the top cutsets in fire sequence 096A show the HFE combination CHFPSTPRCP and GHFPINJVLVS has not been considered in~~	~~PRM-B11~~	~~One of the identified issues generates non-conservative results and the other one is conservative. The second example is likely significant.~~ ~~Consider reviewing the recovery rule file for consistency against the HRA report documentation. Also consider updating the HRA combination evaluation.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

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DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~the HRA evaluation. FPL/ERIN staff concurred that some HEP combinations may be missed, which render conservative results. Because fire scenarios for fire compartment 096 will be refined for realism, the HEP combinations are expected to be re-visited. (This F&O originated from SR PRM-B11)~~			
~~2-12~~	~~A comparison of basic events between the internal event (Rev. 7) and fire models has been performed. For the new basic events (about 650 basic events are identified) in fire model, the majority is set to either 0 or 1, which simulates the fire impact in the fire scenarios. The ones with other values are checked and found to be lacking sufficient basis as required by SR PRM-B13. For the modified HEPs, the majority seems to be ok by updating with a more bounding value of 1.0. However, the following event is an outlier, which may result in early truncation of the cutsets with this AHFPAFWFLO, OPERATOR FAILS TO THROTTLE UP AFW FLOW, 1.7E-4. For the deleted basic events in fire model, all the changes have been traced in the PRM report. (This F&O originated from SR PRM-B13)~~	~~PRM-B12~~ ~~PRM-B13~~	~~Isolated error. However, the error may be significant~~ ~~Consider providing basis for the modeled new basic events in the fire PRA model. Correct AHFPAFWFLO probability in FRANC.~~	~~This F&O has been closed.~~ ~~he action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~2-14~~	~~Fire compartment 096 is the top contributor for U3 CDF. Tracing the failed basic events / components /cables shows that the sequencer failures seem to contribute to loss of redundancies. Since the cables travel to rooms housing redundant trains, the assumed failure of cables fail the sequencer, which in turn fails the switchgears. For example, circuit analysis for 3X03-NPO-3AA states, "ADDED CABLES IN SEQUENCER THAT CAN PREVENT SUT FROM~~	~~PRM-B9~~	~~Current analysis for top fire scenario 096A is conservative. This issue applies to other fire scenarios in the FPRA.~~ ~~Consider updating the top fire scenarios to remove conservatism related to sequencer modeling and failures.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

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DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~POWERING SWGR THRU 3AA05 BREAKER." A discussion with FPL/ERIN staff indicated that the analysis for fire compartment 96 is not yet complete as documented in the summary report. It is anticipated that the approaches and refinements used for other plant locations will result in more realistic risk results for the room. On the other hand, FPL staff also identified that there is an open item associated with fire zone 096 (SSA-3GG-13). (This F&O originated from SR PRM-B9)~~			
~~2-15~~	~~Most new events are added to the model in order to assess spurious operation, and other Fire PRA effects. However, there is no documentation supporting the events, and as such, they do not meet the DA requirements as referenced in PRM-B13. This SR lists an exception (DEVELOP a defined basis to support the claim of non-applicability of any of these requirements in Section 2), which is not provided. (This F&O originated from SR PRM-B13)~~	~~PRM-B13~~	~~Systematic Issue.~~ ~~Consider adding to the documentation whether any events added to the fire PRA in Table D-1, 2, or 3 of the component selection report are new to the PRA. If new, add the details of the event to the documentation per the associated standard requirements or provide justification to the PRA documentation of non-applicability of any DA SR.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~2-16~~	~~RCP Spurious start logic under 3FIRERCPSPUR3 appears to be incorrect. First, the spurious start of an RCP typically takes 2 spurious operations, including start of the lift pump, and then start of the main pump. Second, the logic does not include any consideration of whether the operator already tripped the pumps, and they restarted or whether the RCP received a spurious signal, and then operator trip of the pump is not possible (may be possible with a single spurious depending on the design). Finally, if the RCP restarts (as modeled), tripping of the RCPs may not be possible~~	~~PRM-B9~~	~~Isolated issue. Risk impact is not known~~ ~~Consider refining the model for the spurious start of RCPs. Also address the fire impact of the operator action to trip the RCPs.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

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DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	depending on the operator actions performed. This consideration needs to be included in the determination of the event for operator trips the RCPs. Under gate 3FIRERCPSPUR1, 3FIRERCPSPUR1 (RCP Seal Failure Following Spurious Pump Start Due to Fire) is AND'ed with the HEP CHFPSTPRCP, which is not failed by any fire scenario. This event is evaluated in the HRA report, but the fire impact for an operator to trip the RCPs is not evaluated, (This F&O originated from SR PRM-B9)			
2-18	PTN LERF model development is documented in the Component and Cable Selection Report 0493060006.001, Rev. 1, Section 4.5, LARGE EARLY RELEASE FREQUENCY (LERF). This section described the excluded LERF sequences in internal events model. No discussion is identified on any new accident progression 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. As a result, significant accident progression sequences resulting in a large early release have not been reviewed to determine if repair of equipment can be credited for the FPRA LERF models [LE-C3 CC II requirement]. In addition, accident sequence dependencies in the accident progression sequences have not included in a manner consistent with the applicable requirements of 2-2.2, as appropriate for the level of detail of the analysis [LE-C8 requirement]. (This F&O originated from SR PRM-B14)	LE-C1 LE-C3 LE-C8 PRM-B1 PRM-B14	Systematic issue. Identify and document any new accident progression 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. REVIEW significant accident progression sequences resulting in a large early release to determine if repair of equipment can be credited. JUSTIFY credit given for repair (i.e., ensure that plant conditions do not preclude repair and actuarial data exists from which to estimate the repair failure probability [see SY-A24, DA-C15, and DA-D8]). INCLUDE accident sequence dependencies in the accident progression sequences in a manner consistent with the applicable requirements of 2-2.2, as appropriate for the level of detail of the analysis [LE-C8 requirement].	This F&O has been closed. The action taken to address this item was specifically included in the focused-scope Peer Review.

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DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
~~2-19~~	~~The PTN fire LERF model is built upon a draft internal events LERF model (rev. 8), which needs to be updated when that model is finalized. (This F&O originated from SR PRM-B14)~~	~~LE-A1~~ ~~LE-A2~~ ~~PRM-B14~~ ~~PRM-B15~~	~~Draft internal event LERF model is used. Changes to the draft model when finalized could be significant.~~ ~~Update the fire LERF model when the internal event LERF model is finalized.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~2-22~~	~~Beyond the Generic Fire Modeling Treatments, the Fire PRA did not include additional detailed fire modeling for most fire compartments. (This F&O originated from SR FSS-C6)~~	~~FSS-C6~~ ~~FSS-D3~~ ~~FSS-G1~~	~~Without detailed fire modeling for significant fire scenarios, the results are conservative.~~ ~~Consider performing additional detailed fire modeling for target damage timing when the exposure environment exceeds the damage threshold.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~2-26~~	~~The system unavailability records for the plant have not been reviewed in crediting fire detection and suppression systems. (This F&O originated from SR FSS-D7)~~	~~FSS-D7~~ ~~FSS-D8~~	~~Systematic issue. The intent for Capability Category II is to additionally require a review of plant records to determine if the generic unavailabilitycredit is consistent with actual system unavailability. Outlier experience would be any experience indicating that actual system is unavailable more frequently than would be indicated by the generic values.~~ ~~Consider performing and document the review of plant records to determine if the generic unavailability credit is consistent with actual system unavailability. Outlier experience would be any experience indicating that actual system is unavailable more frequently than would be indicated by the generic values.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~2-29~~	~~PTN FSS report 0493060006.004 Revision 1, App. A documents the SCENARIO SUMMARY REPORT, which includes the combinations of fire sources and target sets. However, the walkdown documentation is lacking. Currently, the walkdown results are documented directly in the FRANC~~	~~FSS-D10~~ ~~FSS-D11~~ ~~FSS-H10~~	~~Documentation issue. However, the inadequacy of the walkdown documentation cannot provide detailed information for scenario development or detailed fire modeling.~~ ~~Consider enhancing the process and documentation of the source-target data~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~database. Consider a walkdown documentation package which would include elements such as a data collection procedure, documentation of who performed what walkdowns on what dates, documentation that review of the collected source-target data was performed, etc. (This F&O originated from SR FSS-D10)~~		~~collection walkdowns. See recommended walkdown information in NUREG/CR-6850.~~	
~~2-31~~	~~The PTN fire PRA model has not completed the quantitative results for any scenarios analyzed quantitatively in a manner that facilitates Fire PRA applications, upgrades, and peer review. (This F&O originated from SR FSS-H8)~~	~~FSS-H8~~	~~Quantitative results for the identified significant fire scenarios in the multi-compartment analysis should be generated and documented.~~ ~~Quantify the identified significant fire scenarios in the multi-compartment analysis and complete documentation.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~2-37~~	~~The fire PRA has not identified how the physical characteristics (unique to fire scenarios, or affected by fire scenarios) identified in LE-A1 and the accident sequence characteristics identified in LE-A2 are addressed in the LERF analysis. FPRA impact can affect accident sequences for LERF such as failing containment isolation, affecting containment cooling or instrument air to containment, opening pressurizer PORVs (pressurizing containment), etc. (This F&O originated from SR LE-A3)~~	~~LE-A3~~ ~~PRM-B15~~	~~Requirement not met.~~ ~~Identify how the physical characteristics (unique to fire scenarios, or affected by fire scenarios) identified in LE-A1 and the accident sequence characteristics identified in LE-A2 are addressed in the LERF analysis.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~2-38~~	~~The fire PRA did not re-visited the plant damage states defined in the internal events LERF model. (This F&O originated from SR LE-A5)~~	~~LE-A5~~ ~~PRM-B15~~	~~Requirement not met.~~ ~~Re-define the plant damage states in the internal events LERF model to account for any fire-specific characteristics~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~2-39~~	~~The MSO Review List reviewed by the Turkey Point Expert Panel should have captured most of the requirement in this SR. However, a systematic process and~~	~~LE-B1~~ ~~PRM-B15~~	~~Systematic issue.~~ ~~Use a systematic process and document the identification of the fire-specific LERF contributors from the set identified in AMSE~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~documentation are not available with respect to the identification of LERF contributors from the set identified in AMSE standard Table 2-2.8-9. (This F&O originated from SR LE-B1)~~		~~standard Table 2-2.8-9.~~	
~~2-4~~	~~The FRANC model itself cannot generate total CDF / LERF and risk importance measures. The models show the contributions from each quantified fire sequences. As shown in the summary report 0493060006 Rev-1, the Unit 3 CDF top cutsets are listed. However, the Unit 4 CDF, Unit 4 CDF & LERF, the risk importance values for each basic events are not included. (This F&O originated from SR PRM-A3)~~	~~PRM-A3~~	~~This finding mainly focuses on documentation. However, the unavailability of the cutset files and risk importance reports prevents the detailed analysis in other tasks such as HRA and circuit analysis, etc.~~ ~~Document cutset files for U3 LERF and U4 CDF/LERF and risk importance reports for each.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~2-40~~	~~A separate FPRA LERF package is not available. SR LE-C2 is assigned as not met since the LERF specific operator actions is not evident in the HRA report and the screen values are used for numerous operator recovery actions for the fire-induced component failures. (This F&O originated from SR LE-C2)~~	~~LE-C2~~ ~~PRM-B15~~	~~LE-C2 CC-II requirement~~ ~~INCLUDE REALISTIC treatment of feasible operator actions for LERF-Specific HEPs (if any) following the onset of core damage CONSISTENT WITH APPLICABLE PROCEDURES.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~2-42~~	~~FPRA specific significant accident progression sequences resulting in a large early release have not been developed. The FPRA LERF changes are directly incorporated in the quantification fault tree. FPRA specific realistic generic or plant-specific analyses for system success criteria for the significant accident progression sequences have not been developed. The FPRA LERF changes are directly incorporated in the quantification fault tree. FPRA specific system models that support the accident progression analysis have not~~	~~LE-C4~~ ~~LE-C5~~ ~~LE-C6~~ ~~PRM-B15~~	~~SR LE-C4/5/6 Requirements~~ ~~For FPRA LERF model, evaluate the fire-specific aspects for the following requirements in SRs LE-C4 through C6:INCLUDE model logic necessary to provide a realistic estimation of the significant accident progression sequences resulting in a large early release. INCLUDE mitigating actions by operating staff, effect of fission product scrubbing on radionuclide release, and expected beneficial failures in significant accident progression sequences. PROVIDE technical justification (by plant-~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~been developed. The FPRA LERF changes are directly incorporated in the quantification fault tree. (This F&O originated from SR LE-C6)~~		~~specific or applicable generic calculations demonstrating the feasibility of the actions, scrubbing mechanisms, or beneficial failures) supporting the inclusion of any of these features. USE appropriate realistic generic or plant specific analyses for system success criteria for the significant accident progression sequences. USE conservative or a combination of conservative and realistic system success criteria for non-risk significant accident progression sequences. DEVELOP system models that support the accident progression analysis in a manner consistent with the applicable requirements for 2-2.4, as appropriate for the level of detail of the analysis.~~	
~~2-43~~	~~The significant accident progression sequences resulting in a large early release have not been reviewed to determine if engineering analyses can support continued equipment operation or operator actions during accident progression that could reduce LERF. The significant accident progression sequences resulting in a large early release have not been reviewed to determine if engineering analyses can support continued equipment operation or operator actions after containment failure that could reduce LERF. (This F&O originated from SR LE-C10)~~	~~LE-C10~~ ~~LE-C12~~ ~~PRM-B15~~	~~LE-C10/12 CC-II requirement~~ ~~REVIEW significant accident progression sequences resulting in a large early release to determine if engineering analyses can support continued equipment operation or operator actions during accident progression that could reduce LERF. USE conservative or a combination of conservative and realistic treatment for non-significant accident progression sequences. REVIEW significant accident progression sequences resulting in a large early release to determine if engineering analyses can support continued equipment operation or operator actions after containment failure that could reduce LERF. USE conservative or a combination of conservative and realistic treatment for non-significant accident progression sequences~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
2-44	Uncertainty Evaluations (Sensitivity studies) should be performed for both CDF and LERF model for Units 3 and 4 since the	QU-E4 UNC-A1	QU-E4 requirements. Perform sensitivity studies should be	This F&O has been resolved. Parametric uncertainty and sensitivity has

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	model uncertainties may have different impact to specific model due to differences in plant designs, FPRA model details, and etc. (This F&O originated from SR QU-E4)	UNC-A2	performed for both CDF and LERF model for Units 3 and 4.	been performed for CDF and LERF for both Units. The results do not indicate any change in the selection of parameters or assumptions are necessary.
~~2-6~~	~~Conservative screening values were used for risk-significant human actions, including both the new fire specific safe shutdown actions identified and the non-fire actions that exist in the internal events PRA and included in the Fire PRA. It is noted that the HEPs derived by the multiplier approach for the non-fire actions are still considered as the screening values until a detailed analysis is performed. There are numerous examples of significant HEPs in the results, as well as significant screening HEPs set to 0.1 in the altered events report. The estimation of the HEPs for the new, fire-related human actions did not account for the fire scenario-specific performance shaping factors (PSFs), including time available to complete action, etc. The formal HRA of significant HEPs includes referencing and considering procedures to perform actions, assessment of the impacts instrumentation needed for cues and execution and resulting impacts to the HPE, feasibility, timing of the event, performance shaping factors, evaluation of cognitive and execution error probabilities, scenario-specific equipment impacts that may affect the timing of the human interaction, as well as considerations of workload (for input to the dependency impact evaluation). Overall, it appears as if the Fire PRA treats the screening results of the method used for the non-fire human actions as detailed results. However, as indicated in the diagram shown in the report, the method is a "simplified"~~	~~FQ-C1~~ ~~HRA-C1~~ ~~HRA-D2~~ ~~HRA-E1~~ ~~HR-G1~~ ~~HR-G2~~ ~~HR-G3~~ ~~HR-I1~~ ~~HR-I2~~ ~~PRM-B11~~ ~~QU-C1~~	~~To meet CC-II requirements, the risk significant HFEs should be evaluated in more detail, as specified in HRA-C1. The approach used to estimate HEPs for the risk-significant, new fire-related operator actions should use an approach that addresses both failure in cognition as well as failure to execute.~~ ~~Update the HRA by performed detailed HRA for all risk-significant HEPs, including the HEPs analyzed using the multiplier method in the HRA, as well as the screening HEPs in the altered event report. The HRA approach should be revised to treat the simplified approach for the non-fire actions as a screening tool, and provide detailed HRA for significant HEPs. Additionally, even the screening results should be reviewed for each fire scenario where the HEP is applied, including consideration of timing, lost indications, spurious operations in the scenario and other effects on the timing for the HEP.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~method, and does not meet the requirements of a detailed HRA per the standard. Although the original HEPs in the internal events PRA included all of the relevant HRA factors, the fire-specific HEPs would have to consider the impact of fire on these factors in developing the HEP results. The end result is an HRA that provides very general results, without specific application to a fire compartment or scenario, and a lack of detailed HRA for significant fire areas. (This F&O originated from SR HRA-C1)~~			
~~2-7~~	~~PTN system model changes in the fire PRA models are summarized in Tables D-1, D-2 and D-3 of the Component and able Selection Report 0493060006.001, Revision 1, Appendix D, MULTIPLE SPURIOUS OPERATIONS EXPERT PANEL EVIEW AND DISPOSITION OF OPEN ITEMS. However, no additional documentation of the changes for PTN fire PRA has been provided. Requirements under SY-A and SY-B are not met as a result. In particular, the requirements of SY-A2, 3, 4, 6, 11, 14, 15, 17, and 23, as well as SY-B5 through B15, do not appear to be met based on a review of the documentation in the tables. Since the level of analysis and documentation for system models for Fire PRA is expected to be similar to that performed for internal events, the documentation in the Appendix D tables does not meet what is expected for this requirement. For example: on Table D-3, page D-57, there appears to be a number of changes to 'correct' logic. The original logic is included in the system notebooks (e.g., DC power notebook). However, since this is just corrected here, the internal events PRA~~	~~PRM-B9~~ ~~SY-A11~~ ~~SY-A14~~ ~~SY-A15~~ ~~SY-A17~~ ~~SY-A2~~ ~~SY-A23~~ ~~SY-A3~~ ~~SY-A4~~ ~~SY-A6~~ ~~SY-B10~~ ~~SY-B11~~ ~~SY-B12~~ ~~SY-B13~~ ~~SY-B14~~ ~~SY-B15~~ ~~SY-B5~~ ~~SY-B6~~ ~~SY-B7~~ ~~SY-B8~~ ~~SY-B9~~	~~Systematic issue. System models were not updated according to the SY-A and SY-B SR requirements.~~ ~~Consider updating the system models and their associated documentation according to SY-A and SY-B SR requirements.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~is not updated. Additionally, without proper development, it is impossible to determine if the change is accurate. In the DC power case, a reference to the power drawing is needed to ensure the logic is now correct. On Table D-2, item 23, there are a lot of logic changes. However, there is no reason as to why the logic changes are needed or why the changes are made as written. In Tables D-2 and D-3, numerous references have been made to the comments / recommendations from site engineers, which add insights but should not be considered as the sole modeling basis. (This F&O originated from SR PRM B9)~~			
~~3-10~~	~~The PTN Fire PRA used much lower HRR for the evaluation of transient fires. The HRR for transient fires is based on the NUREG/CR-6850 HRR for electric motor fires (See F&O 3-10). The Fire Scenario Report (Report 0493060006.004) indicates that a transient NPP transient fire is better represented by a temporary cable installation, which includes an ignition source. Based on this the Fire Scenario Report indicates that the electric motor HRR is used to describe transient fires. A review of the EPRI Fire DB of transient fires indicated the following: a) events in the DB indicated that the fire was either above 75 kw or could have been above 75 kw, if not suppressed. For example, one transient fire resulted in an automatic suppression system actuation, which was likely above 75 kw due to the sprinkler head being above 160 F as a result of the fire, b) a recent event at one of the peer review team members plant was above 75 kw. As a result of this review, and discussion amongst the peer review team~~	~~FSS-C4~~ ~~FSS-D6~~ ~~FSS-G1~~	~~Transient fire evaluations conducted as described in the Fire Scenario Report result in screening fire damage to targets due to the lower HRR which is believed to be non-conservative for developed fires involving ordinary combustible fuel packages such as a trash can or trash bag.~~ ~~Use the NUREG/CR-6850 HRR for transient fires or provide alternate justification for an area specific HRR based on the limiting fire that could occur within the area.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused scope Peer Review.~~

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~members, the HRR for transient fires does not appear to be substantiated for the PTN FPRA. (This F&O originated from SR FSS-D6)~~			
~~3-11~~	~~The screening criteria is defined in the Turkey Point Hot Gas Layer and Multi-Compartment Analysis, (Report H0493060006.006) methodology. Compartments that don't screen are retained for further analysis. A concern identified with the screening criteria involves the use of a standard fire scenario for each analysis rather than determining the most challenging fire scenario inherent to the analyzed compartment. This approach potentially masks the potential for forming an HGL in the exposing compartment. (This F&O originated from SR FSS-G2)~~	~~FSS-G2~~	~~NUREG 6850, Section 11.5.4.3 Step 3.c.1 recommends development of a conservative HRR based on a combination of ignition source and secondary combustibles that produce the highest HRR. This recommendation is provided to ensure that a conservative/realistic HRR is used to determine the potential for HGL formation. Use of a non-conservative HRR may lead to underestimation of the potential for HGL formation and accordingly spread of potentially damaging hot gas to adjacent compartments.~~ ~~A realistic HRR should be developed for each fire compartment to ensure that the potential for formation of an HGL is appropriately assessed on a compartment by compartment basis.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~3-13~~	~~Review of fire modeling in enclosed compartments does not appear to accurately consider the addition of HRR from secondary combustibles. For instance a switchgear cubicle fire located in fire zone 71 is estimated to damage targets above the cubicle 4' horizontally and 7' vertically. The switchgear cubicles are vented at the top so a fire in these cabinets can be expected to spread to the cable trays above. The cable trays would be expected to ignite within the plume of the cabinet which is estimated to be at least 3' wide. Given that an initial width of 3' is reasonable, fire spread and additional HRR due to the resulting cable tray fire only assumes 1' of fire spread along~~	~~FSS-C1~~ ~~FSS-G1~~	~~Systematic application of generic fire modeling results to define target damage when fire spread should be postulated.~~ ~~In situations where the generic fire modeling treatments demonstrate fire spread to secondary combustibles, the scenario should assume full area damage. These scenarios are candidates for detailed fire modeling that would be used to show fire damage to PRA targets and the time to damage allowing credit for non-suppression probability.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~the cable tray. Compared to the NUREG/CR-6850 guidance for flame spread along PVC cable (flame spread = 0.9 mm/sec) the estimation of HRR for these typical scenarios is nonconservative. Realistic estimation of the scenario HRR is necessary to ensure the full impact of the fire on exposed targets is presented and that the effects of a damaging HGL may also be estimated. (This F&O originated from SR FSS-C1)~~			
~~3-14~~	~~According to the generic limitations contained in Attachment B of the Fire Scenario Report (Report 0493060006.004) the generic fire modeling treatments do not account for the effects of hot gas layer (HGL) on the correlations presented. The limitation indicates that because HGL is not considered that these correlations should not be used in enclosed areas with small volumes where a significant HGL thickness may form. Because this relationship is not considered plume temperatures may be underestimated because it is assumed that ambient temperature air is being entrained into the plume, resulting in cooler plume temperatures, rather than heated air from the hot gas layer. Entrainment of heated air into the fire plume results in higher damage heights because the plume remains hotter at higher elevations. (This F&O originated from SR FSS-C1)~~	~~FSS-C1~~ ~~FSS-G1~~	~~Systematic application of generic fire modeling results to define target damage when fire spread should be postulated.~~ ~~The generic treatments used in relatively small rooms should be scrutinized to ensure that any HGL interaction is considered and accounted for if found to be significant.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
3-2	Credit for fire compartment separation via non-rated construction was commonly noted, e.g., according to the FHA the walls of fire compartment 034 are not fire rated and they provide separation from fire compartments 036, 035, & 058. Separation	PP-B1 PP-B2	As noted in the description non-fire rated construction is credited for separation of fire compartments, however no Fire PRA specific justification for the validity of the fire compartment is provided. This is considered a systematic issue for the FPRA.	This F&O has been resolved. The configuration and construction of non-fire rated barriers was confirmed using a combination of information in the Fire Hazards Analysis and supplemental plant walkdowns. The anlaysis and related

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	of FC 034 from the surrounding FCs is one of many examples where non-fire rated construction is credited for separation. Use of this level of separation is acceptable provided the separation is justified. However, the justification does not appear to be provided for the FPRA. (This F&O originated from SR PP-B2)		Provide FPRA specific justification of the construction separating fire compartments, where the barriers will substantially contain the fire.	documentation was updated to provide this information.
3-3	A few cases of special separation are credited in the PB&P. Most notable are separation of Fire Compartments 058 and 037 and 004 and 010. The FHA notes in the write-up for fire zone 004: 'There is a partial height concrete wall on the South side of this room with a full height opening to Fire Zone 10'. No justification is provided for this separation, hence it is not clear that the credited separation may be expected to contain the effects of a fire. Accordingly the effect of a fire beyond the identified fire compartment boundary may occur. While this effect would be expected to be identified through performance of the multicompartment analysis the level of documentation provided in support of the PB&P does not satisfy the standard requirements. (This F&O originated from SR PP-B3)	PP-B1 PP-B3	Two instances were identified where spatial separation is credited for the separation of fire compartments. No justification is provided for this separation. Provide justification for the use of spatial separation in the FPRA. If not justified, combine the compartments in the FPRA.	This F&O has been resolved. Openings between fire zones were addressed with respect to targets on the other side of an opening which are within the zone of influence of an ignition source. Targets were evaluated for fire damage regardless of the zone in which they were located. The multi-compartment analysis considered the volume associated with adjacent zones with openings between the zones in evaluating the potential for hot gas layer formation.
3-4	The PTN self assessment points out that the FHA documents the use of active fire barrier features as necessary for fire zone separation. However in cases where fire compartment separation is provided by unrated barriers there may be active features that are not identified by the FHA but credited by the Fire PRA. In such cases active fire barrier features may be unknowingly credited for separation but not	PP-B1 PP-B5	As discussed in the description justification/discussion is not provided for crediting active fire protection features in barriers that are identified as non-fire rated structures. It is not clear if active features such as fire dampers exist in these barrier segments because the FHA does not rely on them for separation. Documentation should be provided that clearly establishes what features are credited in such barrier	This F&O has been resolved. The walkdowns that were performed did not observe any open fire doors (active features). The documentation for the fire scenario development process was updated to provide the criteria and methodology that were used.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	adequately maintained by the fire protection program. Because these elements were not purposely identified within the development of the Fire PRA it is unknown if the Fire Protection Program identifies all of the necessary features. Because the Fire PRA does not formally define and justify these features this element is judged not met. (This F&O originated from SR PP-B5)		segments and why makes them acceptable. Given the large number of barriers credited in the FPRA that are discussed in the FHA, but without discussion of active elements, there are likely a number of undocumented active elements in these barriers. Determine the active fire barriers on barriers credited in the FHA (not SSA), and provide justification for any active elements credited in the FPRA.	
3-5	According to the Section 3.13 of the PTN FPRA Summary Report the effect of an earthquake on ignition source scenarios is discussed in the IPEEE and Potential Fire Related Vulnerabilities self assessment. Review of the Potential Fire Related Vulnerabilities self assessment did not reveal an analysis that specifically addresses generation of fire ignition source scenarios which could result from an earthquake, nor does this assessment address the potential risk significance of these scenarios. This assessment does identify fire vulnerabilities in terms of fuels, ignition sources, and oxidizers however these discussions are not specific to seismic events nor do they include evaluation of special ignition scenarios that may arise from an earthquake. (This F&O originated from SR SF-A1)	SF-A1	As discussed in the description no discussion was found that specifically addresses fire ignition source scenarios that may arise from an earthquake. Also, since these scenarios are not identified a qualitative assessment of their risk significance is not included. The analysis provided in the Potential Fire Related Vulnerabilities self assessment should be expanded to look for unique ignition source scenarios that may arise from an earthquake and a discussion of the risk significance of these scenarios should be qualitatively assessed.	This F&O has been resolved. The low seismic spectra applicable to the Turkey Point site have been validated via the IPEEE with respect to the potential for causing unique fire scenarios. Their potential for causing damage to pipes or tanks containing combustible gases or liquids or to initiation of electrical fires is considered negligible.
3-7	According to report PTN-PSA-7.01 The generic fire ignition frequencies provided in NUREG/CR-6850 were used to establish the fire ignition frequencies for PTN. While the use of these values is not entirely incorrect, this SR requires the use of 'current nuclear power industry event history that includes power plants of similar type, characteristics,	IGN-A1 IGN-B4	As discussed in the description the revised generic fire frequencies contained in FAQ 08-048 are not incorporated into the PTN fire frequencies nor is there justification for their exclusion. This SR requires use of the current nuclear power industry event history or justification for data exclusion. Because the fire ignition frequency methodology does	This F&O has been resolved. The guidance provided in FAQ 08-0048 requires the use of the original NUREG/CR_6850 fire frequency values as a sensitivity study. Rather than perform two analyses, the PTN analysis was developed using those original values for the NFPA 805

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	and vintage.' Accordingly this requirement requires use of the EPRI revised generic fire frequency values included in FAQ 08-048 or justification for its exclusion. Also, it appears that FAQs 07-35 (bus ducts) and 08-44 (MFW pump fires) were not incorporated into the FPRA. (This F&O originated from SR IGN-A1)		not address the data contained in FAQ 08-048 this SR is considered not met. Use of the NUREG/CR-6850 values results in a conservative estimate of CDF/LERF. FAQ 35 can have significant impact on fires in the area of bus ducts. However, it is not apparent if this is important for Turkey Point. FAQ 44 can result in a lower MFW large fire frequency. The fire ignition frequency information contained in FAQ 08-048 should be incorporated into the PTN fire ignition frequencies. Additional FAQs should also be incorporated into the FPRA.	application. The application of the non-segregated bus duct information from FAQ 07-0035 is not applicable as the plant does not use non-segregated bus duct. The connections to the station transformers are made using cables. FAQ 08-0044 was also not needed and the conservatism associated with original method did not adversely affect the results.
3-8	Review of the plant-specific fire events for outlier experience indicates that some events may have been considered outliers or unknown if the selection criteria had considered treatment of fires that are extinguished prior to full development as potentially challenging. Several cases identified in Appendix A of the Fire Ignition Frequency Development Report, PTN-PSA-7.01 may have developed into challenging fires had they not been discovered and extinguished early in their development. Fires 7, 8, 9, 21, 22, 27, 30, 31 appear to be potentially challenging fires (or unknown). See also the previous assessment from 9-09. (This F&O originated from SR IGN-A4	IGN-A4	As discussed in the description review of the fires identified in Appendix A reveals fires that may have become challenging had they not been extinguished early. The selection criteria for challenging fires contained in Appendix A is based on section C.3.3.1 of NUREG/CR 6850, however the criteria contained in C.3.3.2 is not included; had the criteria of C.3.3.2 been included more fires may have been selected as challenging or identified as unknown. The criteria for selecting challenging fires in Appendix A of the Fire Ignition Frequency Development Report, PTN-PSA-7.01 should be revised to include the criteria contained in C.3.3.2 of CR/NUREG 6850 and the fire events should be revisited to determine if additional fires should be selected.	This F&O has been resolved. The scope of plant specific fire events were re-assessed with an expanded group of plant personnel with particular focus on the subjective criteria from C.3.3.2. The results of the re-assessment affirmed the previous dispositions.
~~3-9~~	~~One situation was identified for which credit of a fire wrap is proposed. The FRANC Excluded Events Table, Attachment E of the Fire Scenario Report, (Report 0493060006.004) indicates that a fire wrap~~	~~FSS-C8~~ ~~FSS-G1~~	~~This finding is based on identification of credit for a wrap in the FRANC Excluded Events Table, Attachment E of the Fire Scenario Report, (Report 0493060006.004).~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~will be credited in Fire Zone 071. This fire wrap protects an MCC 3B cable and is being credited to exclude basic event 3B06. No technical basis for the fire resistance rating of this wrap was found in the FPRA nor is there justification for crediting this wrap assuming mechanical damage, direct flame impingement, or HEAF. Accordingly this SR is considered not met. During the walkdown, Thermo-lag was seen throughout the plant. Thermo-lag has had problems in the past, and the rating would need to be justified prior to credit. (This F&O originated from SR FSS-C8)~~		~~Credit for the proposed fire wrap should be addressed in the wrap integrity should be established with respect to fire resistance, mechanical protection, and potential fire related exposure to which the wrap may be exposed (direct flame impingement, HEAF, etc.).~~	
~~4-10~~	~~The HRR used for fire modeling of the zone of influence is based on motor fires, which is substantially lower than the NUREG/CR-6850 recommended HRR of 317 kW. As a result, the use of severity factor could potentially be double counting the lowered HRR for transient fires (note that even when the severity factor is used as the location/placement factor for transient fires, it is dependent on the HRR in terms of the zone of influence), if the severity factor development is based on the NUREG/CR-6850 HRR for transient fires. The severity factor for transient fires discussed in Section 8.4 of the fire scenario report (0493060006.004) does not provide sufficient justification for a generic transient fire severity factor. In addition, the severity factor derived from an analysis of the number of fire events includes non-suppression results, and would therefore not be independent of any non-suppression probabilities applied later. FSS-C4 requires severity factors to be independent of other factors. It is noted, however, that the~~	~~FSS-C4~~ ~~FSS-D3~~ ~~FSS-D5~~ ~~FSS-E2~~ ~~FSS-G1~~	~~Severity factor is used extensively in the Fire PRA.~~ ~~Use the NUREG/CR-6850 HRR for transient fires, or develop an accepted industry HRR approach (presently being discussed by EPRI). Develop transient fire severity factors based on the likely HRR and location of overhead cables or location of equipment. For example, if cable is 7 feet overhead, the severity factor would be based on the minimum HRR that would damage the cable at that distance. Additionally, the growth time can be used in determining non-suppression time for generic cases, based on the latest FAQ 52. Finally, it is recommended that the current conditional probabilities in 7.1.2 table for electrical cabinets should not be used in the FPRA.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~implementation of the severity factor in the PTN FRANC model did not involve the application of both severity factor and non-suppression factor in the same scenario. Fire severity factor as discussed in Section 7.1.2 for low voltage electrical cabinets is not developed or applied consistently with the NUREG/CR-6850 methods. This is developed from a supplemental report (ERIN report, Supplemental Fire PRA Methods). Additionally, fire propagation outside of the electrical cabinets is also dependent on the non-suppression probability. Therefore, some dependency exists in this data if used in conjunction with a non-suppression factor. The numbers listed in 7.1.2 for electrical cabinets were derived using the total number of cabinet fires in the denominator, rather than the number of fires of the specific panel type. Due to this incorrect derivation of the conditional probabilities for fire propagation outside of the cabinets, the conditional probabilities thus developed (and applied in the FRANC model for low voltage cabinets) could potentially be low by an order of magnitude (non-conservative). For both the transient fires and low voltage cabinet fires, the severity factors are basically developed using fire events data from the EPRI report. Given the fire data duration and damage is a result of multiple factors (growth, suppression, severity, location, etc), and given the fire data often does not have sufficient information to make a reasonable determination of either the fire size or whether a fire propagated outside the cabinet, the peer review team determined that the use of fire events data for developing the above severity factors is not appropriate.~~			

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~(This F&O originated from SR FSS-C4)~~			
~~4-11~~	~~The argument in Section 8.1 of the fire scenario report about the application of the probability of an ignition source being located within an area around the target may not be correct. This is because the application of a location factor for the transient fuel to the fire ignition frequency has already accounted for the probability of the target being within the influence zone of a fire. As such, ignition is a given condition. With the apportioned frequency, the target must be located within the impact area around the transient fuel and an ignition source must be located within an area in the vicinity to ignite the transient fuel. (This F&O originated from SR FSS-C4)~~	~~FSS-C4~~ ~~FSS-D3~~ ~~FSS-D5~~ ~~FSS-G1~~ ~~FSS-H6~~	~~The location/severity factor applied should have already accounted for the probability that the target is located within the impact area around the transient fuel and an ignition source is located within an area in the vicinity to ignite the transient fuel.~~ ~~Revise Section 8.1 and do not apply separate location factors for transient fuel and ignition source simultaneously in any fire scenario.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~4-12~~	~~Except for the MCR fire scenarios, no scenario-specific fire modeling has been performed to provide a mean value of, and statistical representation of, the uncertainty intervals for the parameters used for modeling the compartments with significant fire risk contributions. Therefore, for compartments other than MCR, only the results of conservative, generic fire modeling developed in the Generic Fire Modeling Treatments report were applied to the analysis of fire scenarios. (This F&O originated from SR FSS-E3)~~	~~FSS-E3~~ ~~FSS-H9~~ ~~UNC-A2~~	~~Mean values and uncertainty intervals for the parameters used for modeling the significant fire scenarios have not been provided.~~ ~~Consider developing mean values and uncertainty intervals for the parameters used for modeling the significant fire scenarios.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~4-13~~	~~Uncertainties associated with cases where cable routing has been assumed (e.g., the EXCLUDEDEVENTS table has assumed that certain cables are not routed through selected areas based on walkdown or engineering judgment) have not been investigated with a documented basis. (This~~	~~FSS-E4~~ ~~FSS-H9~~ ~~UNC-A2~~	~~The required uncertainty has not been evaluated / performed.~~ ~~Consider investigating the uncertainties associated with cases with assumed cable routing.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~F&O originated from SR FSS-E4)~~			
~~4-14~~	~~The Hot Gas Layer and Multi-Compartment Analysis report (H0493060006.006, Revision 0) performed a screening evaluation of the need for hot gas layer and multi-compartment analysis, and identified scenarios/zones that warrant further evaluations. No detailed multi-compartment analysis is completed (still in progress) in this report, and no discussion on multi-compartment fire scenarios' risk contribution is provided. (This F&O originated from SR FSS-G6)~~	~~FSS-G3~~ ~~FSS-G6~~	~~Multi-compartment fire scenarios' risk significance is not yet evaluated.~~ ~~Complete the detailed multi-compartment analysis and add the discussion on multi-compartment fire scenarios' risk contribution.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~4-15~~	~~Treatment for transient fire damage to targets is measured from the compartment floor rather than the height of the transient fuel package that is typically considered. PTN FSS report section 8.2 states, "Cable trays (or the lowest tray within a stack of trays) that were at least 5.8' off the floor were considered beyond the zone of influence of the transient fire for nonqualified cables." This apparently was based on the lowered HRR values (See F&O 3-10) used for the transient fires, as well as the transient fire being located at the floor. This may result in the reperformance of transient fire walkdown if the transient fire HRR values need to be updated. Discussion with FP&L following the onsite review provided some basis for the damage height (indicating that transient fires above the floor will have an overall lower average surface HRR). However, the supplemental discussion was still considered inconsistent with past events and existing guidance on analysis of transient fires. (This F&O originated from SR FSS-H6)~~	~~FSS-D6~~ ~~FSS-G1~~ ~~FSS-H6~~	~~Significant modeling issues resulting in many transient fire scenarios being screened during detailed scenario analysis. The results of the FPRA are therefore potentially non-conservative for the analyzed detailed scenarios. Transient fire evaluations conducted as described in the Fire Scenario Report result in screening fire damage to targets that are located > 5.8' above the floor which is believed to be non-conservative for developed fires involving ordinary combustible fuel packages such as a trash can or trash bag. In response to this concern it was pointed out that the thermal plume component relies on empirical relationships between the source strength and the distance between the virtual origin of the fire and the target. The fire plume begins to entrain air at the lowest point of burning, which defines the base of the fire; normally at the floor. However this argument ignores the potential that a fire could begin burning at the top of a fuel package thus elevating its base. At a minimum, during the initial period of burning, damage temperatures generated~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

Table V-3
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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
			~~by the fire would likewise be elevated. Over time the base of the fire may change due to collapse of the fuel package or burning away of the fuel, however the empirical model presented did not develop these ideas as a reason for assuming that the base of the fire is at the floor for its entire duration.~~ ~~The transient fires should be considered to be above the floor level in the analysis.~~	
4-17	Per summary report, Task 9 is fulfilled with the NISYS SSD database, "PTN NFPA 805 Database.mdb". This database has been significantly expanded for the NFPA 805 tasks. A sample circuit analysis worksheet (e.g., for component 20ASB/G3) has signatures at the bottom, which were not populated yet. The NISYS circuit analysis is an Appendix R type circuit analysis and does not identify the circuit failure modes and address likelihood of failure. Failures of the required cables identified are assumed to have a probability of 1.0 unless specifically modified in the ALTEREDEVENTS table of the FRANC model. The treatment of the circuit analysis seems to be bounding (i.e., the likelihood was not part of the analysis). Although Appendix D of the fire scenario report states the bases for the altered FRANC event probabilities, it seems that there is no linking between the altered probabilities and the circuit analysis package. The majority of the altered events are based on operator manual actions while some based on the simple spurious actuation probabilities from NUREG/CR-6850, which were based on specific evaluation (with no basis provided in the FRANC database), but do not directly linked to any specific circuit analysis	CF-B1	Incomplete evaluation and document for circuit failure. The NISYS DB can include identification of when spurious operation may occur, but does not provide the circuit analysis or circuit failure probability analysis needed to support the FPRA. Provide a documented basis, and detailed circuit analysis for any spurious operation probability used in the FPRA per Tasks 9 and 10 of NUREG/CR-6850 (or equivalent).	This F&O has been resolved. Circuit failure probability was considered for high risk scenarios and only in cases where doing so would result in a reduction in total risk. Additional details with respect to circuit configuration and raceway type have been added to the altered events table.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	worksheet. Since the "basis" column of the Altered event table in the FSS report does not appear to include sufficient documentation to allow review/peer review of the results and the NISYS database does not include the analysis, the analysis (not the results) has not been documented. The evaluation and documentation of the review of the fire-induced circuit failure modes and the assignment of the appropriate industry-wide generic values to their conditional failure probabilities for risk-significant contributors based on the specific circuit configuration under consideration should be included in the circuit failure report for Tasks 9 and 10. (This F&O originated from SR CF-B1)			
~~4-19~~	~~The new fire-specific safe shutdown actions identified and incorporated into the PTN Fire PRA have not been defined (even for the risk-significant actions) by specifying (a) accident sequence specific timing of cues, and time window for successful completion (b) accident sequence specific procedural guidance (e.g., AOPs, and EOPs) (c) the availability of cues and other indications for detection and evaluation errors (d) the specific high-level tasks (e.g., train level) required to achieve the goal of the response, or the complexity of the response. (This F&O originated from SR HR-F2)~~	~~HRA-B2~~ ~~HRA-B3~~ ~~HR-F2~~	~~Risk significant human actions should be defined in accordance with SR HR-F2.~~ ~~Identify the risk-significant new fire-specific safe shutdown actions and define these actions in accordance with SR HR-F2 and HRA-B3.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~4-23~~	~~The time available and time required to complete actions were not evaluated for the new, risk significant fire-related safe shutdown actions. PTN FPRA HRA report Tables A-1 and A-2 include evaluation of the time available to complete actions. However, the point in time at which operators are~~	~~HRA-C1~~ ~~HR-G5~~ ~~SF-A5~~	~~Systematic issue. The evaluation of the time available and time required to complete the risk-significant actions is required.~~ ~~Evaluate time available to complete the risk-significant fire-related safe shutdown actions.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~expected to receive relevant indications are not evaluated. (This F&O originated from SR HR-G4)~~			
~~4-24~~	~~It appears that the reasonableness of risk-significant, post-initiator HEPs relative to each other was not yet reviewed in the scenario context, plant history, procedures, operational practices, and experience. (This F&O originated from SR HR-G6)~~	~~FQ-C1~~ ~~HRA-C1~~ ~~HR-G6~~ ~~QU-C1~~	~~The reasonableness of risk-significant, post-initiator HEPs relative to each other should be reviewed and checked in the scenario context, plant history, procedures, operational practices, and experience.~~ ~~Review the reasonableness of risk-significant, post-initiator HEPs relative to each other in the scenario context, plant history, procedures, operational practices, and experience.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~4-25~~	~~Uncertainty characterization of the HEPs developed for the Fire PRA was not provided.~~ ~~(This F&O originated from SR HR-G8)~~	~~HRA-C1~~ ~~HR-G8~~ ~~QU-E4~~ ~~UNC-A1~~	~~HEP uncertainty characterization is needed for the evaluation of uncertainty in the overall risk results.~~ ~~Develop uncertainty characterization of the HEPs used in the Fire PRA (especially for those risk-significant HFEs).~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~4-4~~	~~There does not appear to be a document recording the proper resolution of deficiencies from the previous peer review of the internal events model. In addition, a peer review or gap assessment of the major changes since the previous peer review of the internal events model does not appear to exist (a gap database was provided, but with no supporting documentation). Finally, a gap assessment of the PRA standard changes from RG 1.200 Rev. 1 to Rev. 2 does not appear to exist. (This F&O originated from SR PRM-B2)~~	~~PRM-B2~~	~~SR PRM-B2 and NEI 07-12 require proper disposition of the deficiencies from the previous peer review that may adversely affect the accuracy of the Fire PRA model. CDF has been significantly reduced (more than an order of magnitude) since the last internal events peer review. Additionally, methodology changes have occurred, including use of the HRA calculator and use of a new CCF model.~~ ~~Resolve all significant deficiencies from the previous peer review that may adversely affect the accuracy of the Fire PRA model results, if not already completed, and document these dispositions. Provide a gap assessment or new peer review on the internal events PRA, latest revision.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
4-5	Documentation of the changes in the Internal Events PRA model to develop the Fire PRA model are primarily provided in Section 4 and Appendix D of the Fire PRA Component and Cable Selection Report (Report 0493060006.001). However, no additional, detailed documentation of the changes is provided. Based on a review of the documentation in the tables in these sections (e.g., Tables 4.1-2, D-1, D-2, D-3, etc.), SRs for IE-D, AS-C and SY-C, etc. are not met. Since the level of analysis and documentation for Fire PRA model is expected to be similar to that for internal events, the documentation in the above sections and tables does not meet what is expected for this requirement. Let's look at some examples: on Table D-3, page D-57, there appears to be a number of changes to 'correct' logic. The original logic is included in the system notebooks (e.g., DC power notebook). However, since this is just correction here, the internal events PRA is not updated. Additionally, without proper development, it is difficult to determine if the change is accurate. (This F&O originated from SR PRM-C1)	PRM-C1	The level of documentation provided in Section 4 and Appendix D of the Fire PRA Component and Cable Selection Report (Report 0493060006.001) does not meet the SRs for IE-D, AS-C and SY-C. Include additional documentation to the level satisfying the SRs for IE-D, AS-C and SY-C.	This F&O has been closed. The action taken to address this item was specifically included in the focused scope Peer Review.
4-6	The Fire Scenario Report (0493060006.004) Appendices A, D, and E, and the FRANC model document the equipment failure modes for each fire scenario. However, circuit failure modes associated with failures of the required cables were not identified or documented. Relevant circuit failure modes are necessary for the assessment of circuit failure (e.g., hot short) probabilities. For most components, there is no differentiation in the FPRA between failure modes that can result due to failure of each cable/circuit. As	FSS-A2	Circuit failure modes are necessary for the assessment of circuit failure (e.g., hot short) probabilities and required for meeting SR FSS-A2. The method used in the PTN FPRA can significantly over estimate the likelihood of the circuits causing such particular failure modes as spurious operation. Document circuit failure modes for the required cables for each fire scenario evaluated.	This F&O has been closed. The action taken to address this item was specifically included in the focused scope Peer Review.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~a result, the fire scenarios assume each failure mode would occur from damage to all cables identified in the SSA. In order to refine the fire scenario under CF tasks, the circuit failure would need to be provided for each risk relevant circuit. (This F&O originated from SR FSS-A2)~~			
~~4-8~~	~~The process of defining fire scenarios with the source/target combinations and its FRANC implementation process are such that the risk contribution of each risk-relevant ignition source was characterized. The evaluation and results are documented in the fire scenario report and the FRANC model. However, the analysis does not appear to always differentiate between targets (e.g., cables in different cable trays). For a number of the top 10 scenarios (i.e., full zone burn-out scenarios), it appears all fires damage all equipment and all cables in all trays (without specific knowledge of where each of the targets are located, for example, in the trays). Basically, the process for developing detailed scenarios for all significant fire compartments has not been completed in the FPRA for CDF and LERF. For example, see scenarios in 096, 019 and 020 (base case CDF scenarios). (This F&O originated from SR FSS-A5)~~	~~FSS-A5~~	~~Issue with potentially significant impact.~~ ~~For risk significant fire compartments, develop additional fire scenarios such that specific targets are determined based on the location of each target (e.g., affected tray) relative to the ignition sources in the room.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~4-9~~	~~It appears that the application of severity factors is inconsistent between the FRANC model and those listed in Appendix A of the Fire Scenario Report (0493060006.004). In the FRANC model, severity factor is only used for transient fires and as the split fraction between severe and non-severe MCC fires. For transient fires, it appears that the severity factor is used in the sense of a~~	~~FSS-C4~~ ~~FSS-G1~~	~~This appears to be a systematic issue. However, this may also be just a configuration control and/or documentation issue. Severity factor should be applied to all applicable scenarios to derive realistic result.~~ ~~Reconcile the differences between the FRANC model and the fire scenario report. Apply the severity factor or non-suppression factor to all applicable scenarios in a manner~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~location factor associated with the placement of the transient fuel. In Appendix A of the fire scenario report, severity factor is also used for oil fire, pump fire, and electrical cabinet fire, in addition to transient fires and MCC fires. Further, the values of the severity factor used in the FRANC model and Appendix A of the fire scenario report do not match. The bases for neither were documented for each individual scenario. Also, the severity factor values used for the oil and pump fires do not appear to be consistent with the tabulated values given in Table 5-1 of the fire scenario report. It appears that severity factors or non-suppression factors can be applied to many more detailed scenarios in the FRANC model to make the estimate of the detailed scenario risk more realistic. In addition, the scenario ignition frequencies listed in Appendix A do not appear to be consistent with those used in the FRANC model. (This F&O originated from SR FSS-C4)~~		~~consistent with the methodology and data discussed in the fire scenario report.~~	
5-11	Review of Turkey Point NISYS NFPA 805 Compliance Assessment Database within the Cable Routing and Respective Equipment table, it was noticed that the Spurious ESFAS signal "Spurious/ESFAS/Lacks/Analysis" have total of 56 respective components impacted. Unit 3 Train A SI signal from the Control Room "3MRASI/3C06/3QR43/006" have total of 29 respective components impacted, Unit 3 Train B SI signal from the Control Room "3MRBSI/3C06/3QR45/006" have total of 28 respective components impacted, Unit 4 also have similar components impacted. The concern is the potential mismatch between FPRA and the SSA component lists. (This	ES-B1	The deviation between the ESFAS components actuation and Control Room SI components actuation should be disposition and reconcile, to ensure Fire Safe Shutdown / Appendix R equipment are appropriately credited in the Fire PRA. Reconcile the FPRA component list with the SSA component list for equipment impacted by an SI signal	This F&O has been resolved. The circuit analysis process used for the project has been confirmed to be consistent with the latest industry guidance (NEI 00-01). In addition, the asymmetry was discussed with plant staff and confirmed to be reflective of the actual plant design and configuration.

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	F&O originated from SR ES-B1)			
5-13	Turkey Point FPRA Summary Report NUREG/CR-6850 Task 16 Report No. 049306006.005 Rev. 1 Tables A-1, A-2, B-1 and B-2 documented the Units 3 & 4 Fire PRA quantification Results for both CDF and LERF for all fire scenarios that were quantified. Scenario 096-A was randomly picked review for both Units 3 & 4. The CDF/LERF results are consistent between the Summary Report and Zone Scenarios in database files, Unit 3 CDF "PTNFIRE_W_LERF_MH_ESF.mdb", Unit 3 LERF "PTNFIRE_W_LERF_MH_ESF.mdb", Unit 4 CDF "U4PTNFIRE_W_LERF_MH_ESF.mdb", and Unit 4 LERF U4PTNFIRE_W_LERF_MH_ESF.mdb". However, reviewing the Altered Events table in each database files shows inconsistent basic events impacted between Unit 3 and 4. Unit 3 have no basic event impacted, while Unit 4 have 9 basic events listed. (This F&O originated from SR FQ-A3)	FQ-A3	It appears that there is inconsistent basic event mapping between the database files. A sensitivity run was performed by copying the U4 events to the U3 tables, and re-evaluated U3 CDF. The results are the top scenario in 96 dropped from 4.5E-05 to 1E-06. Based on this, the error appears to be significant. Need to ensure that the altered events table is correctly developed for both U3 and U4 for the CDF and LERF quantification.	This F&O has been resolved. The identified data differences were reviewed and confirmed to be reflective of the design and layout of the units. Additional comparison of the quantification results between the two units was also performed to ensure that any significant differences in results are consistent with the actual unit differences. Various asymmetries in the plant layout were identified.
~~5-16~~	~~Review of PTN Tasks 8 and 11 Report 0493060006.004, Rev. 1, Page 23, Section 7.5.2, states "no hydrogen fires other than turbine/generator have been postulated. The basis appears to be that they use excess flow check valves to limit H2 release. Question was asked during the review, the response said "The small quantify of hydrogen downstream of the check valves and its potential leakage will result in small accumulations of hydrogen and are unlikely to result in combustible concentrations of hydrogen in any area of the plant". However, further review of PTN NFPA 805 Fire Ignition~~	~~FQ-A3~~ ~~FSS-A1~~	~~The discussion between the two reports are inconsistent regarding to misc hydrogen fire. Incorrect apportioning the fire frequency and define appropriate fire scenarios could have significant impact to the CDF and LERF results.~~ ~~Address Miscellaneous H2 fires in the FPRA, identifying other compartments containing hydrogen piping.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~Frequency Report PTN-PSA-7.01, Rev. 2, Fire Compartment Ignition Source Data Sheet (ISDS) for compartment 082 "Unit 4 Auxiliary Transformer Area" indicate that BIN 19 – Misc. Hydrogen Fires was identified in this area. For example, H2 feed to the VCT should be looked at. (This F&O originated from SR FSS-A1)~~			
~~5-3~~	~~Based on a review of the Turkey Point FPRA Component and Cable Selection Report 049306006.001 Rev. 1, the documentation is sufficient to support the supporting requirements. The documentation issues identified in the F&Os generally include suggestions to clarify information in the calculation to accurately reflect the process followed in the PRA. ES-D1-01 concerns a finding related to the MSO attachment. This attachment needs to be updated to clearly document how each MSO was addressed in the model in accordance with the actions from the MSO expert panel. Another example: scenario 45 involving (diesel overload) has a note to complete the on-going evaluation; scenario 34 (loss of SG inventory) has a note to verify total flow rates; ensure adequate Fire PRA documentation. Another example is scenario 7, 'Normal letdown fails to isolate and inventory is lost to the pressurizer relief tank (PRT)', which has an open action to revisit PRA model structure for letdown isolation. The FPRA documentation doesn't discuss the disposition for this scenario and the FPRA doesn't model it. (This F&O originated from SR ES-D1)~~	~~ES-D1~~ ~~PRM-B3~~ ~~PRM-B4~~	~~The report identifies multiple cases with confirm or investigation required. Some of the resolutions were documented as addressed, but there some cases with no documentation of resolution or justification can be found. The PRA documentation does not clearly show the resolution of the MSO items as required by the standard. This is considered a documentation concern because the resolution of these items can be found in the PRA model. Suggestion to update Appendix A with a clear resolution of all MSO identified open items.~~ ~~Provide documentation on open items from the MSO expert panel. Include modeling in the FPRA of any known scenarios that are found to be an issue.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~5-5~~	~~Turkey Point FPRA Human Failure Evaluation Report 0493060006.002, page 6 states that a simulator review was performed to identify instrumentation that should be explicitly modeled in the FPRA, including "Identify any alarms or indications that would lead operators to take immediate control actions without further verification."~~	~~ES-A2~~ ~~ES-C2~~ ~~HRA-A3~~ ~~HRA-B4~~	~~Any alarm procedure that does not require alternate confirmation will need to be reviewed and either dispositioned or assessed for equipment to be added to the FPRA component list. There does not appear to be an extensive review of these alarm response procedures for either identification of instrumentation failures~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~Appendix C of the same report, page C-3 has a section asking which annunciator tiles cause an operator to take immediate action. The response is "Operators will confirm the signal with an alternate indicator before taking any action." This answer is not specific, and may not always be procedurally correct. In a typical NPP, each annunciator sends the operators to some alarm response procedure. The alarm response procedure will typically require confirmation using an alternate indicator; however, this is not always the case. (This F&O originated from SR ES-A2)~~		~~leading to a trip or causing an operator to shutdown plant equipment.~~ ~~Review alarm response procedures to address this issue and document appropriately. This aligns with the guidance in section 2.5.5 of NUREG/CR-6850.~~	
~~6-1~~	~~No documentation is provided of a comprehensive review of fire impacts to plant equipment for unique initiating events. The MSO list includes combinations of spurious operation components. However, this review does not include consideration of combinations of fire-induced failures that can lead to an initiating event. Additionally, there did not appear to be a review of screened initiating events from the internal events PRA, other than ISLOCA pathways. (This F&O originated from SR ES-A3)~~	~~ES-A3~~ ~~ES-A4~~ ~~ES-D1~~ ~~PRM-B3~~ ~~PRM-B4~~	~~Systemic issue~~ ~~Perform a review of fire scenario equipment impacts to identify fire-specific initiating events. Examine groups components that can be disabled by a single fire and include the potential for a single spurious event. Examine these equipment impacts in terms of plant response, timing, success criteria, and the effects on the operability and performance of operators and mitigating systems. For each scenario, identify a new fire-specific initiating event if no existing initiating event bounds or adequately represents the equipment impacts.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
6-10	The altered events table in the FSS report includes several instances where a single basic event combines a hot short spurious operation likelihood with an HEP to recover the spurious operation. For example, ORZR30455C represents a combination of spurious opening of a PORV and operator human error probability to close the PORV. Supporting requirement FQ-A1 addresses the need to translate specific failure modes	FQ-A1 FQ-A4 HRA-E1 HR-I1 HR-I2 QU-A3	This approach is not consistent with the level of detail modeled elsewhere in the PRA. Translate specific failure modes into basic events and avoid combining disparate failure modes into combined basic events.	This F&O has been resolved. The methodology and the analysis has been updated to eliminate the use of this approach. The use of altered events for spurious probability is used only as required and a singular value.

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DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	into basic events. Embedding an HEP with a spurious operation likelihood bypasses this requirement, and this approach is not consistent with the level of detail modeled elsewhere in the PRA. Also, the approach prevents the ability to address the state of knowledge correlation. (This F&O originated from SR FQ-A1)			
~~6-11~~	~~The FPRA models through the Altered events table several 0.1 values for recovery actions that are not in the safe shutdown analysis and are not in the fire safe shutdown procedures. There are about 198 unique instances of such recovery actions. For example, event AHFPTRNAMAN, in area 63, is not included in operations procedure 0-ONOP-016.10. This human interaction modeling doesn't reflect the as built as operated plant, and no evaluation of feasibility is documented for these actions. Discussions with the FPRA development team indicated that the post-fire operating procedures will be updated to incorporate the new recovery actions and feasibility will be evaluated at that time. The FPRA will need to be updated, as necessary to reflect the outcome of feasibility evaluations. (This F&O originated from SR HR-E1)~~	~~HRA-A1~~ ~~HRA-A2~~ ~~HRA-C1~~ ~~HRA-D2~~ ~~HRA-E1~~ ~~HR-E1~~ ~~HR-H2~~ ~~HR-I1~~ ~~HR-I2~~	~~The operator recovery actions were based on proposed new procedures instead of the existing ones, don't reflect the as-built as operated plant and are not confirmed to be feasible.~~ ~~Ensure that all FPRA human failure events reflect the as-built, as-operated plant, and that they are proceduralized. Verify all credited actions, including those modeled in the HRA and those included in the altered events report, are included in the plant operational procedures.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~6-12~~	~~Based on a review of the FPRA HRA Report, no talk throughs or reviews appear to have been made with plant operations and training personnel of procedures and sequences of events to confirm that interpretation of the procedures by FPRA developers is consistent with plant observations and training. The report indicates that a simulator review was~~	~~HRA-A1~~ ~~HRA-A4~~ ~~HRA-E1~~ ~~HR-E3~~ ~~HR-I1~~ ~~HR-I2~~	~~Step not performed~~ ~~Perform talk-throughs or reviews of procedures and sequences of events with plant operations and training personnel to confirm that interpretation of the procedures is consistent with plant observations and training.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~performed to identify instrumentation that should be explicitly modeled in the fire PRA as generally required to shutdown the plant or to perform credited operator actions, and a review agenda is provided in Appendix C, but no documentation of such a review is provided. (This F&O originated from SR HR-E3)~~			
~~6-13~~	~~No simulator observations or talk-throughs with operators have been performed to confirm the response models for fire scenarios modeled. (This F&O originated from SR HR-E4)~~	~~HRA-A4~~ ~~HRA-E1~~ ~~HR-E4~~ ~~HR-I1~~ ~~HR-I2~~	~~Step not performed~~ ~~Perform simulator observations or talk-throughs with operators to confirm the response models for fire scenarios modeled.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
~~6-15~~	~~The documentation of credited recoveries in the altered events table in many instances is vague (e.g., "Manual action to restore bus," and "failure probability of new inside control room HEP, required in less than 60 minutes (3AA, DC 205)"). The effort to evaluate these actions for inclusion in the SSA and feasibility would be facilitated by more detailed descriptions of the actions. PTN system model changes in the fire PRA models are summarized in Tables D-1, D-2 and D-3 of the Component and Cable Selection Report 0493060006.001, Revision 1. However, no additional documentation of the changes is provided. Requirements under SY-A and SY-B are not met. Repair of components that are spuriously operated or fire damaged is modeled using the altered events table of Attachment D, FRANC Altered Events Table, of the Fire Scenario Analysis Report 0493060006.004, Rev 1. However, the substitution does not include a verification that the actions are possible or feasible. (This F&O originated from SR~~	~~HRA-E1~~ ~~HR-I1~~ ~~HR-I2~~ ~~PRM-B9~~	~~Systematic Issue~~ ~~Perform analyses to verify operator recoveries and repairs credited in the Altered events Table in Appendix D are feasible, prior to crediting any recovery via manual operation of the equipment.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~HRA-E1)~~			
~~6-16~~	~~The HEP dependency evaluation produced several dependent HEPs on the order of 1E-11 to 1E-13 (for example, cases 62, 93, 110 and 96). NUREG-1792, "Good Practices for Implementing Human Reliability Analysis," recommends that the total combined probability of all the HFEs in the same accident sequence/cut set should not be less than a justified value. NUREG-1792 suggests that the value not be below ~1E-5, since it is typically hard to defend that other dependent failure modes that are not readily anticipated cannot occur. However, some industry PRAs are using a floor value of ~1E-06. (This F&O originated from SR HRA-C1)~~	~~FQ-C1~~ ~~HRA-C1~~ ~~QU-C2~~	~~Unreasonably low values assigned to dependent HEP combinations.~~ ~~Assign a floor for dependent HEP combinations using a justified minimum value.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~
6-20	The parametric uncertainty associated with conditional circuit failure probabilities are not evaluated and are not incorporated into the model. (This F&O originated from SR CF-A2)	CF-A2 UNC-A2	Step not performed Step not performed	This F&O has been resolved., Parametric uncertainty has been performed for CDF and LERF for each unit's FPRA.
~~6-3~~	~~For the FPRA, no accident sequences were identified beyond those modeled by the internal events PRA. The FPRA accident sequence accident progression, success criteria and timing are therefore based on the internal events PRA. Consideration should be given, however, to success criteria and timing specific to the FPRA. For example, no evaluation is made of the timing associated with RWST draindown. Also, RWST draindown may require sump recirculation, which is not presently represented in the non-LOCA transient event tree accident sequences. This step has not been performed and finding is made~~	~~AS-A1~~ ~~AS-A9~~ ~~LE-A1~~ ~~LE-A2~~ ~~PRM-B14~~ ~~PRM-B15~~ ~~PRM-B5~~ ~~PRM-B7~~	~~Required step not performed.~~ ~~Perform a review of FPRA scenarios to ensure that the existing event tree structures accurately model the specific FPRA initiating events, including considerations of timing, plant response, and human interactions.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused-scope Peer Review.~~

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	~~to include such considerations in the FPRA development and documentation. Also, when any new FPRA initiating events are identified as part of resolving ES F&Os, consideration will need to be made of the accident sequence accident progression and timing associated with any new accident sequences. (This F&O originated from SR PRM-B7)~~			
~~6-4~~	~~No FPRA modeling appears to have been made to address the actions directed by the fire safe shutdown procedures that deviate from the actions directed by the EOPs. (This F&O originated from SR PRM-B6)~~	~~AS-A1~~ ~~AS-A10~~ ~~AS-A4~~ ~~AS-A5~~ ~~HRA-A1~~ ~~HRA-A2~~ ~~HR-E1~~ ~~HR-E2~~ ~~PRM-B5~~ ~~PRM-B6~~	~~Step not performed. Potentially significant impact on FPRA accident sequences and results.~~ ~~Modeling of the following procedural responses to a fire may be needed: 1) equipment is disabled to preclude spurious actuations; 2) human actions to isolate unprotected equipment; 3) human actions to manually operate protected equipment.~~ ~~Some of the above human actions could also induce new sequences not traditionally covered in the Internal Events PRA. New sequences to account for these effects may also need to be incorporated into the Fire PRA Model.~~	~~This F&O has been closed.~~ ~~The action taken to address this item was specifically included in the focused scope Peer Review.~~
6-9	The parametric uncertainty analysis as discussed in QU-E3 (estimate of uncertainty intervals, etc.) is not performed. Also, the "state-of- knowledge" correlation between fire-specific event probabilities (e.g., suppression system unavailabilities, fire ignition frequencies, hot short conditional probabilities, etc.) hasn't yet been applied. (This F&O originated from SR QU-A3)	FQ-A4 QU-A3	Step not performed. Perform the FPRA uncertainty analysis, including estimates of uncertainty bounds, per the requirements of QU-A and QU-E. When performing parametric uncertainty calculations, ensure uncertainty intervals for event probabilities utilized by the FPRA are correlated when significant.	This F&O has been resolved., Parametric uncertainty has been performed for CDF and LERF for each unit's FPRA.
7-1	A review of the quantification results for selected compartments involving fire-induced safety injection actuation and fire-	PRM-A3 PRM-A4 PRM-B5	The method in which the fire-induced spurious safety injection actuation and spurious opening of atmospheric dump	This F&O has been resolved. A review of the model was performed and revision made to address and resolve the

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	induced opening of atmospheric dump valves was performed to verify that the modeling was consistent with the internal events PRA treatment of similar initiating events. This review revealed that duplicate cutsets were being introduced by the manner in which the new logic for capturing the fire-induced initiating events was linked into the fault tree. For example, a review of cutsets for zone 098-A showed that the top two cutsets were identical except that one used a version of the HFE for alignment of bleed and feed based on reactor trip occurring with SG low level and the other used a version of the HFE based on timing associated with trip with nominal SG level. Similar issues were identified in the cutsets for zone 091-ETL. As noted in the 2010 peer review in F&O 1-4, there are also inconsistencies in modeling of the fire-induced small LOCA when compared to the internal events small LOCA initiating event. PTN explains that this was due to circular logic issues, and a sensitivity case shows this to be a non-significant issue. However, it is not clear that the circular logic issue could not be resolved and that all potential impacts of the modeling approach taken are understood. (This F&O originated from SR PRM-A3)	PRM-B9	valve initiating events were linked into the fault tree produces conservative results that could impact the determination of significant contributors to fire-induced risk. Review the quantification results for the fire-induced initiating events to verify that the results are consistent with the comparable internal events. Review the mapping of the fire-induced initiating event impacts to ensure that they are consistent with the comparable internal events initiator, that appropriate differences due to the considerations of the fire PRA are incorporated (e.g., application of bounding timing for HEPs to capture uncertainty in the sequence of fire-induced failures), or that deviations in the modeling are documented and justified. Review the application of the feed and bleed HFE to ensure the appropriate timing is used during the fire quantification. Since the MFW pumps are assumed failed for all fire areas, the most appropriate value may be the HEP based on timing assuming the trip occurs with low level in the SGs. Review treatment of any additional HEPs with event-specific timing assumptions to ensure that the appropriate values are used in the fire quantification.	issue identified in the F&O. Additional reviews were performed as part of the overall results and cutset reviews and no additional instances were identified.
7-3	The current model uses the LERF model for the PTN revision 9 model (PTN-BJFR-99-010, Rev. 1) and maps appropriate equipment impacts into the system models used to model LERF. No new accident progressions beyond the onset of core damage were identified for the fire PRA. However, there is no documentation that a specific review of the accident progressions	PRM-B14	It cannot be determined from the existing documentation that an assessment was performed to identify 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. Document an assessment to determine if	This F&O has been resolved. A review of the mapping of Level 1 sequences to the plant damage states in the LERF model was reviewed. No new accident progressions that required modification of the LERF model were identified.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	leading to LERF was conducted to identify whether new considerations should be addressed in the fire PRA. In addition, effects on PDS mapping due to fire-induced failures may not be appropriately captured. For example, RWST diversion of the RWST to the containment sump is modeled as a failure of HHSI which would normally go to a dry containment PDS. However, the actual PDS should be one for wet containment. While this is a late containment failure concern rather than a concern for LERF, there may be similar fire-induced failures that could affect the mapping of LERF accident progressions. (This F&O originated from SR PRM-B14)		there are potential fire-induced LERF mechanisms not captured by the internal events accident progression models. If none are identified, document the basis of that conclusion.	
7-6	The new fire-specific safe shutdown actions which are credited in the final Fire PRA will be proposed to be added to the plant fire response procedures. These human actions are included in the ALTEREDEVENTS table of the FRANC model using component basic events as surrogate. However, the safe shutdown actions modeled in the FPRA are not currently consistent with those specified in the plant fire response procedures, there is no documented assessment of the cues required to initiate the actions, no training has been provided to operators on the new fire-specific actions, no operator reviews or talk-throughs of the credited actions has been documented, and the applicable performance shaping factors have not been considered, including time available for the action. This F&O supersedes 2010 Peer Review F&Os 1-41, 2-6, 6-4 and 6-11.	HR-E1 HR-E2 HR-E3 HR-E4 HR-H2 HR-I1 HR-I2 HR-I3 HRA-A2 HRA-A4 HRA-B2 HRA-B3 HRA-D2 HRA-E1 PRM-B11	Final post-fire safe shutdown actions have not been defined and appropriate procedures revised to include the actions to be credited in the Fire PRA. Complete the identification of new fire-specific safe shutdown actions which are credited in the final Fire PRA and evaluate and document the HEPs consistent with processes used for internal events HEPs. Include consideration of fire effects on the operator action, availability of cues, availability of time to complete the action, feasibility of the credited actions given a fire, and potential 92-18 impacts for both screening values and detailed HEP development. Also, complete operator reviews and/or talk-throughs when the procedure updates are completed to ensure that the interpretation of the actions is consistent with the operator's understanding and training. Finally, consider expanding the discussion	This F&O has not been resolved. The FPRA includes various actions that are being included as required plant changes in the NFPA 805 LAR. The development and implementation of related procedures has not yet been initiated as it is part of the overall integrated process associated with transition to an NFPA 805 license basis.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	(This F&O originated from SR HRA-A2)		of sources of model uncertainty related to the HRA to include consideration of the accuracy and completeness issues noted in NUREG-6850, Volume 2, Appendix V.	
7-8	Dependency between multiple altered events representing new HFEs in the same cutset and between action represented by the altered events and other HFEs in the same cutset has not been assessed based on the assumption that the dependency effects are bounded by the application of conservative screening values. However, there is no documented assessment to support this assumption. There are cases where complete dependency between events may be appropriate. For example, cutsets 40 – 45 in the provided Aggregate CDF_aggregate.cut file contain altered events MAVC4200A_1.00E-01 and MAVC4460_1.00E-02 in each cutset. The product of these two events is therefore 1.00E-03. However, since both events involve failure to isolate the letdown line, it could be assumed that there is complete dependence between the events since they would share a common cue. This F&O supersedes 2010 Peer Review F&O 6-16. (This F&O originated from SR HR-H3)	HR-H3 HR-I2 HRA-D2 PRM-B11	The dependency associated with operator actions applied using the altered events method has not been addressed. Address dependency between multiple altered events representing new HFEs and between the altered events and other HEPs in the same cutset. If detailed dependency analysis is not performed, provide a justification supporting the assumption that the values chosen for the altered events bounds dependency effects.	This F&O has been resolved. The use of altered events as a surrogate for a recovery action has been significantly reduced as noted previously. Those remaining instances are addressed by modifications to the recovery rule file so that only a single instance of this use would exist in any cutset. This eliminates the potential for multiple surrogate recovery events to appear together in the same cutset.
8-3	Attachment U – Internal Events PRA Quality (DRAFT), document applicability of Internal Events F&Os to internal events PRA, but not to Fire PRA. There was no evidence that the review of F&O disposition status addressed the question of whether the disposition that was taken would adversely affect the development of the fire PRA.	PRM-B2	The potential effect of internal events F&O disposition on development of the FIRE PRA was not addressed. Review internal events F&Os and provide documentation as to how disposition of those F&Os may impact development of the Fire PRA.	This F&O has been resolved. The internal events PRA model F&Os that have not been resolved/closed have been reviewed and found to have no negative impact on Fire PRA results or this application.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	This F&O is derived from 2010 Fire PRA peer review F&O 4-4. (This F&O originated from SR PRM-B2)			
8-5	The Fire PRA model changes were constructed so as to allow credit for the current internal events PRA model structure using existing accident sequence progression, success criteria and timing. The internal events HRAs are modified with a screening modifier. Travel paths are considered in the human failure evaluation report. However, there is no indication that a review was performed to identify accident sequences that may require modification based on unique aspects of the plant fire response procedures. For example, RWST draindown may affect the evaluation of timing for aligning sump recirculation, which is not presently represented in the non-LOCA transient event tree accident sequences used for the majority of the fire scenarios. A review should be performed for possible changes to success criteria, particularly due to model changes from the MSO evaluation. This F&O is derived from 2010 Fire peer review F&O 6.3. (This F&O originated from SR PRM-B5)	HRA-B1 HRA-B3 PRM-B5 PRM-B7	The standard requires a review of the fire-induced initiating events accident sequences, and success criteria included in the internal events model, to identify new accident sequence progressions or success criteria due to unique aspects of fires. This review will help assure that there are no revised actions where the screening multipliers are not appropriate. Conduct and document a review of the fire-induced initiating events accident sequences, and success criteria included in the internal events model, to identify new accident sequence progressions or success criteria due to unique aspects of fires.	This F&O has been resolved. The review of results and cutsets that were performed did identify a number of instances such as that specifically identified in the F&O. In all instances, it was determined that the existing model structure was appropriate and that opportunities for recovery actions were limited either because of a lack of appropriate cues or insufficient timing to gain any meaningful benefit via recovery. The analysis documentation of the HFE treatment was updated to address the internal events PRA model human actions that are used in the FPRA. The documentation addresses the applicability, numerical adjustment, and availability of necessary cues.
8-8	Several portions of the analysis are not documented for Unit 3. Specific examples include: Unit 4 significant contributors are identified in 0493060006.005, Rev. 2. Unit 3 significant contributors are available, but not fully documented.	FSS-E3 PRM-A3 PRM-C1	Unit 3 results not fully documented, although they are available for inspection using the quantification software. Document Unit 3 results consistent with the Unit 4 results.	This F&O has been resolved. The U3 results have been added to the analysis documentation.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	Unit 4 Fire Scenario information is presented in 0493060006.004, Rev. 2, but the equivalent Unit 3 information (Attachment D and E) is not provided. (This F&O originated from SR PRM-A3)			
8-10	2010 FPRA peer review F&O 1-44 finds issues with masking fire effects by setting basic events to 0 in the Altered Events table. This has partially been addressed by setting these events to 'nominal' in the Altered . Events table and for reviewing cases where the nominal value is on one side of an AND gate and the modified HEP value is on the other side. However, there are still cases where fire impacts are masked when the nominally adjusted event is on both sides of an AND gate or the HEP event is on one side of an AND gate and nominally adjusted events are on the other side. Scenarios 030 PTB and 067E PTB are two examples. This old F&O is converted to a new F&O 8-10. (This F&O originated from SR HRA-C1)	HRA-C1 PRM-B11	This appears to have a significant non-conservative impact to PRA results. Given the actions in the altered events report are being added to the model as needed recoveries in order to ensure risk is low, and given the resulting recovery actions do not show up in the results in most cases, there appears to be a disconnect between the addition of new actions to the procedures and the quantification of these actions in the FPRA. It appears part of the disconnect is that the logic modeling, as modified by the altered events table, results in the recovery values being screened from the results. Due to the complexity of this methodology, it seems a difficult task to review and address for these masking issues. Perhaps a more systematic and comprehensive approach, with an independent review, could provide confidence that these nonconservatisms are addressed. Adding new HEP basic events, consistent with the approach used for internal events, would address this issue.	This F&O has been resolved. The use of '0'; has been eliminated in the Altered Events table. Instead, events are set to nominal. In the case of the application calculations for NFPA 805, the 'compliant' case is determined by using a '0' value which would under-estimate the compliance case risk and thereby provide a conservative estimate of the risk increase for the application.
9-1	A general screening based on the ability to form a damaging HGL in an exposing compartment was developed. If no damaging HGL could form in an exposing compartment then there was no possible associated MC scenario. When a damaging HGL could form, a second screening was performed whereby the frequency of developing the HGL was	FSS-G2 FSS-G3 FSS-G6	No basis for the screening criteria is described. Since no MCA scenarios are developed, there is no way to determine if the exceeded (yet applied) screening criteria are significant. Provide a basis for the 1E-07/yr screening criteria including additional information required when the criteria are included. The basis for the screening criteria should	This F&O has been resolved. The existing HLG/MCA analysis includes a number of occurrences where the simplified screening approach was found to generate over-conservative results. Incrementally enhanced treatments were applied to confirm that these locations had a very low likelihood of creating or causing formation of HGL conditions and consequently a possible

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	determined. If the frequency was less than 1E-07/yr, then the scenario could be eliminated. However, there was no basis provided for the 1E-07/yr criteria, nor was the criteria adhered to; in fact, the criteria was exceeded, yet still applied, in over 150 different scenarios. Some of the screened scenarios were slightly over the 1E-07/yr threshold, while others ranged as high as nearly 6E-07/yr. The impact of exceeding the criteria cannot be determined as no specific MCA scenarios were ever developed; therefore, it is not known if the scenarios would be significant. For example, if it is assumed that 10 of the scenarios with a frequency of 5E-07 had CCDPs of 1.0, this would result in an increase in total CDF of 5E-06 which is about 10% of the total fire CDF. (This F&O originated from SR FSS-G2)		ensure the frequency is not too high, thereby potentially masking significant MCA scenarios. Evaluate impact of exceeded screening criteria; for example, a qualitative analysis of the expected CCDP based on known targets in the exposing and exposed compartments.	multi-compartment scenario
9-4	The multi-compartment analysis assumes a bounding value of 7.4E-3 for evaluation of active fire barrier elements. Actual fire barrier elements are not considered; instead the failure probability of a fire door is assumed for active barrier element failure because this failure probability represents the highest single probability of a single barrier failure. This method ignores the potential for multiple fire barrier elements. Per NUREG/CR-4840 (source document for NUREG/CR-6850 Table 11-3, "Barrier Types and Their Failure Probabilities") the total barrier failure rate is a union of the probabilities of the individual failure rates. Therefore, a value of 7.4E-03 may be conservative or non-conservative. This is based on 2010 FPRA peer review	FSS-G4 FSS-G5	Systematic generic assessment of active fire barrier elements may lead to non-conservative results. If a screening value is desired, NUREG/CR-6850 Section 11.5.4.4 suggests using a screening value of 0.1 for active fire barrier elements. This value is much more likely to encompass multiple fire barrier elements. For scenarios that do not screen out, actual fire barrier elements identified during walkdowns (or document review) can be used to develop a more realistic barrier failure probability.	This F&O has been resolved. The update of the analysis to incorporate a barrier failure probability that integrates all possible barrier elements was found to result in a value of approximately double the current value. However, since the entire analysis approach involves a screening strategy, additional analysis refinements are possible. An assessment of the use of a higher barrier failure probability to account for failure of multiple barrier elements found that the overall conclusion that MCA scenarios are not risk significant and need not be explicitly included in the FPRA was confirmed. However, the analysis documentation has not yet been updated ot reflect these results and insights.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	F&O 1-35. (This F&O originated from SR FSS-G5)			
9-5	The screening criteria are defined in the Turkey Point Hot Gas Layer and Multi-Compartment Analysis, (Report H0493060006.006) methodology. Compartments that don't screen are retained for further analysis. A concern identified with the screening criteria involves the use of a standard fire scenario for each analysis rather than determining the most challenging fire scenario inherent to the analyzed compartment. This approach potentially masks the potential for forming an HGL in the exposing compartment. For example, in zones 67 and 68 the standard fire scenario is non-conservative due to the potential for HEAF in 4kV switchgear. The damage time of 5 minutes is non-conservative for HEAF scenarios (should use 0 minutes). This F&O supersedes 2010 FPRA peer review F&O 3-11. (This F&O originated from SR FSS-G2)	FSS-G2	Use of a standard fire scenario may be non-conservative for some zones. Review zones to ensure that the standard fire scenario is actually the most challenging scenario inherent to the analyzed compartment. For zones where the standard fire scenario is not the most challenging, determine the most challenging scenario and evaluate accordingly.	This F&O has been resolved. The use of the 5 minute delay to combustible cable ignition is considered realistic. Other conservatisms in the analysis ensure the overall conservatism of the MCA/HGL evaluation.
9-6	The system unavailability records for the plant have not been reviewed in crediting fire detection and suppression systems. This F&O supersedes 2010 FPRA peer review F&O 2-26 (This F&O originated from SR FSS-D7)	FSS-D7	This is a systematic issue. The intent for Capability Category II is to additionally require a review of plant records to determine if the generic unavailability credit is consistent with actual system unavailability. Outlier experience would be any experience indicating that actual system is unavailable more frequently than would be indicated by the generic values. Consider performing and documenting the review of plant records to determine if the	This F&O has been resolved. The fire protection system availability data for PTN has been reviewed and no outlier behavior has been identified.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
			generic unavailability credit is consistent with actual system unavailability. Outlier experience would be any experience indicating that actual system is unavailable more frequently than would be indicated by the generic values.	
9-10	Section 3.1 of the FSS Report (0493060006.004, Rev. 2) states: "For the electrical panel fires, the scenarios are developed similar to scenarios involving electrical panel fires outside the Control Room and are adequately described in Attachment A. Fire spread to adjacent panels was determined for these scenarios based on a walkdown of the control room during which panels with potential barriers for spread of fire were opened to confirm the existence of such barriers. For MCB fires, the method from NUREG/CR-6850 Appendix L is applied. NUREG/CR-6850 Appendix L defines a non-suppression probability applicable to the MCB. From Figure L-1 of NUREG/CR-6850, for non-qualified cables, and for a bounding distance of 0 meters (assuming that the cables terminating at the individual MCB are in very close proximity), a non-suppression frequency of 8.30E-3 is used for the MCB." However, based on discussion with FPL/ERIN staff, this was not done. Essentially, no fire spread for any cabinet in the MCR was assumed. For panels with incipient detection, success of the detection results in no damage as it is assumed operators isolate the circuit prior to additional damage in the cabinet. If insipient detection fails, the MCB panel fails completely, but never spreads another cabinet.	FSS-A6 FSS-H7	Assumption made that no cabinet/panel fires in the MCR will ever spread to an adjacent cabinet even if the cabinets are open to one another. This incorporates an implied assumption that every MCR panel/cabinet fire will be extinguished prior to spread. Identify adjacent MCR cabinets/panels which could result in fire spread given failure of suppression. Apply NUREG/CR-6850 Appendix L, S or other relevant document to address the potential for fire spread. Ensure documentation is consistent with the process actually used in the analysis.	This F&O has been resolved. Panels with communication between adjacent panels are to be provided with incipient detection to ensure early identification of fire to preclude spread between panels.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	For all other cabinets/MCB panels without incipient detection, full burnout of the cabinet/panel is assumed, but again, no spread to adjacent cabinets is assumed even if the cabinets are open to one another (e.g., walkthrough MCB). (This F&O originated from SR FSS-A6)			
9-11	Several entries in Table 3-1 of Report H0493060006.006 says "Walkdown required to confirm no combustibles within the 383 ZOI" when the cables are not IEEE-383 qualified. Based on discussions with FPL and contractors, it is believed that this is a typo, and the correct damage criteria were actually applied. (This F&O originated from SR FSS-G2)	FSS-G2	It was not confirmed during the peer review that this was just a documentation issue. Therefore, this is classified as a finding because it could affect the analysis results. Verify that the damage criteria used is consistent with non-383 cable damage and revise the documentation as required. If it is discovered that the incorrect damage criteria were applied, update the analysis with the correct criteria.	This F&O has been resolved. It was confirmed that the lower damage threshold associated with thermoplastic materials was used for the analysis. The typographical error has been corrected.
10-1	The 2010 peer review identified that "Fire modeling was conducted via generic fire modeling from which Zones-Of-Influence (ZOI) for specific initiator types was generated. The ZOIs were used to define bounding fire characteristics for each fire scenario. Characteristics that are used to bound potentially risk contributing fire events are identified in Attachment B of the Fire Scenario Report, (Report 0493060006.004). Based on the use of a bounding approach this SR is judged to be met at CC I. Significant fire scenarios should be developed with 2-point fire modeling." Since this review, FP&L has stated that "The use of a panel split fraction to differentiate between fires impacting the panel and components with cables terminating at the panel versus panel fires impacting cables outside of the panel provides an equivalent	FSS-C1 FSS-G1	The present analysis provides a bounding approach for fire severity in most cases, since the 98th percentile fire heat release rate is used. However, use of the split fraction method is based on industry events rather than site specific fire ignition sources and target configurations. Therefore, this could result in non-conservative frequency estimates of target damage. Perform 2-point fire modeling, when applicable, for risk significant fire scenarios.	This F&O has been resolved. The recommended resolution action in the F&O was assessed in the context of the dominant fire risk contributors. This assessment concluded that further refinements such as that described in the F&O would not substantively change the results of the analysis. The existing treatment retains some conservatism which results in this SR meeting CC I. This is adequate for the NFPA 805 application, as this conservative bias would tend to over-estimate the risk metric that is used to judge the acceptability of this application. The issue regarding the ERIN panel split fraction is addressed in the disposition for F&O 10-3.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	and more useful two point fire model." The Panel Split fraction is developed from a supplemental report (ERIN report, Supplemental Fire PRA Methods, dated February 2010). This document was submitted to the EPRI Fire PRA Methods Review Panel. This review is not complete as of the date of this peer review. Use of the split fraction method is based on industry events rather than site specific fire ignition sources and target configurations and therefore, could result in non-conservative frequency estimates of target damage. (This F&O originated from SR FSS-C1)			
10-2	The 2010 review of PTN Tasks 8 and 11 Report 0493060006.004, identified that 'no hydrogen fires other than turbine/generator have been postulated.' (Previously F&O 5-16) Since this Finding was identified, FP&L has determined that 'Miscellaneous Hydrogen piping at PTN is limited to hydrogen supply to the VCT tanks. The associated piping is located in the charging pump rooms (Fire Zones 45 and 55). Fires in these fire zones are assumed to impact all components in the fire zone. The associated risk is low given the availability of thermal barrier cooling for RCP seals and HHSI pumps. Allocation of the IGF associated with miscellaneous hydrogen fires to these fire zones would result in an increase in the ignition frequency for these zones by less than a factor of 3. Given the low risk significance of these zones this will have a negligible impact on overall plant risk and the charging pump rooms will remain low risk contribution fire	FSS-A1	Including the fire frequency and associated fire scenarios from hydrogen fires will have impact to the CDF and LERF results. Incorporate the hydrogen fire scenarios being developed into the model, and update documentation as necessary.	This F&O has been resolved. Miscellaneous hydrogen fires have been incorporated in the Fire PRA in the charging pump room fire areas where the hydrogen lines associated with VCT cover gas are routed.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	zones. Incorporation of this ignition frequency into the associated documentation will be incorporated in a future revision to the documentation.' Hydrogen fires are also being developed for H2 piping and valves in Compartments 82 and 87 (scenarios 82-P and 87-P). However, since these do not appear yet in the Fire Scenario Report, action is required. This finding is currently being addressed and appears to be resolved once the new H2 fires are included in the model and documentation is updated. (This F&O originated from SR FSS-A1)			
10-3	FSS-C4 requires severity factors to be independent of other factors. Fire severity factor as discussed in Section 7.1.2 for electrical cabinets is not developed or applied consistently with the NUREG/CR-6850 methods. This is developed from a supplemental report (ERIN report, Supplemental Fire PRA Methods, dated February 2010). This document was submitted to the EPRI Fire PRA Methods Review Panel. This review is not complete as of the date of this peer review. Using this method, fire propagation outside of the electrical cabinets is dependent on the nonsuppression probability. Therefore, some dependency exists in this data if used in conjunction with a non-suppression factor. Due to this derivation of the conditional probabilities for fire propagation outside of the cabinets, the conditional probabilities thus developed (and applied in the FRANC model) could potentially be non-	FSS-C4 FSS-D5 FSS-G1	Severity factor (panel split fraction) is used extensively in the Fire PRA. Use the severity factor method described in NUREG/CR-6850, or develop an accepted industry approach (presently being discussed by EPRI). Develop fire severity factors based on the likely HRR and location of overhead cables or location of equipment. For example, if cable is 7 feet overhead, the severity factor would be based on the minimum HRR that would damage the cable at that distance. Additionally, the growth time can be used in determining non-suppression time.	The FPRA quantification uses the panel factors consistent with the latest guidance from the EPRI Methods Review panel. A sensitivity study has been performed to address the impact of elimination of the credit for the panel factors. The results of this evaluation indicate that the delta CDF/LERF would exceed the Reg Guide 1.174 guidelines should these factors be completely eliminated (the 1E-5/1E-6 delta CDF/delta LERF limits would be exceeded but the conservatively calculated delta risk would be less than 2E-5/2E-6). Further refinements of this sensitivity evaluation are possible to reduce the calculated delta risk. Credit for additional Defense In Depth measures may be taken in areas of concern as necessary to compensate for the increased delta risk.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	conservative. The severity factors are developed using generic fire events data from the EPRI fire events database. Given the fire data duration and damage is a result of multiple factors (growth, suppression, severity, location, etc), and given the fire data often does not have sufficient information to make a reasonable determination of either the fire size or whether a fire propagated outside the cabinet, the severity factor used (panel split fraction) may not necessarily bound the conditions of the specific fire scenarios under analysis. (This F&O originated from SR FSS-C4)			
10-4	One situation was identified for which credit of fire wrap is taken in Compartment 96 for ignition source 3B04, which is a 480V load center. This fire wrap protects PB3319, PB3813, PB7022, and PB7521. The wrap appears as being credited in a HEAF scenario. No justification for crediting this wrap assuming mechanical damage and direct flame impingement from the HEAF is provided. Similar issue for 3B03 also in Compartment 96. Thermo-lag is also seen as credited in some scenarios, which would require justification due to issues with this particular type of cable barrier. (This F&O originated from SR FSS-C8)	FSS-C8	This finding is based on identification of credit for a wrap in Attachment A of the Fire Scenario Report, (Report 0493060006.004). Any credited fire wrap should be addressed and the wrap integrity should be established with respect to fire resistance, mechanical protection, and potential fire related exposure to which the wrap may be exposed (direct flame impingement, HEAF, etc.).	This F&O has been resolved. A qualitative assessment has been performed to assess the potential impact of this F&O. The hose stream test imposed on the fire barrier qualification subsequent to fire exposure is considered to provide a comparable level challenge to the thermolag barrier as would the HEAF force applied at the onset of fire exposure.
10-6	Treatment for transient fire damage to targets is measured from the compartment floor rather than the height of the transient fuel package that is typically considered. Discussion with FP&L during the review provided some basis for the damage height	FSS-D6	Many transient fire scenarios have been screened during detailed scenario analysis. The results of the FPRA are therefore potentially non-conservative for the analyzed detailed scenarios. The transient fires should be considered to	This F&O has been resolved. Supplemental walkdowns were performed to re-assess the treatment of transient fires. These walkdowns focused on two key attributes – the appropriateness of the selected HRR characterization and the

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	(indicating that transient fires above the floor will have an overall lower average surface HRR). However, the supplemental discussion was still considered inconsistent with past events and existing guidance on analysis of transient fires, and could lead to non-conservative estimates of transient fire damage to targets. Transient fire evaluations conducted as described in the Fire Scenario Report result in screening fire damage to targets that are located > 7.3' above the floor which is believed to be non-conservative for developed fires involving ordinary combustible fuel packages such as a trash can or trash bag. In response to this concern it was pointed out that the thermal plume component relies on empirical relationships between the source strength and the distance between the virtual origin of the fire and the target. The fire plume begins to entrain air at the lowest point of burning, which defines the base of the fire; normally at the floor. However this argument ignores the potential that a fire could begin burning at the top of a fuel package thus elevating its base. At a minimum, during the initial period of burning, damage temperatures generated by the fire would likewise be elevated. Over time the base of the fire may change due to collapse of the fuel package or burning away of the fuel, however the empirical model presented did not present sufficient basis for assuming that the base of the fire is at the floor for its entire duration. (This F&O originated from SR FSS-D6)		be above the floor level in the analysis.	location of the postulated fire scenarios. With respect to this specific F&O, the placement (elevation) of the assumed fire was based on the physical features of the location. The fires were not artificially elevated in the absence of a physical feature.
10-8	Ambient conditions are assumed in the	FSS-D4	Underestimating the ambient conditions	This F&O has been resolved.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	Generic Fire Modeling Treatment Report (prepared by Hughes). Ambient temperature is assumed to be 68°F for all calculations. No technical discussion or justification is provided in the Fire Scenario Report to substantiate that this is a reasonable value for the compartments where this was applied. (This F&O originated from SR FSS-D4)	FSS-H4	could result in non-conservative estimations of zones of influence and targets considered to be fire damaged. Assess areas where elevated ambient temperatures could be experienced and justify the acceptability of the models used. Otherwise, incorporate elevated ambient temperatures into the zone of influence calculations.	A qualitative assessment has been performed to assess the potential impact of this F&O. The sensitivity of the ZOI dimensions to the ambient temperature is relatively low as described in the original Hughes Generic Fire Modeling treatments report, in particular for IEEE-383 qualified/Thermoset cables. In the case of an initial ambient temperature of 35°C, the expected affect on the ZOI dimensions is within the measurement uncertainty in the field.
10-9	The 2010 peer review identified that 'Except for the MCR fire scenarios, no other fire scenario has used the Non-Suppression Probability (NSP) in PTN fire model at this time.' Since this review, FP&L has taken credit for suppression (both automatic and manual) in the Multi-Compartment/Hot Gas Layer evaluation. However, this evaluation does not include an assessment of the fire protection system effectiveness. Of particular concern is that fire detection and/or suppression timing (i.e., thermal response of the detector and/or sprinkler) was not calculated and subtracted from the time considered for manual suppression when using the FAQ-0050 process. In addition, fire detection reliabilities are not included in the assessment. If the detection system does not function as intended, the time to detection to initiate fire brigade response would be substantially longer. (This F&O originated from SR FSS-D8)	FSS-D8	The method currently employed could result in optimistic times for suppression activation or fire brigade response. Assess and document the effectiveness of suppression with respect to: System design complies with applicable codes and standards, and current fire protection engineering practice, The time available to suppress the fire prior to target damage, Specific features of physical analysis unit and fire scenario under analysis (e.g., pocketing effects, blockages that might impact plume behaviors or the "visibility" of the fire to detection and suppression systems, and suppression system coverage), and Suitability of the installed system given the nature of the fire source being analyzed.	A qualitative assessment has been performed to assess the potential impact of this F&O. The HGL and MCA analyses credit both automatic suppression system and fire brigade actions. In the context of the HGL and MCA, the fire brigade action of interest is fire control as that would terminate the possibility for HGL formation. However, the only readily available numeric credit is fire suppression credit. To reduce the conservatism introduced into the analysis, fire detection time is ignored for the HGL and MCA. The timeframe associated with detection and suppression is significantly less than the timeframe required to reach a hot gas layer temperature which would impact the HGL analysis.
10-11	The 2010 peer review identified that "fire scenario evaluation tools were developed based on the Generic Fire Modeling	FSS-C2 FSS-C3	The present analysis provides a bounding approach in most cases, since the 98th percentile fire heat release rate is used from	This F&O has been resolved. The recommended resolution involves the crediting of growth and decay in the

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	Treatments. These walkdown/evaluation tools are based on bounding fires that are assumed to cause target damage at a height above the base fire with the fire burning at peak intensity and without burnout times. Because these tools assume a fire burning at peak intensity and without burnout, this SR is considered met at CC I." Since the review, FP&L has stated that "The use of a panel split fraction to differentiate between fires impacting the panel and components with cables terminating at the panel versus panel fires impacting cables outside of the panel provides an equivalent and more useful two point fire model... The application of the two point treatment to individual fire scenarios is carried through to the MCA/HGL evaluation which addresses the impact of each scenario on MCA." The Panel Split fraction is developed from a supplemental report (ERIN report, Supplemental Fire PRA Methods, dated February 2010). This document was submitted to the EPRI Fire PRA Methods Review Panel. This review is not complete as of the date of this peer review. Use of the split fraction method is based on industry events rather than site specific fire ignition sources and target configurations and therefore, could result in non-conservative frequency estimates of target damage. (This F&O originated from SR FSS-C2)	FSS-G1	fire initiation without growth and burnout. However, use of the split fraction method is based on industry events rather than site specific fire ignition sources and target configurations. Therefore, this could result in non-conservative frequency estimates of target damage. Include fire growth and decay for risk significant fire scenarios.	modeling of the postulated fire. The existing analysis does not take credit for these variables. A review of the dominant fire scenarios found that the risk benefit that might be gained is minimal. Therefore, this refinement was not performed. The resulting categorization of the related SR is CC 1. Since the approach results in some conservatism being retained in the results, this CC is judged to be adequate for the NFPA 805 applications as the conservative bias would tend to result in the over-estimation of the risk metrics used for this application.
10-12	The 2010 peer review identified that "The PTN FPRA methodology generally does not include postulation or evaluation of smoke damage. Additional review shows that the smoke issues do not affect the FPRA results	FSS-D9	This appears to be a documentation issue, but FP&L should confirm that smoke damage has been considered and document accordingly. Confirm that smoke damage has been	This F&O has been resolved. An analysis of the impact of smoke damage has been completed and documented in the PTN FPRA Scenario Report.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	significantly. However, the FPRA does not include a qualitative evaluation of smoke damage to FPRA equipment." Since the 2010 review, FP&L stated, "Section 6.2 of the Scenario Report was added to address this concern." However, section 6.2 provides a high level discussion and methodology including the statement that "Exposure time plays a key role in the likelihood of failures from smoke. As a result, damage from short term smoke exposure will only result from severe conditions.... Instruments, control components and all high voltage powered components are exceptionally vulnerable to circuit bridging as a result of airborne smoke and deposited particulates." However, there is no documented discussion of the smoke damage assessment results, and none of the targets in the scenarios indicated smoke damage as the failure mode. NUREG/CR-6850 recommends considering smoke damage to banks of interconnected panels, and this should be considered. (This F&O originated from SR FSS-D9)		considered and document accordingly.	
10-13	A credit for incipient detection is taken for MCB fires (non-suppression probability of 0.02). There is no documentation to justify this value. Per discussion with FP&L the approach appears to be in agreement with FAQ-08-0046. The approach also does not use the NUREG/CR-6850 Appendix L factor for panels that credit incipient detection. Secondly, the incipient detection system is not yet installed, and therefore, the Fire PRA should be reviewed and updated as needed to reflect any differences between the	FSS-A6 FSS-D7 FSS-H7	This appears to be a documentation issue, but since the system is not yet installed, there could be an impact to the assumptions made within the Fire PRA. Document the basis for probability of non-suppression value assumed in analysis. When the incipient system is installed, the FPRA should be reviewed and updated accordingly.	This F&O has been resolved. The credit taken for incipient detection is consistent with that specified in FAQ-08-0046.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	assumed and as-built conditions of the system. (This F&O originated from SR FSS-A6)			
10-14	Beyond the Generic Fire Modeling Treatments, the Fire PRA did not include additional detailed fire modeling for most fire compartments. Note 4 (under FSS-A5 of the ASME Standard) states that "once a fire scenario has been 'selected,' this implies that the scenario will eventually be evaluated and/or quantified at a level of detail commensurate with the risk significance of the scenario." (This F&O originated from SR FSS-A5)	FSS-A5	For risk significant fire scenarios, detailed fire modeling should be performed to ensure you are not masking the "true risk significant fire areas". Without detailed fire modeling for significant fire scenarios, the results are conservative. Consider performing additional detailed fire modeling to provide "reasonable assurance that the fire risk contribution of each unscreened physical analysis unit can be characterized."	This F&O has been resolved. The current analysis is consistent with a Capability Category I analysis. This provides a degree of conservatism in the analysis which would also tend to over-estimate the change in risk which is reported for the NFPA 805 application. A review of the results of the application analyses indicates more rigorous analyses consistent with CC II or CC III would not alter the conclusions of the analyses.
10-15	PTN credits multiple suppression paths for MCA/HGL evaluation. However, the dependencies have not been evaluated and modeled. For example, fixed suppression and fire brigade response may both rely on a single detection system. (This F&O originated from SR FSS-C7)	FSS-C7 FSS-G1 FSS-H7	Lack of dependency analysis could lead to an optimistic estimate of suppression probability. When multiple suppression paths are credited, perform a review and address any dependencies between suppression and detection systems credited in the MCA/HGL calculation.	This F&O is resolved. A review of the credited suppression systems in the Multi-Compartment /Hot Gas Layer analysis has confirmed that no dependency exists between the suppression systems and detection systems. Detection in the zones with suppression systems is associated with an independent detection system.
10-16	Review of fire modeling in single compartments does not consider the addition of HRR from secondary combustibles. It is acknowledged that secondary combustibles were considered for the MCA/HGL evaluation. Fire spread and additional HRR due to the resulting cable tray fire and adjacent cabinets would increase the total fire size and the subsequent zone of influence. Compared to the NUREG/CR-6850 guidance for flame spread along PVC cable (flame spread = 0.9 mm/sec) the estimation	FSS-C1 FSS-D3 FSS-G1	Discounting of secondary combustibles when considering localized fire damage could lead to non-conservative results. Include secondary combustibles in the heat release rates used for zone of influence estimates.	This F&O has been resolved. Supplemental walkdowns have been performed to identify and address the potential for fire spread for scenarios where the non-383 cables are not protected by Flammastic material. The analysis has been updated to include these scenarios as appropriate.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	of HRR for the applied scenarios is non-conservative. Realistic estimation of the scenario HRR is necessary to ensure the full impact of the fire on exposed targets is presented and that the effects of a damaging HGL may also be estimated. FP&L has stated that walkdowns are in progress to include fire spread to cable trays and incorporate this into the fire scenarios. (This F&O originated from SR FSS-C1)			
10-17	The 2010 peer review identified that Attachment B of the Fire Scenario Report (Report 0493060006.004) generic fire modeling treatments do not account for the effects of hot gas layer (HGL) on the zones of influence. The limitation indicates that because HGL is not considered that these correlations should not be used in enclosed areas with small volumes where a significant HGL thickness may form. Because this relationship is not considered plume temperatures may be underestimated because it is assumed that ambient temperature air is being entrained into the plume, resulting in cooler plume temperatures, rather than heated air from the hot gas layer. Entrainment of heated air into the fire plume results in higher damage heights because the plume remains hotter at higher elevations. Since this review, FP&L states that "The impact of a hot gas layer on the zone of influence is evaluated for all fire zones/scenarios in the MCA/HGL evaluation." A review of this evaluation confirms that HGL effects on ZOI were in fact considered for the generic treatments; however, there is not sufficient	FSS-D1	Modifying the zone of influence to account for HGL effects could impact the defined target damage set. The generic treatments used in relatively small rooms should be scrutinized to ensure that any HGL interaction is considered and accounted for if found to be significant. The selection of which generic fire modeling treatment is used to define target damage for HGL effects on a scenario basis should be documented in a clear manner to facilitate updates and peer reviews.	This F&O has been resolved. The MCA/HGL evaluation has been modified to address the concern noted in the F&O. The potential for a larger zone of influence is addressed via new fire scenarios added to the fire PRA.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	documentation in Attachment A to the Fire Scenario Report to determine which zone of influence was applied to which scenario, and whether it was applied correctly to consider the effects of HGL. The Generic treatments include several iterations and combinations of variables, including opening percentage of the compartment. The fire scenario documentation at the time of this review did not provide sufficient information on opening percentage to confirm that the ZOI was applicable to the compartment. (This F&O originated from SR FSS-D1)			
10-18	In at least two cases, transient fire scenarios have not been included in the fire modeling for some compartments (e.g., fire compartments 67 and 68). Per discussion with FP&L the transients may have been excluded based on the dominance of the frequency of fixed scenarios. However, transients should only be excluded when precluded by design. Based on the size of these rooms, and the presence of secondary combustibles, transient fires could lead to fire growth and eventually HGL, and therefore should be analyzed. (This F&O originated from SR FSS-A1)	FSS-A1	The exclusion of transients in some compartments may lead to a non-conservative estimate of CDF and LERF. Include transient scenarios in all compartments where fire modeling has been employed.	This F&O has been resolved. Supplemental walkdowns were performed to re-assess the treatment of transient fires. These walkdowns focused on two key attributes – the appropriateness of the selected HRR characterization and the location of the postulated fire scenarios. The postulated location for the treatment of transient fires was based on where a transient ignition source might reasonably occur. The results of these walkdowns were incorporated into the FPRA analysis.
10-19	For fire modeling analysis of transient fires, FP&L implements a floor area weighting factor. However, the documentation does not include a graphical representation of the assumed transient locations and boundaries. It is therefore not possible to review (or update) transient fires. Also during review of transient weighting factors it appears to have been double counted in some compartments (e.g.,	FSS-H1	Lack of documentation on transient fire locations and boundaries will present a challenge for updates and peer reviews. Update documentation to include a graphical representation of transient fire locations and boundaries.	This F&O has been resolved. The specific instance noted in the F&O was corrected. In addition, supplemental walkdowns were performed to re-assess the overall treatment of transient fires. These walkdowns focused on two key attributes – the appropriateness of the selected HRR characterization and the location of the postulated fire scenarios. However, the documentation that was generated did not

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	compartment 63). Based on discussion with FP&L this was due to an error in the Excel based spreadsheet tool for transient frequency quantification. This appears to be an isolated case and will be corrected. (This F&O originated from SR FSS-H1)			specifically produce graphical representations. Instead, the information was incrementally enhanced to provide a spatial reference to a location with in the space. The need for special depiction of transient fire scenario locations will be addressed in conjunction with the development of procedures for post transition configuration control.
10-20	The fire modeling analysis of the Turbine Generator (T/G) fires is performed in accordance with Appendix O to NUREG/CR-6850. However, there is no discussion regarding the lack of analysis of the catastrophic T/G fire event, which should consider blade ejection, oil line rupture, and hydrogen explosion. Per discussion with FP&L, the catastrophic fire was discounted since the T/G is located outdoors. While this may not result in hot gas layer formation and structural collapse, a review of the guidance is warranted, and inclusion of this event frequency should as a minimum map to the loss of the T/G and if suppression fails, all equipment within the T/G structure. (This F&O originated from SR FSS-A1)	FSS-A1	Lack of consideration of the catastrophic T/G fire may lead to a non-conservative estimate of CDF and LERF. Perform a review of the catastrophic T/G fire in accordance with Appendix O to NUREG/CR-6850, or document the justification for excluding this event at PTN.	This F&O has been resolved. The analysis documentation has been updated to address catastrophic T/G fires that may lead to building collapse or other significant widespread damage. The results of this update did not identify any new risk significant contributors or insights.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
10-21	The supplemental generic Fire Model Treatments: Transient Ignition Source Strength includes an assumption for transient burnout of 12 minutes. This burnout time is based on an assumed fire loading and the 317kW heat release rate, and appears to be optimistic given the uncertainty in transient fire loading. The burnout is then used to develop a zone of influence for thermoplastic targets, based on the thermal response tables in Appendix H to NUREG/CR-6850 for thermoplastic cable at 260°C. Since this resultant vertical zone of influence is used to screen transient scenarios from impacting secondary targets higher than 7.3 feet from the floor, additional justification is needed to demonstrate that a 12 minute fire, and subsequent use of 260°C damage threshold is appropriate for screening purposes. Also noted is that Attachment B to the Fire Scenario Report zone of influence does not reflect the same values recommended by the Generic Fire Model Treatment. As an example, the differentiation between transient Severe and Non-Severe categories is not based on a 317kW fire. This appears to be a documentation issue only. (This F&O originated from SR FSS-C3)	FSS-C3 FSS-G1 FSS-H2	The current approach results in many transient fire scenarios being screened during detailed scenario analysis. The results of the FPRA are therefore potentially non-conservative for the analyzed detailed scenarios. Provide additional justification for the applied transient fire analysis as a screening approach. Consider increasing the burnout time and using the NUREG/CR-6850 recommended damage threshold to 205°C to bound uncertainties in fuel loading for transient fires.	This F&O has been resolved. Supplemental walkdowns were performed to re-assess the treatment of transient fires. These walkdowns did not identify any instances where an altering of the transient fire duration had any material impact on the HGL and MCA. The documentation has also been updated to address the criteria used for selecting the characteristic transient fire HRR. The approach is consistent with the recently issued guidance from the EPRI/NRC review panel. The results of these walkdowns were incorporated into the FPRA analysis. The twelve minute fire corresponds to the 317 kW fuel package only and represents ~ 35 lb of Class A material. Additional discussion is provided in Rev. 0 of Supplement 3 of the Hughes Generic Fire Modeling treatments that examines the fire durations and test durations of all NUREG/CR 6850 tests. It is shown that the method used to determine a 12 minute fire predicts or overestimates the fire duration in all cases and is therefore a sound approach.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
10-22	Per NUREG/CR-6850, appendix H, temperature sensitive equipment should be considered to fail at 65°C. Supplemental Generic Fire Model Treatments: Hot Gas Layer Tables includes new zone of influence and hot gas layer treatments for temperature sensitive equipment. However, per discussion with FP&L these have not been implemented in the fire scenarios. (This F&O originated from SR FSS-C6)	FSS-C6 FSS-G1	For smaller volume rooms, estimates of equipment damage may be non-conservative. Apply the appropriate hot gas layer and zone of influence for temperature sensitive equipment where applicable.	This F&O has been resolved. The consideration of sensitive electronics was addressed in a qualitative fashion in the Scenario Report.
10-23	The PTN FSS report 0493060006.004, Rev 2, section 6 discusses the damage criteria for thermal, smoke, and sensitive equipment. However, suppression effects do not appear to have been considered for the potential to damage equipment. (This F&O originated from SR FSS-C5)	FSS-C5	Equipment damaged by suppression activities may impact estimates of CDF and LERF for some scenarios. Perform an assessment of electrical equipment that may be vulnerable to water intrusion from suppression activities (or thermal shock from gaseous systems), and include any additional failed equipment, not already considered damaged by fire, in scenarios as appropriate.	This F&O has been resolved. The specific issue raised in the F&O is beyond the scope of the associated SR. In addition, no known consensus method exists for treatment. A qualitative assessment, based on other guidance for evaluation of potential impact of suppression effects was performed which indicated that no specific change in the analysis is needed.

ATTACHMENT 3 TO L-2012-354

REVISED TABLE V-3

Replaces Table V-3 of L-2012-092

Florida Power and Light Company
Turkey Point Nuclear Generating Station Units 3 and 4
License Amendment Request No. 216
Transition to 10 CFR 50.48(c) - NFPA 805
Performance-Based Standard for Fire Protection for
Light Water Reactor Electric Generating Plants, 2001 Edition

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
1-1	In numerous significant scenarios, the spurious operation probability is assumed to be 1.0 (true) for any events where spurious operation can occur. For example, in scenario 79ALA (one of the top 5 scenarios in unit 3), three events are set to true affecting the top cutsets; GMM0GE100 (MOVs 878A or B spuriously operate), MAVK3CV303A, OHTX3CNTRL. Capability Category I requires setting spurious operation probabilities to industry accepted values. It appears most of the events set to true would be either MOVs (0.33) or AOVs (0.62) or similar, and should not be set to true for significant fire scenarios. Analysis using the specific circuit configuration for each significant spurious operation would be required for CC II, and may lead to different results than the generic values, depending on the circuit design and cable affected.	CF-A1	The overall Fire PRA results appear to be greatly impacted by setting spurious operation probabilities to 1.0. Scenario 79ALA, which is presently 8E-06 would be reduced by at least an order of magnitude by assigning spurious operation probabilities to several events. Similarly, with 79AKA, and 79AJA also at 8E-06. Perform Circuit Failure Probability Analysis for significant spurious operations events, and modify the FRANC model to assign a Perform Circuit Failure Probability Analysis for significant spurious operations events, and modify the FRANC model to assign a probability for the event in the cutsets. In order to meet CCII, the spurious operation probability should be based on the specific circuit configuration for each significant spurious operation.	This F&O has been resolved. At the time of the Peer Review, the FPRA had only a very limited credit for fire induced spurious actuation probability. The specific instance identified in the F&O was updated. The resolution of this F&O also included a review of significant fire initiating events and additional credit for hot short induced spurious operation was applied in the analysis as appropriate. In all cases, the application of the spurious actuation factor is consistent with the guidance in NUREG/CR-6850 and FAQ 08-0047.
1-10	Transient Fires are postulated in all fire compartments, as listed in Appendix B and Table 3-6 of the Ignition Frequency Report. All factors affecting the fire frequency were assessed based upon a slightly modified NUREG/CR-6850 approach. However, the rankings that were provided do not appear to be consistent with the methods in NUREG/CR-6850, result in an underestimate for fire frequencies in some areas, and an over estimate in other areas. One F&O is provided on this SR. In particular: a) Areas were ranked as zero in maintenance, occupancy, or storage even though entrance to the areas is physically possible, b) Areas were ranked as 1, even though activities were not prohibited by plant procedure.	IGN-A9	Systematic issue. Appears as if numerous compartment transient frequencies were underestimated, while others would have been slightly over estimated as a result. Initial review was confirmed by walkdown of 5 areas. The ranking on all 5 areas did not appear to match the walkdown teams estimate for each area. Re-assess the transient fire rankings per the Guidance in NUREG/CR-6850. Confirm the rankings by walkdown of each area, taking into account the actual condition.	This F&O has been resolved. A sensitivity evaluation was performed that involved increasing the weighting factor for occupancy and storage from 'low' to 'medium' for all instances where such a condition could reasonably be expected to occur. The results of this sensitivity found that the impact on the calculated CDF for each unit was less than 1E-7. Given this small impact, the existing analysis is adequate for the application.

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	In areas where the room is sealed during operation (roof plugs), transients could have been left in the room prior to sealing, so the ranking on this factor should not be zero - per the 6850 guidance. During the walkdown, Compartments 70 and 71 both had permanently stored breaker grounding devices, with poly-covers, and 71 had a temporary transformer for the polar crane (operating). Both should be ranked as 'medium' for storage. Similarly, the cable room had storage of 3 temporary fans, cables and blankets and should be marked as medium for storage. This room also appears to include numerous components that will likely be worked on during power, (ranking moderate for non-hot work), and numerous people were present during our limited walkdown. Compartment 88, an open area in front of the switchgear room, had numerous combustibles stored and located, and should probably be marked as medium or high (presently marked as low). Both area 85 and 88 have frequent foot traffic, and should be marked as medium for occupancy. 85 appears as if it should be moderate for storage (no controls). Similarly; no controls appear to be in place for 116. The above are samples of identified issues, based on our limited walkdown. It appears there will be similar issues with other areas in the plant. We looked at other areas adjacent to the areas we were in (compartments 87, 84, etc), and expect similar problems with the present rankings. (This F&O originated from SR IGN-A9)			
1-17	Table 3-2 includes uncertainty values (EF) for prior and posterior values. However, Error Factors are not propagated to the	IGN-A10 QU-E3	Systematic Issue. Estimate EFs for significant fire compartments. ESTIMATE the uncertainty	This F&O has been resolved. The quantitative uncertainty analysis was prepared subsequent to the peer review.

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	compartment specific ignition frequencies. The other parameters, such as conditional failure probabilities for circuit failures, do not have uncertainty intervals. The lack of uncertainty intervals would not generate meaningful uncertainty interval of the CDF/LERF results. (This F&O originated from SR IGN-A10)	UNC-A1 UNC-A2	interval of the CDF results. ESTIMATE the uncertainty intervals associated with parameter uncertainties (DA-D3, HR-D6, HR-G8, IE-C15), taking into account the state-of-knowledge correlation.	A parametric uncertainty evaluation that considers fire ignition frequency as well as other variables was performed that uses a Monte Carlo sampling process. The results of the analysis showed a mean that was slighter higher than the calculated results which was expected.
1-18	During walkdowns, several key areas appeared to have ignition sources not included on the ISDS. For example, in the cable spreading room, 2 transformers were in the compartment (3X033 - 75KVA, 3X130 - 45KVA), both within the screening distance of targets. Also in the compartment is CP-600 spectralink cabinet, an open cabinet, the RCP Vibration Monitoring Cabinet, 4P21 and 4P09 instrument AC panel. Note; we did not do a 100% review of the CS room, so additional cabinets may be missing. See also F&O 1-19. (This F&O originated from SR IGN-A7)	IGN-A7	Appears to be missing components in numerous areas, based on a limited sampling during walkdown. Perform a re-verification of the ISDS for significant fire areas in the FPRA. Add missing components to each ISDS, where applicable.	This F&O has been resolved. The specific instances identified in the F&O were reviewed and the analysis updated accordingly. In addition, the supplemental walkdowns that were performed as part of ongoing analysis refinements efforts for the significant fire areas did not identify any other omissions.
1-19	It appears the Ignition Source Counting did not count Lighting Panels or other similar panels. For example, there were at least 8 lighting panels in the cable spreading room that were not on the ISDS. Additional similar panels are located in most electrical rooms we walked down, such as the switchgear rooms and other electrical rooms. Based on our walkdowns, many of the lighting panels should be included in the ISDS, based on guidance in 6850 and the subsequent FAQ on sealed cabinets. A review of the generic guidance provided for ignition counting did list the screening of small, wall mounted cabinets (sealed). However, the lighting panels do not appear to meet the criteria	IGN-A7	Appears to be a systematic issue in the FPRA. Include unsealed lighting panels and similar electrical cabinets in the ISDS as potential ignition sources.	This F&O has been resolved. A re-assessment of the lighting panels was performed. The re-assessment focused on the need for treatment as a fire initiating event. No effort was undertaken to alter the population of electrical cabinets considered in the fire frequency development. Therefore, the existing values potentially have a conservative bias. The assessment did not identify any instances were explicit treatment as a fire initiating event was needed.

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	listed in the procedure (not sealed, numerous switches/breakers), etc. Many of the cabinets are located close to cable trays or other intervening combustibles, so a small fire could result in a larger fire due to spreading. (This F&O originated from SR IGN-A7)			
1-2	Section 4.1of the Component Selection Report mentions: "Since the FPRA quantification calculates a fire CCDP and the initiating event frequency for each zone is based on the fire ignition frequency, the initiating event faults are not required to be used for FPRA quantification." Fault tree initiating events were not impacted by the component mapping, and are therefore not changed by fire damage. As a result, equipment associated with Fault Tree initiating events were not identified as components potentially causing a fire-induced initiating event. 163 events are screened in Table A of the Equipment Selection Analysis based on being associated a fault tree initiating event. Most are modeled in other system models. However, Several were found to not be modeled in the rest of the model: CPSD3PC611, CPSD4PC611 and 2 related failures. A few others (Cooling units) do not appear to be modeled elsewhere. (This F&O originated from SR ES-A1)	AS-B1 ES-A1 ES-A3 ES-A4 FQ-A2	The significance of not identifying components as causing initiating events is basically that the assumed model impact is accurate by modeling a reactor trip with a subsequent failure of the function, rather than modeling the initiating event itself. In some cases, this impact is a matter of timing for operator actions. In the case of this FPRA, the HEPs have been conservatively set assuming a loss of MFW as a starting point. However, the fault tree initiating events include loss of CCW, loss of HVAC and others. It is not clear that the present model accurately determines CDF/LERF results for systems impacted which may cause a complicated reactor trip (special initiating event). Modify FPRA to model the fire impact to Fault Tree Initiating Events, and analyze the FPRA assuming a fault tree initiating event for those areas where the initiating event can occur.	This F&O has been resolved. The FPRA assumes each postulated fire results in at least a reactor trip. Logic is included in the model so that appropriate event tree is quantified if the fire induces a different type of event (event tree). The overall structure of the FPRA model was reviewed to address the specific item identified in the F&O and to confirm appropriateness of overall treatment. The only change that was required was related to biasing the application of recovery actions so that they were based on an assumed loss of MFW.
1-25	There does not appear to be a review of non-significant cutsets in the PRA documentation. (This F&O originated from SR QU-D5)	FQ-E1 QU-D5	Requirement of QU-D5 as called for by FQ-E1 Perform a review of non-significant cutsets and accident sequences, as discussed in QU-D5 for the FPRA.	This F&O has been resolved. Review of non-significant cutsets performed and documented.

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
1-27	Significant fire compartment contributors to LERF are documented in Appendix C of the summary report. However, the contribution from plant damage states is not provided or the contributors from LEB SRs. Sources of uncertainty, including sensitivity analysis performed, are not evaluated for LERF. (This F&O originated from SR LE-F1)	FQ-E1 LE-F1 LE-F2 LE-F3 UNC-A1	Requirement of LE-F1, F3. Document the contributors to LERF based on the requirements of LE-F1 of the internal events section of the standard, as required by FE-Q1. Document the Sources of uncertainty, including sensitivity analysis performed for CDF in Appendix D of the Summary Report.	This F&O has been resolved. Added LERF top cutsets and importances run as well as sensitivity analysis in Summary Report. Also performed and documented the uncertainty evaluation for LERF.
1-3	The internal events PRA model has numerous locations in the model where the specific initiating event results in a model impact. For example, under gate U3QT07; initiating events that can cause a PORV or SRV to lift are ANDed with the failure to reclose the PORV or SRV. In this case, special initiator %ZZIP6U3 is identified as an initiating event that will cause a PORV lift, along with %ZZT2U3. Equipment that can cause each are not mapped or modeled in the Fire PRA. As a result of a previous review, the modeling of Feed-and-Bleed was changed to assume a loss of feedwater (low SG level) occurred. The shorter time results in a higher HEP for feed-and-bleed in all scenarios, regardless of whether a loss of FW occurred. However, numerous other modeling impacts can occur, that are not modeled. Under gate I62115, logic for HVAC unit 3S230 failure to start is included when a Loss of offsite power would occur. This logic is applicable only for when a LOOP occurs, and not applicable for non-LOOP events. This type of logic is contained throughout the internal events PRA modeling. Another example is under gate E1104A, where loss of DC power results in lockout relay failures. There are many other examples throughout the PRA. Additionally, the identification of the specific initiating	AS-B1 ES-A1 ES-A3 ES-A4 FQ-A2	As a result of assuming a reactor trip and not mapping components/equipment to modeled internal initiating events; the risk can be under-estimated. In this case, since the general approach used is systematic, this problem is difficult to determine without significant effort to combine the impact of each modeled impact. In most cases, the modeling results in non-conservatism in the result. However, the fix for feed-and-bleed resulted in conservatism for most of the scenarios where FW is not initially lost. In either case; whether modeled conservatively or nonconservatively, the standard requirements in this area are to model the impact of the FPRA accurately. Map all identified internal events initiating events to the specific components that can cause the event, and modify the FPRA to determine the CCDP based on the fire-induced initiating event that results.	This F&O has been resolved. The issues and concerns identified in the F&O related to the fire-induced initiating events were reviewed. The review found several instances where a change to the modeling was required to allow the existing treatment methodology to be retained. The review did not identify any instances where specific fire initiating event logic beyond that already in the model was needed.

Table V-3
DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	event for quantification was not performed per the requirements of FQ-A2. For quantification, the modeled initiating event is assumed to be a reactor trip in all cases. This treatment does not meet the intent of SR FQ-A2, where the quantified model should encompass the risk contribution from all applicable initiating events.			
1-34	No evidence was found that supported confirmation of conformance of fire rated barrier segments to applicable test standards. Additionally, the effectiveness, reliability, and availability of any passive fire barrier feature credited does not appear to be performed. (This F&O originated from SR FSS-G4)	FSS-G4	Systematic issue. Provide the documentation that supports confirmation of conformance of fire rated barrier segments to applicable test standards, and the barrier effectiveness, reliability and availability.	This F&O has been resolved. The treatment of barriers in the MCA is based on information in the Fire Hazards Analysis and supplemented with walkdown observations. The analysis documentation was updated to provide this information. The MCA was modified as needed to incorporate the results of this effort.
1-37	Significant contributors to Fire PRA results are included in Section 4.3 and the appendices of the Summary Report. This includes a list of operator actions that contribute to CDF. However, no importance measures are provided for CDF or LERF. (This F&O originated from SR QU-D7)	FQ-E1 QU-D7	Requirement of QU-D7 Provide importance measures as required by QU-D7 and FQ-E1	This F&O has been resolved. Importance measures for CDF and LERF have been determined and added to the Summary Report.
1-38	Results of the Fire PRA did not include the following: (e) the total plant CDF and contributions from the different initiating events and accident classes (i) the uncertainty distribution for the total CDF (j) importance measure results (l) asymmetries in quantitative modeling to provide application users the necessary understanding of the reasons such asymmetries are present in the model (m) the process used to illustrate the computer code(s) used to perform the quantification will yield correct results process. Some of these issues are listed in other F&Os.	FQ-F1 QU-F2 UNC-A2	Systematic Issue Provide required documentation per QU-F2 and FQ-F1.	This F&O has been resolved. The documentation of the analysis results has been expanded to include the information noted in the F&O. These results were also reviewed for reasonableness and no issues or concerns were identified.

Table V-3
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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	However, item e(accident classes), l (asymmetries) and m (validation of computer codes) is not covered elsewhere. (This F&O originated from SR QU-F2)			
1-40	The quantification of significant basic events, cutsets and accident sequences is not provided. Additionally, the definitions used for significant basic event, significant cutset, and significant accident sequence are not provided. (This F&O originated from SR QU-F6)	FQ-F1 QU-F6 UNC-A2	Requirement of QU-F6 and FQ-F1. Provide the quantification of significant basic events, cutsets and accident sequences, and the definition used for significant basic event, significant cutset, and significant accident sequence	This F&O has been resolved. The Summary Report has been updated to provide the importance measures of the model basic events, top 90% of all plant cutsets, and a review of the scenarios contributing more than 1% of the total risk.
2-1	The plant partitioning task does not include detailed discussion with respect to this SR PP-B7. The manholes are modeled as separate fire compartments. However, no walkdown for these manholes has been performed. No justification for the modeling approach has been provided except being briefly mentioned in Section 2.2 of Report PTN-PSA-7.01 Revision 2. Walkdowns were also not documented for spatial separation or other boundaries that are not fire rated but was credited in the FPRA. (This F&O originated from SR PP-B7)	PP-B1 PP-B7	Section 3.11.5 of FHA states that man-hole covers are justified as three-hour fire boundary although they need not to be specifically rated as fire barrier. Therefore, the modeling of manhole as fire compartments is considered acceptable although no walkdown has been performed for the manholes. Other credited barriers are discussed in PP-B2-4 above Consider adding justification for the modeling of manholes according to the requirements in SR PP-B7. Consider performing walkdown for manholes with significant risk contribution. Also, document walkdowns on all credited, nonrated barriers credited in the FPRA.	This F&O has been resolved. Walkdowns of fire zone boundaries were performed and documented in support of a review of the Fire Hazards Analysis update. Additional discussion regarding the basis for the ignition frequency for the manholes was added to the documentation.
2-44	Uncertainty Evaluations (Sensitivity studies) should be performed for both CDF and LERF model for Units 3 and 4 since the model uncertainties may have different impact to specific model due to differences in plant designs, FPRA model details, and etc. (This F&O originated from SR QU-E4)	QU-E4 UNC-A1 UNC-A2	QU-E4 requirements. Perform sensitivity studies should be performed for both CDF and LERF model for Units 3 and 4.	This F&O has been resolved. Parametric uncertainty and sensitivity has been performed for CDF and LERF for both Units. The results do not indicate any change in the selection of parameters or assumptions are necessary.
3-2	Credit for fire compartment separation via non-rated construction was commonly	PP-B1	As noted in the description non-fire rated construction is credited for separation of fire	This F&O has been resolved.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	noted, e.g., according to the FHA the walls of fire compartment 034 are not fire rated and they provide separation from fire compartments 036, 035, & 058. Separation of FC 034 from the surrounding FCs is one of many examples where non-fire rated construction is credited for separation. Use of this level of separation is acceptable provided the separation is justified. However, the justification does not appear to be provided for the FPRA. (This F&O originated from SR PP-B2)	PP-B2	compartments, however no Fire PRA specific justification for the validity of the fire compartment is provided. This is considered a systematic issue for the FPRA. Provide FPRA specific justification of the construction separating fire compartments, where the barriers will substantially contain the fire.	The configuration and construction of non-fire rated barriers was confirmed using a combination of information in the Fire Hazards Analysis and supplemental plant walkdowns. The anlaysis and related documentation was updated to provide this information.
3-3	A few cases of special separation are credited in the PB&P. Most notable are separation of Fire Compartments 058 and 037 and 004 and 010. The FHA notes in the write-up for fire zone 004: 'There is a partial height concrete wall on the South side of this room with a full height opening to Fire Zone 10'. No justification is provided for this separation, hence it is not clear that the credited separation may be expected to contain the effects of a fire. Accordingly the effect of a fire beyond the identified fire compartment boundary may occur. While this effect would be expected to be identified through performance of the multicompartment analysis the level of documentation provided in support of the PB&P does not satisfy the standard requirements. (This F&O originated from SR PP-B3)	PP-B1 PP-B3	Two instances were identified where spatial separation is credited for the separation of fire compartments. No justification is provided for this separation. Provide justification for the use of spatial separation in the FPRA. If not justified, combine the compartments in the FPRA.	This F&O has been resolved. Openings between fire zones were addressed with respect to targets on the other side of an opening which are within the zone of influence of an ignition source. Targets were evaluated for fire damage regardless of the zone in which they were located. The multi-compartment analysis considered the volume associated with adjacent zones with openings between the zones in evaluating the potential for hot gas layer formation.
3-4	The PTN self assessment points out that the FHA documents the use of active fire barrier features as necessary for fire zone separation. However in cases where fire compartment separation is provided by unrated barriers there may be active	PP-B1 PP-B5	As discussed in the description justification/discussion is not provided for crediting active fire protection features in barriers that are identified as non-fire rated structures. It is not clear if active features such as fire dampers exist in these barrier	This F&O has been resolved. The walkdowns that were performed did not observe any open fire doors (active features). The documentation for the fire scenario development process was updated to provide the criteria and methodology that

Table V-3
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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	features that are not identified by the FHA but credited by the Fire PRA. In such cases active fire barrier features may be unknowingly credited for separation but not adequately maintained by the fire protection program. Because these elements were not purposely identified within the development of the Fire PRA it is unknown if the Fire Protection Program identifies all of the necessary features. Because the Fire PRA does not formally define and justify these features this element is judged not met. (This F&O originated from SR PP-B5)		segments because the FHA does not rely on them for separation. Documentation should be provided that clearly establishes what features are credited in such barrier segments and why makes them acceptable. Given the large number of barriers credited in the FPRA that are discussed in the FHA, but without discussion of active elements, there are likely a number of undocumented active elements in these barriers. Determine the active fire barriers on barriers credited in the FHA (not SSA), and provide justification for any active elements credited in the FPRA.	were used.
3-5	According to the Section 3.13 of the PTN FPRA Summary Report the effect of an earthquake on ignition source scenarios is discussed in the IPEEE and Potential Fire Related Vulnerabilities self assessment. Review of the Potential Fire Related Vulnerabilities self assessment did not reveal an analysis that specifically addresses generation of fire ignition source scenarios which could result from an earthquake, nor does this assessment address the potential risk significance of these scenarios. This assessment does identify fire vulnerabilities in terms of fuels, ignition sources, and oxidizers however these discussions are not specific to seismic events nor do they include evaluation of special ignition scenarios that may arise from an earthquake. (This F&O originated from SR SF-A1)	SF-A1	As discussed in the description no discussion was found that specifically addresses fire ignition source scenarios that may arise from an earthquake. Also, since these scenarios are not identified a qualitative assessment of their risk significance is not included. The analysis provided in the Potential Fire Related Vulnerabilities self assessment should be expanded to look for unique ignition source scenarios that may arise from an earthquake and a discussion of the risk significance of these scenarios should be qualitatively assessed.	This F&O has been resolved. The low seismic spectra applicable to the Turkey Point site have been validated via the IPEEE with respect to the potential for causing unique fire scenarios. Their potential for causing damage to pipes or tanks containing combustible gases or liquids or to initiation of electrical fires is considered negligible.
3-7	According to report PTN-PSA-7.01 The generic fire ignition frequencies provided in NUREG/CR-6850 were used to establish the fire ignition frequencies for PTN. While the	IGN-A1 IGN-B4	As discussed in the description the revised generic fire frequencies contained in FAQ 08-048 are not incorporated into the PTN fire frequencies nor is there justification for	This F&O has been resolved. The guidance provided in FAQ 08-0048 requires the use of the original

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	use of these values is not entirely incorrect, this SR requires the use of 'current nuclear power industry event history that includes power plants of similar type, characteristics, and vintage.' Accordingly this requirement requires use of the EPRI revised generic fire frequency values included in FAQ 08-048 or justification for its exclusion. Also, it appears that FAQs 07-35 (bus ducts) and 08-44 (MFW pump fires) were not incorporated into the FPRA. (This F&O originated from SR IGN-A1)		their exclusion. This SR requires use of the current nuclear power industry event history or justification for data exclusion. Because the fire ignition frequency methodology does not address the data contained in FAQ 08-048 this SR is considered not met. Use of the NUREG/CR-6850 values results in a conservative estimate of CDF/LERF. FAQ 35 can have significant impact on fires in the area of bus ducts. However, it is not apparent if this is important for Turkey Point. FAQ 44 can result in a lower MFW large fire frequency. The fire ignition frequency information contained in FAQ 08-048 should be incorporated into the PTN fire ignition frequencies. Additional FAQs should also be incorporated into the FPRA.	NUREG/CR_6850 fire frequency values as a sensitivity study. Rather than perform two analyses, the PTN analysis was developed using those original values for the NFPA 805 application. The application of the non-segregated bus duct information from FAQ 07-0035 is not applicable as the plant does not use non-segregated bus duct. The connections to the station transformers are made using cables. FAQ 08-0044 was also not needed and the conservatism associated with original method did not adversely affect the results.
3-8	Review of the plant-specific fire events for outlier experience indicates that some events may have been considered outliers or unknown if the selection criteria had considered treatment of fires that are extinguished prior to full development as potentially challenging. Several cases identified in Appendix A of the Fire Ignition Frequency Development Report, PTN-PSA-7.01 may have developed into challenging fires had they not been discovered and extinguished early in their development. Fires 7, 8, 9, 21, 22, 27, 30, 31 appear to be potentially challenging fires (or unknown). See also the previous assessment from 9-09. (This F&O originated from SR IGN-A4	IGN-A4	As discussed in the description review of the fires identified in Appendix A reveals fires that may have become challenging had they not been extinguished early. The selection criteria for challenging fires contained in Appendix A is based on section C.3.3.1 of NUREG/CR 6850, however the criteria contained in C.3.3.2 is not included; had the criteria of C.3.3.2 been included more fires may have been selected as challenging or identified as unknown. The criteria for selecting challenging fires in Appendix A of the Fire Ignition Frequency Development Report, PTN-PSA-7.01 should be revised to include the criteria contained in C.3.3.2 of CR/NUREG 6850 and the fire events should be revisited to determine if additional fires should be selected.	This F&O has been resolved. The scope of plant specific fire events were re-assessed with an expanded group of plant personnel with particular focus on the subjective criteria from C.3.3.2. The results of the re-assessment affirmed the previous dispositions.

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DISPOSITION OF 2010 PTN FIRE PRA PEER REVIEW 'FINDING' F&Os

Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
4-17	Per summary report, Task 9 is fulfilled with the NISYS SSD database, "PTN NFPA 805 Database.mdb". This database has been significantly expanded for the NFPA 805 tasks. A sample circuit analysis worksheet (e.g., for component 20ASB/G3) has signatures at the bottom, which were not populated yet. The NISYS circuit analysis is an Appendix R type circuit analysis and does not identify the circuit failure modes and address likelihood of failure. Failures of the required cables identified are assumed to have a probability of 1.0 unless specifically modified in the ALTEREDEVENTS table of the FRANC model. The treatment of the circuit analysis seems to be bounding (i.e., the likelihood was not part of the analysis). Although Appendix D of the fire scenario report states the bases for the altered FRANC event probabilities, it seems that there is no linking between the altered probabilities and the circuit analysis package. The majority of the altered events are based on operator manual actions while some based on the simple spurious actuation probabilities from NUREG/CR-6850, which were based on specific evaluation (with no basis provided in the FRANC database), but do not directly linked to any specific circuit analysis worksheet. Since the "basis" column of the Altered event table in the FSS report does not appear to include sufficient documentation to allow review/peer review of the results and the NISYS database does not include the analysis, the analysis (not the results) has not been documented. The evaluation and documentation of the review of the fire-induced circuit failure modes and the assignment of the appropriate industry-	CF-B1	Incomplete evaluation and document for circuit failure. The NISYS DB can include identification of when spurious operation may occur, but does not provide the circuit analysis or circuit failure probability analysis needed to support the FPRA. Provide a documented basis, and detailed circuit analysis for any spurious operation probability used in the FPRA per Tasks 9 and 10 of NUREG/CR-6850 (or equivalent).	This F&O has been resolved. Circuit failure probability was considered for high risk scenarios and only in cases where doing so would result in a reduction in total risk. Additional details with respect to circuit configuration and raceway type have been added to the altered events table.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	wide generic values to their conditional failure probabilities for risk-significant contributors based on the specific circuit configuration under consideration should be included in the circuit failure report for Tasks 9 and 10. (This F&O originated from SR CF-B1)			
5-11	Review of Turkey Point NISYS NFPA 805 Compliance Assessment Database within the Cable Routing and Respective Equipment table, it was noticed that the Spurious ESFAS signal "Spurious/ESFAS/Lacks/Analysis" have total of 56 respective components impacted. Unit 3 Train A SI signal from the Control Room "3MRASI/3C06/3QR43/006" have total of 29 respective components impacted, Unit 3 Train B SI signal from the Control Room "3MRBSI/3C06/3QR45/006" have total of 28 respective components impacted, Unit 4 also have similar components impacted. The concern is the potential mismatch between FPRA and the SSA component lists. (This F&O originated from SR ES-B1)	ES-B1	The deviation between the ESFAS components actuation and Control Room SI components actuation should be disposition and reconcile, to ensure Fire Safe Shutdown / Appendix R equipment are appropriately credited in the Fire PRA. Reconcile the FPRA component list with the SSA component list for equipment impacted by an SI signal	This F&O has been resolved. The circuit analysis process used for the project has been confirmed to be consistent with the latest industry guidance (NEI 00-01). In addition, the asymmetry was discussed with plant staff and confirmed to be reflective of the actual plant design and configuration.
5-13	Turkey Point FPRA Summary Report NUREG/CR-6850 Task 16 Report No. 049306006.005 Rev. 1 Tables A-1, A-2, B-1 and B-2 documented the Units 3 & 4 Fire PRA quantification Results for both CDF and LERF for all fire scenarios that were quantified. Scenario 096-A was randomly picked review for both Units 3 & 4. The CDF/LERF results are consistent between the Summary Report and Zone Scenarios in database files, Unit 3 CDF "PTNFIRE_W_LERF_MH_ESF.mdb", Unit 3 LERF "PTNFIRE_W_LERF_MH_ESF.mdb", Unit 4 CDF	FQ-A3	It appears that there is inconsistent basic event mapping between the database files. A sensitivity run was performed by copying the U4 events to the U3 tables, and re-evaluated U3 CDF. The results are the top scenario in 96 dropped from 4.5E-05 to 1E-06. Based on this, the error appears to be significant. Need to ensure that the altered events table is correctly developed for both U3 and U4 for the CDF and LERF quantification.	This F&O has been resolved. The identified data differences were reviewed and confirmed to be reflective of the design and layout of the units. Additional comparison of the quantification results between the two units was also performed to ensure that any significant differences in results are consistent with the actual unit differences. Various asymmetries in the plant layout were identified.

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	"U4PTNFIRE_W_LERF_MH_ESF.mdb", and Unit 4 LERF U4PTNFIRE_W_LERF_MH_ESF.mdb". However, reviewing the Altered Events table in each database files shows inconsistent basic events impacted between Unit 3 and 4. Unit 3 have no basic event impacted, while Unit 4 have 9 basic events listed. (This F&O originated from SR FQ-A3)			
6-10	The altered events table in the FSS report includes several instances where a single basic event combines a hot short spurious operation likelihood with an HEP to recover the spurious operation. For example, ORZR30455C represents a combination of spurious opening of a PORV and operator human error probability to close the PORV. Supporting requirement FQ-A1 addresses the need to translate specific failure modes into basic events. Embedding an HEP with a spurious operation likelihood bypasses this requirement, and this approach is not consistent with the level of detail modeled elsewhere in the PRA. Also, the approach prevents the ability to address the state of knowledge correlation. (This F&O originated from SR FQ-A1)	FQ-A1 FQ-A4 HRA-E1 HR-I1 HR-I2 QU-A3	This approach is not consistent with the level of detail modeled elsewhere in the PRA. Translate specific failure modes into basic events and avoid combining disparate failure modes into combined basic events.	This F&O has been resolved. The methodology and the analysis has been updated to eliminate the use of this approach. The use of altered events for spurious probability is used only as required and a singular value.
6-20	The parametric uncertainty associated with conditional circuit failure probabilities are not evaluated and are not incorporated into the model. (This F&O originated from SR CF-A2)	CF-A2 UNC-A2	Step not performed Step not performed	This F&O has been resolved., Parametric uncertainty has been performed for CDF and LERF for each unit's FPRA.
6-9	The parametric uncertainty analysis as discussed in QU-E3 (estimate of uncertainty intervals, etc.) is not performed. Also, the "state-of- knowledge" correlation between	FQ-A4 QU-A3	Step not performed. Perform the FPRA uncertainty analysis, including estimates of uncertainty bounds,	This F&O has been resolved., Parametric uncertainty has been performed for CDF and LERF for each unit's FPRA.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	fire-specific event probabilities (e.g., suppression system unavailabilities, fire ignition frequencies, hot short conditional probabilities, etc.) hasn't yet been applied. (This F&O originated from SR QU-A3)		per the requirements of QU-A and QU-E. When performing parametric uncertainty calculations, ensure uncertainty intervals for event probabilities utilized by the FPRA are correlated when significant.	
7-1	A review of the quantification results for selected compartments involving fire-induced safety injection actuation and fire-induced opening of atmospheric dump valves was performed to verify that the modeling was consistent with the internal events PRA treatment of similar initiating events. This review revealed that duplicate cutsets were being introduced by the manner in which the new logic for capturing the fire-induced initiating events was linked into the fault tree. For example, a review of cutsets for zone 098-A showed that the top two cutsets were identical except that one used a version of the HFE for alignment of bleed and feed based on reactor trip occurring with SG low level and the other used a version of the HFE based on timing associated with trip with nominal SG level. Similar issues were identified in the cutsets for zone 091-ETL. As noted in the 2010 peer review in F&O 1-4, there are also inconsistencies in modeling of the fire-induced small LOCA when compared to the internal events small LOCA initiating event. PTN explains that this was due to circular logic issues, and a sensitivity case shows this to be a non-significant issue. However, it is not clear that the circular logic issue could not be resolved and that all potential impacts of the modeling approach taken are understood. (This F&O originated from SR PRM-A3)	PRM-A3 PRM-A4 PRM-B5 PRM-B9	The method in which the fire-induced spurious safety injection actuation and spurious opening of atmospheric dump valve initiating events were linked into the fault tree produces conservative results that could impact the determination of significant contributors to fire-induced risk. Review the quantification results for the fire-induced initiating events to verify that the results are consistent with the comparable internal events. Review the mapping of the fire-induced initiating event impacts to ensure that they are consistent with the comparable internal events initiator, that appropriate differences due to the considerations of the fire PRA are incorporated (e.g., application of bounding timing for HEPs to capture uncertainty in the sequence of fire-induced failures), or that deviations in the modeling are documented and justified. Review the application of the feed and bleed HFE to ensure the appropriate timing is used during the fire quantification. Since the MFW pumps are assumed failed for all fire areas, the most appropriate value may be the HEP based on timing assuming the trip occurs with low level in the SGs. Review treatment of any additional HEPs with event-specific timing assumptions to ensure that the appropriate values are used in the fire quantification.	This F&O has been resolved. A review of the model was performed and revision made to address and resolve the issue identified in the F&O. Additional reviews were performed as part of the overall results and cutset reviews and no additional instances were identified.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
7-3	The current model uses the LERF model for the PTN revision 9 model (PTN-BJFR-99-010, Rev. 1) and maps appropriate equipment impacts into the system models used to model LERF. No new accident progressions beyond the onset of core damage were identified for the fire PRA. However, there is no documentation that a specific review of the accident progressions leading to LERF was conducted to identify whether new considerations should be addressed in the fire PRA. In addition, effects on PDS mapping due to fire-induced failures may not be appropriately captured. For example, RWST diversion of the RWST to the containment sump is modeled as a failure of HHSI which would normally go to a dry containment PDS. However, the actual PDS should be one for wet containment. While this is a late containment failure concern rather than a concern for LERF, there may be similar fire-induced failures that could affect the mapping of LERF accident progressions. (This F&O originated from SR PRM-B14)	PRM-B14	It cannot be determined from the existing documentation that an assessment was performed to identify 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. Document an assessment to determine if there are potential fire-induced LERF mechanisms not captured by the internal events accident progression models. If none are identified, document the basis of that conclusion.	This F&O has been resolved. A review of the mapping of Level 1 sequences to the plant damage states in the LERF model was reviewed. No new accident progressions that required modification of the LERF model were identified.
7-6	The new fire-specific safe shutdown actions which are credited in the final Fire PRA will be proposed to be added to the plant fire response procedures. These human actions are included in the ALTEREDEVENTS table of the FRANC model using component basic events as surrogate. However, the safe shutdown actions modeled in the FPRA are not currently consistent with those specified in the plant fire response procedures, there is no documented assessment of the cues required to initiate the actions, no training	HR-E1 HR-E2 HR-E3 HR-E4 HR-H2 HR-I1 HR-I2 HR-I3 HRA-A2 HRA-A4	Final post-fire safe shutdown actions have not been defined and appropriate procedures revised to include the actions to be credited in the Fire PRA. Complete the identification of new fire-specific safe shutdown actions which are credited in the final Fire PRA and evaluate and document the HEPs consistent with processes used for internal events HEPs. Include consideration of fire effects on the operator action, availability of cues, availability of time to complete the action, feasibility of the credited actions given a fire,	This F&O has not been resolved. The FPRA includes various actions that are being included as required plant changes in the NFPA 805 LAR. The development and implementation of related procedures has not yet been initiated as it is part of the overall integrated process associated with transition to an NFPA 805 license basis.

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	has been provided to operators on the new fire-specific actions, no operator reviews or talk-throughs of the credited actions has been documented, and the applicable performance shaping factors have not been considered, including time available for the action. This F&O supersedes 2010 Peer Review F&Os 1-41, 2-6, 6-4 and 6-11. (This F&O originated from SR HRA-A2)	HRA-B2 HRA-B3 HRA-D2 HRA-E1 PRM-B11	and potential 92-18 impacts for both screening values and detailed HEP development. Also, complete operator reviews and/or talk-throughs when the procedure updates are completed to ensure that the interpretation of the actions is consistent with the operator's understanding and training. Finally, consider expanding the discussion of sources of model uncertainty related to the HRA to include consideration of the accuracy and completeness issues noted in NUREG-6850, Volume 2, Appendix V.	
7-8	Dependency between multiple altered events representing new HFEs in the same cutset and between action represented by the altered events and other HFEs in the same cutset has not been assessed based on the assumption that the dependency effects are bounded by the application of conservative screening values. However, there is no documented assessment to support this assumption. There are cases where complete dependency between events may be appropriate. For example, cutsets 40 – 45 in the provided Aggregate CDF_aggregate.cut file contain altered events MAVC4200A_1.00E-01 and MAVC4460_1.00E-02 in each cutset. The product of these two events is therefore 1.00E-03. However, since both events involve failure to isolate the letdown line, it could be assumed that there is complete dependence between the events since they would share a common cue. This F&O supersedes 2010 Peer Review F&O 6-16. (This F&O originated from SR HR-H3)	HR-H3 HR-I2 HRA-D2 PRM-B11	The dependency associated with operator actions applied using the altered events method has not been addressed. Address dependency between multiple altered events representing new HFEs and between the altered events and other HEPs in the same cutset. If detailed dependency analysis is not performed, provide a justification supporting the assumption that the values chosen for the altered events bounds dependency effects.	This F&O has been resolved. The use of altered events as a surrogate for a recovery action has been significantly reduced as noted previously. Those remaining instances are addressed by modifications to the recovery rule file so that only a single instance of this use would exist in any cutset. This eliminates the potential for multiple surrogate recovery events to appear together in the same cutset.

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8-3	Attachment U – Internal Events PRA Quality (DRAFT), document applicability of Internal Events F&Os to internal events PRA, but not to Fire PRA. There was no evidence that the review of F&O disposition status addressed the question of whether the disposition that was taken would adversely affect the development of the fire PRA. This F&O is derived from 2010 Fire PRA peer review F&O 4-4. (This F&O originated from SR PRM-B2)	PRM-B2	The potential effect of internal events F&O disposition on development of the FIRE PRA was not addressed. Review internal events F&Os and provide documentation as to how disposition of those F&Os may impact development of the Fire PRA.	This F&O has been resolved. The internal events PRA model F&Os that have not been resolved/closed have been reviewed and found to have no negative impact on Fire PRA results or this application.
8-5	The Fire PRA model changes were constructed so as to allow credit for the current internal events PRA model structure using existing accident sequence progression, success criteria and timing. The internal events HRAs are modified with a screening modifier. Travel paths are considered in the human failure evaluation report. However, there is no indication that a review was performed to identify accident sequences that may require modification based on unique aspects of the plant fire response procedures. For example, RWST draindown may affect the evaluation of timing for aligning sump recirculation, which is not presently represented in the non-LOCA transient event tree accident sequences used for the majority of the fire scenarios. A review should be performed for possible changes to success criteria, particularly due to model changes from the MSO evaluation. This F&O is derived from 2010 Fire peer review F&O 6.3. (This F&O originated from SR PRM-B5)	HRA-B1 HRA-B3 PRM-B5 PRM-B7	The standard requires a review of the fire-induced initiating events accident sequences, and success criteria included in the internal events model, to identify new accident sequence progressions or success criteria due to unique aspects of fires. This review will help assure that there are no revised actions where the screening multipliers are not appropriate. Conduct and document a review of the fire-induced initiating events accident sequences, and success criteria included in the internal events model, to identify new accident sequence progressions or success criteria due to unique aspects of fires.	This F&O has been resolved. The review of results and cutsets that were performed did identify a number of instances such as that specifically identified in the F&O. In all instances, it was determined that the existing model structure was appropriate and that opportunities for recovery actions were limited either because of a lack of appropriate cues or insufficient timing to gain any meaningful benefit via recovery. The analysis documentation of the HFE treatment was updated to address the internal events PRA model human actions that are used in the FPRA. The documentation addresses the applicability, numerical adjustment, and availability of necessary cues.

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8-8	Several portions of the analysis are not documented for Unit 3. Specific examples include: Unit 4 significant contributors are identified in 0493060006.005, Rev. 2. Unit 3 significant contributors are available, but not fully documented. Unit 4 Fire Scenario information is presented in 0493060006.004, Rev. 2, but the equivalent Unit 3 information (Attachment D and E) is not provided. (This F&O originated from SR PRM-A3)	FSS-E3 PRM-A3 PRM-C1	Unit 3 results not fully documented, although they are available for inspection using the quantification software. Document Unit 3 results consistent with the Unit 4 results.	This F&O has been resolved. The U3 results have been added to the analysis documentation.
8-10	2010 FPRA peer review F&O 1-44 finds issues with masking fire effects by setting basic events to 0 in the Altered Events table. This has partially been addressed by setting these events to 'nominal' in the Altered Events table and for reviewing cases where the nominal value is on one side of an AND gate and the modified HEP value is on the other side. However, there are still cases where fire impacts are masked when the nominally adjusted event is on both sides of an AND gate or the HEP event is on one side of an AND gate and nominally adjusted events are on the other side. Scenarios 030 PTB and 067E PTB are two examples. This old F&O is converted to a new F&O 8-10. (This F&O originated from SR HRA-C1)	HRA-C1 PRM-B11	This appears to have a significant non-conservative impact to PRA results. Given the actions in the altered events report are being added to the model as needed recoveries in order to ensure risk is low, and given the resulting recovery actions do not show up in the results in most cases, there appears to be a disconnect between the addition of new actions to the procedures and the quantification of these actions in the FPRA. It appears part of the disconnect is that the logic modeling, as modified by the altered events table, results in the recovery values being screened from the results. Due to the complexity of this methodology, it seems a difficult task to review and address for these masking issues. Perhaps a more systematic and comprehensive approach, with an independent review, could provide confidence that these nonconservatisms are addressed. Adding new HEP basic events, consistent with the approach used for internal events, would address this issue.	This F&O has been resolved. The use of '0'; has been eliminated in the Altered Events table. Instead, events are set to nominal. In the case of the application calculations for NFPA 805, the 'compliant' case is determined by using a '0' value which would under-estimate the compliance case risk and thereby provide a conservative estimate of the risk increase for the application.
9-1	A general screening based on the ability to form a damaging HGL in an exposing	FSS-G2	No basis for the screening criteria is described. Since no MCA scenarios are	This F&O has been resolved.

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	compartment was developed. If no damaging HGL could form in an exposing compartment then there was no possible associated MC scenario. When a damaging HGL could form, a second screening was performed whereby the frequency of developing the HGL was determined. If the frequency was less than 1E-07/yr, then the scenario could be eliminated. However, there was no basis provided for the 1E-07/yr criteria, nor was the criteria adhered to; in fact, the criteria was exceeded, yet still applied, in over 150 different scenarios. Some of the screened scenarios were slightly over the 1E-07/yr threshold, while others ranged as high as nearly 6E-07/yr. The impact of exceeding the criteria cannot be determined as no specific MCA scenarios were ever developed; therefore, it is not known if the scenarios would be significant. For example, if it is assumed that 10 of the scenarios with a frequency of 5E-07 had CCDPs of 1.0, this would result in an increase in total CDF of 5E-06 which is about 10% of the total fire CDF. (This F&O originated from SR FSS-G2)	FSS-G3 FSS-G6	developed, there is no way to determine if the exceeded (yet applied) screening criteria are significant. Provide a basis for the 1E-07/yr screening criteria including additional information required when the criteria are included. The basis for the screening criteria should ensure the frequency is not too high, thereby potentially masking significant MCA scenarios. Evaluate impact of exceeded screening criteria; for example, a qualitative analysis of the expected CCDP based on known targets in the exposing and exposed compartments.	The existing HLG/MCA analysis includes a number of occurrences where the simplified screening approach was found to generate over-conservative results. Incrementally enhanced treatments were applied to confirm that these locations had a very low likelihood of creating or causing formation of HGL conditions and consequently a possible multi-compartment scenario
9-4	The multi-compartment analysis assumes a bounding value of 7.4E-3 for evaluation of active fire barrier elements. Actual fire barrier elements are not considered; instead the failure probability of a fire door is assumed for active barrier element failure because this failure probability represents the highest single probability of a single barrier failure. This method ignores the potential for multiple fire barrier elements. Per NUREG/CR-4840 (source document for	FSS-G4 FSS-G5	Systematic generic assessment of active fire barrier elements may lead to non-conservative results. If a screening value is desired, NUREG/CR-6850 Section 11.5.4.4 suggests using a screening value of 0.1 for active fire barrier elements. This value is much more likely to encompass multiple fire barrier elements. For scenarios that do not screen out, actual fire barrier elements identified during walkdowns (or document review) can be	This F&O has been resolved. The update of the analysis to incorporate a barrier failure probability that integrates all possible barrier elements was found to result in a value of approximately double the current value. However, since the entire analysis approach involves a screening strategy, additional analysis refinements are possible. An assessment of the use of a higher barrier failure probability to account for failure of multiple barrier elements found

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	NUREG/CR-6850 Table 11-3, "Barrier Types and Their Failure Probabilities") the total barrier failure rate is a union of the probabilities of the individual failure rates. Therefore, a value of 7.4E-03 may be conservative or non-conservative. This is based on 2010 FPRA peer review F&O 1-35. (This F&O originated from SR FSS-G5)		used to develop a more realistic barrier failure probability.	that the overall conclusion that MCA scenarios are not risk significant and need not be explicitly included in the FPRA was confirmed. However, the analysis documentation has not yet been updated ot reflect these results and insights.
9-5	The screening criteria are defined in the Turkey Point Hot Gas Layer and Multi-Compartment Analysis, (Report H0493060006.006) methodology. Compartments that don't screen are retained for further analysis. A concern identified with the screening criteria involves the use of a standard fire scenario for each analysis rather than determining the most challenging fire scenario inherent to the analyzed compartment. This approach potentially masks the potential for forming an HGL in the exposing compartment. For example, in zones 67 and 68 the standard fire scenario is non-conservative due to the potential for HEAF in 4kV switchgear. The damage time of 5 minutes is non-conservative for HEAF scenarios (should use 0 minutes). This F&O supersedes 2010 FPRA peer review F&O 3-11. (This F&O originated from SR FSS-G2)	FSS-G2	Use of a standard fire scenario may be non-conservative for some zones. Review zones to ensure that the standard fire scenario is actually the most challenging scenario inherent to the analyzed compartment. For zones where the standard fire scenario is not the most challenging, determine the most challenging scenario and evaluate accordingly.	This F&O has been resolved. The use of the 5 minute delay to combustible cable ignition is considered realistic. Other conservatisms in the analysis ensure the overall conservatism of the MCA/HGL evaluation.
9-6	The system unavailability records for the plant have not been reviewed in crediting fire detection and suppression systems. This F&O supersedes 2010 FPRA peer	FSS-D7	This is a systematic issue. The intent for Capability Category II is to additionally require a review of plant records to determine if the generic unavailability credit	This F&O has been resolved. The fire protection system availability data for PTN has been reviewed and no outlier behavior has been identified.

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	review F&O 2-26 (This F&O originated from SR FSS-D7)		is consistent with actual system unavailability. Outlier experience would be any experience indicating that actual system is unavailable more frequently than would be indicated by the generic values. Consider performing and documenting the review of plant records to determine if the generic unavailability credit is consistent with actual system unavailability. Outlier experience would be any experience indicating that actual system is unavailable more frequently than would be indicated by the generic values.	
9-10	Section 3.1 of the FSS Report (0493060006.004, Rev. 2) states: "For the electrical panel fires, the scenarios are developed similar to scenarios involving electrical panel fires outside the Control Room and are adequately described in Attachment A. Fire spread to adjacent panels was determined for these scenarios based on a walkdown of the control room during which panels with potential barriers for spread of fire were opened to confirm the existence of such barriers. For MCB fires, the method from NUREG/CR-6850 Appendix L is applied. NUREG/CR-6850 Appendix L defines a non-suppression probability applicable to the MCB. From Figure L-1 of NUREG/CR-6850, for non-qualified cables, and for a bounding distance of 0 meters (assuming that the cables terminating at the individual MCB are in very close proximity), a non-suppression frequency of 8.30E-3 is used for the MCB." However, based on discussion with FPL/ERIN staff, this was not done. Essentially, no fire spread for any cabinet in the MCR was assumed. For panels with	FSS-A6 FSS-H7	Assumption made that no cabinet/panel fires in the MCR will ever spread to an adjacent cabinet even if the cabinets are open to one another. This incorporates an implied assumption that every MCR panel/cabinet fire will be extinguished prior to spread. Identify adjacent MCR cabinets/panels which could result in fire spread given failure of suppression. Apply NUREG/CR-6850 Appendix L, S or other relevant document to address the potential for fire spread. Ensure documentation is consistent with the process actually used in the analysis.	This F&O has been resolved. Panels with communication between adjacent panels are to be provided with incipient detection to ensure early identification of fire to preclude spread between panels.

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	incipient detection, success of the detection results in no damage as it is assumed operators isolate the circuit prior to additional damage in the cabinet. If insipient detection fails, the MCB panel fails completely, but never spreads another cabinet. For all other cabinets/MCB panels without incipient detection, full burnout of the cabinet/panel is assumed, but again, no spread to adjacent cabinets is assumed even if the cabinets are open to one another (e.g., walkthrough MCB). (This F&O originated from SR FSS-A6)			
9-11	Several entries in Table 3-1 of Report H0493060006.006 says "Walkdown required to confirm no combustibles within the 383 ZOI" when the cables are not IEEE-383 qualified. Based on discussions with FPL and contractors, it is believed that this is a typo, and the correct damage criteria were actually applied. (This F&O originated from SR FSS-G2)	FSS-G2	It was not confirmed during the peer review that this was just a documentation issue. Therefore, this is classified as a finding because it could affect the analysis results. Verify that the damage criteria used is consistent with non-383 cable damage and revise the documentation as required. If it is discovered that the incorrect damage criteria were applied, update the analysis with the correct criteria.	This F&O has been resolved. It was confirmed that the lower damage threshold associated with thermoplastic materials was used for the analysis. The typographical error has been corrected.
10-1	The 2010 peer review identified that "Fire modeling was conducted via generic fire modeling from which Zones-Of-Influence (ZOI) for specific initiator types was generated. The ZOIs were used to define bounding fire characteristics for each fire scenario. Characteristics that are used to bound potentially risk contributing fire events are identified in Attachment B of the Fire Scenario Report, (Report 0493060006.004). Based on the use of a bounding approach this SR is judged to be met at CC I. Significant fire scenarios should be	FSS-C1 FSS-G1	The present analysis provides a bounding approach for fire severity in most cases, since the 98th percentile fire heat release rate is used. However, use of the split fraction method is based on industry events rather than site specific fire ignition sources and target configurations. Therefore, this could result in non-conservative frequency estimates of target damage. Perform 2-point fire modeling, when applicable, for risk significant fire scenarios.	This F&O has been resolved. The recommended resolution action in the F&O was assessed in the context of the dominant fire risk contributors. This assessment concluded that further refinements such as that described in the F&O would not substantively change the results of the analysis. The existing treatment retains some conservatism which results in this SR meeting CC I. This is adequate for the NFPA 805 application, as this conservative bias would tend to over-estimate the risk metric that is used to judge

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	developed with 2-point fire modeling." Since this review, FP&L has stated that "The use of a panel split fraction to differentiate between fires impacting the panel and components with cables terminating at the panel versus panel fires impacting cables outside of the panel provides an equivalent and more useful two point fire model." The Panel Split fraction is developed from a supplemental report (ERIN report, Supplemental Fire PRA Methods, dated February 2010). This document was submitted to the EPRI Fire PRA Methods Review Panel. This review is not complete as of the date of this peer review. Use of the split fraction method is based on industry events rather than site specific fire ignition sources and target configurations and therefore, could result in non-conservative frequency estimates of target damage. (This F&O originated from SR FSS-C1)			the acceptability of this application. The issue regarding the ERIN panel split fraction is addressed in the disposition for F&O 10-3.
10-2	The 2010 review of PTN Tasks 8 and 11 Report 0493060006.004, identified that 'no hydrogen fires other than turbine/generator have been postulated.' (Previously F&O 5-16) Since this Finding was identified, FP&L has determined that 'Miscellaneous Hydrogen piping at PTN is limited to hydrogen supply to the VCT tanks. The associated piping is located in the charging pump rooms (Fire Zones 45 and 55). Fires in these fire zones are assumed to impact all components in the fire zone. The associated risk is low given the availability of thermal barrier cooling for RCP seals and HHSI pumps. Allocation of the IGF associated with miscellaneous	FSS-A1	Including the fire frequency and associated fire scenarios from hydrogen fires will have impact to the CDF and LERF results. Incorporate the hydrogen fire scenarios being developed into the model, and update documentation as necessary.	This F&O has been resolved. Miscellaneous hydrogen fires have been incorporated in the Fire PRA in the charging pump room fire areas where the hydrogen lines associated with VCT cover gas are routed.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	hydrogen fires to these fire zones would result in an increase in the ignition frequency for these zones by less than a factor of 3. Given the low risk significance of these zones this will have a negligible impact on overall plant risk and the charging pump rooms will remain low risk contribution fire zones. Incorporation of this ignition frequency into the associated documentation will be incorporated in a future revision to the documentation.' Hydrogen fires are also being developed for H2 piping and valves in Compartments 82 and 87 (scenarios 82-P and 87-P). However, since these do not appear yet in the Fire Scenario Report, action is required. This finding is currently being addressed and appears to be resolved once the new H2 fires are included in the model and documentation is updated. (This F&O originated from SR FSS-A1)			
10-3	FSS-C4 requires severity factors to be independent of other factors. Fire severity factor as discussed in Section 7.1.2 for electrical cabinets is not developed or applied consistently with the NUREG/CR-6850 methods. This is developed from a supplemental report (ERIN report, Supplemental Fire PRA Methods, dated February 2010). This document was submitted to the EPRI Fire PRA Methods Review Panel. This review is not complete as of the date of this peer review. Using this method, fire propagation outside of the electrical cabinets is dependent on the nonsuppression probability. Therefore, some dependency exists in this data if used	FSS-C4 FSS-D5 FSS-G1	Severity factor (panel split fraction) is used extensively in the Fire PRA. Use the severity factor method described in NUREG/CR-6850, or develop an accepted industry approach (presently being discussed by EPRI). Develop fire severity factors based on the likely HRR and location of overhead cables or location of equipment. For example, if cable is 7 feet overhead, the severity factor would be based on the minimum HRR that would damage the cable at that distance. Additionally, the growth time can be used in determining non-suppression time.	The FPRA quantification uses the panel factors consistent with the latest guidance from the EPRI Methods Review panel. A sensitivity study has been performed to address the impact of elimination of the credit for the panel factors. The results of this evaluation indicate that the delta CDF/LERF would exceed the Reg Guide 1.174 guidelines should these factors be completely eliminated (the 1E-5/1E-6 delta CDF/delta LERF limits would be exceeded but the conservatively calculated delta risk would be less than 2E-5/2E-6). Further refinements of this sensitivity evaluation are possible to reduce the calculated delta risk. Credit for additional Defense In Depth

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	in conjunction with a non-suppression factor. Due to this derivation of the conditional probabilities for fire propagation outside of the cabinets, the conditional probabilities thus developed (and applied in the FRANC model) could potentially be non-conservative. The severity factors are developed using generic fire events data from the EPRI fire events database. Given the fire data duration and damage is a result of multiple factors (growth, suppression, severity, location, etc), and given the fire data often does not have sufficient information to make a reasonable determination of either the fire size or whether a fire propagated outside the cabinet, the severity factor used (panel split fraction) may not necessarily bound the conditions of the specific fire scenarios under analysis. (This F&O originated from SR FSS-C4)			measures may be taken in areas of concern as necessary to compensate for the increased delta risk.
10-4	One situation was identified for which credit of fire wrap is taken in Compartment 96 for ignition source 3B04, which is a 480V load center. This fire wrap protects PB3319, PB3813, PB7022, and PB7521. The wrap appears as being credited in a HEAF scenario. No justification for crediting this wrap assuming mechanical damage and direct flame impingement from the HEAF is provided. Similar issue for 3B03 also in Compartment 96. Thermo-lag is also seen as credited in some scenarios, which would require justification due to issues with this particular type of cable barrier. (This F&O originated from SR FSS-C8)	FSS-C8	This finding is based on identification of credit for a wrap in Attachment A of the Fire Scenario Report, (Report 0493060006.004). Any credited fire wrap should be addressed and the wrap integrity should be established with respect to fire resistance, mechanical protection, and potential fire related exposure to which the wrap may be exposed (direct flame impingement, HEAF, etc.).	This F&O has been resolved. A qualitative assessment has been performed to assess the potential impact of this F&O. The hose stream test imposed on the fire barrier qualification subsequent to fire exposure is considered to provide a comparable level challenge to the thermolag barrier as would the HEAF force applied at the onset of fire exposure.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
10-6	Treatment for transient fire damage to targets is measured from the compartment floor rather than the height of the transient fuel package that is typically considered. Discussion with FP&L during the review provided some basis for the damage height (indicating that transient fires above the floor will have an overall lower average surface HRR). However, the supplemental discussion was still considered inconsistent with past events and existing guidance on analysis of transient fires, and could lead to non-conservative estimates of transient fire damage to targets. Transient fire evaluations conducted as described in the Fire Scenario Report result in screening fire damage to targets that are located > 7.3' above the floor which is believed to be non-conservative for developed fires involving ordinary combustible fuel packages such as a trash can or trash bag. In response to this concern it was pointed out that the thermal plume component relies on empirical relationships between the source strength and the distance between the virtual origin of the fire and the target. The fire plume begins to entrain air at the lowest point of burning, which defines the base of the fire; normally at the floor. However this argument ignores the potential that a fire could begin burning at the top of a fuel package thus elevating its base. At a minimum, during the initial period of burning, damage temperatures generated by the fire would likewise be elevated. Over time the base of the fire may change due to collapse of the fuel package or burning away of the fuel, however the empirical model	FSS-D6	Many transient fire scenarios have been screened during detailed scenario analysis. The results of the FPRA are therefore potentially non-conservative for the analyzed detailed scenarios. The transient fires should be considered to be above the floor level in the analysis.	This F&O has been resolved. Supplemental walkdowns were performed to re-assess the treatment of transient fires. These walkdowns focused on two key attributes – the appropriateness of the selected HRR characterization and the location of the postulated fire scenarios. With respect to this specific F&O, the placement (elevation) of the assumed fire was based on the physical features of the location. The fires were not artificially elevated in the absence of a physical feature.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	presented did not present sufficient basis for assuming that the base of the fire is at the floor for its entire duration. (This F&O originated from SR FSS-D6)			
10-8	Ambient conditions are assumed in the Generic Fire Modeling Treatment Report (prepared by Hughes). Ambient temperature is assumed to be 68°F for all calculations. No technical discussion or justification is provided in the Fire Scenario Report to substantiate that this is a reasonable value for the compartments where this was applied. (This F&O originated from SR FSS-D4)	FSS-D4 FSS-H4	Underestimating the ambient conditions could result in non-conservative estimations of zones of influence and targets considered to be fire damaged. Assess areas where elevated ambient temperatures could be experienced and justify the acceptability of the models used. Otherwise, incorporate elevated ambient temperatures into the zone of influence calculations.	This F&O has been resolved. A qualitative assessment has been performed to assess the potential impact of this F&O. The sensitivity of the ZOI dimensions to the ambient temperature is relatively low as described in the original Hughes Generic Fire Modeling treatments report, in particular for IEEE-383 qualified/Thermoset cables. In the case of an initial ambient temperature of 35°C, the expected affect on the ZOI dimensions is within the measurement uncertainty in the field.
10-9	The 2010 peer review identified that 'Except for the MCR fire scenarios, no other fire scenario has used the Non-Suppression Probability (NSP) in PTN fire model at this time.' Since this review, FP&L has taken credit for suppression (both automatic and manual) in the Multi-Compartment/Hot Gas Layer evaluation. However, this evaluation does not include an assessment of the fire protection system effectiveness. Of particular concern is that fire detection and/or suppression timing (i.e., thermal response of the detector and/or sprinkler) was not calculated and subtracted from the time considered for manual suppression when using the FAQ-0050 process. In addition, fire detection reliabilities are not included in the assessment. If the detection system does not function as intended, the time to detection to initiate fire brigade	FSS-D8	The method currently employed could result in optimistic times for suppression activation or fire brigade response. Assess and document the effectiveness of suppression with respect to: System design complies with applicable codes and standards, and current fire protection engineering practice, The time available to suppress the fire prior to target damage, Specific features of physical analysis unit and fire scenario under analysis (e.g., pocketing effects, blockages that might impact plume behaviors or the "visibility" of the fire to detection and suppression systems, and suppression system coverage), and Suitability of the installed system given the	A qualitative assessment has been performed to assess the potential impact of this F&O. The HGL and MCA analyses credit both automatic suppression system and fire brigade actions. In the context of the HGL and MCA, the fire brigade action of interest is fire control as that would terminate the possibility for HGL formation. However, the only readily available numeric credit is fire suppression credit. To reduce the conservatism introduced into the analysis, fire detection time is ignored for the HGL and MCA. The timeframe associated with detection and suppression is significantly less than the timeframe required to reach a hot gas layer temperature which would impact the HGL analysis.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	response would be substantially longer. (This F&O originated from SR FSS-D8)		nature of the fire source being analyzed.	
10-11	The 2010 peer review identified that "fire scenario evaluation tools were developed based on the Generic Fire Modeling Treatments. These walkdown/evaluation tools are based on bounding fires that are assumed to cause target damage at a height above the base fire with the fire burning at peak intensity and without burnout times. Because these tools assume a fire burning at peak intensity and without burnout, this SR is considered met at CC I." Since the review, FP&L has stated that "The use of a panel split fraction to differentiate between fires impacting the panel and components with cables terminating at the panel versus panel fires impacting cables outside of the panel provides an equivalent and more useful two point fire model... The application of the two point treatment to individual fire scenarios is carried through to the MCA/HGL evaluation which addresses the impact of each scenario on MCA." The Panel Split fraction is developed from a supplemental report (ERIN report, Supplemental Fire PRA Methods, dated February 2010). This document was submitted to the EPRI Fire PRA Methods Review Panel. This review is not complete as of the date of this peer review. Use of the split fraction method is based on industry events rather than site specific fire ignition sources and target configurations and therefore, could result in non-conservative frequency estimates of target damage.	FSS-C2 FSS-C3 FSS-G1	The present analysis provides a bounding approach in most cases, since the 98th percentile fire heat release rate is used from fire initiation without growth and burnout. However, use of the split fraction method is based on industry events rather than site specific fire ignition sources and target configurations. Therefore, this could result in non-conservative frequency estimates of target damage. Include fire growth and decay for risk significant fire scenarios.	This F&O has been resolved. The recommended resolution involves the crediting of growth and decay in the modeling of the postulated fire. The existing analysis does not take credit for these variables. A review of the dominant fire scenarios found that the risk benefit that might be gained is minimal. Therefore, this refinement was not performed. The resulting categorization of the related SR is CC 1. Since the approach results in some conservatism being retained in the results, this CC is judged to be adequate for the NFPA 805 applications as the conservative bias would tend to result in the over-estimation of the risk metrics used for this application.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	(This F&O originated from SR FSS-C2)			
10-12	The 2010 peer review identified that "The PTN FPRA methodology generally does not include postulation or evaluation of smoke damage. Additional review shows that the smoke issues do not affect the FPRA results significantly. However, the FPRA does not include a qualitative evaluation of smoke damage to FPRA equipment." Since the 2010 review, FP&L stated, "Section 6.2 of the Scenario Report was added to address this concern." However, section 6.2 provides a high level discussion and methodology including the statement that "Exposure time plays a key role in the likelihood of failures from smoke. As a result, damage from short term smoke exposure will only result from severe conditions.... Instruments, control components and all high voltage powered components are exceptionally vulnerable to circuit bridging as a result of airborne smoke and deposited particulates." However, there is no documented discussion of the smoke damage assessment results, and none of the targets in the scenarios indicated smoke damage as the failure mode. NUREG/CR-6850 recommends considering smoke damage to banks of interconnected panels, and this should be considered. (This F&O originated from SR FSS-D9)	FSS-D9	This appears to be a documentation issue, but FP&L should confirm that smoke damage has been considered and document accordingly. Confirm that smoke damage has been considered and document accordingly.	This F&O has been resolved. An analysis of the impact of smoke damage has been completed and documented in the PTN FPRA Scenario Report.
10-13	A credit for incipient detection is taken for MCB fires (non-suppression probability of 0.02). There is no documentation to justify this value. Per discussion with FP&L the approach appears to be in agreement with	FSS-A6 FSS-D7 FSS-H7	This appears to be a documentation issue, but since the system is not yet installed, there could be an impact to the assumptions made within the Fire PRA. Document the basis for probability of non-	This F&O has been resolved. The credit taken for incipient detection is consistent with that specified in FAQ-08-0046.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	FAQ-08-0046. The approach also does not use the NUREG/CR-6850 Appendix L factor for panels that credit incipient detection. Secondly, the incipient detection system is not yet installed, and therefore, the Fire PRA should be reviewed and updated as needed to reflect any differences between the assumed and as-built conditions of the system. (This F&O originated from SR FSS-A6)		suppression value assumed in analysis. When the incipient system is installed, the FPRA should be reviewed and updated accordingly.	
10-14	Beyond the Generic Fire Modeling Treatments, the Fire PRA did not include additional detailed fire modeling for most fire compartments. Note 4 (under FSS-A5 of the ASME Standard) states that "once a fire scenario has been 'selected,' this implies that the scenario will eventually be evaluated and/or quantified at a level of detail commensurate with the risk significance of the scenario." (This F&O originated from SR FSS-A5)	FSS-A5	For risk significant fire scenarios, detailed fire modeling should be performed to ensure you are not masking the "true risk significant fire areas". Without detailed fire modeling for significant fire scenarios, the results are conservative. Consider performing additional detailed fire modeling to provide "reasonable assurance that the fire risk contribution of each unscreened physical analysis unit can be characterized."	This F&O has been resolved. The current analysis is consistent with a Capability Category I analysis. This provides a degree of conservatism in the analysis which would also tend to over-estimate the change in risk which is reported for the NFPA 805 application. A review of the results of the application analyses indicates more rigorous analyses consistent with CC II or CC III would not alter the conclusions of the analyses.
10-15	PTN credits multiple suppression paths for MCA/HGL evaluation. However, the dependencies have not been evaluated and modeled. For example, fixed suppression and fire brigade response may both rely on a single detection system. (This F&O originated from SR FSS-C7)	FSS-C7 FSS-G1 FSS-H7	Lack of dependency analysis could lead to an optimistic estimate of suppression probability. When multiple suppression paths are credited, perform a review and address any dependencies between suppression and detection systems credited in the MCA/HGL calculation.	This F&O is resolved. A review of the credited suppression systems in the Multi-Compartment /Hot Gas Layer analysis has confirmed that no dependency exists between the suppression systems and detection systems. Detection in the zones with suppression systems is associated with an independent detection system.
10-16	Review of fire modeling in single compartments does not consider the addition of HRR from secondary combustibles. It is acknowledged that secondary combustibles were considered for	FSS-C1 FSS-D3 FSS-G1	Discounting of secondary combustibles when considering localized fire damage could lead to non-conservative results. Include secondary combustibles in the heat release rates used for zone of influence	This F&O has been resolved. Supplemental walkdowns have been performed to identify and address the potential for fire spread for scenarios where the non-383 cables are not protected by

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	the MCA/HGL evaluation. Fire spread and additional HRR due to the resulting cable tray fire and adjacent cabinets would increase the total fire size and the subsequent zone of influence. Compared to the NUREG/CR-6850 guidance for flame spread along PVC cable (flame spread = 0.9 mm/sec) the estimation of HRR for the applied scenarios is non-conservative. Realistic estimation of the scenario HRR is necessary to ensure the full impact of the fire on exposed targets is presented and that the effects of a damaging HGL may also be estimated. FP&L has stated that walkdowns are in progress to include fire spread to cable trays and incorporate this into the fire scenarios. (This F&O originated from SR FSS-C1)		estimates.	Flammastic material. The analysis has been updated to include these scenarios as appropriate.
10-17	The 2010 peer review identified that Attachment B of the Fire Scenario Report (Report 0493060006.004) generic fire modeling treatments do not account for the effects of hot gas layer (HGL) on the zones of influence. The limitation indicates that because HGL is not considered that these correlations should not be used in enclosed areas with small volumes where a significant HGL thickness may form. Because this relationship is not considered plume temperatures may be underestimated because it is assumed that ambient temperature air is being entrained into the plume, resulting in cooler plume temperatures, rather than heated air from the hot gas layer. Entrainment of heated air into the fire plume results in higher damage heights because the plume remains hotter at higher elevations.	FSS-D1	Modifying the zone of influence to account for HGL effects could impact the defined target damage set. The generic treatments used in relatively small rooms should be scrutinized to ensure that any HGL interaction is considered and accounted for if found to be significant. The selection of which generic fire modeling treatment is used to define target damage for HGL effects on a scenario basis should be documented in a clear manner to facilitate updates and peer reviews.	This F&O has been resolved. The MCA/HGL evaluation has been modified to address the concern noted in the F&O. The potential for a larger zone of influence is addressed via new fire scenarios added to the fire PRA.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	Since this review, FP&L states that "The impact of a hot gas layer on the zone of influence is evaluated for all fire zones/scenarios in the MCA/HGL evaluation." A review of this evaluation confirms that HGL effects on ZOI were in fact considered for the generic treatments; however, there is not sufficient documentation in Attachment A to the Fire Scenario Report to determine which zone of influence was applied to which scenario, and whether it was applied correctly to consider the effects of HGL. The Generic treatments include several iterations and combinations of variables, including opening percentage of the compartment. The fire scenario documentation at the time of this review did not provide sufficient information on opening percentage to confirm that the ZOI was applicable to the compartment. (This F&O originated from SR FSS-D1)			
10-18	In at least two cases, transient fire scenarios have not been included in the fire modeling for some compartments (e.g., fire compartments 67 and 68). Per discussion with FP&L the transients may have been excluded based on the dominance of the frequency of fixed scenarios. However, transients should only be excluded when precluded by design. Based on the size of these rooms, and the presence of secondary combustibles, transient fires could lead to fire growth and eventually HGL, and therefore should be analyzed. (This F&O originated from SR FSS-A1)	FSS-A1	The exclusion of transients in some compartments may lead to a non-conservative estimate of CDF and LERF. Include transient scenarios in all compartments where fire modeling has been employed.	This F&O has been resolved. Supplemental walkdowns were performed to re-assess the treatment of transient fires. These walkdowns focused on two key attributes – the appropriateness of the selected HRR characterization and the location of the postulated fire scenarios. The postulated location for the treatment of transient fires was based on where a transient ignition source might reasonably occur. The results of these walkdowns were incorporated into the FPRA analysis.
10-19	For fire modeling analysis of transient fires, FP&L implements a floor area weighting	FSS-H1	Lack of documentation on transient fire locations and boundaries will present a	This F&O has been resolved. The specific instance noted in the F&O was

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
	factor. However, the documentation does not include a graphical representation of the assumed transient locations and boundaries. It is therefore not possible to review (or update) transient fires. Also during review of transient weighting factors it appears to have been double counted in some compartments (e.g., compartment 63). Based on discussion with FP&L this was due to an error in the Excel based spreadsheet tool for transient frequency quantification. This appears to be an isolated case and will be corrected. (This F&O originated from SR FSS-H1)		challenge for updates and peer reviews. Update documentation to include a graphical representation of transient fire locations and boundaries.	corrected. In addition, supplemental walkdowns were performed to re-assess the overall treatment of transient fires. These walkdowns focused on two key attributes – the appropriateness of the selected HRR characterization and the location of the postulated fire scenarios. However, the documentation that was generated did not specifically produce graphical representations. Instead, the information was incrementally enhanced to provide a spatial reference to a location with in the space. The need for special depiction of transient fire scenario locations will be addressed in conjunction with the development of procedures for post transition configuration control.
10-20	The fire modeling analysis of the Turbine Generator (T/G) fires is performed in accordance with Appendix O to NUREG/CR-6850. However, there is no discussion regarding the lack of analysis of the catastrophic T/G fire event, which should consider blade ejection, oil line rupture, and hydrogen explosion. Per discussion with FP&L, the catastrophic fire was discounted since the T/G is located outdoors. While this may not result in hot gas layer formation and structural collapse, a review of the guidance is warranted, and inclusion of this event frequency should as a minimum map to the loss of the T/G and if suppression fails, all equipment within the T/G structure. (This F&O originated from SR FSS-A1)	FSS-A1	Lack of consideration of the catastrophic T/G fire may lead to a non-conservative estimate of CDF and LERF. Perform a review of the catastrophic T/G fire in accordance with Appendix O to NUREG/CR-6850, or document the justification for excluding this event at PTN.	This F&O has been resolved. The analysis documentation has been updated to address catastrophic T/G fires that may lead to building collapse or other significant widespread damage. The results of this update did not identify any new risk significant contributors or insights.

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Finding F&O	Discussion	Fire PRA SR	Basis and Recommendation	Disposition in Fire PRA Update
10-21	The supplemental generic Fire Model Treatments: Transient Ignition Source Strength includes an assumption for transient burnout of 12 minutes. This burnout time is based on an assumed fire loading and the 317kW heat release rate, and appears to be optimistic given the uncertainty in transient fire loading. The burnout is then used to develop a zone of influence for thermoplastic targets, based on the thermal response tables in Appendix H to NUREG/CR-6850 for thermoplastic cable at 260°C. Since this resultant vertical zone of influence is used to screen transient scenarios from impacting secondary targets higher than 7.3 feet from the floor, additional justification is needed to demonstrate that a 12 minute fire, and subsequent use of 260°C damage threshold is appropriate for screening purposes. Also noted is that Attachment B to the Fire Scenario Report zone of influence does not reflect the same values recommended by the Generic Fire Model Treatment. As an example, the differentiation between transient Severe and Non-Severe categories is not based on a 317kW fire. This appears to be a documentation issue only. (This F&O originated from SR FSS-C3)	FSS-C3 FSS-G1 FSS-H2	The current approach results in many transient fire scenarios being screened during detailed scenario analysis. The results of the FPRA are therefore potentially non-conservative for the analyzed detailed scenarios. Provide additional justification for the applied transient fire analysis as a screening approach. Consider increasing the burnout time and using the NUREG/CR-6850 recommended damage threshold to 205°C to bound uncertainties in fuel loading for transient fires.	This F&O has been resolved. Supplemental walkdowns were performed to re-assess the treatment of transient fires. These walkdowns did not identify any instances where an altering of the transient fire duration had any material impact on the HGL and MCA. The documentation has also been updated to address the criteria used for selecting the characteristic transient fire HRR. The approach is consistent with the recently issued guidance from the EPRI/NRC review panel. The results of these walkdowns were incorporated into the FPRA analysis. The twelve minute fire corresponds to the 317 kW fuel package only and represents ~ 35 lb of Class A material. Additional discussion is provided in Rev. 0 of Supplement 3 of the Hughes Generic Fire Modeling treatments that examines the fire durations and test durations of all NUREG/CR 6850 tests. It is shown that the method used to determine a 12 minute fire predicts or overestimates the fire duration in all cases and is therefore a sound approach.

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10-22	Per NUREG/CR-6850, appendix H, temperature sensitive equipment should be considered to fail at 65°C. Supplemental Generic Fire Model Treatments: Hot Gas Layer Tables includes new zone of influence and hot gas layer treatments for temperature sensitive equipment. However, per discussion with FP&L these have not been implemented in the fire scenarios. (This F&O originated from SR FSS-C6)	FSS-C6 FSS-G1	For smaller volume rooms, estimates of equipment damage may be non-conservative. Apply the appropriate hot gas layer and zone of influence for temperature sensitive equipment where applicable.	This F&O has been resolved. The consideration of sensitive electronics was addressed in a qualitative fashion in the Scenario Report.
10-23	The PTN FSS report 0493060006.004, Rev 2, section 6 discusses the damage criteria for thermal, smoke, and sensitive equipment. However, suppression effects do not appear to have been considered for the potential to damage equipment. (This F&O originated from SR FSS-C5)	FSS-C5	Equipment damaged by suppression activities may impact estimates of CDF and LERF for some scenarios. Perform an assessment of electrical equipment that may be vulnerable to water intrusion from suppression activities (or thermal shock from gaseous systems), and include any additional failed equipment, not already considered damaged by fire, in scenarios as appropriate.	This F&O has been resolved. The specific issue raised in the F&O is beyond the scope of the associated SR. In addition, no known consensus method exists for treatment. A qualitative assessment, based on other guidance for evaluation of potential impact of suppression effects was performed which indicated that no specific change in the analysis is needed.