UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
2100 RENAISSANCE BLVD., SUITE 100
KING OF PRUSSIA, PA 19406-2713

March 30, 2015

Mr. Larry Coyle
Site Vice President
Entergy Nuclear Operations, Inc.
Indian Point Energy Center
450 Broadway, GSB
PO Box 249
Buchanan, NY 10511-0249

SUBJECT: INDIAN POINT POWER STATION, UNITS 2 AND 3 - FOLLOW-UP ON ENFORCEMENT ACTIONS (OPERATOR MANUAL ACTIONS) REPORT 05000247/2014011 AND 05000286/2014011

Dear Mr. Coyle:

On February 18, 2015, the U.S. Nuclear Regulatory Commission (NRC) completed a follow-up inspection at your Indian Point Power Station, Units 2 and 3. The enclosed inspection report documents the inspection results, which were discussed on February 18, 2015, with Mr. Richard Burroni, Engineering Director, and other members of your staff.

In April 2014, Entergy notified the NRC that corrective actions were complete to resolve the previously identified NRC violations documented in NRC Inspection Report and Notices of Violation 05000247/2012009 and 05000286/2012008. This inspection was performed to verify the adequacy of those completed actions to restore compliance with the Commission's rules and regulations, and with the conditions of your license. Specifically, the team reviewed your corrective actions to restore compliance with Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Appendix R, Section III.G.2, regarding denied exemptions to implement operator manual actions in lieu of meeting those fire protection regulations.

The NRC determined that your completed corrective actions were appropriate to restore compliance with those fire protection regulations. Based on the results of this inspection, four findings of very low safety significance (Green) were identified. These findings were also determined to be violations of NRC requirements, which were subsequently corrected and compliance restored. The NRC is treating these findings as non-cited violations (NCV) consistent with Section 2.3.2.a of the NRC Enforcement Policy because of their very low safety significance, and because they were entered into your corrective action program. If you contest any NCV in this report, you should provide a written response within 30 days of the date of this inspection report with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington D.C. 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Senior Resident Inspector at Indian Point. In addition, if you disagree with the cross-cutting aspect assigned to any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region I, and the NRC Senior Resident Inspector at Indian Point.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

John F. Rogge, Chief
Engineering Branch 3
Division of Reactor Safety

Docket Nos.: 50-247 and 50-286
License Nos.: DPR-26 and DPR-64

Enclosure:
Inspection Report 05000247/2014011 and
05000286/2014011
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

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REGION I

Docket Nos.:	50-247 and 50-286
License Nos.:	DPR-26 and DPR-64
Report Nos.:	05000247/2014011 and 05000286/2014011
Licensee:	Entergy Nuclear Northeast (Entergy)
Facility:	Indian Point Power Station, Units 2 and 3
Location:	450 Broadway, GSB Buchanan, NY 10511-0249
On-Site Dates:	May 19 to 22, 2014 August 26 to 27, 2014 November 24 to 25, 2014
In-Office Dates:	June 7, 2014 to February 18, 2015
Inspectors:	J. Richmond, Senior Reactor Inspector (Team Leader) W. Schmidt, Senior Risk Analyst J. Patel, Reactor Inspector
Approved by:	John F. Rogge, Chief Engineering Branch 3 Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000247/2014011 and 05000286/2014011; 05/19/2014 - 02/18/2015; Indian Point Power Station, Units 2 and 3; Follow-Up on Traditional Enforcement Actions; Fire Protection; Operator Manual Actions.

This follow-up inspection was conducted by three regional inspectors; a senior reactor inspector, a senior risk analyst, and a reactor inspector. The team performed three on-site inspections and multiple in-office inspections between May 19, 2014 and February 18, 2015. Four findings of very low significance were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process." The cross-cutting aspects associated with findings were determined using IMC 0310, "Components Within the Cross-Cutting Areas." Findings for which the significance determination process (SDP) does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5, dated February 2014.

Cornerstone: Mitigating Systems

- Green. The team identified a finding of very low safety significance, involving a non-cited violation of Indian Point Units 2 and 3 Facility Operating Licenses Conditions 2.K and 2.H, respectively, for failure to implement and maintain in effect all provisions of the approved Fire Protection Program. Specifically, Entergy revised the safe shutdown (SSD) methodology to use the safety injection system as a credited reactor coolant system make-up source, but the thermo-hydraulic analysis used to validate the revised method was not consistent with the SSD analysis or with the operating procedures. Entergy entered this issue into its corrective action program and revised the thermo-hydraulic analysis prior to the end of this inspection to demonstrate the adequacy of the new methodology.

  This finding was more than minor because it was similar to Example 3.k of NRC IMC 0612, Appendix E, "Examples of Minor Issues," and was associated with the Protection Against External Factors (e.g., Fire) attribute of the Mitigating Systems Cornerstone and affected the objective to ensure the reliability and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The team performed a Phase 1 SDP screening, in accordance with IMC 0609, Appendix F, "Fire Protection SDP." This finding affected the post-fire SSD category, and was determined to have a low degradation rating because a subsequent analysis verified that safety injection was sufficient to maintain the reactor coolant system sub-cooled. This finding had a cross-cutting aspect in the area of Human Performance, Documentation, because Entergy did not maintain complete, accurate, and up-to-date documentation used as critical design inputs for a thermo-hydraulic analysis. [H.7] (Section 4OA5.1.1)

- Green. The team identified a finding of very low safety significance, involving a non-cited violation of Indian Point Unit 3 Facility Operating License Condition 2.H, for failure to implement and maintain in effect all provisions of the approved Fire Protection Program. Specifically, Entergy evaluated a new fire barrier and determined that it provided adequate separation between redundant SSD trains within the same fire area, but the barrier did not satisfy regulatory requirements, and was not included in the barrier surveillance program. Entergy performed a more detailed barrier evaluation prior to the end of this inspection and created a new fire area using the guidance in Generic Letter 86-10, "Implementation of Fire Protection Requirements." Entergy entered this issue into its corrective action program and re-evaluated the barrier prior to the end of this inspection to verify its adequacy to withstand the hazards in the area, revised the combustible control program for adjacent areas, and added it to the barrier surveillance program.

  This finding was more than minor because, if left uncorrected, it could have become a more significant safety issue because combustible loading or barrier integrity may not have been adequately maintained in the future, and was associated with the Protection Against External Factors (e.g., Fire) attribute of the Mitigating Systems Cornerstone and affected the objective to ensure the reliability and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The team performed a Phase 1 SDP screening, in accordance with NRC Inspection Manual Chapter 0609, Appendix F, "Fire Protection SDP." This finding affected the post-fire SSD category, and screened to very low safety significance. The team determined that it did not affect the ability to reach and maintain a stable plant condition within the first 24 hours of a fire event because the fire barrier was not degraded during the inspection period and no postulated fires were identified that could breach the new fire barrier. This finding had a cross-cutting aspect in the area of Human Performance, Design Margins. [H.6] (Section 4OA5.1.2)

- Green. The team identified a finding of very low safety significance, involving a non-cited violation of Indian Point Unit 3 Facility Operating License Condition 2.H, for failure to implement and maintain in effect all provisions of the approved Fire Protection Program. Specifically, Entergy did not ensure that design changes which revised the SSD methodology were adequately translated into operating procedures. Entergy entered this issue into its corrective action program and revised its operating procedures and associated SSD methodology prior to the end of this inspection.

  This finding was more than minor because it was associated with the Protection Against External Factors (e.g., Fire) attribute of the Mitigating Systems Cornerstone and affected the objective to ensure the reliability and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The team performed a Phase 2 SDP analysis, in accordance with NRC IMC 0609, Appendix F, "Fire Protection SDP." This finding affected the post-fire SSD category, and screened to very low safety significance. The team determined that this issue did not affect the ability to reach and maintain a stable plant condition within the first 24 hours of a fire event because no credible fire scenario was identified that could result in a loss of the credited make-up flow path. This finding had a cross-cutting aspect in the area of Human Performance, Design Margins. [H.6] (Section 4OA5.1.3)

- Green. The team identified a finding of very low safety significance, involving a non-cited violation of Indian Point Unit 3 Facility Operating License Condition 2.H, for failure to implement and maintain in effect all provisions of the approved Fire Protection Program. Specifically, Entergy did not have an adequate post-fire operating procedure for its alternative shutdown capability to ensure that post-fire SSD equipment was isolated from the effects of fire in Appendix R, Section III.G.3, fire areas. Entergy entered this issue into its corrective action program and revised its operating procedures prior to the end of this inspection.

  This finding was more than minor because it was similar to Example 3.k of NRC IMC 0612, Appendix E, "Examples of Minor Issues," and was associated with the Protection Against External Factors (e.g., Fire) attribute of the Mitigating Systems Cornerstone and affected the objective to ensure the reliability and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The team performed a Phase 3 SDP analysis, in accordance with NRC IMC 0609, Appendix F, "Fire Protection SDP." This finding affected the post-fire SSD category, and screened to very low safety significance. The team determined that this issue was of very low safety significance because of the low frequency of a fire, a negligible chance of control room evacuation, and the low chance of core damage associated with those fire areas where a fire could damage the charging system and make it unavailable. This finding did not have a cross-cutting aspect because it was a legacy issue and was considered to not be indicative of current licensee performance. (Section 4OA5.1.4)

Licensee Identified Findings

None.

REPORT DETAILS

Background

The NRC requirements related to fire protection are provided in Title 10 of the *Code of Federal Regulations* Section 50.48 (10 CFR 50.48). In accordance with 10 CFR 50.48(b), nuclear power plants licensed to operate before January 1, 1979, are required to meet Section III.G, of 10 CFR Part 50, Appendix R (i.e., Appendix R). The underlying purpose of Section III.G of Appendix R is to ensure that the ability to achieve and maintain safe shutdown (SSD) is preserved following a fire event.

Paragraph III.G.2 of Appendix R requires redundant trains of systems, necessary to achieve and maintain hot shutdown conditions, where the trains are located in the same fire area outside primary containment, be provided with one of the following means of ensuring that one of the redundant trains is free of fire damage:

- Separation of cables and equipment by a fire barrier having a three-hour rating;
- Separation of cables and equipment by a horizontal distance of more than 20 feet with no intervening combustibles or fire hazards and with fire detectors and an automatic fire suppression system installed in the fire area; or,
- Enclosure of cables and equipment of one redundant train in a fire barrier having a one-hour rating and with fire detectors and an automatic fire suppression system installed in the fire area.

However, as a result of fire protection inspections conducted at several plants in the early 2000's, the NRC identified that, in lieu of the methods specified in Paragraph III.G.2, some licensees, including Entergy, relied on actions taken by operators (e.g., operator manual actions (OMA)) to restore equipment functionality after fire damage, in order to achieve and maintain post-fire SSD conditions.

In 2006, the NRC issued Regulatory Issue Summary 2006-10, "Regulatory Expectations with Appendix R, Paragraph III.G.2, Operator Manual Actions," which informed licensees that OMAs are not permitted, unless they have been specifically approved by the NRC as part of a licensee's request for exemption from the requirements of Paragraph III.G.2. The NRC also issued Enforcement Guidance Memorandum (EGM) 07-004 (ML071830345), which granted enforcement discretion for licensees relying on OMAs and provided until March 6, 2009, for licensees to complete corrective actions. Corrective actions included establishing compliance with fire protection regulations or, as appropriate, submitting an exemption request to the NRC to implement OMAs in lieu of fire protection regulations.

In response to this issue, in letters dated March 6, 2009 (ML090770151 and ML090760993), Entergy submitted exemption requests for Indian Point Power Station (IP) Units 2 and 3 in which it requested exemption from certain requirements of Section III.G.2, specifically to permit the use of OMAs upon which it had been relying for SSD in a number of fire areas. The NRC determined that enforcement discretion would continue during the duration of the NRC's review of Entergy's exemption request.

Entergy continued to rely on the OMAs while the exemption requests were being reviewed by the NRC. Entergy also implemented additional compensatory measures (fire watches in all affected fire areas) to enhance the fire protection response in the areas. In May 2011, the NRC completed a triennial fire protection inspection (Inspection Report 05000247/2011010 and 05000286/2011008, ML111920339) during which the inspection team assessed the adequacy of Entergy's compensatory measures.

By letters dated February 1, 2012 (ML112140509 and ML112200442), the NRC approved in part and denied in part Entergy's exemption requests, thereby ending the period of enforcement discretion. The NRC also requested additional information from Entergy regarding its plans for achieving compliance with Appendix R, in light of the denied exemptions (ML12031A176). By letter dated March 1, 2012 (ML12074A028), Entergy responded with a proposed schedule that showed restoration of compliance for all but two of the OMAs by the fourth quarter of 2012, and for the final two OMAs, by the end of the Unit 2 refueling outage in Spring 2014.

In April 2012, the NRC completed an inspection (Inspection Report 05000247/2012009 and 05000286/2012008, ML12229A128) of Entergy's ongoing corrective actions to achieve compliance with Appendix R, Section III.G.2, regarding the denied exemptions to use OMAs (e.g., unapproved OMAs) in lieu of meeting those fire protection regulations. The inspection report documented two violations which were cited as Notices of Violation (NOV) in the report (e.g., one NOV per unit for the respective unapproved OMAs in each unit). In addition, the inspection also verified the adequacy of Entergy's compensatory measures and assessed the risk significance for each unapproved OMA.

By letter dated May 2, 2013 (ML13142A226), Entergy notified the NRC that all planned corrective actions for Unit 3 unapproved OMAs were complete. By a subsequent letter dated April 29, 2014 (ML14135A290), Entergy notified the NRC that all planned corrective actions for Unit 2 unapproved OMAs were complete.

This report presents the results of a follow-up inspection conducted in accordance with NRC Inspection Procedure 92702, "Follow-up on Traditional Enforcement Actions including Violations, Deviations, Confirmatory Action Letters, Confirmatory Orders, and Alternative Dispute Resolution Confirmatory Orders," to review Entergy's implementation of corrective actions to restore compliance regarding the use of unapproved OMAs.

The objectives of this inspection were to determine whether adequate corrective actions had been implemented to remove the need for the unapproved OMAs, such that regulatory compliance had been achieved. Specific documents reviewed by the team are listed in the attachment.

4. OTHER ACTIVITIES

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

4OA5 Other Activities

Inspection Procedure 92702, "Follow-up on Traditional Enforcement Actions including Violations, Deviations, Confirmatory Action Letters, Confirmatory Orders, and Alternative Dispute Resolution Confirmatory Orders"

.1 (Closed) Unit 2 VIO 05000247/2012009-01 and Unit 3 VIO 05000286/2012008-01

a. Inspection Scope

The team performed a follow-up inspection for two Green NOVs discussed in NRC Inspection Reports 05000247/2012009 and 05000286/2012008 (ML12229A128) dated August 16, 2012. The violations involved the failure to restore compliance with NRC fire protection regulations within a reasonable amount of time after the identification of the violations. The objective of this inspection was to verify that Entergy had performed adequate corrective actions to restore compliance.

The team reviewed the changes made by Entergy to their safe shutdown (SSD) methodology, as described in Entergy letters to the NRC dated May 2, 2013, for Unit 3 (ML13142A226) and April 29, 2014, for Unit 2 (ML14135A290). Specifically, to verify that the SSD capabilities were properly protected from fire damage, the team assessed changes to the fire protection program (FPP), fire hazard analysis, post-fire SSD analyses, and supporting drawings and documents. To assess whether the revised SSD methodology and operating procedures could adequately achieve and maintain post-fire SSD without reliance on an unapproved OMA, the team interviewed the fire protection and SSD engineers and licensed operators. In addition, the team reviewed the post-fire SSD operating procedures to verify whether Entergy relied upon any OMAs that had not been granted an exemption. The team's review included an assessment of the adequacy of selected systems for reactor pressure control, reactivity control, reactor coolant makeup, decay heat removal, process monitoring, and associated support system functions.

The team evaluated equipment and cable separation to determine whether the applicable separation requirements of Section III.G of 10 CFR Part 50, Appendix R, and the design and licensing bases were maintained for the credited SSD equipment and their supporting power, control, and instrumentation cables. The team compared the redundant equipment fire barriers, penetration seals, and electrical raceway and conduit fire barriers (e.g., fire protection wrap) to design and licensing basis requirements and industry standards to verify that material and configuration were appropriate for the required fire rating and conformed to the appropriate requirements.

In addition, the team reviewed Entergy's revised SSD methodology to determine whether the electrical circuits and cables associated with the revised methodology were:

- adequately protected from potential fire damage; or
- analyzed to show that fire-induced faults (e.g., hot shorts, open circuits, and shorts to ground) would not prevent SSD; or
- analyzed to show that potential damage could be mitigated with approved OMAs, in order to verify whether fire-induced faults could adversely impact SSD capabilities.

The team's evaluations considered: credible fire scenarios; cable insulation attributes, failure modes, routing; and common power supply or electrical bus configurations.

The team reviewed cable raceway drawings and cable routing databases to determine whether the cables were routed as described in the SSD analysis. The team's review included the engineering evaluations, installation work orders, and qualification records for those new fire barriers now credited to prevent fire damage in lieu of the unapproved OMAs. The team walked down equipment and cables where Entergy now relied upon separation and/or fire barriers to provide SSD equipment protection from fire damage, in lieu of the unapproved OMAs, to identify any potential degradation or non-conformances.

b. Findings and Observations

Overall the team concluded that Entergy's actions to address the unapproved OMA issues were adequate. Table 1 (Unit 2) and Table 2 (Unit 3) below contain the team's specific inspection scope, observations, and conclusions for each OMA.

Table 1: IP Unit 2 Unapproved OMA Inspection Scope and Conclusions

OMA No.[1]	Fire Area[1] ------ Fire Zones[1]	Entergy's Completed Corrective Actions[1]	Entergy's OMA Description[1] ------ NRC Inspection Scope and Conclusions
5	F ------ 27A 33A 59A	Revise Appendix R SSD analysis and methodology to credit equipment train independent of the fire area/zone, thereby eliminating this OMA	OMA 5[1] Open HCV-142 bypass valve 227 to align charging pump make-up path to the Reactor Coolant System (RCS). Adequately Resolved. The team reviewed Engineering Change EC-39731 and Engineering Evaluation IP-RPT-12-00033, which evaluated the use of the reactor coolant pump (RCP) seal injection line in place of the normal charging line for RCS make-up. Entergy determined that the seal injection supply lines had normally open manual valves and normally open motor-operated valves (MOV) which were administratively controlled de-energized. Therefore, Entergy eliminated this OMA by the use of a different make-up flow path that would not be adversely affected by a fire in Fire Area F. The team evaluated the seal injection line availability and susceptibility to fire damage. Specifically, the team assessed the MOV power circuits to verify that administrative controls maintained them de-energized in the open position, to ensure that a fire-induced failure for a fire in Fire Area F could not spuriously close the required valves. The team also verified that Unit 2 did not have a vulnerability similar to that identified in Unit 3, for the use of seal injection as the RCS make-up flow path (see Table 2, OMA 9). No similar vulnerability existed because of differences in fire area configuration, cables routing, and equipment location.

6	F ------ 5A 6 22A	Revise Appendix R SSD analysis and methodology to credit equipment train independent of the fire area/zone and implement modification to establish separate fire area OR implement modification to protect circuits of concern, thereby eliminating this OMA	OMA 6[1] Align charging pump suction source to the Refueling Water Storage Tank (RWST). Adequately Resolved. The team reviewed EC-41582, which (1) installed a new 3-hour fire-rated Electrical Raceway Fire Barrier System (ERFBS) and enclosure for LCV-112C (volume control tank outlet valve), (2) installed new cables with a different cable routing for LCV-112C and LCV-112B (RWST outlet valve), and (3) relocated the backup nitrogen (N_2) supply bottle for LCV-112B into a different fire area. The team walked down the accessible fire barriers and equipment to independently evaluate material conditions and configuration of the new 3-hour rated barriers for LCV-112C, the new cables and cable routing, and the backup N_2 bottle to determine whether they were installed in accordance with regulatory and design requirements.
6	F ------ 7A 27A	Implement modification to protect circuits of concern, thereby eliminating this OMA	OMA 6[1] Align charging pump suction source to the Refueling Water Storage Tank (RWST). Adequately Resolved. The team reviewed EC-41582, which evaluated the 22 charging pump room boundary and created a new fire area, designated Fire Area R (i.e., 22 charging pump room). The team walked down the new fire area boundary to independently evaluate the material conditions and configuration of Fire Area R to verify whether the new barrier satisfied regulatory and design requirements for a 3-hour fire-rated barrier. In addition, the team evaluated the new Fire Area R 3-hour fire-rated barrier to determine whether it provided adequate protection for the 22 charging pump, its associated circuits, and its supports systems from the effects of fire in Fire Area F.

			The team noted that Entergy also evaluated the use of the safety injection (SI) system as an SSD method for postulated fires in the new Fire Area R. Entergy performed an analysis to demonstrate that SI had sufficient capacity and capability to perform the RCS make-up function. The analysis was performed to resolve OMA 13 (see OMA 13 in this table).
7	F ------ 6 7A	Revise Appendix R SSD analysis and methodology to credit equipment train independent of the fire area/zone, thereby eliminating this OMA	OMA 7[1] Transfer instrument buses 23 and 23A to alternate power. Adequately Resolved. The team reviewed EC-41610 and IP-RPT-12-00046, which determined that off-site power would remain available (e.g., free of fire damage) for a fire in Fire Area F. The team independently assessed whether off-site power could be adversely affected by a fire in Fire Area F.
8	H ------ 72A 77A 84A 85A 87A	Revise Appendix R SSD analysis and methodology to credit equipment train independent of the fire area/zone, thereby eliminating this OMA	OMA 8[1] Fail open valves 204A (charging flow to Loop 2 hot leg) and 204B (charging flow to Loop 1 cold leg) to align charging pump make-up path to the RCS. Adequately Resolved. The team reviewed EC-39731 and IP-RPT-12-00033, which determined that this OMA was not necessary for a III.G.2 fire in Fire Area H (Containment Building). The report also determined that this manual action outside of the control room would remain valid, as a back-up action, for a III.G.3 fire scenario which would result in a control room evacuation. However, operator actions in response to a III.G.3 fire do not require NRC review or approval. In order to maintain the normal charging flow path, 2-ONOP-FP-001 directed operators to remove control power fuses or open DC circuit breakers, to de-energize and fail open valves 204A and 204B. The team walked down the fuse and breaker panels, located in the control room, and reviewed the procedure steps to verify the adequacy of the control room action to replace the field manual action.
	H ------ 75A	Revise Appendix R SSD analysis and methodology to credit a train of equipment free of fire damage in the fire area/zone, thereby eliminating this OMA	

9, 10	H ------ 75A 77A 87A	Implement modification to protect circuits of concern, thereby eliminating this OMA	OMA 9[1] Activate or enable Alternate Safe Shutdown System pneumatic instruments (steam generator level, pressurizer pressure and level) at the Fan House local control panel. OMA 10[1] Enable Alternate Safe Shutdown System source-range channel and Loop 21 and 22 hot leg (T_h) and cold leg (T_c) temperature channels. Adequately Resolved. The team reviewed EC-42090, which modified the affected instrument circuits by installing new cables from the alternate SSD panel to the control room and installed isolated readouts and solenoid valve controls in the control room, to eliminate these field actions to activate the alternate indications and controls. The team walked down the new instruments and controls in the Unit 2 control room to verify adequacy of the new controls.
11	J ------ 19 39A 43A 45A 46A 47A 50A	Reassess electrical circuit and power supply loading analyses and revise Appendix R SSD analysis and methodology to provide the basis for elimination of this OMA	OMA 11[1] Trip breakers 52/5A and 52-SAC on Bus 5A and 52/6A and 52/TAO at Bus 6A and remove control power fuses. Adequately Resolved. The team reviewed EC-39731 and IP-RPT-12-00033, which analyzed selected electrical circuits and power supply loading. The team reviewed electrical schematic drawings associated with breakers 52-5A and 52-6A to determine whether a fire in Fire Area J could result in a failure to trip the incoming feeder breakers 5A and 6A.

12	J ------ 25 39A 43A 46A 50A 270	Revise Appendix R SSD analysis and methodology to credit equipment train independent of the fire area/zone, thereby eliminating this OMA	OMA 12[1] Transfer Instrument Buses 23 and 23A to emergency power source. Adequately Resolved. The team reviewed EC-41610 and IP-RPT-12-00046, which evaluated existing design features of the 23 inverter and determined that this OMA was not required. The 23 inverter was equipped with a static transfer switch that automatically transferred the inverter loads from the inverter's AC output to an alternate AC power source on loss of normal DC input to the inverter. The team reviewed schematic drawings, the transfer switch setpoint settings, and maintenance work orders which documented as-found and as-left settings, to verify whether the automatic transfer function would be adversely affected for a fire in Fire Area J.
13	J ------ 43A 46A	Revise Appendix R SSD analysis and methodology to credit equipment train independent of the fire area/zone, thereby eliminating this OMA	OMA 13[1] Align charging pump suction to RWST. Adequately Resolved. However, the team identified a finding, which was subsequently corrected by Entergy, related to the adequacy of the analysis used to determine that SI was adequate to replace charging for RCS make-up (see this report, Section 4OA5.1.1). The team subsequently reviewed Entergy's follow-up corrective actions to the team's observations and concluded that they were reasonable and appropriate. The team reviewed EC-41610 and IP-RPT-12-00046, which determined that an SI pump (operated from the control room) had sufficient capacity and capability to replace the charging system for the RCS make-up function, for a fire in Fire Area J. Therefore, Entergy revised the SSD strategy to rely on a SI pump for make-up, thereby eliminating this OMA.

			The team reviewed the SI system requirements to independently determine whether Entergy's evaluation had adequately identified the necessary support equipment and instrumentation. The team also reviewed IP-RPT-13-00022, which performed a thermo-hydraulic analysis for the use of SI during a postulated fire event. The team assessed the assumptions and modeling scenario to determine whether the analysis conservatively bounded the worst case fire scenario for a fire in the affected fire areas. The team evaluated the adequacy of fire area barriers between the safety injection pump room and the Fire Area J to determine whether they satisfied regulatory and design requirements. The team also reviewed cable routing data to verify whether the necessary components, support equipment, and instrumentation would remain free of fire damage for a fire in the affected fire areas. Finally, the team reviewed 2-ONOP-FP-001 and selected emergency operating procedures (EOP) to verify whether adequate written instructions were provided to operators to use SI system during a postulated fire event.
14	K ------ 60A 65A	Implement modification to protect circuits of concern, thereby eliminating this OMA	OMA 14[1] Operate transfer switch EDC5 and close supply breaker at substation 12FD3 to transfer 21 AFW Pump to Alternate Safe Shutdown System power source. Adequately Resolved. The team reviewed EC-37968, which encapsulated selected circuits with a 3-hour fire-rated ERFBS to protect them from fire damage for a fire in Fire Area K. The team reviewed modification documents, engineering evaluations, and walked down the ERFBS to independently verify whether the as-installed configuration satisfied regulatory and design requirements.

15	K ------ 60A 65A	Implement modification to protect circuits of concern, thereby eliminating this OMA	OMA 15[1] Open 21 AFW Pump recirculation bypass valve BFD-77. Adequately Resolved, as described for OMA 14
19	K ------ 60A 65A	Implement modification to protect circuits of concern, thereby eliminating this OMA	OMA 19[1] Operate 21 AFW Pump flow control valves to control AFW flow to Steam Generators 21 & 22. Adequately Resolved, as described for OMA 14
20	F ------ 7A	Implement modification to protect circuits of concern, thereby eliminating this OMA	OMA 20[1] Locally operate 21 Charging Pump scoop tube positioner. Adequately Resolved. The team reviewed EC-40404, which modified the control circuit for the 21 charging pump to allow operators to remotely operate the pump's circuit breaker from the control room. The modification also installed a control selector switch in the control room, which allowed operators to run the pump at high speed. The team reviewed electrical schematic drawings, and walked down the new controls to verify whether the new control room controls adequately replaced the previous OMAs, and to verify whether those controls could be adversely affected by a fire in Fire Area F.
21	F ------ 7A	Implement modification to protect circuits of concern, thereby eliminating this OMA	OMA 21[1] Locally start 21 Charging Pump using the emergency control station located in the 480V Switchgear Room. Adequately Resolved, as described for OMA 20

Note (1): As identified in Entergy's response letter, Attachment 1, to the NRC, dated April 29, 2014 (ML14135A290).

Table 2: IP Unit 3 Unapproved OMA Inspection Scope and Conclusions

OMA No.[1]	Fire Area[1] ------ Fire Zones[1]	Entergy's Completed Corrective Actions[1]	Entergy's OMA Description[1] ------ NRC Inspection Scope and Conclusions
2	ETN-4{1} ------ 7A	Revise Appendix R SSD analysis and methodology to credit existing separation within the fire area/zone, thereby eliminating this OMA	OMA 2[1] Swap 32 Component Cooling Water (CCW) pump to alternate power supply or align city water to charging pumps. Adequately Resolved. The team reviewed EC-35373 and IP-RPT-12-00008, which evaluated the separation between cables located on the tunnel's north side to cables located on the tunnel's south side. Entergy identified that previous NRC exemptions approved the existing separation to satisfy the requirements for protection of redundant trains within the same fire area (exemptions dated January 7, 1987 (ML003779008) and February 2, 1984 (ML003779284). Entergy determined that this OMA was not required because the approved separation criteria provided adequate fire protection for redundant equipment trains on the north and south side of the tunnel in Fire Area ETN-4{1}. The team reviewed cable routing data to verify whether redundant circuits were adequately separated, in accordance with the approved exemptions. The team walked down this fire area to evaluate whether the fire protection features conformed to those described in the exemption requests, which included an automatic fire detection system providing area-wide coverage, a pre-action automatic sprinkler system covering all the cables in the trays through the area, manual hose stations, and portable fire extinguishers.

3	ETN-4{1} ------ 7A	Revise Appendix R SSD analysis and methodology to credit existing separation within the fire area/zone, thereby eliminating this OMA	OMA 3[1] Operate 480V Bus 3A breaker locally to start 31 AFW Pump. Adequately Resolved, as described for OMA 2
4	ETN-4{1} ------ 7A	Revise Appendix R SSD analysis and methodology to credit existing separation within the fire area/zone, thereby eliminating this OMA	OMA 4[1] Locally operate the bypass valve for Flow Control Valve (FCV)-1121 in support of use of 31 AFW pump. Adequately Resolved, as described for OMA 2
5	ETN-4{1} ------ 60A	Revise Appendix R SSD analysis and methodology to credit existing separation within the fire area/zone, thereby eliminating this OMA	OMA 5[1] Operate HCV-1118 manually to control 32 AFW pump. Adequately Resolved, as described for OMA 2
6	ETN-4{1} ------ 7A 60A	Revise Appendix R SSD analysis and methodology to credit existing separation within the fire area/zone, thereby eliminating this OMA	OMA 6[1] Align Appendix R Diesel Generator (ARDG) to 480V Buses 2A, 3A, 5A, and 312. Adequately Resolved, as described for OMA 2
7	ETN-4{1} ------ 7A 60A	Revise Appendix R SSD analysis and methodology to credit existing separation within the fire area/zone, thereby eliminating this OMA	OMA 7[1] Swap 31 or 32 charging pump to alternate power supply. Adequately Resolved, as described for OMA 2

8	ETN-4{1} ------ 7A 60A	Revise Appendix R safe shutdown analysis and methodology to credit existing separation within the fire area/zone, thereby eliminating this OMA	OMA 8[1] Locally operate FCV-405B, FCV-405D, or FCV-406B to control AFW flow to Steam Generators (SGs). Adequately Resolved, as described for OMA 2
9	ETN-4{1} ------ 60A	Revise Appendix R SSD analysis and methodology to credit existing separation within and/or independent of the fire area/zone, thereby eliminating this OMA	OMA 9[1] Locally open valve 227 to establish charging [previously "CVCS"] makeup flowpath to Reactor Coolant System (RCS). Adequately Resolved. However, the team identified a finding, which was subsequently corrected by Entergy, related to an inadequate procedure revision for the use of seal injection as the RCS make-up flow path (see this report, Section 4OA5.1.3). The team subsequently reviewed Entergy's follow-up corrective actions to the team's observations and concluded that they were reasonable and appropriate. The team reviewed IP-RPT-12-00047, which evaluated the use of the RCP seal injection line in place of the normal charging line for RCS make-up. Entergy determined that the seal injection supply lines had normally open manual valves and normally open MOVs which were administratively controlled de-energized. Therefore, Entergy eliminated this OMA by the use of a different make-up flow path that would not be adversely affected by a fire in Fire Area ETN-4{1}. The team evaluated the seal injection line availability and susceptibility to fire damage. Specifically, the team assessed the MOV power circuits to verify whether administrative controls maintained them de-energized in the open position, to ensure that a fire-induced failure could not spuriously close the required valves.

10	ETN-4{1} ------ 60A	Implement modification to protect circuits of concern for valves LCV-112B and LCV-112C, thereby eliminating this OMA	OMA 10[1] Locally close Level Control Valve (LCV)-112C and open valve 288 to align charging pump suction to the Refueling Water Storage Tank (RWST). Adequately Resolved. The team reviewed EC-40329, which installed a 1-hour rated fire barrier around the power and control cables for valves LCV-112B and LCV-112C in Fire Area ETN-4{1} Fire Zone 60A. The team walked down the newly installed fire barriers to independently determine whether they were installed as required by design and regulatory requirements. The team assessed the fire protection features in this fire area to verify whether a 1-hour rated fire barrier provided adequate fire protection. The fire protection features included an automatic fire detection system providing area-wide coverage, a pre-action type automatic sprinkler system covering all the cables in the tray through the area, manual hose stations, and portable fire extinguishers.
11	ETN-4{1} ------ 60A	Revise Appendix R SSD analysis and methodology to credit existing separation within the fire area/zone, thereby eliminating this OMA	OMA 11[1] Locally operate Pressure Control Valve PCV-1139 to ensure steam supply to 32 AFW Pump. Adequately Resolved, as described for OMA 2

12	ETN-4{1} ------ 60A	Revise Appendix R SSD analysis and methodology to credit existing separation within and/or independent of the fire area/zone, thereby eliminating this OMA	OMA 12[1] Locally operate PCV-1310A and PCV-1310B to ensure steam supply to 32 AFW pump. Adequately Resolved. The team reviewed IP-RPT-12-00047, which evaluated existing separation in electrical tunnel Fire Area ETN-4{1} zone 60A and credited the control room action to de-energize the control power circuit to fail open valves PCV-1301A and PCV-1310B. The team reviewed the revised procedure 3-ONOP-FP-001 that added a new step for a control room operator action to ensure that these steam supply valves to 32 AFW pump were maintained open.
13	ETN-4{1} ------ 60A	Implement power/control circuit modification to ensure post-fire functionality of the Service Water strainers for III.G.2 fire scenarios, thereby eliminating this OMA	OMA 13[1] Locally manually perform Service Water (SW) pump strainer backwash as required. Adequately Resolved. The NRC previously identified a non-cited violation (NCV) in NRC Inspection Report 05000247/2011010 and 05000286/2011008, ML111920339) related to this OMA. In the May 2011 inspection, the NRC determined that Entergy had not established an adequate interim compensatory measure for this OMA. During this inspection, the team reviewed EC-36675, which modified the power circuit of the SW strainers, such that the circuit was protected from the effects of a fire in Fire Area ETN-4{1}. New power feed for the strainers (SWP 32 and 35, and Appendix R SWP 38) was provided directly from the pump motor terminals. The team performed a walk down and visually inspected the components.

14	ETN-4{3} ------ 73A	Revise Appendix R SSD analysis and methodology to credit existing separation within and/or independent of the fire area/zone, thereby eliminating this OMA	OMA 14[1] Operate HCV-1118 manually to control 32 AFW pump. Adequately Resolved. The team reviewed IP-RPT-12-00047, which determined that the 31 AFW pump, necessary support equipment, and instrumentation would remain free of fire damage for a fire in Fire Area ETN-4{3} because the associated cables were not routed through this fire area. Therefore, Entergy revised the SSD strategy to rely on 31 AFW, thereby eliminating this OMA. The team reviewed cable routing data to verify whether the required circuits were routed outside of this fire area.
15	ETN-4{3} ------ 73A	Revise Appendix R SSD analysis and methodology to credit existing separation within and/or independent of the fire area/zone, thereby eliminating this OMA	OMA 15[1] Locally operate PCV-1139 to ensure steam supply to 32 AFW pump. Adequately Resolved, as described for OMA 14
16	ETN-4{3} ------ 73A	Revise Appendix R SSD analysis and methodology to credit existing separation within and/or independent of the fire area/zone, thereby eliminating this OMA	OMA 16[1] Locally operate 32 PCV-1310A, PCV-1310B to ensure steam supply to 32 AFW pump. Adequately Resolved, as described for OMA 14
17	ETN-4{3} ------ 73A	Revise Appendix R SSD analysis and methodology to credit existing separation within and/or independent of the fire area/zone, thereby eliminating this OMA	OMA 17[1] Locally operate FCV-405C and FCV-405D to control AFW flow to SG. Adequately Resolved, as described for OMA 14

18	PAB-2{3} ------ 6	Revise Appendix R SSD analysis and methodology to credit equipment train independent of the fire area/zone, thereby eliminating this OMA	OMA 18[1] Locally close valve LCV-112C and open valve 228 to align charging pump suction path to RWST. Adequately Resolved. However, the team identified two findings, which were subsequently corrected by Entergy, related to the adequacy of the analyses used to determine that SI was adequate to replace charging for RCS make-up (see this report, Sections 4OA5.1.1 and 4OA5.1.2). The team subsequently reviewed Entergy's follow-up corrective actions to the team's observations and concluded that they were reasonable and appropriate. The team reviewed EC-53064 and IP-RPT-12-00043, which determined that a SI pump (operated from the control room) had sufficient capacity and capability to replace the charging system for the RCS make-up function, for a fire in Fire Areas PAB-2{3} and PAB-2{5}. Therefore, Entergy revised the SSD methodology to rely on the 32 SI pump for make-up, thereby eliminating this OMA. The team reviewed the SI system requirements to independently determine whether Entergy's evaluation had adequately identified the necessary support equipment and instrumentation. The team also reviewed IP-RPT-13-00022, which performed a thermo-hydraulic analysis for the use of SI during a postulated fire event. The team assessed the assumptions and modeling scenario to determine whether the analysis conservatively bounded the worst case fire scenario for a fire in the affected fire areas. The team also reviewed cable routing data to verify whether the necessary components, support equipment, and instrumentation would remain free of fire damage for a fire in the affected fire areas.

			In addition, EC-53064 created a new fire area, designated Fire Area PAB-2{6}, which encompassed the SI pump room and associated circuits within the primary auxiliary building (PAB). The team performed extensive walkdowns of the fire barrier boundary between Fire Area PAB-2{6} and the adjacent fire areas to independently verify whether (1) the fire barrier's as-built configuration was consistent with the barrier's analysis, and (2) combustible loading and fixed ignition sources were consistent with the analysis assumptions. Finally, the team reviewed procedures 3-ONOP-FP-001 and selected EOPs to verify whether adequate written instructions were provided to operators to use SI system during a postulated fire event.
19	PAB-2{5} ------ 17A 19A	Revise Appendix R SSD analysis and methodology to credit equipment train independent of the fire area/zone, thereby eliminating this OMA	OMA 19[1] Locally close supply breaker for 32 Charging [previously "CVCS"] Pump. Adequately Resolved, as discussed for OMA 18
20	PAB-2{5} ------ 17A 19A	Revise Appendix R SSD analysis and methodology to credit equipment train independent of the fire area/zone, thereby eliminating this OMA	OMA 20[1] Locally control 32 charging pump using scoop tube positioner. Adequately Resolved, as discussed for OMA 18
21	PAB-2{5} ------ 59A	Revise Appendix R SSD analysis and methodology to credit equipment train independent of the fire area/zone, thereby eliminating this OMA	OMA 21[1] Open bypass valve 227 to establish charging flowpath to RCS around potentially failed closed HCV-142. Adequately Resolved, as discussed for OMA 18

22	PAB-2{5} ------ 17A 20A 27A 30A	Revise Appendix R SSD analysis and methodology to credit equipment train independent of the fire area/zone, thereby eliminating this OMA	OMA 22[1] Locally close LCV-112C and open bypass valve 288 to establish flowpath from RWST to charging pump suction. Adequately Resolved, as discussed for OMA 18
23	TBL-5 ------ 52A	Implement modification to protect affected circuits in this zone, thereby eliminating this OMA	OMA 23[1] Locally operate [bypass valve for] FCV-1121 AFW pump recirculation valve during pump startup. Adequately Resolved. The team reviewed EC-38081, which modified the configuration of the electrical conduit that contains the circuit of concern. The modification consisted of embedding the exposed conduit in a concrete barrier, providing 3-hour rated fire barrier. The team performed a walk-down of the area to inspect the barrier.
24	TBL-5 ------ 52A 54A	Implement modification to protect affected circuits in this zone, thereby eliminating this OMA	OMA 24[1] Locally operate FCV- 406A and FCV-406B to control AFW flow to SGs. Adequately Resolved. The team reviewed EC-38081, which modified the associated circuits of Instrument Bus 33, by installing fuses, coordinated with up-stream breakers, to protect Instrument Bus 33 from fire damage. Instrument Bus 33 provided the control power to valves FCV-406A and FCV-406B. Therefore, Entergy determined that this OMA was no longer required because the control circuits for valves FCV-406A and FCV-406B were no longer susceptible to fire damage. The team reviewed the revised schematic drawings to verify whether the new fuses provided adequate protection for conductor-to-conductor or conductor-to-ground shorts, to ensure that the SSD function would remain in-service.

25	TBL-5 ------ 37A 38A 43A 44A	Implement power/control circuit modification to ensure post-fire functionality of the Service Water strainers for III.G.2 fire scenarios, thereby eliminating this OMA	OMA 25[1] Locally/manually backwash SW pump strainer as required if power to strainer associated with selected SW pump is lost (use one of STR PMP-31 through STR PMP-36). Adequately Resolved, as discussed for OMA 13
26	YARD-7 ------ 22	Reevaluate Appendix R SSD analysis, methodology, and fire protection licensing basis to validate whether the OMA may be eliminated	OMA 26[1] Locally start ARDG to supply Motor Control Center (MCC) 312A in support of the use of SW pump 38. Adequately Resolved. Entergy determined that this OMA was not required because the revised SSD analysis showed that off-site power was not affected by the fire-induced failures due to a fire in Fire Area YARD-7, when the existing III.G.2 separation was credited, as approved in a previous exemption dated February 2, 1984 (ML003779284). The team reviewed IP-RPT-12-00047 to verify that off-site power remains free of fire damage.
27	YARD-7 ------ 22 222	Implement power/control circuit modification to ensure post-fire functionality of the Service Water strainers for III.G.2 fire scenarios, thereby eliminating this OMA	OMA 27[1] Locally/manually backwash SW pump strainer as required if power to strainer associated with selected SW pump is lost. Adequately Resolved, as discussed for OMA 13

Note (1): As identified in Entergy's response letter, Attachment 2, to the NRC, dated April 29, 2014 (ML14135A290).

.1 (Unit 2 and 3) Inadequate Analysis of Safety Injection Make-Up Capability

Introduction: The team identified a finding of very low safety significance (Green), involving an NCV of IP Units 2 and 3 Facility Operating Licenses (FOL) Conditions 2.K and 2.H, respectively, because Entergy did not implement and maintain in effect all provisions of the FPP, as approved by the NRC. Specifically, Entergy revised the SSD methodology to use one train of the SI system as the credited RCS make-up source, in certain fire areas. However, Entergy's thermo-hydraulic analysis was not consistent with the conditions analyzed in the SSD analysis or with the operating procedures. Therefore, the team concluded that Entergy had not adequately analyzed the effects of fire damage to ensure that operators could achieve SSD using the prescribed SSD method.

Description: Entergy's engineering evaluations IP-RPT-12-00046 (Unit 2) and IP-RPT-12-00043 (Unit 3) evaluated the use of one train of SI, operated from the control room, for the RCS make-up function in order to eliminate Unit 2 OMA 13 (Table 1) and Unit 3 OMAs 18, 19, 20, 21, and 22 (Table 2) which had been previously credited to recover the charging system for postulated fires in Unit 2 Fire Area J and Unit 3 Fire Areas PAB-2{3} and PAB-2{5}. Specifically, Entergy's thermo-hydraulic analysis concluded that one SI pump had sufficient capacity and capability to replace a charging pump. Entergy used the SSD performance criteria as the analytical acceptance criteria for the use of SI, which was that the pressurizer level would remain in the indicated range, and the RCS would remain subcooled with one SI pump in-service.

The team identified that IP-RPT-13-00022, "Unit 3 Appendix R Thermo-Hydraulic Analysis for Safety Injection," used assumptions that were not consistent with the fire damage scenarios predicted by the SSD analysis and modeled equipment operation differently than the approved fire response and EOPs. Specifically, the thermo-hydraulic analysis assumed that fire-induced circuit failures in fire areas PAB-2{3} and PAB-2{5} would cause a loss of off-site power and therefore, the RCPs would be de-energized. The team reviewed IP3-ANAL-FP-01503, "Unit 3 SSD Analysis," and determined that the off-site power circuits were not affected by fire-induced circuit failures in those fire areas and, therefore, the RCPs would remain energized. The analysis also assumed that the operators would open one power operated relief valve (PORV), using the EOPs, to reduce reactor pressure and allow SI to inject to maintain pressurizer level in the indicated range. Based on these assumptions, the analysis predicted that pressurizer level would remain in the indicated range. However, the team determined that the EOPs did not direct operators to manually open a PORV, as assumed in the analysis. In addition, the analysis stated that the subcooling margin would not be maintained in the upper reactor vessel head region if the SI pump performance decreased by more than 3 percent. The team identified that Entergy's Technical Specifications In-Service Test program allowed up to a 5 percent decrease in pump performance as acceptable, with no additional evaluations (e.g., an SI pump could degrade below the level needed to support the SSD methodology with no additional corrective action). Based on team questions, Entergy demonstrated the SSD method (e.g., use of SI) in the facility simulator under expected fire damage conditions. However, the simulated plant

operating parameters during the postulated fire event did not satisfy the SSD performance criteria to maintain pressurizer level in the indicated range. Entergy entered this issue into its corrective action program (CAP) as CR-IP3-2014-02688. Interim compensatory measures included roving fire watches in all affected fire areas.

The team also identified that Entergy did not have a Unit 2 specific thermo-hydraulic analysis. For Unit 2, IP-RPT-12-00046 approved the use of SI based on the Unit 3 analysis because of unit similarity. Entergy entered this issue into its CAP as an extent of condition review as part of the Unit 3 condition report CR-IP3-2014-02688. Interim compensatory measures included roving fire watches in all affected fire areas.

Entergy performed a more detailed thermo-hydraulic re-analysis (IP-RPT-15-00003) for both Unit 2 and Unit 3 to demonstrate that adequacy of SI to replace charging for RCS make-up. The results of the re-analysis showed that the pressurizer level was briefly lost, but subsequently recovered to a level below the wide range instrument level tap, for the remainder of the analytical run. Although pressurizer level did not remain in the indicated range, the re-analysis demonstrated that the reactor vessel level and subcooling margins were satisfactory. Entergy also revised the Unit 2 and Unit 3 SSD analysis performance criteria for the RCS make-up function to allow use of a more detailed analytical method to demonstrate acceptability. The team reviewed Entergy's thermo-hydraulic re-analysis and SSD analysis revisions and concluded that Entergy's corrective actions were reasonable and appropriate.

Analysis: The failure to adequately analyze SSD equipment capability was a performance deficiency. Specifically, Entergy's SSD methodology for a fire in Unit 2 Fire Area J and Unit 3 Fire Areas PAB-2{3} and PAB-2{5} relied on SI for make-up, but the fire damage scenario assumptions used in the thermo-hydraulic analysis were inconsistent with the fire damage predictions of the SSD analysis.

This finding was more than minor because it was similar to Example 3.k of NRC IMC 0612, Appendix E, "Examples of Minor Issues," which determined that analytical errors would be more than minor if, as a result of the errors, there was reasonable doubt of the operability of the component. For this issue, the team had a reasonable doubt of operability as to whether the use of SI could satisfy Entergy's performance criteria to maintain pressurizer level in the indicated range, and as to whether saturated conditions would be reached in the RCS, if the pressurizer were allowed to empty and level could not be recovered. In addition, the finding was associated with the Protection Against External Factors (e.g., Fire) attribute of the Mitigating Systems Cornerstone and affected the objective to ensure the reliability and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage).

The team performed Significance Determination Process (SDP) screening for this issue, in accordance with IMC 0609, Appendix F, "Fire Protection SDP." This finding affected the post-fire SSD category because the design analysis and implementing procedures were adversely affected. This finding was screened to very low safety significance (Green). It was assigned a low degradation rating because Entergy's subsequent

evaluation adequately demonstrated that the credited train of SI provided sufficient flow under the postulated scenario to maintain the reactor coolant system in a sub-cooled condition, and subsequently changed the SSD analysis.

This finding had a cross-cutting aspect in the area of Human Performance, Documentation, because Entergy did not maintain complete, accurate, and up-to-date documentation used as critical design inputs for a thermo-hydraulic analysis. Specifically, when Entergy performed the thermo-hydraulic to validate the use of SI, the design assumptions used were not up-to-date and accurate with the expected plant conditions described in the SSD analysis (e.g., licensing basis) or with the expected operator actions required by the EOPs. [H.7]

Enforcement: Indian Point Units 2 and 3 FOL Conditions 2.K and 2.H, respectively, in part, required Entergy to implement and maintain in effect all provisions of the FPP, as approved by the NRC. IP-RPT-05-00071, "Unit 2 Safe Shutdown Analysis," and IP3-ANAL-FP-01503, "Unit 3 Safe Shutdown Analysis," Sections 5.3, "Hot Shutdown Functions," both stated that reactor coolant make-up and inventory was maintained by ensuring that sufficient level in the pressurizer was maintained. IP-RPT-05-00071, Section 6.1.8, and IP3-ANAL-FP-01503, Section 6.1.9, "Safe Shutdown Systems - Reactor Coolant System," both stated that RCS subcooling was achieved by maintaining RCS system pressure in excess of the saturation pressure associated with the hot leg temperature, in part, by monitoring pressurizer level, which indicated RCS coolant inventory.

Contrary to the above, from December 31, 2012, until January 30, 2015, Entergy did not ensure that pressurizer level would be maintained during the use of SI for RCS make-up. Specifically, the thermo-hydraulic analysis of SI did not conservatively envelope the expected plant conditions, and a plant simulator demonstration did not indicate that pressurizer level could be maintained. Entergy revised the thermo-hydraulic and SSD analyses to correct these deficiencies. Because this violation was of very low safety significance (Green) and was entered into Entergy's CAP (CR-IP3-2014-02688), this violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000247,286/2014011-01, Inadequate Analysis of Safety Injection Make-Up Capability)**

.2 (Unit 3) Inadequate Fire Barrier Analysis

Introduction: The team identified a finding of very low safety significance (Green), involving an NCV of IP Unit 3 FOL Condition 2.H, because Entergy did not implement and maintain in effect all provisions of the FPP, as approved by the NRC. Specifically, Entergy evaluated a new fire barrier and determined that it provided adequate separation between redundant SSD trains within the same fire area. However, the new barrier did not satisfy regulatory requirements. In addition, Entergy failed to include the new barrier in their barrier surveillance program and did not update design drawings, as required.

Description: The team reviewed engineering change EC-41486 and IP-RPT-12-00043, which evaluated the existing structural features within Fire Area PAB-2{5}, as well as associated cable routing, to determine whether they were adequate to protect a redundant train for RCS make-up, in this case SI, from a postulated significant fire in Fire Area PAB-2{5} in order to eliminate Unit 3 OMAs 18, 19, 20, 21, and 22 (Table 2). Entergy determined that the structural features provided an adequate barrier for the specific hazards, based on spatial separation and partial non-rated barriers between the cables and components of SI and the charging system.

The team reviewed Entergy's evaluation and determined that those structural features which Entergy relied on as fire barriers between redundant trains within the same fire area did not satisfy the regulatory requirements. Specifically, Section III.G.2 required that redundant trains within the same fire area be protected by either:

- 3-hour rated fire barrier; or
- 1-hour rated fire barrier with automatic fire suppression and detection systems; or
- 20 feet combustible free zone with automatic fire suppression and detection systems.

Furthermore, the team identified that those barriers were not placed in Entergy's fire barrier surveillance program to periodically inspect those barriers, as required by Entergy's FPP. In addition, the fire barrier arrangement drawings were not revised or updated to show the new credited barriers. The team performed independent walkdowns on both sides of the new fire barrier, to the extent practicable, to evaluate material conditions, combustible loading, and barrier penetration configuration, and compared their observations to Entergy's barrier evaluation. During the walkdowns, the team identified unsealed penetrations which the evaluation had not considered. The team also identified that the evaluation's assumptions for transient combustible loading were not consistent with the EN-DC-161, "Control of Combustibles." Entergy entered these issues into its CAP as CR-IP3-2014-01132. Interim compensatory measures included roving fire watches in all affected fire areas.

Entergy promptly corrected this issue by performing a more detailed barrier evaluation, including walkdowns on both sides of the new barriers in all accessible areas. Entergy re-evaluated the SI fire boundary as a barrier between fire areas rather than a barrier between redundant trains within the same fire area, in accordance with the guidance in Generic Letter 86-10, "Implementation of Fire Protection Requirements," Enclosure 1, "Interpretations of Appendix R," Section 4, "Fire Area Boundaries." Generic Letter 86-10 stated that fire area boundaries need not be completely sealed floor to ceiling and wall to wall, and must be evaluated to determine that the boundaries will withstand the hazards associated with the area. Entergy designated the newly created fire area as Fire Area PAB-2{6}, determined that selected adjacent areas were required to be designated as combustible free zones and revised EN-DC-161 accordingly. The new fire area boundary was added to the barrier surveillance program and affected engineering documents and drawings were revised. The team concluded that Entergy's corrective actions were reasonable and appropriate.

Analysis: The failure to adequately evaluate a design change and update affected FPP documents was a performance deficiency. Specifically, the barrier evaluation did not consider all unsealed penetrations, did not walkdown or verify important assumptions regarding combustible loading in fire zones immediately adjacent to the unsealed penetrations, did not add the new barrier to the plant's barrier surveillance program, and did not revise the fire area arrangement plan drawings (i.e., the fire hazards barrier drawings) to include the new barrier.

This finding was more than minor because, if left uncorrected, it could have become a more significant safety issue because combustible loading or barrier integrity may not have been adequately maintained in the future. In addition, it was associated with the Protection Against External Factors (e.g., fire) attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability and reliability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage).

The team performed a Phase 1 SDP screening for this issue, in accordance with IMC 0609, Appendix F. This finding affected the post-fire SSD category because the design analysis and implementing procedures were adversely affected. The team determined that this issue did not affect the ability to reach and maintain a stable plant condition within the first 24 hours of a fire event because the fire barrier was not degraded during the inspection period and no postulated fires were identified that could breach the new fire barrier. Therefore, this finding screened to very low safety significance (Green).

This finding had a cross-cutting aspect in the area of Human Performance, Design Margins, because design margins for separation of redundant SSD equipment were not carefully guarded and were changed without a through systematic and rigorous process. [H.6]

Enforcement: Indian Point Unit 3 FOL Condition 2.H, in part, required Entergy to implement and maintain in effect all provisions of the FPP, as approved by the NRC. The Updated Final Safety Analysis Report (UFSAR) Section 9.6.2.2, "Fire Areas and Fire Area Boundaries," stated that fire barriers separating fire areas complied with Appendix R, Section III.G, "Fire Protection of Safe Shutdown Capability." Section III.G.2, in part, required the redundant trains of SSD systems located within the same fire area be provided with one of the following means of ensuring that one of the redundant trains was free of fire damage: (a) 3-hour rated fire barrier; or (b) 1-hour rated fire barrier with automatic fire suppression and detection systems; or (c) 20 feet combustible free zone with automatic fire suppression and detection systems.

Contrary to the above, from December 31, 2012, until June 30, 2014, Entergy failed to provide the separation required by III.G.2 between redundant trains of RCS make-up (i.e., SI and charging) both of which were located within the same fire area (i.e., Fire Area PAB-2{5}). In response to this issue, Entergy re-evaluated the separation between SI and charging as a boundary between two adjacent fire areas rather than a barrier

between redundant trains within the same fire area, using the guidance in Generic Letter 86-10, "Implementation of Fire Protection Requirements," Enclosure 1, "Interpretations of Appendix R," Section 4, "Fire Area Boundaries." The new fire area boundary was added to the barrier surveillance program and the arrangement drawings updated as required. Because this violation was of very low safety significance (Green) and was entered into Entergy's CAP (CR-IP3-2014-01132), this violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy.
(NCV 05000286/2014011-02, Inadequate Fire Barrier Analysis)

.3 (Unit 3) Inadequate Post-Fire Safe Shutdown Procedure

Introduction: The team identified a finding of very low safety significance (Green), involving an NCV of IP Unit 3 FOL Condition 2.H, because Entergy did not implement and maintain in effect all provisions of the FPP, as approved by the NRC. Specifically, Entergy did not ensure that design changes which revised the SSD methodology were adequately translated into the SSD operating procedure.

Description: The team reviewed 3-ONOP-FP-001, "Plant Fires," to determine whether the operating procedure instructions adequately implemented the revised SSD methodologies. In order to eliminate Unit 3 OMA 9 (Table 2), Entergy revised the SSD methodology to credit the RCP seal injection flow path for the RCS make-up function, in lieu of the normal charging flow path for the following areas:

- PAB-2{1}, RHR Pump Room
- PAB-2{2}, CCW Pump Area
- ETN-4{1}, Electric Tunnel Entrance
- ETN-4{3}, Electric Tunnel Upper Penetration Area
- ETN-4{4}, Lower Electric Tunnel
- TBL-5, Turbine Building
- AFW-6, Auxiliary Feedwater Pump Room
- Yard-7, Yard and Intake Structure

The team identified several inconsistencies between the methodologies described in the SSD analysis and the operating instructions in 3-ONOP-FP-001 which could complicate or delay an operator's response to a postulated fire event.

3-ONOP-FP-001, Step 6.b, directed the operator to place 31 and 32 charging pumps in the trip Pull-to-Lock position, then start the 33 charging pump in response to any significant fire in the PAB. Fold-out page Step 5 (e.g., if-at-any-time, or continuous action step) directed operators to immediately isolate the seal injection if both seal injection flow from charging and RCP thermal barrier cooling flow from component cooling water (CCW) were lost. In addition, that continuous action step did not allow a sufficient duration to manually recover either charging or CCW.

The team determined that the SSD analysis credited the 31 and 32 charging pumps as redundant trains protected from fire damage for a fire in the above fire areas. The team also determined that the SSD analysis did not analyze the 33 charging pump or its associated cable routing. Therefore, the team could not determine whether the 33 charging pump was susceptible to fire-induced failures that could result in a loss of seal injection flow for a fire in the above fire areas.

The team also determined that for multiple fire areas, one or two of the three CCW pumps were analyzed as susceptible to fire damage, but the SSD analysis did not analyze the CCW auto-start function. The team postulated a scenario in which the running CCW pump was the one that was not protected from fire damage, which in turn could result in a loss of thermal barrier cooling. However, the team could not determine whether the CCW pump that was protected from fire damage, but postulated to be in standby, would auto-start.

Because a loss of thermal barrier cooling could occur in conjunction with procedurally disabling the charging pumps protected from fire damage, the team questioned whether a fire could result in a concurrent loss of seal injection flow and thermal barrier cooling. The team concluded that operators might need to enter abnormal operating procedures (AOP) not referenced or directed by 3-ONOP-FP-001 in order to recover a charging or CCW pump. The team determined that those AOP recovery steps would need to be performed prior to performance of the continuous action step which directed operators to immediately isolate seal injection, in order to avoid an unrecoverable loss of RCS make-up. Therefore, the team concluded that Entergy had not sufficiently evaluated the new SSD methodology because Entergy's analysis did not consider whether charging and CCW could be simultaneously affected by fire damage, and did not recognize that the approved method relied on an unanalyzed charging pump. Entergy entered this issue into its CAP as CR-IP3-2014-01127 and CR-IP3-2014-01728. Interim compensatory measures included roving fire watches in all affected fire areas.

Entergy promptly corrected this by revising the SSD methodology to include the 33 charging pump and the CCW auto-start function. In addition, Entergy revised 3-ONOP-FP-001 to provide enhanced guidance to the operator to determine when seal injection must be isolated, and added steps to specifically recover a charging pump and/or a CCW pump prior to isolation of the seal injection flow path. The team concluded that Entergy's corrective actions were reasonable and appropriate.

Analysis: The failure to ensure that a reliable RCS make-up capability remained available was a performance deficiency. Specifically, 3-ONOP-FP-001 did not contain adequate instructions to ensure that the seal injection flow path would remain available for a fire that relied on charging and the seal injection flow path as the make-up source.

This finding was more than minor because it was associated with the Protection Against External Factors (e.g., fire) attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability and reliability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage).

The team and a Region I Senior Risk Analyst (SRA) performed a Phase 2 SDP analysis for this issue, in accordance with IMC 0609, Appendix F. This finding affected the post-fire SSD category because the implementing SSD procedure was adversely affected. The team determined that this issue did not affect the ability to reach and maintain a stable plant condition within the first 24 hours of a fire event because no credible fire scenario was identified that could result in a loss of the credited make-up flow path. Specifically, as discussed below, based on detailed circuit analysis and plant walkdowns, the team determined that only Fire Area ETN-4{1} contained cabling that made it susceptible to a potential loss of the credited seal injection flow path and determined that it was of very low safety significance (Green).

The team performed detailed circuit and cable analysis and used cable routing data to determine whether a single fire could result in cable damage that could cause a loss of the 33 charging pump, the CCW auto-start function, and the thermal barrier cooling flow path. Fire Areas PAB-2{1}, PAB-2{2}, ETN-4{3}, ETN-4{4}, TBL-5, AFW-6, and YARD-7 screened out because the team did not identify any cables associated with the 33 charging pump in those areas.

For Fire Area ETN-4{1}, the team identified cables associated with the 33 charging pump, a CCW pump, CCW auto-start circuit, and thermal barrier supply and return valve circuits. Therefore, the team concluded that a significant fire of sufficient duration in this area could result in a loss of the SSD credited seal injection make-up path, if the procedural step was implemented as written. The team performed walkdowns in this area to identify any fixed or transient ignition sources that could credibly cause cable damage. No fixed or transient ignition sources were identified. The team determined that Entergy's combustible control program designated this area as a combustible free zone. In addition, the team determined that this area had adequate suppression and detection, with preaction sprinklers in between each cable tray. Therefore, the team concluded that there was no credible fire scenario that could result in a loss of the seal injection flow path for Fire Area ETN-4{1}.

This finding had a cross-cutting aspect in the area of Human Performance, Design Margins, because design margins for protection from fire damage to the credited make-up flow path were not carefully guarded and were changed without a through systematic and rigorous process. [H.6]

Enforcement: Indian Point Unit 3 FOL Condition 2.H, in part, required Entergy to implement and maintain in effect all provisions of the FPP, as approved by the NRC. IP3-ANAL-FP-01503, "Safe Shutdown Analysis," stated that RCP seal injection was the make-up source protected from fire damage for multiple fire areas, including Fire Area ETN-4{1}.

Contrary to the above, from December 31, 2012, until October 16, 2014, Entergy did not ensure that a make-up source would remain available for all fire areas. Specifically, Entergy had not evaluated the plant configuration allowed by the operating procedure (e.g., 33 charging pump and a CCW pump not protected from fire damage) to verify that the SSD make-up function would remain available. 3-ONOP-FP-001 fold-out page

Step 5 directed operators to immediately isolate seal injection if both seal injection flow (charging) and thermal barrier cooling (CCW) were lost. The step did not allow a sufficient duration to manually recover either charging or CCW. Entergy revised the SSD analysis and 3-ONOP-FP-001 to correct this deficiency. Because this violation was of very low safety significance (Green) and was entered into Entergy's CAP (CR-IP3-2014-01127 and CR-IP3-2014-01728), this violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy.
(NCV 05000286/2014011-03, Inadequate Post-Fire Safe Shutdown Procedure)

.4 (Unit 3) Inadequate Alternative Post-Fire Safe Shutdown Procedure

Introduction: The team identified a finding of very low safety significance (Green), involving an NCV of IP Unit 3 FOL Condition 2.H, because Entergy did not implement and maintain in effect all provisions of the FPP, as approved by the NRC. Specifically, Entergy did not have an adequate post-fire operating procedure for its alternative shutdown capability to ensure that SSD equipment was isolated from the effects of fire in III.G.3 fire areas.

Description: While reviewing Entergy's corrective actions to resolve unapproved OMAs (as discussed above), the team identified an additional deficiency not associated with an OMA for an Appendix R, Section III.G.2, fire area. Specifically, IP-ANAL-FP-01503, "Unit 3 Safe Shutdown Analysis," determined that the requirements for component and cable separation specified in Appendix R, Section III.G.2, could not be satisfied for Fire Area CTL-3. As such, Entergy designated Fire Area CTL-3 as an alternative SSD area, in accordance with Appendix R, Section III.G.3 and III.L. Fire Area CTL-3 consisted of the control room, switchgear room, cable spreading room, and the three diesel generator rooms. The SSD analysis determined that a postulated worst case fire in Fire Area CTL-3 would result in a control room evacuation, with alternative shutdown performed at remote shutdown locations throughout the plant. The remote shutdown panels had transfer and isolation capabilities to ensure that fire damaged cables could be disconnected from the remote shutdown panel control circuits, such that remote operation of SSD equipment would be independent of Fire Area CTL-3.

For Fire Area CTL-3, the SSD analysis credited the 31 and 32 charging pumps to provide RCS make-up. Entergy's alternative shutdown method relied on operation of local transfer switches, located in the charging pump rooms, to disconnect a pump's control and power circuit from its normal source (i.e., an MCC located in Fire Area CTL-3 and the control room) and then connect those circuits to an alternate power source (i.e., an MCC located in the turbine building). Once a pump was aligned to the alternate power source, an operator would start and stop the pump by manually closing and opening the MCC breaker in the turbine building. Entergy's alternate shutdown method also directed operators to take local manual control of the pump suction valves (i.e., LCV-112B and 112C) before starting a pump, to prevent any fire-induced spurious valve operations. In addition, the analysis also determined that a significant fire in Fire Area CTL-3 could result in:

- Fire-induced spurious closure of the pump suction valves; and
- Damage to a running pump within a few minutes following a loss of suction; and
- Fire-induced spurious start of a non-running pump.

The team determined that Entergy relied on prompt control room actions to prevent fire-induced damage to a charging pump, in the event of a significant fire in Fire Area CTL-3. Specifically, 3-ONOP-FP-001 Step 6.b directed operators to secure the 31 and 32 charging pumps by placing the control room switch in the Pull-to-Lock position for any significant fire in the PAB, control building, or electrical tunnel. The team independently determined that once a charging pump was placed in Pull-to-Lock, it would be de-energized and remain unaffected by any fire-induced cable damage for a fire in Fire Area CTL-3. However, the team identified that Step 6.b might not be implemented in a timely manner before a significant fire in Fire Area CTL-3 required a control room evacuation. The team postulated a scenario in which the control room evacuation criteria in 3-ONOP-FP-001 could be met before the operator could get to Step 6.b and secure the charging pumps. The team reviewed the alternate SSD procedure 3-AOP-SSD-1 and determined that there were no prompt actions to secure the 31 and 32 charging pumps before the evacuation of the control room, and there were no prompt back-up actions outside the control room to secure the pumps. Therefore, the team concluded that these procedure inadequacies could result in a loss of the SSD credited RCS make-up capability for a postulated significant fire in Fire Area CTL-3, an alternative SSD area. Entergy entered this issue into its CAP as CR-IP3-2014-02513. Interim compensatory measures included roving fire watches in all affected fire areas.

Entergy promptly corrected this issue by revising 3-ONOP-FP-001 and 3-AOP-SSD-1 to ensure the charging pumps were promptly secured to postulated fire-induced damage for a significant fire in Fire Area CTL-3. The team concluded that Entergy's corrective actions were reasonable and appropriate.

Analysis: The failure to ensure that a reliable RCS make-up capability remained available was a performance deficiency. Specifically, 3-ONOP-FP-001 and 3-AOP-SSD-1 did not contain adequate instructions to ensure that charging pumps would remain available for a significant fire in Fire Area CTL-3, an alternative shutdown area.

This finding was more than minor because it was similar to Example 3.k of NRC IMC 0612, Appendix E, "Examples of Minor Issues," which determined that analytical errors would be more than minor if, as a result of the errors, there was reasonable doubt of the operability of the component. For this issue, the team had a reasonable doubt of operability based on the charging pump's susceptibility to fire damage. In addition, the finding was associated with the Protection Against External Factors (e.g., Fire) attribute of the Mitigating Systems Cornerstone and affected the objective to ensure the reliability and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage).

The team and a Region I SRA performed a Phase 3 SDP analysis for this issue, in accordance with IMC 0609, Appendix F. This finding affected the post-fire SSD category

because the design analysis and implementing procedures were adversely affected. Specifically, as discussed below, based on detailed circuit analysis and plant walkdowns, the team and a Region I SRA determined that this issue was of very low safety significance (Green), because of the low frequency of a fire, a negligible chance of control room evacuation, and the low chance of core damage, associated with those fire areas where a fire could damage the charging system and make it unavailable.

The SRA estimated a fire frequency in the range of 1 in 15,000 years for each of two affected locations (i.e., MCC-36C in the 480V switchgear room and the rod control panel in the cable spreading room) and a fire frequency in the range of 1 in 100,000 years for a transient fire in the cable spreading room. With these specific fires and the potential to only affect the changing system, the SRA concluded that it was unlikely that the shift manager would order a complete control room evaluation. Further, the SRA used the IP Unit 3 Standardized Plant Analysis Risk (SPAR) model and determined that, if the charging system and MCC-36C were assumed to fail due to each of these fires, then the increase in core damage probability (ΔCDP), assuming that the fire would result in a plant trip from the control room, was on the order of 1 in 100,000 fire events. The total fire frequencies in the range of 1 in 8,000 years, when combined with an estimated ΔCDP of 1 in 100,000, given such a fire event, produced an estimated increase in core damage frequency (ΔCDF) that was several orders of magnitude below the 1 in a million year risk significance threshold.

This finding did not have a cross-cutting aspect because it was a legacy issue (i.e., deficiency existed for many years) and was considered to not be indicative of current licensee performance. The team concluded that if Entergy self-identified this issue today, adequate corrective actions would likely have been implemented, based on today's performance standards.

Enforcement: Indian Point Unit 3 FOL Condition 2.H, in part, required Entergy to implement and maintain in effect all provisions of the FPP, as approved by the NRC. IP3-ANAL-FP-01503, "Safe Shutdown Analysis," stated that Section III.L of the rule was applicable for areas of the plant where postulated fire scenarios were mitigated through use of alternative shutdown methods. UFSAR Section 9.6.2.5, "Safe Shutdown Capability," stated that the availability of the RCS make-up function was ensured, in accordance with the rule. Appendix R, Section III.G.3, states, in part, where protection of SSD systems does not satisfy the requirements of III.G.2, alternative dedicated shutdown capability shall be provided. Appendix R, Section III.L.3, states, in part, that alternative shutdown capability shall be independent of the specific fire areas and procedures shall be in effect to implement this capability.

Contrary to the above, from at least February 2004 until December 1, 2014, Entergy's alternative shutdown procedures did not provide adequate written instructions to ensure the alternative shutdown capability for the RCS make-up performance goal was independent of Fire Area CTL-3. Specifically, 3-AOP-SSD-1 did not contain any steps to implement prompt control room action to secure 31 and 32 charging pumps prior to evacuation of the control room, and did not contain any steps to secure 31 and 32 charging pumps from outside the control room in the event that control room

abandonment occurred before the pumps could be secured in the control room. As a result, the pumps were susceptible to fire damage and the make-up function was not independent of Fire Area CTL-3. Entergy revised 3-AOP-SSD-1 to correct this deficiency. Because this violation was of very low safety significance (Green) and was entered into Entergy's CAP (CR-IP3-2014-02513), this violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000286/2014011-04, Inadequate Alternative Post-Fire Safe Shutdown Procedure)**

4OA6 Meetings, Including Exit

The team presented the inspection results to Mr. Richard Burroni, Engineering Director, and other members of Entergy's staff on February 18, 2015. The team verified that this report does not contain proprietary information.

KEY POINTS OF CONTACT

SUPPLEMENTAL INFORMATION

Licensee Personnel
G. Dahl, Licensing Specialist
K. Elliot, Safe Shutdown Engineer
D. Powell, Senior Reactor Operator
J. Bretti, Probability Risk Assessment Engineer

NRC Personnel
J. Stewart, Senior Resident Inspector, Indian Point
A. Patel, Resident Inspection, Indian Point
G. Newman, Resident Inspection, Indian Point
D. Frumkin, Fire Protection Branch, Nuclear Reactor Regulation (NRR)

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened
None.

Opened and Closed

05000247,286/2014011-01	NCV	Inadequate Analysis of Safety Injection Make-up Capability (Section 4OA5.1.1)
05000286/2014011-02	NCV	Inadequate Fire Barrier Analysis (Section 4OA5.1.2)
05000286/2014011-03	NCV	Inadequate Post-Fire Safe Shutdown Procedure (Section 4OA5.1.3)
05000286/2014011-04	NCV	Inadequate Alternative Post-Fire Safe Shutdown Procedure (Section 4OA5.1.4)

Closed

05000247/2012009-01	VIO	Failure to Protect Safe Shutdown Equipment from the Effects of Fire (Section 4OA5.1)
05000286/2012008-01	VIO	Failure to Protect Safe Shutdown Equipment from the Effects of Fire (Section 4OA5.1)

Discussed

05000286/2011008-01	NCV	Inappropriate Interim Compensatory Measure for Service Water Strainer Backwash Function (Table 2, OMA 13)

LIST OF DOCUMENTS REVIEWED

Fire Protection Licensing and Design Basis Documents

IP2-RPT-03-00015, Unit 2 Fire Hazards Analysis, Rev. 6
IP3-ANAL-FP-01503, Unit 3 Appendix R Safe Shutdown Analysis, Rev. 3
IP3-ANAL-FP-02143, Unit 3 Fire Hazards Analysis, Rev. 5
IP-RPT-05-00071, Unit 2 Appendix R Safe Shutdown Analysis, Rev. 2
NRC Letter to Entergy, Unit 2 Appendix R Exemptions (ML112140509), dated 2/1/12
NRC Letter to Entergy, Unit 3 Appendix R Exemptions (ML112200442), dated 2/1/12
NRC Letter to Indian Point, Unit 3 Appendix R Exemptions (ML003779284), dated 2/2/84
NRC Letter to Indian Point, Unit 3 Appendix R Exemptions (ML003779008), dated 1/7/87
SEP-FPP-IP-001, Indian Point Fire Protection Program (FPP), Rev. 3
Unit 2 UFSAR Section 9.6.2, Fire Protection, Rev. 25
Unit 3 UFSAR Section 9.6.2, Fire Protection, Rev. 05

Calculations, Analysis, and Engineering Evaluations

EC-35373, Unit 3 Disposition for OMAs 2, 3, 4, 5, 6, 7, 8, and 11, Topic Notes, Rev. 0
EC-36675, Unit 3 Disposition for Service Water Strainer OMAs, Topic Notes, Rev. 0
EC-36689, Unit 3 Disposition for Service Water Strainer OMAs, Topic Notes, Rev. 0
EC-36691, Unit 3 Disposition for Service Water Strainer OMAs, Topic Notes, Rev. 0
EC-36693, Unit 3 Disposition for Service Water Strainer OMAs, Topic Notes, Rev. 0
EC-37968, Unit 2 Disposition for AFW OMAs, Topic Notes, Rev. 0
EC-38081, Unit 3 Disposition of OMAs 23 and 24, Topic Notes, Rev. 0
EC-39731, Unit 3 Disposition for OMAs 5, 8, and 11, Topic Notes, Rev. 0
EC-40329, Unit 3 Disposition for OMA 10, Topic Notes, Rev. 0
EC-40404, Unit 2 Relocate 21 Charging Pump Control, Topic Notes, Rev. 0
EC-41486, Unit 3 Disposition for OMAs 18, 19, 20, 21, and 22, Topic Notes, Rev. 0
EC-41582, Unit 2 Provide Fire Enclosure and Cable Reroute for LCV-112B & LCV-112C, Topic Notes, Rev. 0
EC-41610, Unit 2 Disposition for OMAs 7, 12, and 13, Topic Notes, Rev. 0
EC-41616, Unit 3 Disposition for OMAs 9, 12, 14, 15, 16, 17, and 26, Topic Notes, Rev. 0
EC-42090, Unit 2 Disposition for OMAs 8 and 10, Topic Notes, Rev. 0
EC-44765, Unit 3 Disposition for CVCS OMAs, Topic Notes, Rev. 0
EC-48552, Unit 2 Fire Protection Foam Tank, Rev. 0
EC-51166, Unit 3 Safe Shutdown Analysis & Fire Hazards Analysis Revision, Rev. 0
EC-53064, Unit 3 Disposition of OMAs, Rev. 0
EC-53184, revision of IP3-ANAL-FP-01503 to Add 33 Charging Pump and CCW Auto-start Functions to the Safe Shutdown Methodology, Rev. 0
EC-55195, Unit 3 Post-Fire Evaluation of Safety Injection, Rev. 0
EC-55196, Unit 2 Post-Fire Evaluation of Safety Injection, Rev. 0
IP-CALC-06-00029, Appendix R Cooldown to RHR Initiation Using RETRAN-3D, Rev. 2
IP-RPT-09-00012, Units 2 and 3 Post-Fire Operator Manual Actions Validation, Rev. 0
IP-RPT-12-00008, Unit 3 Disposition of OMAs for Fire Area ETN-4{1}, Rev. 0
IP-RPT-12-00033, Unit 2 Disposition of OMAs 5, 8, and 11 for Fire Areas F, H, J, Rev. 0
IP-RPT-12-00043, Unit 3 Evaluation of Post-Fire Availability of Charging vs. Safety Injection for Fire Area PAB-2, Rev. 0, 1, and 2
IP-RPT-12-00046, Unit 2 Disposition of OMAs 7, 12, and 13 for Fire Areas F and J, Rev. 0

IP-RPT-12-00047, Unit 3 Disposition of OMAs for Fire Areas ETN-4{1}, ETN-4{3}, and YARD-7, Rev. 0 and 1
IP-RPT-13-00022, Unit 3 Feasibility Study of Appendix R Fire Thermo-Hydraulic Analysis using High Head Safety Injection Pump, Rev. 0
IP-RPT-15-00003, Unit 2 and Unit 3 Appendix R Fire Thermo-Hydraulic Analysis using Safety Injection Pump, Rev. 1

Drawings and Wiring Diagrams

014D13785, Schematic of 10KVA Inverter for Instrument Bus 23 and 24, Rev. 5
208088, Sht. 0, One Line Drawing of 480V AC SWGR 21 & 22 Bus 2a, 3A, 5A, & 6A, Rev. 44
400401-04, Unit 2 Fire Area/Zone Arrangement at Elevation 15 foot, Rev. 4
400402-03, Unit 2 Fire Area/Zone Arrangement at Elevation 36 foot, Rev. 3
400403-05, Unit 2 Fire Area/Zone Arrangement at Elevation 53 foot, Rev. 5
400404-03, Unit 2 Fire Area/Zone Arrangement at Elevation 80 foot, Rev. 3
400405-02, Unit 2 Fire Area/Zone Arrangement at Elevation 98 foot, Rev. 2
400406-01, Unit 2 Fire Area/Zone Arrangement at Elevation 15 foot, Rev. 1
400407-01, Unit 2 Fire Area/Zone Arrangement at Elevation 33 foot, Rev. 1
400408-02, Unit 2 Fire Area/Zone Arrangement at Elevation 53 foot, Rev. 1
400409-01, Unit 2 Fire Area/Zone Arrangement at Elevation 72 foot, Rev. 1
500B971, Sht. 112, Elementary Wiring Diagram Valve Table-MOV, Rev. 16
500B971, Sht. 116, Elementary Wiring Diagram Valve Table-MOV, Rev. 11
500B971, Sht. 129, Elementary Wiring Diagram Motor Operated Valves, Rev. 9
500B971, Sht. 132A, Elementary Wiring Diagram Motor Operated Valve, Rev. 4
500B971, Sht. 138, Elementary Wiring Diagram Motor Operated Valves, Rev. 12
500B971, Sht. 139, Elementary Wiring Diagram Motor Operated Valves, Rev. 12
500B971, Sht. 153, Elementary Wiring Diagram Motor Operated Valves, Rev. 9
500B971, Sht. 155, Elementary Wiring Diagram Motor Operated Valves, Rev. 9
500B971, Sht. 27, Elementary Wiring Diagram Component Cooling Pump 31, Rev. 27
500B971, Sht. 28, Elementary Wiring Diagram Safety Injection Pump 31, Rev. 8
500B971, Sht. 29, Elementary Wiring Diagram Safety Injection Pump 32, Rev. 10
500B971, Sht. 45, Elementary Wiring Diagram Component Cooling Pump 32, Rev. 10
500B971, Sht. 46, Elementary Wiring Diagram Component Cooling Pump 33, Rev. 10
500B971, Sht. 70, Elementary Wiring Diagram Safety Injection System, Rev. 8
500B971, Sht. 73, Elementary Wiring Diagram Charging Pump 33, Rev. 11
9321-F-27363, Chemical & Volume Control System Flow Diagram, Rev. 52
9321-F-27373, Chemical & Volume Control System Flow Diagram, Rev. 37
9321-F-27503, Safety Injection System Flow Diagram, Rev. 54
9321-F-31663, Wiring Diagram 480V Switchgear No. 31 Units 25H & 28H, Rev. 17
9321-F-40009, Sht. 1, Unit 3 Fire Area/Zone Arrangement Plans, Rev. 5
9321-F-40009, Sht. 2, Unit 3 Fire Area/Zone Arrangement Plans, Rev. 4
9321-F-40009, Sht. 3, Unit 3 Fire Area/Zone Arrangement Plans, Rev. 6
9321-F-40009, Sht. 4, Unit 3 Fire Area/Zone Arrangement Plans, Rev. 5
9321-F-40009, Sht. 5, Unit 3 Fire Area/Zone Arrangement Plans, Rev. 4
9321-F-40009, Sht. 6, Unit 3 Fire Area/Zone Arrangement Plans, Rev. 3
9321-LL-3117, Sht. 19, Service Air Compressor 480 V Switchgear 21, Rev. 12
9321-LL-3117, Sht. 3B, 480V AC Bus 5A Interlocking Relay, Rev. 28
9321-LL-3117, Sht. 4, Breaker 52/5A Station Transformer 5 - Bus 5A tie, Rev. 25
9321-LL-3117, Sht. 7, Breaker 52/EG1 Emergency Generator 21, Rev. 19

9321-LL-31173, Sht. 27A, Schematic Diagram 480V Switchgear 31, Rev. 4
9321-LL-3118, Sht. 3B, 480V AC Bus 6A Interlocking Relay, Rev. 28
9321-LL-3118, Sht. 4, Breaker 52/6A Station Transformer 6 – Bus 6A tie, Rev. 24
9321-LL-31183, 48A, Schematic Diagram 480V Switchgear 32, Rev. 9
9321-LL-31263, Sht. 125A, Schematic Diagram 480V Motor Control Center 36, Rev. 14
9321-LL-31263, Sht. 125B, Schematic Diagram 480V Motor Control Center 36, Rev. 9
9321-LL-31263, Sht. 127A, Schematic Diagram 480V Motor Control Center 36, Rev. 14
9321-LL-31263, Sht. 138A, Schematic Diagram 480V Motor Control Center 36, Rev. 7

Piping and Instrumentation Diagrams
9321-F-27353, Flow Diagram Safety Injection System Sheet No. 1, Rev. 42
9321-F-27503, Flow Diagram Safety Injection System Sheet No. 2, Rev. 54

Procedures
2-IC-PC-I-E-Static-Inverter-23, Unit 2 No. 23 Static Inverter Maintenance Procedure, Rev. 8
2-ONOP-FP-001, Unit 2 Plant Fires, Rev. 13
2-PC-R58, Unit 2 480 Volt Undervoltage Relay Calibration, Rev. 5
2-PT-M048, Unit 2 480 Volt Undervoltage Alarm, Rev. 30
3-AOP-CCW-1, Loss of Component Cooling Water, Rev. 5
3-AOP-CVCS-1, Chemical & Volume Control System Malfunction, Rev. 7
3-AOP-SSD-1, Unit 3 Control Room Inaccessibility Safe Shutdown Control, Rev. 17 and 18
3-COL-SI-001, Unit 3 Safety Injection System, Rev. 43
3-E-0, Unit 3 Reactor Trip or Safety Injection Emergency Operating Procedure, Rev. 5
3-E-1, Unit 3 Loss of Reactor or Secondary Coolant Emergency Operating Procedure, Rev. 4
3-ES-0.1, Unit 3 Reactor Trip Response Emergency Operating Procedure, Rev. 7
3-ES-0.2, Unit 3 Natural Circulation Cooldown Emergency Operating Procedure, Rev. 2
3-ONOP-FP-001, Unit 3 Plant Fires, Rev. 29, 34, 35, and 36
3-PT-R100A, Unit 3 Controlled Barrier Inspection, Rev. 2
AP-64.1, Controlled Barriers Surveillance Program, Rev. 4
EN-DC-161, Indian Point Control of Combustibles, Rev. 10
IP-SMM-AD-102, Operating Procedure Preparation, Review, and Approval, Rev. 7 and 8
OAP-015, AOP and ONOP Users Guide, Rev. 0
OAP-115, Operations Commitments and Policy Details, Rev. 18

Condition Reports (* denotes NRC identified during this inspection)
CR-IP2-2014-02779*
CR-IP2-2014-03536*
CR-IP3-2014-00970*
CR-IP3-2014-00989*
CR-IP3-2014-01127*
CR-IP3-2014-01132*
CR-IP3-2014-01328*
CR-IP3-2014-01728*
CR-IP3-2014-02513*
CR-IP3-2014-02688*
CR-IP3-2014-03383*

Work Orders
00296557
52359576
52431908

Miscellaneous Documents

Entergy Letter to NRC, NL-09-031, Request for Exemption from Appendix R Paragraph III.G.2 for Use of Operator Manual Actions for Indian Point Unit 2 (ML090770151), dated 3/6/09
Entergy Letter to NRC, NL-09-032, Request for Exemption from Appendix R Paragraph III.G.2 for Use of Operator Manual Actions for Indian Point Unit 3 (ML090760993), dated 3/6/09
Entergy Letter to NRC, NL-12-041, Response to Request for Additional Information Regarding Operator Manual Actions (ML12074A028), dated 3/1/12
Entergy Letter to NRC, NL-12-122, Units 2 and 3 Reply to Notices of Violation Regarding Unapproved III.G.2 Operator Manual Actions (ML12268A057), dated 9/17/12
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NRC Generic Letter 86-10 Enclosure 1, Interpretations of Appendix R, dated 4/24/86
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LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
AC	Alternating Current
AFW	Auxiliary Feedwater
AOP	Abnormal Operating Procedure
ARDG	Appendix R Diesel Generator
CAP	Corrective Action Program
CCW	Component Cooling Water
CDF	Core Damage Frequency
ΔCDP	Core Damage Probability
CFR	Code of Federal Regulations
CR	Condition Report
DC	Direct Current
EC	[Entergy] Engineering Change
EGM	[NRC] Enforcement Guidance Memorandum
Entergy	Entergy Nuclear Northeast
EOP	Emergency Operating Procedures
ERFBS	Electrical Raceway Fire Barrier System
FCV	Flow Control Valve
FOL	Facility Operating License
FPP	Fire Protection Program
IMC	[NRC] Inspection manual Chapter
IP	Indian Point Power Station
LCV	Level Control Valve
MCC	Motor Control Center
MOV	Motor Operated Valve
N_2	Nitrogen
NCV	Non-Cited Violation
NOV	Notice of Violation
NRC	Nuclear Regulatory Commission
OMA	Operator Manual Action
P&ID	Piping and Instrumentation Drawing
PAB	Primary Auxiliary Building
PARS	Publicly Available Records System
PCV	Pressure Control Valve
PORV	Power Operated Relief Valve
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RG	[NRC] Regulatory Guide
RWST	Refueling Water Storage Tank
SDP	[NRC] Significance Determination Process
SG	Steam Generator
SI	Safety Injection
SPAR	Standardized Plant Analysis Risk
SRA	[Region I] Senior Risk Analyst
SSD	Safe Shutdown
SW	Service Water
UFSAR	Updated Final Safety Analysis Report