



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
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December 5, 2017

Mr. Anthony J. Vitale
Site Vice President
Entergy Nuclear Operations, Inc.
Indian Point Energy Center
450 Broadway, GSB
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**SUBJECT: INDIAN POINT NUCLEAR GENERATING – TRIENNIAL FIRE PROTECTION
INSPECTION REPORT 05000247/2017007 and 05000286/2017007**

Dear Mr. Vitale:

On November 3, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed a triennial fire protection inspection at your Indian Point Nuclear Generating (Indian Point), Units 2 and 3 and the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented two findings of very low safety significance (Green) in this report. These findings involved violations of NRC requirements. The NRC is treating these findings as non-cited violations (NCV's) consistent with Section 2.3.2.a of the NRC Enforcement Policy.

If you contest the violations or significance of these NCVs, you should provide a written response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. 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; and the NRC 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 U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I, and the NRC Resident Inspector at Indian Point.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC's Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Glenn T. Dentel, Chief
Engineering Branch 2
Division of Reactor Safety

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

Enclosure:
Inspection Report 05000247/2017007
and 05000286/2017007 w/Attachment:
Supplementary Information

SUBJECT: INDIAN POINT NUCLEAR GENERATING – TRIENNIAL FIRE PROTECTION INSPECTION REPORT 05000247/2017007 and 05000286/2017007 dated December 5, 2017

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos. 50-247 and 50-286

License Nos. DPR-26 and DPR-64

Report Nos. 05000247/2017007 and 05000286/2017007

Licensee: Entergy Nuclear Northeast (Entergy)

Facility: Indian Point Nuclear Generating, Units 2 and 3

Location: 450 Broadway, General Services Building
Buchanan, NY 10511-0249

Dates: October 16, 2017, through November 3, 2017

Inspectors: E. DiPaolo, Senior Reactor Inspector (Team Leader)
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Approved by: Glenn T. Dentel, Chief
Engineering Branch 2
Division of Reactor Safety

SUMMARY

IR 05000247/2017007 and 05000286/2017007; 10/16/2017 – 11/03/2017; Indian Point Nuclear Generating (Indian Point; Triennial Fire Protection Inspection.

This report covers a two-week onsite triennial fire protection team inspection by specialist inspectors. Two findings of very low safety significance (Green) were identified. These findings were determined to be non-cited violations (NCVs). The significance of most findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects Within Cross-Cutting Areas," dated December 4, 2014. All violations of U.S. Nuclear Regulatory Commission (NRC) requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated November 1, 2016. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG 1649, "Reactor Oversight Process," Revision 6.

Cornerstone: Mitigating Systems

- Green. An NRC-identified finding of very low safety significance (Green), involving an NCV of Indian Point Unit 3 Facility Operating License (FOL) Condition 2.H, was identified because Entergy did not implement and maintain in effect all provisions of the Fire Protection Program (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 safe shutdown (SSD) equipment analyzed to be available during the postulated fire in fire area ETN-4{2}, Upper Electrical Tunnel, were credited in the procedure. Entergy entered this issue into its corrective action program (CAP) and promptly implemented compensatory measures by establishing a fire watch.

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 of ensuring 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 Significance Determination Process screening for this issue, in accordance with NRC IMC 0609, Appendix F, "Fire Protection Significance Determination Process." This finding affected the post-fire SSD category because the implementing procedures were adversely affected. The team determined that this finding screened to very low safety significance (Green) based upon task 2.3.5, because no credible fire ignition source scenarios were identified in fire area ETN-4{2} that could affect both electrical channels I and II cables. This finding did not have a cross-cutting aspects because it was a legacy issue and was considered to not be indicative of current licensee performance. (Section 1R05.05)

- Green. An NRC-identified finding of very low safety significance (Green) and NCV of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.54(hh)(2), "Conditions of Licenses," the Unit 2 FOL Condition 2.N, and the Unit 3 FOL Condition 2.AC was identified for failure to maintain strategies for addressing large fires and explosions. Specifically, Entergy failed to maintain the B.5.b strategies when the site's diesel contingency pump (B.5.b pump), B5B-101-PMP, was declared non-functional and unavailable on March 20, 2017, due to a deficiency associated with the pump's engine and failed to promptly restore the pump to a functional status or establish any

compensatory measures. Entergy entered this issue into its CAP and promptly completed repairs to the B.5.b pump.

This finding was more than minor because it is associated with the Protection Against External Factors (e.g., fire) attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent core damage. The team evaluated the significance of the finding in accordance with IMC 0609, Appendix L, "B.5.b Significance Determination Process." The finding was determined to be of very low safety significance (Green) because although the B.5.b pump was considered unavailable, the team concluded that the pump was recoverable. This finding had a cross-cutting aspect of Resources, in the area of Human Performance, because leaders did not ensure that personnel, equipment, procedures, and other resources were available and adequate to support nuclear safety. Specifically, procedural guidance and equipment were not available to operators to implement adequate compensatory measures when the B.5.b pump became non-functional and unavailable. [H.1] (Section 1R05.13)

Other Findings

A violation of very low safety significance that was identified by Entergy was reviewed by the inspectors. Corrective actions taken or planned by Entergy have been entered into the CAP. This violation and corrective action tracking number are listed in Section 4OA7 of this report.

REPORT DETAILS

Background

This report presents the results of a triennial fire protection inspection conducted in accordance with NRC Inspection Procedure 71111.05T, "Fire Protection." The objective of the inspection was to assess whether Entergy had implemented an adequate FPP and that post-fire SSD capabilities have been established and are being properly maintained at Indian Point, Units 2 and 3. The following fire areas and/or fire zones were selected for detailed review based on risk insights from the Indian Point Individual Plant Examination of External Events:

Unit 2 Fire Areas / Fire Zones

- Fire Area A, FZ-11-Cable Spreading Room
- Fire Area A, FZ-32A-Electrical Tunnel
- Fire Area C, FZ-23-Auxiliary Boiler Feed Pump Room

Unit 3 Fire Areas / Fire Zones

- Fire Area CNT-1-Containment
- Fire Area ETN-4, FZ-60A-Upper Electrical Tunnel
- Fire Area CTL-3, FZ-10-Diesel Generator 31
- Fire Area CTL-3, FZ-14-480V Switchgear Room

Inspection of these areas/zones fulfills the inspection procedure requirement to inspect a minimum of three samples.

The inspection team evaluated Entergy's FPP against applicable requirements which included Unit 2 FOL Condition 2.K, Unit 3 FOL Condition 2.H, NRC Safety Evaluation Reports, 10 CFR 50.48, and 10 CFR Part 50, Appendix R. The team also reviewed related documents that included the Updated Final Safety Analysis Report, the fire protection plan, fire hazards analysis (FHA), and post-fire SSD analyses.

The team evaluated aspects of five mitigating strategies for responding to large fires and explosions, as required by Unit 2 FOL Condition 2.N, Unit 3 FOL Condition 2.AC, and 10 CFR 50.54(hh)(2). Inspection of these strategies fulfills the inspection procedure requirement to inspect a minimum of one sample.

Specific documents reviewed by the team are listed in the Attachment to this report.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R05 Fire Protection (71111.05T)

.01 Protection of Safe Shutdown Capabilities

a. Inspection Scope

The team reviewed the FHA, SSD analyses, and supporting drawings and documentation to verify that SSD capabilities were properly protected. The team ensured that applicable separation requirements of Section III.G of 10 CFR Part 50, Appendix R and the licensee's design and licensing bases were maintained for the credited SSD equipment and their supporting power, control, and instrumentation cables. This review included an assessment of the adequacy of the selected systems for reactivity control, reactor coolant makeup, reactor heat removal, process monitoring, and associated support system functions.

b. Findings

No findings were identified.

.02 Passive Fire Protection

a. Inspection Scope

The team walked down accessible portions of the selected fire areas to evaluate whether the material conditions of the fire area boundaries were adequate for the fire hazards in the area. The team compared the fire area boundaries, including walls, ceilings, floors, fire doors, fire dampers, penetration seals, electrical raceway and conduit fire barriers, and redundant equipment fire barriers and radiant energy heat barriers to design and licensing basis requirements, industry standards, and the Indian Point FPP, as approved by the NRC, to identify any potential degradation or non-conformances.

The team reviewed selected engineering evaluations, installation and repair work orders, and qualification records for a sample of penetration seals to determine whether the fill material was properly installed and whether the as-left configuration satisfied design requirements for the intended fire rating. The team also reviewed similar records for selected fire protection wraps to verify whether the material and configuration was appropriate for the required fire rating and conformed to the engineering design.

The team also reviewed recent inspection and functional test records for fire dampers, and the inspection records for penetration seals and fire barriers, to verify whether the inspection and testing was adequately conducted, the acceptance criteria were met, and any potential performance degradation was identified. In addition, the team reviewed recent test results for the carbon dioxide (CO₂) and Halon fire damper functionality tests for the areas protected to verify the testing was adequately conducted, the acceptance criteria were met, and any performance degradation was identified.

b. Findings

No findings were identified.

.03 Active Fire Protection

a. Inspection Scope

The team evaluated manual and automatic fire suppression and detection systems in the selected fire areas to determine whether they were installed, tested, maintained, and operated in accordance with NRC requirements, National Fire Protection Association (NFPA) codes of record, and the Indian Point FPP, as approved by the NRC. The team also assessed whether the suppression systems capabilities were adequate to control and/or extinguish fires associated with the hazards in the selected areas.

The team reviewed the as-built capability of the fire water supply system to verify the design and licensing basis and NFPA code of record requirements were satisfied, and to assess whether those capabilities were adequate for the hazards involved. The team reviewed the fire water system hydraulic analyses to assess the adequacy of a single fire water pump to supply the largest single hydraulic load on the fire water system plus concurrent fire hose usage. The team evaluated the fire pump performance tests to assess the adequacy of the test acceptance criteria for pump minimum discharge pressure at the required flow rate, to verify the criteria was adequate to ensure that the design basis and hydraulic analysis requirements were satisfied. The team also evaluated the underground fire loop flow tests to verify the tests adequately demonstrated that the flow distribution circuits were able to meet design basis requirements. In addition, the team reviewed recent pump and loop flow test results to verify the testing was adequately conducted, the acceptance criteria were met, and any potential performance degradation was identified.

The team reviewed initial discharge testing, design specifications, vendor requirements, modifications and engineering evaluations, and routine functional testing for the CO₂ and Halon suppression systems for the areas protected. The team walked down accessible portions of the CO₂ and Halon systems, including storage tanks and supply systems, to independently assess the material condition, operational lineup, and availability of the systems. The team also reviewed and walked down the associated fire fighting strategies and CO₂ and Halon system operating procedures.

The team walked down accessible portions of the detection and water suppression systems in the selected areas and major portions of the fire water supply system, including motor and diesel driven fire pumps and fire water storage tanks, interviewed system and program engineers, and reviewed selected condition reports (CRs) to independently assess the material condition of the systems and components. In addition, the team reviewed recent test results for the fire detection and suppression systems for the selected fire areas to verify the testing was adequately conducted, the acceptance criteria were met, and any performance degradation was identified.

The team assessed the fire brigade capabilities by reviewing training, qualification, and drill critique records. The team also reviewed Indian Point's fire fighting strategies (i.e., pre-fire plans) and smoke removal plans for the selected fire areas to determine if appropriate information was provided to fire brigade members and plant operators to

identify SSD equipment and instrumentation, and to facilitate suppression of a fire that could impact post-fire SSD capability. The team independently inspected the fire brigade equipment, including personnel protective gear (e.g., turnout gear) and smoke removal equipment, to determine operational readiness for firefighting. In addition, the team reviewed Indian Point's fire brigade equipment inventory and inspection procedure and recent inspection and inventory results to verify adequate equipment was available, and any potential material deficiencies were identified.

b. Findings

No findings were identified.

.04 Protection from Damage from Fire Suppression Activities

a. Inspection Scope

The team performed document reviews and plant walkdowns to verify that redundant trains of systems required for hot shutdown, which are located in the same fire area, are not subject to damage from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems. Specifically, the team verified that:

- A fire in one of the selected fire areas would not indirectly, through production of smoke, heat, or hot gases, cause activation of suppression systems that could potentially damage all redundant SSD trains;
- A fire in one of the selected fire areas (or the inadvertent actuation or rupture of a fire suppression system) would not indirectly cause damage to all redundant trains (e.g. sprinkler caused flooding of other than the locally affected train); and,
- Adequate drainage is provided in areas protected by water suppression systems.

b. Findings

No findings were identified.

.05 Post-Fire Safe Shutdown Capability – Normal and Alternative

a. Inspection Scope

The team reviewed the SSD analysis, operating procedures, piping and instrumentation drawings, electrical drawings, the Updated Final Safety Analysis Report, and other supporting documents for the selected fire areas to verify that the licensee had properly identified the systems and components necessary to achieve and maintain SSD conditions. The team assessed the adequacy of the selected systems and components for reactivity control, reactor coolant makeup, reactor heat removal, process monitoring, and support system functions. This review included verification that alternative post-fire shutdown could be performed both with and without the availability of offsite power. Plant walkdowns were also performed to verify that the plant configuration was consistent with that described in the SSD and fire hazards analyses. The team verified that the systems and components credited for use during shutdown would remain free from fire damage.

The team verified that the training program for licensed and non-licensed operators included alternative shutdown capability. The team also verified that personnel required for SSD using the normal or alternative shutdown systems and procedures are trained and available onsite at all times, exclusive of those assigned as fire brigade members.

The team reviewed the adequacy of procedures utilized for post-fire shutdown and performed an independent walk through of procedure steps to ensure the implementation and human factors adequacy of the procedures. The team also verified that the operators could be reasonably expected to perform specific actions within the time required to maintain plant parameters within specified limits.

The team also reviewed the periodic testing of the alternative shutdown transfer capability and instrumentation and control functions to ensure the tests are adequate to ensure the functionality of the alternative shutdown capability.

Specific procedures reviewed for normal and alternative post-fire shutdown included the following:

Unit 2

- 2-AOP-SSD-1, Control Room Inaccessibility Safe Shutdown Control
- 2-ONOP-FP-001, Plant Fires
- 2-SOP-ESP-001, Local Equipment Operation and Contingency Actions

Unit 3

- 3-ONOP-FP-1, Plant Fires
- 3-AOP-SSD-1, Control Room Inaccessibility Safe Shutdown Control

The team reviewed manual actions to ensure that they had been properly reviewed and approved and that the actions could be implemented in accordance with plant procedures in the time necessary to support the SSD method for each fire area. The team also reviewed the periodic testing of the alternative shutdown transfer capability and instrumentation and control functions to ensure the tests are adequate to ensure the functionality of the alternative shutdown capability.

b. Findings

Unit 3 – Inadequate Alternative Post-Fire Safe Shutdown Procedure

Introduction: An NRC-identified finding of very low safety significance (Green), involving an NCV of Indian Point Unit 3 FOL Condition 2.H, was identified 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 analyzed to be available during the postulated fire in fire area ETN-4{2}, Upper Electrical Tunnel, were credited in the procedure.

Description: IP3-ANAL-FP-01503, "Unit 3 Safe Shutdown Analysis," analyzed fire area ETN-4{2}, Upper Electrical Tunnel, for SSD equipment and cables within the area and

determined that the requirements for component and cable separation specified in Appendix R, Section III.G.2, could not be satisfied. As such, Entergy designated fire area ETN-4{2} as an alternative SSD area, in accordance with Appendix R, Section III.G.3 and III.L. The SSD analysis also identified fire area CTL-3, Control Building Area, as a III.G.3 area. Fire area CTL-3 consisted of the control room, switchgear room, cable spreading room, and the diesel generator rooms. The SSD analysis determined that a postulated worst case fire in any of III.G.3 fire areas would result in a control room evacuation, with alternative shutdown performed at remote shutdown locations throughout the plant.

Operators would implement Indian Point Unit 3 procedure 3-ONOP-FP-1, "Plant Fires," for response to any fire in the plant. Procedure 3-ONOP-FP-1 provided criteria for evacuation of the control room, and when those criteria were met, the procedure directed operators to implement Indian Point Unit 3 procedure 3-AOP-SSD-1, "Control Room Inaccessibility Safe Shutdown Control." The team identified that for a fire in fire area ETN-4{2}, procedure 3-ONOP-FP-1 did not direct operators to implement alternative SSD procedure 3-AOP-SSD-1. Additionally, the team identified that Attachment 2 of 3-ONOP-FP-1, which provided tables by each fire area that contained equipment credited for each fire areas, was missing a table for fire area ETN-4{2}. The team noted that alternative SSD procedure 3-AOP-SSD-1 credited equipment for achieving SSD based on the SSD equipment and cables analyzed for control building fire area CTL-3. The team reviewed Indian Point Unit 3 SSD analysis IP3-ANAL-FP-01503 and determined that the analysis credited different sets of alternative SSD equipment for fire areas CTL-3 and ETN-4{2}. Based on these, the team identified the following deficiencies within 3-AOP-SSD-1 procedure:

- ETN-4{2} credited the use of 32 charging pump while CTL-3 credited the use of 31 charging pump;
- ETN-4{2} credited Appendix R diesel generator for supplying power to the vital 480V buses, however, no instructions were provided in the procedure to energize vital 480V buses from Appendix R diesel generator;
- Appendix R diesel generator had capability to power 38 service water pump from MCC 312A, however, 38 service water pump was not analyzed in the analysis for ETN-4{2}; and,
- ETN-4{2} credited process instruments for steam generator level, steam generator pressure, reactor coolant system temperature, reactor coolant system pressure, and pressurizer level, which were not consistent with equipment credited for alternative shutdown areas in 3-AOP-SSD-1.

The team determined that the SSD analysis correctly analyzed and identified equipment to achieve SSD conditions for a postulated fire in fire area ETN-4{2}. However, the results of the SSD analysis were not correctly translated into post-fire SSD operating procedures. Entergy entered this issue into its CAP as CR-IP3-2017-05108 and CR-IP3-2017-05109, and promptly implemented compensatory measures in accordance with the FPP. Interim compensatory measures included establishing fire watches in the affected fire area. The team concluded that Entergy's compensatory measures were reasonable and appropriate.

Analysis: Failure to ensure that the alternative post-fire SSD operating procedures for some postulated fire-induced equipment failures provided adequate instruction for

achieving SSD of the plant was a performance deficiency. This performance deficiency 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 of ensuring 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 Significance Determination Process screening for this issue, in accordance with NRC IMC 0609, Appendix F, "Fire Protection Significance Determination Process." This finding affected the post-fire SSD category because the implementing procedures were adversely affected. The team determined that this finding screened to Green based upon task number 2.3.5, because the affected cables were routed in the area that was protected by four separate pre-action sprinkler systems that protected the cable trays along each wall of the tunnel with head at 10-ft intervals in the cable trays; heat detectors (one for each pre-action systems) that are located in the trays with individual detectors at approximately 20-ft intervals; and area wide ionization detectors and CO₂ fire extinguishers. Based on the team's walkdown, no credible fire ignition source scenarios were identified in the fire area ETN-4{2} that could affect both electrical channels I and II cables. Therefore, this finding screened to very low safety significance (Green).

The finding did not have a cross-cutting aspect because it was a legacy issue (i.e., deficiency existed for more than three years) and was considered to not be indicative of current licensee performance.

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 10 CFR Part 50, Appendix R was applicable for areas of the plant where postulated fire scenarios were mitigated through use of alternative shutdown methods. 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, as of November 2, 2017, Entergy's alternative shutdown procedures did not provide adequate written instructions to ensure SSD was achieved for a postulated fire in fire area ETN-4{2}. Specifically, 3-AOP-SSD-1 procedure did not contain any steps to direct the use of alternative shutdown equipment credited in ETN-4{2} fire area. The procedure was not consistent with respect to SSD equipment analyzed for the alternate shutdown areas. As a result, operators would have relied on equipment that was susceptible to fire damage. Entergy implemented compensatory measures for this procedure deficiency. Because this violation was of very low safety significance (Green) and was entered into Entergy's CAP (CR-IP3-2017-05108 and CR-IP3-2017-05109), this violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000286/2017007-01, Inadequate Alternative Post-Fire Safe Shutdown Procedure)**

.06 Circuit Analysis

a. Inspection Scope

The team verified that the licensee performed a post-fire SSD analysis for the selected fire areas and the analysis appropriately identified the structures, systems, and components important to achieving and maintaining SSD. Additionally, the team verified that the licensee's analysis ensured that necessary electrical circuits were properly protected and that circuits that could adversely impact SSD due to hot shorts or shorts to ground were identified, evaluated, and dispositioned to ensure spurious actuations would not prevent SSD.

The team's review considered fire and cable attributes, cable routing, potential undesirable consequences, and common power supply/bus concerns. Specific items included the credibility of the fire threat, cable insulation attributes, cable failure modes, and actuations resulting in flow diversion or loss of coolant events.

The team also reviewed cable raceway drawings and/or cable routing databases for a sample of components required for post-fire SSD to verify that cables were routed as described in the SSD analysis. The team also reviewed equipment important to SSD, but not part of the success path, to verify that the licensee had taken appropriate actions in accordance with the design and licensing basis and NRC Regulatory Guide 1.189, Revision 2.

Circuit analysis was performed for the following components:

Unit 2

- HCV3100 & HCV3101, Indian Point Unit 2 (IP2) Reactor Head Vent Motor-Operated Valves
- 730 & 731, IP2 Residual Heat Removal (RHR) Pump Suction Isolation Shutdown Cooling Motor-Operated Valves
- 22, IP2 RHR Pump
- PT-3105, IP2 Pressurizer Pressure Indication for Alternate Safe Shutdown
- LCV-112B, IP2 Refuel Water to Charging Pump Suction

Unit 3

- MOV-882, RHR Pump Suction Stop Valve
- MOV-744, RHR Pump Discharge Header Isolation Valve
- LCV-112B, Level Control Valve Isolation for the Refueling Water Storage Tank to Charging Pump
- MOV-822B, Shut-Off Valve for Component Cooling Water from RHR System Heat Exchanger 32
- ACS2 Pump-31, Component Cooling Water Pump 31
- TE-413A, RCS Delta T Temperature Element Hot Leg Loop 1

The team reviewed a sample of circuit breaker coordination studies to ensure equipment needed to conduct post-fire SSD activities would not be impacted due to a lack of coordination that could result in a common power supply or common bus concern.

The team verified that the transfer of control from the control room to the alternative shutdown location(s) would not be affected by fire-induced circuit faults (e.g., by the provision of separate fuses and power supplies for alternative shutdown control circuits).

b. Findings

No findings were identified.

.07 Communications

a. Inspection Scope

The team reviewed SSD procedures, the SSD analysis, and associated documents to verify an adequate method of communications would be available to plant operators following a fire. During this review, the team considered the effects of ambient noise levels, clarity of reception, reliability, and coverage patterns. The team also inspected the designated emergency storage lockers to verify the availability of portable radios for the fire brigade and for plant operators. The team also verified that communications equipment such as repeaters and transmitters would not be affected by a fire.

b. Findings

No findings were identified.

.08 Emergency Lighting

a. Inspection Scope

The team observed the placement and coverage area of eight-hour emergency lights throughout the selected fire areas to evaluate their adequacy for illuminating access and egress pathways and any equipment requiring local operation or instrumentation monitoring for post-fire SSD. The team also verified that the battery power supplies were rated for at least an eight-hour capacity. Preventive maintenance procedures, the vendor manual, completed surveillance tests, and battery replacement practices were also reviewed to verify that the emergency lighting was being maintained consistent with the manufacturer's recommendations and in a manner that would ensure reliable operation.

b. Findings

No findings were identified.

.09 Cold Shutdown Repairs

a. Inspection Scope

The team verified that Entergy had dedicated repair procedures, equipment, and materials to accomplish repairs of components required for cold shutdown which might be damaged by the fire to ensure cold shutdown could be achieved within the time frames specified in their design and licensing bases. The team verified that the repair

equipment, components, tools, and materials (e.g. pre-cut cables with prepared attachment lugs) were available and accessible on site.

b. Findings

No findings were identified.

.10 Compensatory Measures

a. Inspection Scope

The team verified that compensatory measures were in place for out-of-service, degraded, or inoperable fire protection and post-fire SSD equipment, systems, or features (e.g. detection and suppression systems and equipment, passive fire barriers, or pumps, valves or electrical devices providing SSD functions or capabilities). The team also verified that the short term compensatory measures compensated for the degraded function or feature until appropriate corrective action could be taken and that the licensee was effective in returning the equipment to service in a reasonable period of time.

The team reviewed selected compensatory measures on Unit 2 in the form of operator manual actions for 10 CFR Part 50 Appendix R, Section III.G.2 designated areas to evaluate whether those actions could be reasonably accomplished. Specific attributes reviewed included availability of diagnostic instrumentation, expected environmental conditions, minimum staffing, communications, equipment availability, training, procedures, and verification and validation. The team noted that for the selected fire areas on Unit 3 which were designated as 10 CFR Part 50 Appendix R, Section III.G.2 areas, there were no compensatory measures in the form of operator manual actions.

b. Findings

No findings were identified.

.11 Fire Protection Program Changes

a. Inspection Scope

The team reviewed recent changes to the approved FPP to verify that the changes did not constitute an adverse effect on the ability to safely shutdown.

b. Findings

No findings were identified.

.12 Control of Transient Combustibles and Ignition Sources

a. Inspection Scope

The team reviewed the licensee's procedures and programs for the control of ignition sources and transient combustibles to assess their effectiveness in preventing fires and in controlling combustible loading within limits established in the FHA. A sample of hot

work and transient combustible control permits were also reviewed. The team performed plant walkdowns to verify that transient combustibles and ignition sources were being implemented in accordance with the administrative controls.

b. Findings

No findings were identified.

.13 Large Fires and Explosions Mitigation Strategies

a. Inspection Scope

The team reviewed selected mitigation strategies intended to maintain or restore core decay heat removal and spent fuel pool cooling capabilities under the circumstances associated with the loss of large areas of the plant due to explosions or large fires. The team assessed whether Entergy continued to meet the requirements of FOL Condition 2.N for Unit 2, FOL Condition 2.AC for Unit 3, and 10 CFR 50.54(hh)(2). The team reviewed the following mitigation strategies:

- Unit 2 Spent Fuel Pool External Fill or Spray using Portable Pump
- Unit 2 and 3 Refueling Water Storage Tank Makeup with Diesel Contingency Pump
- Unit 3 Steam Generator Depressurization and Fill with 32 Auxiliary Boiler Feed Pump
- Unit 3 Manual Depressurization of Steam Generators using Local Operation of Atmospheric Steam Dump Valves

The team's review included: a detailed assessment of the procedural guidance; a tabletop discussion with a non-licensed operator (i.e., postulated highest ranking Operations Department staff member to survive an event or hostile action) to discuss initial response actions; walk down of selected mitigation strategies with plant staff to assess the feasibility of the strategies and familiarity of the staff with plant equipment and implementing procedures; maintenance and surveillance testing of selected strategy equipment; and an inventory check of selected mitigation equipment to verify whether equipment storage and availability was appropriate.

b. Findings

Introduction: An NRC-identified finding of very low safety significance (Green) and NCV of 10 CFR 50.54(hh)(2), "Conditions of Licenses," the Unit 2 FOL Condition 2.N, and the Unit 3 FOL Condition 2.AC was identified for failure to maintain strategies for addressing large fires and explosions. Specifically, Entergy failed to maintain the B.5.b strategies when the site's B.5.b pump, B5B-101-PMP, was declared non-functional and unavailable on March 20, 2017, due to a deficiency associated with the pump's engine and failed to promptly restore the pump to a functional status or establish any compensatory measures.

Description: The team reviewed the operational status of the site's B.5.b pump. The team discovered that the pump was declared non-functional and unavailable on March 20, 2017, due to a deficient throttle on the pump's diesel engine. In addition, the

pump's diesel engine failed to crank on a start demand during testing on September 11, 2017. Entergy did not establish any compensatory measures for the non-functional B.5.b pump and planned to complete repairs through the normal work scheduling process with a targeted completion date in February 2018. The team noted that there was no mechanism in place by control room operators to track the operational status of the pump. The team concluded that unnecessary delays would be encountered in the event that mitigating strategies associated with a loss of large areas of the plant due to explosions or fire needed to be implemented due to the unavailable pump. The team determined that the failure to promptly restore the B.5.b pump to a functional status or establish any compensatory measures was a performance deficiency.

Analysis: The failure to promptly restore the site's B.5.b pump to a functional and available status or establish any compensatory measures in order to satisfy the Units 2 and 3 FOL conditions associated with maintaining strategies for addressing large fires and explosions was a performance deficiency. Specifically, Entergy failed to maintain B.5.b strategies when the site's B.5.b pump was declared non-functional and unavailable on March 20, 2017, due to a deficient throttle valve on the pump's diesel engine. In addition, the B.5.b pump's diesel engine failed to crank on a start demand on September 11, 2017. Entergy failed to promptly restore the B.5.b pump to a functional status or establish any compensatory measures. This finding was more than minor because it is associated with the Protection Against External Factors (e.g., fire) attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent core damage.

The team evaluated the significance of the finding in accordance with IMC 0609, Appendix L, "B.5.b Significance Determination Process." The finding was determined to be of very low safety significance (Green) because although the B.5.b pump was considered unavailable, the team concluded that the pump was recoverable. This was because: 1) operators, with minor assistance of onsite maintenance personnel, were able to troubleshoot, repair, and place the B.5.b pump into operation within the time needed to support the most time limiting mitigating strategy (1.5 hours versus a 2 hour commitment) on November 3, 2017; and 2) an alternate B.5.b pump (B5B-102-PMP), although not officially credited, maintained, or periodically tested, was demonstrated to be functional in the as-found condition on November 4, 2017.

This finding had a cross-cutting aspect of Resources, in the area of Human Performance, because leaders did not ensure that personnel, equipment, procedures, and other resources were available and adequate to support nuclear safety. Specifically, procedural guidance and equipment were not available to operators to implement adequate compensatory measures when the B.5.b pump became non-functional and unavailable. Entergy entered this issue into the CAP as CR-IP2-2017-04349. [H.1]

Enforcement: 10 CFR 50.54(hh)(2) requires, in part, that each licensee shall develop and implement guidance and strategies intended to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities under the circumstances associated with loss of large areas of the plant due to explosions or fire. Unit 2 FOL Condition 2.N and Unit 3 FOL Condition 2.AC require that the licensee shall develop and

maintain strategies for addressing large fires and explosions. Procedure 0-SOP-ESP-002, "Emergency Contingency Plan," Revision 12, implements mitigating strategies addressing large fires and explosion utilizing the diesel-driven B.5.b pump.

Contrary to the above, between March 20, 2017, and November 3, 2017, Entergy failed to maintain strategies for addressing large fires and explosions. Specifically, the B.5.b Pump was declared non-functional and unavailable due to a deficient throttle on the pump's diesel engine. Entergy did not promptly restore the pump to a functional status or establish any compensatory measures until November 3, 2017, when repairs and testing were completed. Because this finding is of very low safety significance (Green) and has been entered into Entergy's CAP as CR-IP2-2017-04349, this violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000247, 286/2017007-02, Failure to Maintain B.5.b Mitigating Strategies)**

4. OTHER ACTIVITIES (OA)

4OA2 Identification and Resolution of Problems

.01 Corrective Actions for Fire Protection Deficiencies

a. Inspection Scope

The team verified that Entergy was identifying fire protection and post-fire SSD issues at an appropriate threshold and entering them into the CAP. The team also reviewed a sample of selected issues to verify that Entergy had taken or planned appropriate corrective actions.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

The team presented their preliminary inspection results to Mr. Anthony J. Vitale, Site Vice President, and other members of the site staff at an exit meeting on November 3, 2017. No proprietary information was included in this inspection report.

4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by Entergy and is a violation of NRC requirements which meets the criteria of the NRC Enforcement Policy for being dispositioned as an NCV.

- Indian Point Unit 2 Technical Specification 5.4.1.k and Indian Point Unit 3 Technical Specification 5.4.1.d require written procedures shall be established, implemented, and maintained covering FPP implementation. Procedure 0-PT-M004, "Fire Extinguisher Inspection," Revision 9 implements monthly inspections of portable fire extinguishers to verify hydrostatic testing and periodic maintenance was performed within the periodicity specified by NFPA 10-1990, "Standard for Portable Fire

Extinguishers.” Procedure 0-PT-M004 requires portable fire extinguishers to be removed from service and replaced if their periodic maintenance or hydrostatic testing are not current within the specified periodicity.

Contrary to the above, from July 1, 2015, to August 25, 2017, approximately 200 portable fire extinguishers were not removed from service and replaced when they exceeded their specified periodicity for maintenance and/or hydrostatic testing. Specifically, plant staff did not properly implement procedure 0-PT-M004 to verify portable fire extinguishers were periodically maintained and hydrostatically tested at intervals specified by NFPA 10-1990. The application software used in conjunction with 0-PT-M004 to perform monthly fire extinguisher inspections was revised in June 2015 and plant staff did not set up the software to require verification that fire extinguisher maintenance and hydro tests were current. Fire protection engineers identified the issue in August 2017, evaluated the subject fire extinguishers, and determined they were acceptable for continued use until December 31, 2017, based on the relatively short period of untimely maintenance/testing, satisfactory monthly verifications of physical condition, and the availability of additional portable fire extinguishers in the affected fire areas. Additional corrective actions included initiation of an accelerated maintenance and hydro test program to ensure all portable fire extinguishers met NFPA-10 maintenance and test requirements by December 21, 2017, and revision of 0-PT-M004 and the associated application software. Entergy entered the issue into the CAP (CRs IP3-2017-04084 and IP3-2017-02945). The inspectors evaluated this finding using IMC 0609.04, “Initial Characterization of Findings,” and IMC 0609, Appendix A, Exhibit 2, “Mitigating Systems Screening Questions.” The inspectors determined that the finding was of very low safety significance (Green) because the finding did not impact the frequency of a fire and did not involve a loss or degradation of equipment or function specifically designed to mitigate an external event.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

- A. Vitale, Site Vice President
- M. Troy, Engineering Programs Supervisor
- S. Bianco, Fire Marshal
- R. Caffo, Fire Brigade Member and Nuclear Plant Operator
- G. Dahl, Senior Regulatory Affairs Engineer
- S. Hurbanek, Senior Reactor Operator
- K. Elliot, Safe Shutdown Engineer
- J. Geraci, Telecommunication Engineer
- K. McKenna, Unit 2 Operations Manager
- M. Mirzai, Licensing
- P. Robert, Telecommunication Engineer
- D. Powell, FLEX Program Manager and Assistant Fire Marshal
- E. Schimpf, Reactor Operator
- C. Wilson, Fire Protection Program Engineer

NRC

- B. Haagensen, Senior Resident Inspector, Indian Point Nuclear Generating Units 2 and 3
- A. Siwy, Resident Inspector, Indian Point Nuclear Generating Units 2 and 3
- M. Rossi, Resident Inspector, Indian Point Nuclear Generating Units 2 and 3

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None.

Opened and Closed

05000286/2017007-01	NCV	Inadequate Alternative Post-Fire Safe Shutdown Procedure (Section 1R05.05)
05000247, 286/2017007-02	NCV	Failure to Maintain B.5.b Mitigating Strategies (Section 1R05.13)

Closed

None.

LIST OF DOCUMENTS REVIEWED

Fire Protection Licensing Documents

AP-64.1, Fire Protection/Appendix R Systems and Components Governed by Technical Requirements Manual and Technical Specifications, Revision 4

Appendix A to NRC Branch Technical Position APCS 9.5-1, Guidelines for Fire Protection for Nuclear Power Plants dated 2/24/17

EN-DC-330, Fire Protection Program, Revision 4

Indian Point 2 Updated Final Safety Analysis Report, Revision 26

IP2 UFSAR, Section 9.6.2, Fire Protection System, Revision 26

IP2 Technical Specifications

IP2-DBD-221, Indian Point 2 Design Basis Document for Fire Protection System, Revision 3

IP2-RPT-03-00015, Indian Point 2 Fire Hazards Analysis, Revision 7

IP2-RPT-03-00015, IP2 Fire Hazards Analysis, Revision 7

Indian Point Unit 3 (IP3) Facility Operating License, through Amendment 259

IP3 Technical Requirements Manual, Section 3.7.A, Revision 4

IP3 Technical Specifications

IP3 Updated Final Safety Analysis Report, Revision 6

IP3-ANAL-FP-01503, Appendix R Sections III.G and III.L Safe Shutdown Analysis Report, Revision 3

IP3-ANAL-FP-02143, Fire Hazards Analysis Report, Revision 5

IP3-DBD-321, Indian Point Unit 3 Design Basis Document for Fire Protection System, Revision 4

IP3-RPT-FP-00962, NFPA Codes of Record for NFPA Code Compliance Review, Revision 0

IP3-RPT-FP-01249, IP3 NFPA-25 Code Compliance Review, Inspection Testing, and Maintenance of Water Based Fire Protection Systems, Revision 1

IP3-RPT-FP-02211, Indian Point No.3 Nuclear Power Plant Compliance to Branch Technical Position APCS 9.5-1, Appendix A, Revision 0

IP3-RPT-FP-02211, IP3 Compliance to Branch Technical Position APCS 9.5-1, Appendix A Revision 0

Individual Plant Examination of External Events Section 4, Internal Fires Analysis

IP-RPT-05-00071, IP2 10CFR50, Appendix R Safe-Shutdown Analysis, Revision 2

Letter dated 10/16/84, Technical Exemption from the Requirements of 10CFR50, Appendix R for IP2

Letter dated 11/13/85, Technical Exemption from the Requirements of 10CFR50, Appendix R for IP2

Letter dated 3/4/87, Technical Exemption from the Requirements of 10CFR50, Appendix R for IP2
NRC Branch Technical Position APCS 9.5-1, Guidelines for Fire Protection for Nuclear Power Plants dated 5/1/76

SEP-FPP-IP-001, Indian Point Energy Center Fire Protection Program Plan, Revision 4

SEP-FPP-IP-002, Indian Point Energy Center Fire Watch Program, Revision 2

SEP-FPP-IP-003, Temporary Buildings and Trailers, Revision 0

Safety Evaluation Report (SER) dated 1/12/80, Evaluation of Fire Protection Features at IP2

SER dated 1/31/79, Indian Point Nuclear Generating Unit 2

SER dated 10/31/80, Indian Point Nuclear Generating Unit 2

SER dated 11/3/77, Indian Point Nuclear Generating Units 2 and 3

SER dated 2/3/78, Indian Point Nuclear Generating Units 2 and 3

SER dated 3/30/84, Indian Point Nuclear Generating Unit 2

SER dated 8/22/83, Indian Point Nuclear Generating Unit 2

Design Basis Documents

IP2-DBD-221, IP2 Design Basis Document for Fire Protection Systems, Revision 3

Design Changes

IEC No. 45124, Update EP Operation's Communications to Address Fukushima Flex Requirements in NEI 12-01, Revision 0

Fire Protection Evaluations of Modifications and Design Changes

EC 41582, Installation of 3 hour Fire Enclosure around Valve LCV-112C, Revision 1
EC 42090, IP2, Remote (Isolated) Indicators for ASSS Instrumentation Channels, Revision 1
EC 56077, Penetrated Cable Spreading Room and Control Room Fire Barriers; Re-Sealed Penetrations
EC 57573, Replacement of #31 Main Transformer, Revision 0
EC 72656, Cable Spreading Room Halon Control Pane EC-541899, IP3 – Installation of Additional Hemyc Insulation Wrap to Appendix R Conduit/Cable Trays, Revision 0
FFX-92-08169-E, IP2, Generic Motor Operated Valves, Revision 2

Calculations/Engineering Evaluation Reports

1988FP-100GSU.WXF, Main Transformer MT31 Hydraulic Design Analysis, dated 5/20/15
CALC 0090-00066-C-004, IP3 Fire Suppression Effects Analysis, Revision 0
Calculation IP3-RPT-ED-00922, Appendix G, Appendix 'R' Diesel Generator System Evaluation, Revision 4
CPG-79-02-03, Indian Point Unit 2 Cable Spreading Room Original Installation, Revision 0
CPG-80-2-004, 3 Hour East and West Walls of Control Building and Associated Cable Penetrations
FEX-00160, IP2 Evaluation of Alternate Safe Shutdown, Revision 3
Final Report CTP 1001A Three Hour Fire Qualification Test, 7/25/80
Final Report CTP 1076 Three Hour Fire Qualification Test, 3/28/85
IP2180-01-001, IP2, REGUIDE 1.189 Project (MSO), Revision 1
IP3-ANAL-FP-01325, Fire Dampers 4&9 Separating the Control Building, Revision 0
IP3-ANAL-FP-02143, Fire Hazards Analysis (FHA) Report, Revision 5
IP3-CALC-FP-02795, Combustible Loading Calculation for IP3 Fire Hazards Analysis, Revision 0
IP3-CALC-MULT-382, N2 Backup to AFW Bldg. Valves and Atmospheric Dump Valves, Revision 5
IP3-CALC-RHR-01079, Thrust and Torque Limits Calculation for AC-MOV-730, Revision 3
IP3-CALC-RHR-01080, Thrust and Torque Limits Calculation for AC-MOV-731, Revision 3
IP3-RPT-06-00062, Comparison of IP3 HEMYC 1-Hour Electrical Raceway Fire Barrier System to NRC and Industry Hemyc ERFBS Fire Test Results, Revision 1
IP-ANAL-FP-01049, Fire Barrier Analysis Cable Spreading Room to Electric Tunnels, Revision 1
IP-CALC-04-00766, IP3 SG Boil-Dry Analysis with RETRAN-3D, Revision 2
IP-CALC-04-01171, Hydraulic Analysis of Indian Point Energy Center (IPEC) Fire Protection Water Supply Systems and Several Unit 2 Suppression Systems and the Unit 2 Standpipe System, Revision 0
IP-CALC-05-01034, Appendix R Cooldown Benchmark and Sensitivity Analysis, Revision 3
IP-CALC-06-00029, Appendix R Cooldown to RHR Initiation Using RETRAN-3D, Revision 2
IP-RPT-04-00188, Evaluation of Hemyc Wrap Fire Protective Systems, Revision 1
IP-RPT-04-00223, Indian Point 2 Smoke Removal Evaluation, Revision 0
IP-RPT-05-00071, Indian Point 2 10 CFR 50 Appendix R Safe Shutdown Analysis, Revision 2
IP-RPT-05-00084, Indian Point 2 10 CFR 50 Appendix R Safe Shutdown Manual Action Feasibility Report, Revision 0
IP-RPT-06-00022, Model 93 Reactor Coolant Pump Buffer Volume Related to Safe Shutdown Analysis Validation, Revision 0
IP-RPT-08-00072, Operator Manual Action Screening for Appendix R, Revision 0

IP-RPT-09-00012, Validation of Operator Manual Actions Credited for Appendix R, Section III.G Fire Areas, Revision 0
 IP-RPT-15-00003, 10 CFR 50 Appendix R Fire Thermal Hydraulic Analysis Using Safety Injection Pump, Revision 2
 NEA-00031, Indian Point 2 Steam Generator Boil Off Analysis, Revision 2
 PGI-00355, NRC IN 92-18 MOV Control Hot Short Issue, Revision 2
 PGI-00403-00, Indian Point 2 Type 1 Fire barrier Penetration Seal Index, Addendum 1
 Water Supply Systems and Several Unit 2 Suppression Systems and the Unit 2 Standpipe System
 WCAP-12312, Safety Evaluation for an Ultimate Heat Sink Temperature Increase to 95 Degrees Fahrenheit, Revision 2

Procedures

0-ELC-420-FIR, Appendix R Emergency Light Unit Inspection, Battery Replacement, and Test, Revision 9
 0-FIR-006-FIR, Installation/Repair Hemyc Wrap for Tray(s) and Conduit/Air Drops, Revision 1
 0-PT-M001, Fire Brigade Equipment Inventory and Inspection, Revision 16
 0-PT-M002, Alternate Safe Shutdown Equipment Inventory and Inspection, Revision 16
 0-PT-M004, Fire Extinguisher Inspection, Revision 9
 0-PT-Q001, Alternate Safe Shutdown Equipment Inventory and Inspection, Revision 13
 2-BRK-001-ELC, ITE Type KC, Model G-AIR Circuit Breaker, Revision 2
 2-BRK-002-ELC, ITE Type KD (3000 AMP) and KE (4000AMP), Model "A" Air Circuit Breaker Non/Class "A", Revision 1
 2-BRK-023-ELC, DB Breaker Amptector/Westector Overcurrent Test, Revision 8
 2-BRK-023-ELC, DB Breaker Amptector/Westector Overcurrent Test, Revision 6
 2-BRK-024-ELC, DB Breaker Amptector/Westector Calibration Test, Revision 4
 2-BRK-024-ELC, DB Breaker Amptector/Westector Calibration Test, Revision 3
 2-COL-1.1, Reactor Coolant System, Revision 30
 2-COL-4.2.1, Residual Heat Removal System, Revision 30
 2-ELC-004-FIR, Indian Point 2 Repairs for Safe Shutdown in the Event of an Appendix R Fire, Revision 3
 2-FR-4.1, Response to Loss of Secondary Heat Sink, Revision 11
 2-PT-2Y017, Penetration Fire Barrier Seal Inspection, Revision 7
 2-PT-2Y041, Fire Damper Functionality, Revision 3
 2-PT-A016, Electrical Tunnel Pre-action System, Revision 16
 2-PT-A048, Rollup Fire Doors, Revision 2
 2-PT-EM19, Cable Spreading Room Halon System, Revision 11
 2-PT-M049A, Appendix R Emergency Lighting, Revision 24
 2-PT-Q017A, IP2, Alternate Safe Shutdown Supply Verification to 21 AFP, Revision 13
 2-PT-Q017B, IP2, Alternate Safe Shutdown Supply Verification to 23 CHP, Revision 11
 2-PT-Q017C, IP2, Alternate Safe Shutdown Supply Verification to 23 CCP, Revision 17
 2-PT-Q017D, IP2, Alternate Safe Shutdown Supply Verification to 23 SWP, Revision 11
 2-PT-Q017E, IP2, Alternate Safe Shutdown Supply Verification to 24 SWP, Revision 11
 2-PT-Q017F, IP2, Alternate Safe Shutdown Supply Verification to 21 SIP/RHRP, Revision 9
 2-PT-Q066, Main Turbine Lube Oil Pumps, Revision 8
 2-PT-SA013, Cable Spreading Room Halon System, Revision 14
 2-PT-SA20, Swing Fire Doors, Revision 3
 2-SOP-27.6, Unit 2 Appendix R Diesel Generator Operation, Revision 17
 2-SOP-29.6.1, Cable Spreading Room Halon Fire Protection Operation, Revision 10
 3-ARP-015, Panel SMF – Safety Injection, Revision 34
 3-BRK-017-ELC, Current Sensor and/or Trip Unit Replacement Setting and Testing, Revision 13

3-ELC-004-FIR, Appendix R Repair, Revision 12
 3-PC-OL01A, RCS Wide Range Hot and Cold Leg Temperature Calibration, Revision 5
 3-PT-M042A, Electric Fire Pump Test, Revision 5
 3-PT-M080, Appendix R Emergency Lighting Functional Test, Revision 22
 3-PT-Q006, Air Side Seal Oil Backup Pump Functional and Main Turbine Bearing Oil Pumps Starting Test, Revision 18
 3-PT-R084, Fire Pump Functional Test, Revision 20
 3-SOP-FP-001, Fire Protection System Operation, Revision 35
 AP-64.1, Fire Protection/Appendix R Systems and Components Governed by Technical Requirements Manual and Technical Specification, Revision 4
 EN-DC-127, Control of Hot Work and Ignition Sources, Revision 17
 EN-DC-161, Control of Combustibles, Revision 17
 EN-DC-186, Fuse Control, Revision 2
 EN-DC-330, Fire Protection Program, Revision 4
 EN-LI-104, Self-Assessment and Benchmark and Benchmark Process, Revision 13
 ENN-EE-S-003-IP, Sizing of Fuses, Revision 0
 EN-OM-126-01, New to Nuclear Workforce Orientation, Revision 2
 EN-TQ-125, Fire Brigade Training, Revision 4
 IP-SMM-TQ-122, Indian Point Energy Center Fire Protection Program Training, Revision 5
 OAP-115, Operations Commitments and Policy Details, Revision 11
 OAP-115, Operations Commitments and Policy Details, Revision 28
 OAP-115, Operations Commitments and Policy Details, Revision 30
 PT-EM9, Fire Damper Operability, Revision 4
 SAO-703, Fire Protection Impairment Criteria and Surveillances, Revision 35
 SEP-FPP-IP-001, IPEC Fire Protection Program Plan, Revision 4
 SEP-FPP-IP-002, IPEC Fire Watch Program Plan, Revision 2

Operations Procedures

2-AOP-SSD-1, Control Room Inaccessibility Safe Shutdown Control, Revisions 24 and 25
 2-ONOP-FP-001, Plant Fires, Revision 19
 2-SOP-ESP-001, Local Equipment Operation and Contingency Actions, Revision 12
 3-AOP-SSD-1, Control Room Inaccessibility Safe Shutdown Control, Revision 21
 3-ONOP-FP-1, Plant Fires, Revision 41
 3-SOP-EL-012, Operation of the Alternate Safe Shutdown Equipment, Revision 18
 3-SOP-EL-013, Appendix R Diesel Generator Operation, Revision 30
 3-SOP-ESP-001, Local Equipment Operation and Contingency Actions, Revision 25
 EN-DC-186, Fuse Control, Revision 2
 ENN-EE-S-003-IP, Sizing Fuses, Revision 0
 OAP-115, Operations Commitments and Policy Details, Revision 28

Large Fires and Explosions Mitigation Strategies Documents

0-AOP-SEC-3, Event Contingency Actions, Revision 3
 0-PT-Q003, B.5.b Equipment Inventory and Diesel Driven Pump Test, Revision 22
 0-SOP-ESP-002, Emergency Contingency Plan, Revision 12
 0-SOP-ESP-003, Emergency Contingency Plan Strategy Attachments, Revision 1
 2-SOP-ESP-001, Local Equipment Operation and Contingency Actions, Revision 4
 3-SOP-ESP-001, Local Equipment Operation and Contingency Actions, Revision 19
 Hale Products Inc. Unit Model FP500DJ Pump Curve
 Hale Products Inc. Unit Model HP300DJ Pump Curve
 I0CBT-ERT-B.5.b, B.5.b and Security Procedures Training for ERO, Revision 1
 IP-CALC-08-00097, Hydraulic Analysis of B.5.b Mitigating Strategies, dated 1/22/14

IP-CALC-08-00134, PWR Enhancement Strategy #7 – External Containment Sprays, dated 9/24/08

List of IPEC B.5.b Regulatory Commitments

LOR-AOP-021, Security Procedures Lesson Plan

WO-456422, B.5.b Throttle Knob Free Spins without Changing Speed, completed 11/4/17

WO-488399, Alternative B.5.b Pump Test, completed 11/4/17

WO-52733003, 3 Month Equipment Inventory and Test 0-PT-Q003, completed 3/12/17

WO-52750243, 3 Month Equipment Inventory and Test 0-PT-Q003, completed 6/26/17

Completed Tests/Surveillances

0-PT-M001, Brigade Equipment Inventory and Inspection, performed on 9/4/17

0-PT-M001, Monthly Fire Brigade Equipment Inventory & Inspection, performed on 9/6/17

0-PT-M004, Monthly Fire Extinguisher Inspection, performed on 7/31/17

2-PT-2Y017, 2Y penetration fire barrier seal inspection, performed on 1/29/15

2-PT-3Y015A, Underground Fire Loop Flow, performed on 7/13/15

2-PT-3Y1015B, Turbine Building Fire Loop Flow, performed on 7/27/14

2-PT-A023, Fire Main Booster Capacity Test, performed on 5/15/17

2-PT-A023, Fire Main Booster Capacity Test, performed on 8/13/15

2-PT-A040, Diesel Driven Fire Pump Capacity, performed on 2/28/17

2-PT-A040, Diesel Driven Fire Pump Capacity, performed on 2/29/16

2-PT-A16, Electrical Tunnel Pre-action Water Spray System, 9/9/16

2-PT-EM-19, Cable Spreading Room Halon System, performed on 7/17/17

2-PT-M034A, 11 Fire Main Booster Pump, performed on 8/24/17

2-PT-M034B, 12 Fire Main Booster Pump, performed on 8/24/17

2-PT-M040, Diesel Fire Pump, performed on 8/13/17

2-PT-MO49A, Appendix R Emergency Lighting – Conventional, Revision 24, performed on 8/13/17

2-PT-MO49B, Appendix R Emergency Lighting – Nuclear, Revision 18, performed on 9/2/17

2-PT-SA013, Cable Spreading Room Halon System, performed on 5/26/17

2-PT-SA020, Swing Fire Doors, performed on 10/24/16

3-FIR-005-FIR, 2-Year Inspection, Cleaning, and Preventive Maintenance of IP3 Fire and Smoke Dampers, performed on 7/26/17

3-IC-PC-M-U-FPPH, Fire Protection Pump House Level Pressure and Flow Instruments, performed on 1/16/17

3-PT SA13, 1-Year Fire Protection System Smoke Detector Test, performed on 5/22/16

3-PT-2Y004, CO₂ System Test for Cable Spreading and Switchgear Rooms, performed on 9/30/17

3-PT-A042, 1-Year Heat Detector Actuation Test for Fire Door FDR-30-CB, performed on 2/26/17

3-PT-M042A, Monthly Electric Fire Pump Test, performed on 7/17/17

3-PT-R084, 2-Year Fire Pump Functional Test, performed on 2/23/17

3-PT-R100A, 2-Year Controlled Barrier Inspection, performed on 6/29/17

3-PT-R113, High Pressure Water Fire Protection System Flush and Loop Flow Determinations, performed on 10/12/16

3-PT-SA070, 6-Month Fire Door Inspection, performed on 10/14/16

3-PT-SA17, 6-Month Fire Protection Ultra-Violet Flame Detectors, performed on 2/17/17

52534593, 2-Year Battery Replacement EBR-7-PAB, performed on 12/21/15

52539770, 2-Year Battery Replacement EBR-47-PAB, performed on 1/21/16

52570841, 2-Year Battery Replacement EBR-2-PAB, performed on 10/15/16

52577121, 2-Year Battery Replacement EBR-29-PAB, performed on 6/21/16

52590836, 2-Year Battery Replacement EBR-13-TB, performed on 9/21/16

52601820, 2-Year Battery Replacement EBR-6-CB, performed on 12/6/16

52603409, 2-Year Battery Replacement EBR-5-EDG, performed on 12/22/16
52645459, 2-Year Battery Replacement EBR-14-PAB, performed on 8/7/17
52758967, Alternate Safe Shutdown Equipment Inventory and Inspection, performed on 8/12/17
52775840, Emergency Battery Lighting Function Test, performed on 9/20/17
PT-SA12A, Ionization Type Smoke Detector, performed on 2/7/2017

Quality Assurance Audits and Self Assessments

Quality Assurance Audit Notification QA-9-2016-IP-1, dated 1/7/16
Quality Assurance Audit Report QA-9-2016-IP-1, dated 2/19/16
LO-HQNLO-2014-31, Fire Marshall Implementation at Exelon, dated 3/21/14
LO-IP3LO-2014-00149, Fire Protection Snapshot Assessment of Outage Performance, dated 5/16/16
QA-9-2015-IP-1, Quality Assurance CO₂ Fire Protection "Module A" Audit Plan, Indian Point Energy Center, dated 1/7/16
QA-9-2016-IP-1, Quality Assurance Audit Report, dated 2/19/16

System Health Reports

Fire Protection Program Health Report 1st Quarter 2017
Fire Protection Program Health Report 2nd Quarter 2017
Fire Protection Program Health Report 3rd Quarter 2016
Indian Point Unit 2 Updated Final Safety Analysis Report, Section 9.6.2, Fire Protection System, Revision 26
IP2 System Health Report, DC Power, 2nd Quarter 2017
IP2 System Health Report, 480 Volts Alternate Current (Vac), 1st Quarter 2016
IP2 System Health Report, 480 Vac, 3rd Quarter 2016

Drawings and Wiring Diagrams

138379-30, IP2, One Line Diagram 125 Volts Direct Current (Vdc) System, Revision 30
138743-6, IP1, External D/C of 125 Vdc Turbine Emergency Oil Pump, Revision 6
192477-3, Unit No 1 Flow Diagram Piping and Instrumentation Symbols, Revision 3
1980M377, Halon Control Station Cable Spreading Room, Revision 5
1988FP-100, IP3 Main Transformer MT31 Fire Protection System, Revision 2
1988FPE-100, IP# Fire Alarm & Detection System Main Transformer MT31 Fire Detection Layout Plan, Revision 2
205792, IP2, Internal Wiring Diagram of Supervisory Panel SFF, Revision 31
208502, IP2, Single Line Dia. 118 Vac, 1 Phase Inst. Busses No. 21 22, 23 and 24, Revision 65
227551-66, Fire Protection System Diagram Details Sheet #1, 5/20/98
227552-47, Fire Protection System Diagram Details Sheet #2, 7/2/14
227553-51, Fire Protection System Diagram Details Sheet #3, 8/25/08
227554-27, Fire Protection System Diagram Details Sheet #4, 8/25/08
250907, IP2, Electrical Dist. & Transmission System, Revision 38
2-PT-0066, Main Turbine Lube Oil Pumps, Revision 8
400400-02, IPEC Unit 1&2 Fire Area/Zone Arrangement Site Plan, 3/27/07
400401-04, IPEC Unit 2 Fire Area/Zone Arrangement at El, 15', 4/17/07
400402-01, IPEC Unit 1&2 Fire Area/Zone Arrangement at El, 36', 12/24/12
400402-03, IPEC Unit 1&2 Fire Area/Zone Arrangement at El, 36', 12/24/12
400403-05, IPEC Unit 2 Fire Area/Zone Arrangement at El, 53', 1/10/13
400404-04, IPEC Unit 2 Fire Area/Zone Arrangement at El, 80', 3/26/14
400405-02, IPEC Unit 2 Fire Area/Zone Arrangement at El, 98', 3/27/07
400406-01, IPEC Unit 1 Fire Area/Zone Arrangement at El, 15', 3/27/07
400407-01, IPEC Unit 1 Fire Area/Zone Arrangement at El, 33', 3/27/07

400408-03, IPEC Unit 1 Fire Area/Zone Arrangement at EI, 53', 9/12/14
 500B971 Sheet 110, Elementary Wiring Diagram Valve Table – Control, Dated 4/12/13
 500B971 Sheet 27, Elementary Wiring Diagram Component Cooling Pump 31 Electrical,
 Revision 9
 503827, IP2, RCS Loop Diag. ASSS Instrumentation Cont. Isolation Valves Loop No. 506, 507,
 Instrumentation, Revision 0
 503839, IP2, Loop Diag. ASSS Instrument Gauge Rack LT-5002-1, LT-5001-1, LT-3101-1, PT-
 3105-1, Revision 0
 617F644, 480V One Line Diagram, Revision 37
 617F644, 480V One Line Diagram, Revision 37
 9321-F-30033, Appendix "R" On-Site Alternate Power Source Diesel Generator Main One Line
 Diagram, Revision 12
 9321-F-30043 Sheet 1, Single line Diagram 480V Motor Control Centers No's 31, 33 & 34,
 Revision 55
 9321-F-30043 Sheet 2, Single line Diagram 480V Motor Control Centers No's 32 & 35, Revision
 20
 9321-F-30053, Single line Diagram 480V Motor Control Centers 37, 38, 39& 311, Revision 74
 9321-F-30063 Sheet 1, Single line Diagram 480V Motor Control Centers No's 36A, 36B & 36C,
 Revision 83
 9321-F-30063 Sheet 2, Single line Diagram 480V Motor Control Centers No's 36D & 36E,
 Revision 10
 9321-F-3008, IP2, DC Power Panels 21, 22, 23 & 24, Revision 92
 9321-F-30083, Single line Diagram DC System, Revision 63
 9321-F-31363 Sheet 1, Wiring Diagram Motor Control Center 36C Electrical, Revision 19
 9321-F-33413, Wiring Diagram Instrument Power Cab. POE, Revision 7
 9321-F-33413, Wiring Diagram Instrument Power Cab. POE, Revision 7
 9321-F-33493, Wiring Diagram Miscellaneous Power & Distribution Panel, Revision 6
 9321-F-33493, Wiring Diagram Miscellaneous Power Distribution Panel, Revision 6
 9321-F-36013, Sheet 3, Motor Operated Valves (MCC 36A) Pipe Penetration, Revision 7
 9321-F-36023, Sheet 3, Motor Operated Valves (MCC 36B) Pipe Penetration, Revision 5
 9321-F-36023, Sheet 4, Motor Operated Valves (MCC 36B) P.A.B., Revision 7
 9321-F-38520, Wiring Diagram 125V Power Panel 36 Station Battery 36 & 36A Battery Charger
 36& 36A, Revision 4
 9321-F-39893, Single Line diagram 118 Vac Instrument Buses 31, 31A, 32, 32A, 33, 33A, 34,
 34A, Revision 46
 9321-F-4006-78, Yard Fire Protection Piping, 6/23/11
 9321-F-7054-44, Indian Point No2 Control Building Floor Openings Fire barrier 15/11 Control RM,
 EL. 53' Cable Spreading Room
 9321-H-36933, Extension of Electrical facilities One Line Diagram, Revision 12
 9321-H-36943, Extension of Electrical Facilities Auxilliary One Line Diagram, Revision 15
 9321-H-39913 Sheet 23, External Connection Diagram R.A.S. Rack NO.23 (A-6), Revision 10
 9321-H-39913 Sheet 23, External Connection Diagram R.A.S. Rack No.23 (A-6), Revision 10
 9321-LL-31173 Sheet 27, Schematic Diagram 480V Switchgear 31, Revision 4
 9321-LL-31263 Sheet 1, Schematic Diagram 480V Motor Control Central NO. 36, Revision 18
 9321-LL-31263 Sheet 127A, Schematic Diagram 480V Motor Control Center 36, Revision 14
 9321-LL-31263, Sheet 133A, Schematic Diagram 480V Motor Control Center 36, Revision 10
 9321-LL-31403 Sheet 2, Schematic Diagram Miscellaneous DC Circuits, Revision 9
 9321-LL-31403 Sheet 2A, Schematic Diagram Miscellaneous D.C. Circuits, Revision 6
 A138040, IP1, One-Line Diagram 13.8KV & 440V System, Revision 57
 A208088, IP2, One-Line Diagram Of 480 Vac, SWG R5, 21 & 22, Bus 2A, 3A, 5A & 6A, Revision
 46

A208377, IP2, Main One Line Diagram, Revision 19
 A209561, IP2, Steam Generator & Pressurizer Level & Pressure Instrumentation Arrangement
 outside Containment, Revision 5
 A214549-5, Control Building Fire Protection at East and West Wells, Rev 0
 A231592, IP2, 6900 Volt AC One-Line Diagram, Rev 19
 A250073, IP2, Loop Diagram, No. 2 Supply & O2 Analyzer Cond. Storage Rank, Revision 5
 B225137-10, IP2, Elementary Wiring Diagram of Residual Heat Removal Pumps #21 & 22,
 Revision 10
 B225191, IP2, Elementary Diagram of Control Valve Table, Revision 6
 B227992-11, Fire barrier Penetrations Wall II/IP1-S Cable Spreading Room, dated 12/17/03
 B227992-11, Fire Barrier Penetrations Wall II/IP1-S, Cable Spreading Room, dated 3/30/84
 B228045-04, Fire barrier Penetration Schedule Wall II/IP1-S, dated 12/17/2003
 B228046-11, Fire Barrier Penetrations Schedule Wall II/IP1-S, Cable Spreading Room, dated
 3/30/84
 D262139, IP2, Loop Diagram- Chemical and Volume Control System Volume Control Tank (VCT)
 #21 Discharge and RFW M.U. Valves Loop Number: 112, Revision 0
 IP2-S-000145, IP2, Residual Heat Loop Isolation Valve MOV 745A, Revision 5
 IP2-S-000164, IP2, RHR Exchanger 21 CCW Outlet Isolation Valve, Revision 4
 IP2-S-000227-02, IP2, RHR Pump Suction from Loop 2 Hot Leg Isolation MOV 730, Revision 2
 IP2-S-000230-03, IP2, RHR Pump Suction from Loop 2 Hot Leg Isolation MOV 731, Revision 3
 IP2-S-000253-04, IP2, Reactor Head Vent MOV HCV3101, Revision 4
 IP2-S-000254-04, IP2, Reactor Head Vent MOV HCV3100, Revision 8
 IP2-S-000255, IP2, VCT Drain MOV LCV 112C, Revision 3
 IP3-ANAL-FP-01503, figure 6-1, Appendix R Safe Shutdown Electrical Distribution System,
 Revision 3
 P1551-IP2-APPR, IP2, Appendix R Safe Shutdown Electrical Distribution System, Revision 1

Piping and Instrumentation Diagrams

308762, IP2, IA/N2 Supply to Pressurizer & Steam Generator Instrument Flow Diagram,
 Revision 6
 9231-F-42243, Control Building & Fan House Building Fire Damper Additions, Revision 5
 9231-F-93713, Diesel Generator Building CO₂ Fire Protection System Elevation 15',
 9321-2018, Condensate and Boiler Feed Pump Flow Diagram, Revision 148
 9321-2019, Boiler Feedwater Flow Diagram, Revision 118
 9321-F- 27053 Sht. 2, Flow Diagram Safety Injection System, Revision 57
 9321-F-20173, Main Steam, Revision 72
 9321-F-2018, IP2, Flow Dia., Condensate & Boiler Feed Pump Suction, Revision 148
 9321-F-20183, Sht. 1, Condensate & Boiler Feed Pump Suction, Revision 65
 9321-F-20183, Sht. 2, Condensate & Boiler Feed Pump Suction, Revision 26
 9321-F-2019, IP2, Flow Dia., Boiler Feedwater, Revision 118
 9321-F-2720, IP2, Auxiliary Coolant System, Revision 92
 9321-F-2722, IP2, Flow Dia., Service Water System Nuclear Steam Supply Plant, Revision 130
 9321-F-2722, Sht. 1, Service Water Flow Diagram, Revision 130
 9321-F-27223, Service Water System, Revision 5
 9321-F-27243, IP3 Primary Make-Up Water System Nuclear Steam Supply Plant, Revision 45
 9321-F-2735, IP2, Flow Dia., Safety Injection System, Revision 145
 9321-F-27353, Sht. 1, Safety Injection System, Revision 44
 9321-F-2736, Sht. 1, Chemical and Volume Control System Flow Diagram, Revision 130
 9321-F-27363, Sht. 1, Chemical & Volume Control System, Revision 53
 9321-F-27373, Sht. 2, Chemical & Volume Control System, Revision 37
 9321-F-2738, IP2, Flow Diagram, Reactor Coolant System, Revision 122

9321-F-27383 Sht. 1, Flow Diagram Reactor Coolant System, Revision 28
9321-F-27473 Sht. 2, Flow Diagram Reactor Coolant System, Revision 44
9321-F-27513, Sht. 1, Flow Diagram Auxiliary Coolant System in PAB & FSB, Revision 34
9321-F-40009, Sht. 1, IP3 Fire Area/Zone Arrangement Plans Elevation 3', 15' & 18', Revision 6
9321-F-40009, Sht. 2, IP3 Fire Area/Zone Arrangement Plans Elevation 27', 32', 33', 34', 35' & 36', Revision 5
9321-F-40009, Sht. 4, IP3 Fire Area/Zone Arrangement Plans Elevation 51', 53', 54' & 55', Revision 5
9321-F-40903, Sht. 1, IP3 Fire Protection System, Revision 32
9321-F-40913, Sht. 1, IP3 Fire Protection System, Revision 29
9321-F-40913, Sht. 2, IP3 Fire Protection System, Revision 4
9321-F-40914, IP3 Fire Protection Isometric Distribution System Outside Loop East Side, Revision 1
9321-F-40915, IP3 Fire Protection Isometric Distribution System Outside Loop West Side, Revision 1
9321-M-40953, Sht. 5, Fire Barrier Penetrations Control Building – Elevation 15' West Wall, Revision 6
A227781, IP2, Flow Diagram, Auxiliary Coolant System, Revision 82
A251783, IP2, Flow Diagram, Auxiliary Coolant System Residual Heat Removal Pumps, Revision 32
IP-FP-0-47, Fire Damper Schedule, Revision 2
Revision 3

Pre-Fire Plans

IPEC Pre Fire Plans, Revision 15
PFP-302, General Floor Plan – Containment Building – Elevation 68', Revision 3
PFP-303, General Floor Plan – Containment Building – Elevation 95', Revision 3
PFP-351, 480v Switchgear Room – Control Building – Elevation 15', Revision 15
PFP-354, Diesel Generators 31, 32 & 33 – Elevation 15', Revision 0
PFP-357, Upper Electrical Tunnel, Revision 5

Fire Drills and Critiques

2014 Fire Brigade Log
2015 Fire Brigade Log
2016 Fire Brigade Log
2017 Fire Brigade Log
U1 Screenwell House Unannounced Drill, dated 6/4/17
U1 South Loading Well Announced Drill, dated 9/5/17
U2 Cable Spreading Room Unannounced Drill, dated 9/5/17
U3 Admin Bldg Weld Shop Announced Drill, dated 9/9/17
U3 MBFPLO Purifier Announced Drill, dated 9/25/16
U3 Riverfront Warehouse Unannounced Drill, dated 6/5/16
U3 South Loading Well Unannounced Drill, dated 9/9/17
Unit 3 15' Water Factor Unannounced Drill, dated 10/31/16

Fire Brigade Training

EN-TQ-125, Fire Brigade Drills, Revision 4
IP-SMM-TQ-122, IPEC Fire Protection Training Program, Revision 5

Operator Safe Shutdown Training

IOLP-LOR-AOP010, 2/3-AOP-SSD-1, Control Room Inaccessibility Safe Shutdown Control,
Revision 1

Transient Combustible, Hot Work, and Ignition Source Permits and Evaluations

Transient Combustible Evaluation 17-062, IP2 Auxiliary Feedwater pump room, dated 8/28/17

Transient Combustible Evaluation 17-064, IP2 APAB 80 Foot SRST Sluice, dated 9/18/17

Miscellaneous Documents

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F16163-R-001, Valve Assessment for Selective Leaching, dated 5/3/17

National Fire Protection Association (NFPA) 10-1990, Standard for Portable Fire Extinguishers

NFPA 20-1976, Standard for the Installation of Centrifugal Fire Pumps

NFPA Fire Protection Handbook, Fourteenth Edition

NFPA 27-1975, Private Fire Brigades

NRC Information Notice 2013-06, Corrosion in Fire Protection Piping Due to Air and Water
Interaction

NRC Information Notice 2013-02, Issues Potentially Affecting Nuclear Fire Safety, dated 3/19/13

NRC Information Notice 2013-09, Compressed Flammable gas Cylinders and Associated
Hazards

NRC Information Notice 2014-15, Inadequate Controls of Respiratory Protection Accessibility,
Training, and Maintenance, dated 12/1/14

NRC Information Notice 2015-02, Antifreeze Agents in Fire Water Sprinkler Systems, dated
2/4/15

OE-NOE-2014-00070-CA-00016, Information Notice 2014-10, "Potential Circuit-Failure-Induced
Secondary Fires or Equipment Damage, dated 2/7/15

OE-NOE-2014-00112, Entergy evaluation of NRC Information Notice 2014-15

OE-NOE-2015-00030, Entergy evaluation of NRC Information Notice 2015-02

P#26/19.7, Need to Repair MOV's After Spurious Failures – Over Torque Concern, dated 6/14/95

U2/U3 Daily Control Room Logs

U2/U3 Daily Shift Rosters

Vendor Manual Review/Approval Form for NEC call Phones & Motorola Radio Phones, dated
7/30/03

WT-WTIPC-2013-00064, Entergy evaluation of NRC Information Notice 2013-02

Condition Reports

CR-IP2-2012-03036	CR-IP2-2016-07078	CR-IP2-2017-02397
CR-IP2-2014-04161	CR-IP2-2016-07082	CR-IP2-2017-02929
CR-IP2-2014-04162	CR-IP2-2016-07092	CR-IP2-2017-02945
CR-IP2-2015-00786	CR-IP2-2016-07094	CR-IP3-2014-01098
CR-IP2-2015-01722	CR-IP2-2016-07105	CR-IP3-2014-01105
CR-IP2-2015-02642	CR-IP2-2016-07233	CR-IP3-2014-01114
CR-IP2-2015-02818	CR-IP2-2016-07310	CR-IP3-2014-01122
CR-IP2-2016-00120	CR-IP2-2016-07316	CR-IP3-2015-01603
CR-IP2-2016-00913	CR-IP2-2016-07317	CR-IP3-2015-05576
CR-IP2-2016-03483	CR-IP2-2016-07320	CR-IP3-2015-05983
CR-IP2-2016-05816	CR-IP2-2016-07322	CR-IP3-2016-02132
CR-IP2-2016-05888	CR-IP2-2016-07326	CR-IP3-2016-03734
CR-IP2-2016-07028	CR-IP2-2016-07340	CR-IP3-2017-00309
CR-IP2-2016-07049	CR-IP2-2017-01789	CR-IP3-2017-04084
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CR-IP3-2017-04471	CR-IP2-2017-04983*	CR-IP3-2017-05089*
CR-IP2-2017-03967*	CR-IP3-2017-04917*	CR-IP3-2017-05091*
CR-IP2-2017-04283*	CR-IP3-2017-04983*	CR-IP3-2017-05100*
CR-IP2-2017-04349*	CR-IP3-2017-04997*	CR-IP3-2017-05105*
CR-IP2-2017-04357*	CR-IP3-2017-05035*	CR-IP3-2017-05108*
CR-IP2-2017-04367*	CR-IP3-2017-05085*	CR-IP3-2017-05109*
CR-IP2-2017-04374*	CR-IP3-2017-05087*	

*NRC identified during this inspection.

Work Orders

00416982	52535078	52744576
00417309	52541986	52750239
00417400	52546705	52753803
00421657	52552630	52755215
52309686	52554768	52756325
52377549	52556633	52758967
52394117	52598693	52759728
52421224	52608542	52760532
52444457	52608549	52761238
52445093	52610893	52765086
52448198	52612376	52769285
52451338	52620418	52769286
52465781	52626126	52769463
52474912	52636271	52769463
52480659	52638683	52771602
52489153	52644410	52771603
52500840	52677931	52773764
52506182	52678593	52775041
52507307	52695005	52777029
52522954	52713556	
52524192	52720601	

LIST OF ACRONYMS

CAP	corrective action program
CFR	<i>Code of Federal Regulations</i>
CO ₂	carbon dioxide
CR	condition report
FHA	fire hazards analysis
FOL	Facility Operating License
FPP	Fire Protection Program
IMC	Inspection Manual Chapter
IPEC	Indian Point Energy Center
NCV	non-cited violation
NFPA	National Fire Protection Association
NRC	Nuclear Regulatory Commission, U.S.
RHR	Residual Heat Removal
SSD	safe shutdown