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

January 6, 2017

Mr. Anthony J. Vitale, Site Vice President
Entergy Nuclear Operations, Inc.
Indian Point Energy Center
450 Broadway, GSB
P.O. Box 249
Buchanan, NY 10511-0249

SUBJECT: INDIAN POINT NUCLEAR GENERATING UNIT 2 – TRIENNIAL FIRE PROTECTION INSPECTION REPORT 05000247/2016007

Dear Mr. Vitale:

On December 16, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed a triennial fire protection inspection at your Indian Point Nuclear Generating Unit 2 and 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.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations, and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed station personnel. The inspectors also reviewed mitigation strategies for addressing large fires and explosions.

Based on the results of this inspection, no findings were identified.

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 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 No. 50-247
License No. DPR-26

Enclosure:
Inspection Report 05000247/2016007
w/Attachment: Supplementary Information

cc w/encl: Distribution via ListServ

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.	50-247
License No.	DPR-26
Report No.	05000247/2016007
Licensee:	Entergy Nuclear Operations, Inc.
Facility:	Indian Point Nuclear Generating Unit 2
Location:	450 Broadway, GSB Buchanan, NY 10511-0249
Inspection Period:	November 28 to December 16, 2016
Inspectors:	M. Patel, Acting Senior Reactor Inspector, Division of Reactor Safety (DRS), Team Leader C. Cahill, Senior Reactor Analyst, DRS J. Orr, Senior Reactor Inspector, DRS K. Young, Senior Reactor Inspector, DRS J. Rady, Reactor Inspector, DRS L. Dumont, Reactor Inspector, DRS
Approved By:	Glenn T. Dentel, Chief Engineering Branch 2 Division of Reactor Safety

SUMMARY

IR 05000247/2016007; 11/28/2016 – 12/16/2016; Indian Point Nuclear Generating Unit 2; Triennial Fire Protection Inspection.

This report covered a two week on-site triennial fire protection team inspection by specialist inspectors. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6, dated July 2016.

No findings were identified.

REPORT DETAILS

Background

This report presents the results of a triennial fire protection inspection conducted in accordance with NRC Inspection Procedure (IP) 71111.05T, “Fire Protection.” An objective of the inspection was to assess whether Entergy Nuclear Operations, Inc. (Entergy) has implemented an adequate fire protection program and that post-fire safe shutdown capabilities have been established and are being properly maintained at the Indian Point Nuclear Generating Unit 2 (IP2). The following fire areas (FA) and associated fire zones (FZ) were selected for detailed review based on prior inspection results and risk insights from the IP2 Individual Plant Examination of External Events:

Fire Area / Fire Zone

- FZ 15 Main Control Room
- FZ 10 Diesel Generator Building
- FA F PAB Corridor 80’ & 98’ and Fan House 89’

Inspection of these FAs/FZs fulfilled the IP requirement to inspect a minimum of three samples.

The inspectors evaluated Entergy’s fire protection program (FPP) against applicable requirements which included Unit 2 Operating License Conditions 2.K. and 2.N., Unit 3 Operating License Condition 2.AC., NRC Safety Evaluations, Title 10 of the *Code of Federal Regulations* (10 CFR) 50.48, and 10 CFR 50, Appendix R. The inspectors also reviewed related documents that included the Updated Final Safety Analysis Report (UFSAR), the Fire Protection Program Plan, the Fire Hazards Analysis (FHA), and the Safe Shutdown Analysis Report.

The team evaluated aspects of three mitigating strategies for responding to large fires and explosions, which are required by Operating License Condition 2.N for Unit 2, Operating License Condition 2.AC for Unit 3, and 10 CFR 50.54(hh)(2). The team also reviewed related documents that included Nuclear Energy Institute 06-12, "B.5.b Phases 2 & 3 Submittal Guidance," Revision 2 (ML070090060). Inspection of these strategies fulfills the IP requirement to inspect a minimum of one sample.

Documents reviewed for each section of this report are listed in the Attachment.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R05 Fire Protection (IP 71111.05T)

.01 Protection of Safe Shutdown Capabilities

a. Inspection Scope

The team reviewed the FHA, post-fire safe shutdown analyses, and supporting drawings and documents to verify whether the safe shutdown capabilities were properly protected

from fire damage. The team evaluated equipment and cable separation to determine whether the applicable separation requirements of Appendix R, Section III.G, and the IP2 design and licensing bases were maintained for the credited safe shutdown equipment and their supporting power, control, and instrumentation cables. The team's review included an assessment of the adequacy of the selected systems for reactor pressure control, reactivity control, reactor coolant makeup, decay 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 FAs to evaluate whether the material conditions of the FA boundaries were adequate for the fire hazards in the area. The team compared the FA boundaries, including walls, ceilings, floors, fire doors, fire dampers, penetration seals, electrical raceway and conduit fire barriers, and redundant equipment fire barriers to design and licensing basis requirements, industry standards, and the IP2 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 and an encapsulation system 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 records and functional test procedures for fire dampers, and the inspection records for penetration seals and fire barriers, to verify whether the inspection was adequately conducted, the acceptance criteria were met, and any potential 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 FAs 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 IP2 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 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, interviewed system and program engineers, and reviewed condition reports 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 FAs 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 Entergy's fire-fighting strategies (i.e., pre-fire plans) and smoke removal plans for the selected FAs to determine if appropriate information was provided to fire brigade members and plant operators to identify safe shutdown equipment and instrumentation, and to facilitate suppression of a fire that could impact post-fire safe shutdown 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 fire-fighting. In addition, the team reviewed Entergy's fire brigade equipment inventory 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 FA, 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 FAs would not indirectly, through production of smoke, heat or hot gases, cause activation of suppression systems that could potentially damage all redundant safe shutdown trains;
- A fire in one of the selected FAs (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 Alternative Shutdown Capability

a. Inspection Scope

The team reviewed the safe shutdown analysis, operating procedures, piping and instrumentation drawings, electrical drawings, the UFSAR, and other supporting documents for the selected FAs to determine whether Entergy had properly identified the systems and components necessary to achieve and maintain post-fire safe shutdown conditions. The team evaluated selected systems and components credited by the safe shutdown analysis for reactor pressure control, reactivity control, reactor coolant makeup, decay heat removal, process monitoring, and support system functions to assess the adequacy of Entergy's alternative shutdown methodology. The team also assessed whether alternative post-fire shutdown could be performed both with and without the availability of off-site power. The team walked down selected plant configurations to verify whether they were consistent with the assumptions and descriptions in the safe shutdown and the FHA. In addition, the team evaluated whether the systems and components credited for use during post-fire safe shutdown would remain free from fire damage.

The team reviewed the training program for licensed and non-licensed operators to verify whether it included alternative shutdown capability. The team also verified whether personnel, required for post-fire safe shutdown, using either the normal or alternative shutdown methods, were trained and available on-site 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 (i.e., a procedure tabletop) to assess the adequacy of implementation and human factors within the procedures. The team also evaluated the time required to perform specific actions to verify whether operators could reasonably be expected to perform those actions within sufficient time to maintain plant parameters within specified limits.

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

- 2-AOP-SSD-1, Control Room Inaccessibility Safe Shutdown Control, Revision 23;
- 2-ONOP-FP-001, Plant Fires, Revision 17; and,

- 2-SOP-ESP-001, Local Equipment Operation and Contingency Actions, Revision 12.

The team reviewed selected operator manual actions to verify whether they had been properly reviewed and approved and whether the actions could be implemented in accordance with plant procedures in the time necessary to support the safe shutdown method for each FA. The team also reviewed the periodic testing of the alternative shutdown transfer and isolation capability, and instrumentation and control functions, to evaluate whether the tests were adequate to ensure the functionality of the alternative shutdown capability.

b. Findings

No findings were identified.

.06 Circuit Analysis

a. Inspection Scope

The team reviewed Entergy's post-fire safe shutdown analysis for the selected FAs to determine whether the analysis identified both required and associated electrical circuits and cables for the systems and components necessary to achieve and maintain safe shutdown. The team reviewed electrical schematics and cable routing data for power, control, and instrumentation associated with selected components. Specifically, the team evaluated the selected circuits and cables to determine whether they were (a) adequately protected from potential fire damage, or (b) analyzed to show that fire-induced faults (e.g., hot shorts, open circuits, and shorts to ground) would not prevent safe shutdown, or (c) analyzed to show that potential damage could be mitigated with approved operator manual actions, in order to determine whether fire-induced faults could adversely impact safe shutdown capabilities. The team's evaluations considered credible fire scenarios, cable insulation attributes, cable failure modes, cable routing, and common power supply or electrical bus configurations.

In addition, the team reviewed cable raceway drawings and cable routing databases for a sample of components required for post-fire safe shutdown to determine whether those cables were routed as described in the safe shutdown analysis. The team also reviewed equipment important to safe shutdown, but not part of the success path, to assess whether Entergy's safe shutdown methodologies were appropriate, conformed to design and licensing basis requirements, and appropriately considered the guidance in NRC Regulatory Guide 1.189, "Fire Protection for Nuclear Power Plants," Revision 2.

Cable failure modes were reviewed for the following components:

- 21CHP, 21 Charging Pump
- 21CCP, 21 Component Cooling Pump
- 250A and 4925, 21 Reactor Coolant Pump Seal Water Injection Line Isolation Valves
- LCV-112C, Volume Control Tank Outlet Isolation Valve
- LT-417D(427D), Steam Generator 21(22) Level Indicators

The team reviewed a sample of circuit breaker and fuse over-current protection coordination studies to determine whether equipment needed for post-fire safe shutdown activities could be adversely affected due to a lack of coordination that could result in a common power supply or common electrical bus concern. The team also evaluated whether coordination studies appropriately considered multiple faults due to fire. In addition, the team reviewed a sample of circuit breaker maintenance records, for components required for safe shutdown, to determine whether the breakers were properly maintained.

The team assessed the transfer of control from the main control room to the alternative shutdown location to determine whether it would be adversely 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 safe shutdown procedures, the safe shutdown 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 FAs to evaluate their adequacy for illuminating access and egress pathways and any equipment requiring local operation or instrumentation monitoring for post-fire safe shutdown. 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 reviewed Entergy's dedicated repair procedures for components which might be damaged by fire and were required to achieve post-fire cold shutdown. The team evaluated selected cold shutdown repairs to determine whether they could be achieved within the time frames assumed in the design and licensing bases. In addition, the team verified whether the necessary repair equipment, 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 safe shutdown equipment, systems, or features (e.g. detection and suppression systems and equipment; passive fire barriers; or pumps, valves, or electrical devices providing safe shutdown 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 Entergy was effective in returning the equipment to service in a reasonable period of time.

b. Findings

No findings were identified.

.11 Review and Documentation of FPP 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 Entergy'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 conducted a review of 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 and/or fires. The team assessed whether Entergy continued to meet the requirements of the Indian Point Nuclear Power Station Units 2 and 3 Operating Licenses and 10 CFR 50.54(hh)(2).

The team reviewed the following mitigation strategies:

- Unit 3 Makeup to the Spent Fuel Pool with Permanently Installed and Portable Equipment;
- Unit 3 External Spray;
- Unit 2 Manual Operation of Steam Generator Atmospheric Dump Valves; and,
- Unit 2 Makeup to the Steam Generators with the Portable Pump

The team's review included: a detailed assessment of the procedural guidance; a tabletop discussion with licensed operators; and a walk down of four mitigation strategies with operators to assess the feasibility of the strategies and operator familiarity, maintenance and surveillance testing of selected strategy equipment, and an inventory check of the B.5.b pump and equipment trailers to ensure the appropriateness of equipment storage and availability.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems (IP 71152)

a. Inspection Scope

The team reviewed a sample of condition reports associated with the FPP, post-fire safe shutdown issues, and mitigation strategy issues to determine whether Entergy was appropriately identifying, characterizing, and correcting problems associated with these areas and whether the planned or completed corrective actions were appropriate.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

The team presented the inspection results to Mr. Anthony J. Vitale, Site Vice President, and other members of the site staff at an exit meeting on December 16, 2016. The team verified that this report does not contain proprietary information.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

J. Balletta	Senior Reactor Operator
S. Bianco	Fire Brigade Training
T. Chan	Design Engineer
G. Dahl	Licensing Engineer
K. Elliot	Appendix R Engineer
D. Powell	Senior Reactor Operator
C. Wilson	Fire Protection Engineer

NRC

B. Haagensen	Senior Resident Inspector, Indian Point
S. Rich	Resident Inspector, Indian Point
C. Safouri	Acting Resident Inspector, Indian

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

NONE

Opened and Closed

NONE

Closed

NONE

Discussed

NONE

LIST OF DOCUMENTS REVIEWED

Fire Protection Licensing Documents

Indian Point Nuclear Generating Unit No. 2, Amended Facility Operating License, 9/28/73
IP2 EN-DC-330, Indian Point Nuclear Generating Unit No. 2, Fire Protection Program, Revision 4
IP2 UFSAR, Revision 26
IP2-RPT-03-00015, IP2 Fire Hazards Analysis, Revision 7
IP-RPT-04-00224, NFPA Code of Record Determination for Indian Point Unit 2 Fire Protection

Design Basis Documents and Specifications

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

Calculations/Engineering Evaluation Reports

0247-09-0013.024, IP2 Nuclear Power Plant Fire Probabilistic Risk Assessment, Multiple Spurious Operations Report, Revision 0
CE-PS 100-79, Fireproofing of Diesel Generator Bldg., Revision 0
FEX-00246-00, Evaluation of PAB Fire Protection Line at EL. 80' Due to Potential Flooding of RHR Pump Cells at EL 15', Revision 0
IP2-RPT-03-00010, 3M INTERAM Fire-Resistant Enclosure at Electrical Penetration H20 & Response to NRC Information Notice 95-52, Supplement 1, Revision 1
IP3-CALC-CVCS-393, Calculation of Allowable Time for Operating Charging Pumps Without Cooling Water, Revision 1
IP-CALC-04-01171, the Hydraulic Analysis of Indian Point Unit 1 and Unit 2 Fire Protection Water Supply Systems and Several Unit 2 Suppression Systems, Revision 0
IP-CALC-08-00024, Sizing Calculation for RHR Pump Flooding Line, Revision 0
IP-RPT-04-00188, Evaluation of Hemyc Wrap Fire Protective Systems, Revision 1
IP-RPT-05-00071, IP2 10 CFR 50, Appendix R Safe-Shutdown Separation Analysis, Revision 2
IP-RPT-09-00012, Validation of Operator Manual Actions Credited for Appendix R, Section III.G Fire Areas: IP2 and IP3, Revision 0
IP-RPT-12-00022, Inaccessible Fire Barrier Penetration Seals, Revision 0
PGI-00355, NRC Information Notice 92-18 MOV Control Hot Short Issue, Revision 4
PGI-00581-00, Fire Protection 86-10 Evaluation for EDG Structural Steel Fire Resistant Coating, Revision 0
SGX-00048-01, 480V Switchgear Coordination Calculation for Switchgears 21 and 22, Revision 1

Engineering Change Requests (ECR)

EC-40404, Relocate 21 Charging Pump Control Switch from 480V switchgear to the CCR and Install Solenoid and its control in CCR to Resolve U2-OMA-20 and 21, 3/24/14
EC-41582, OMA Resolution: OMA-6, 4/07/14
EC-42090, Resolve OMA 9 and 10, Support Safe Shutdown Instrument Indication in IP2 CCR, 3/24/14
EC-45124, Update EP & Operations Communication to Address Fukushima FLEX Requirements in NEI 12-01, Revision 0
EC-50149, FLEX Electrical EC for Phase 2, Revision 0
FPX-93-09146-F, Removal of Thermal Lag Fire Barrier from RHR Pump 22 Feeder, dated 5/9/94

Fire Barrier Tests

CTP 1001A, Three Hour Fire Qualification Test, 7/25/80
CTP 1076, Three Hour Fire Qualification Test, 3/28/85
CTP 1098A, Three Hour Fire Qualification Test, 8/11/86
CTP 2005/CTP 2008, Fire Endurance Test of 3M INTERAM Mat Fire Protective Envelopes, 11/12/98

Piping and Instrumentation Diagrams

9321-F-2018, Flow Diagram Condensate & Boiler Feed Pump Suction, Revision 148
9321-F-2019, Boiler Feedwater Flow Diagram, Revision 118
9321-F-2036, Flow Diagram Instrument Air Control Bldg. Conventional Plant, Etc., Revision 101
9321-F-2720, Auxiliary Coolant System Flow Diagram, Revision 92
9321-F-2722, Service Water System Flow Diagram, Revision 128

9321-F-2736, CVCS Flow Diagram, Revision 130
9321-F-2738, Reactor Coolant System Flow Diagram, Revision 122

Drawings and Wiring Diagrams
225151, Elementary Wiring Diagram of Component Cooling Pump 23, Revision 15
260430, Loop Diagram Reactor Coolant System, Pressurizer Level Control, Revision 3
260510, Loop Diagram Feedwater SG 21 Wide Range Level, Revision 6
260511, Loop Diagram Feedwater SG 22 Wide Range Level, Revision 6
400400-05, Fire Area/Zone Arrangement Site Plan, Revision 2
400402, Fire Area/Zone Arrangement at EL. 36', Revision 3
400403-05, Fire Area/Zone Arrangement at EL. 53', Revision 5
400404-04, Fire Area/ Zone arrangement at EL 80', Revision 4
400405-02, Fire Area/Zone Arrangement at EL. 98', Revision 2
503797, Elementary Wiring Diagram for Charging Pump 21, Revision 0
503802, IP2 PAB, EL. 98' Valve LCV-112C Fire Enclosure Plan & Sections, Civil, Revision 0
9321-F-3008, Single Line Diagram DC Power Panels, Revision 92
9321-F-4006-78, Yard Fire Protection Piping, Revision 78
A208088, One Line Diagram of 480Vac Switchgear 21 and 22, Revision 44
A208377, Main One Line Diagram, Revision 17
A208831, Schematic Diagram for Post-Accident MOV 250A, Revision 4
A208832, Schematic Diagram for Post-Accident MOV 4925, Revision 7
A227551-66, Sht. 1, Fire Protection System Diagram Details, Revision 66
A227552-47, Sht. 2, Fire Protection System Diagram Details, Revision 47
A227553-51, Sht. 3, Fire Protection System Diagram Detail, Revision 51
A227554-27, Sht. 4, Fire Protection System Diagram Detail, Revision 27
A231592, 6900Vac One Line Diagram, Revision 19
A240128, Boiler Feedwater Level and Flow Instrumentation SG's 21 thru 24, Revision 5
B192477-3, Flow Diagram Piping & Instrumentation Symbols, Revision 0
B225115, Sht. 9, Elementary Wiring Diagram Switch Development, Revision 3
B225133, Elementary Wiring Diagram on Component Cooling Pump 21, Revision 14
B228010-04, Fire Barrier Penetrations Diesel Generator Building, Wall 1032A-W, 12/17/03
B228016-05, Fire Barrier Penetrations Charging Pump Rooms, PAB Wells 7A/5-N, 7A/6-N, 7A/7-N, 12/17/03
B228050-06, Fire Barrier Penetration Schedule Walls 7A/5-N, 7A/6-N, 7A/7-N, 12/17/03
B228053-05, Fire Barrier Penetration Schedule Walls 14/ST3-S, 14/43A-W, 10/32A-W, 12/17/03
IP2-S-000255, Elementary Wiring Diagram VCT Drain MOV LCV-112C, Revision 3

Procedures
0-PT-M002, Alternate Safe Shutdown Equipment Inventory and Inspection, Revision 16
0-PT-Q001, Alternate Safe Shutdown Equipment Inventory and Inspection, Revision 13
2-AOP-SSD-1, Control Room Inaccessibility Safe Shutdown Control, Revision 23
2BRK-021-CUB, Westinghouse 480V DB Series Breaker Cubicle Inspection and Cleaning, Revision 5
2-BRK-023-ELC, DB Breaker Amptector Overcurrent Test, Revision 6
2-BRK-024-ELC, DB Breaker Amptector Calibration Test, Revision 3
2-COL-3.1, Chemical and Volume Control System, Revision 43
2-ELC-004-FIR, IP2 Repairs for Safe Shutdown in the Event of an Appendix R Fire, Revision 2
2-IC-PC-I-L-417, 21 SG Wide Range Level Calibration, Revision 2
2-IC-PC-I-L-417, 21 SG Wide Range Level Calibration, Revision 3
2-IC-PC-I-L-427, 22 SG Wide Range Level Calibration, Revision 2
2-PC-R3-1, Pressurizer Level Transmitters, Revision 8

2-PC-R37, Alternate Safe Shutdown and Remote Shutdown Instruments, Revision 13
2-PT-2Y042, 21 CHP Central Control Room Station Switches, Revision 1
2-PT-Q017A, Alternate Safe Shutdown Supply Verification to 21 AFP, Revision 13
2-PT-Q017B, Alternate Safe Shutdown Supply Verification to 23 CHP, Revision 11
2-PT-Q017C, Alternate Safe Shutdown Supply Verification to 23 CCP, Revision 17
2-PT-Q017D, Alternate Safe Shutdown Supply Verification to 23 SWP, Revision 11
2-PT-Q017E, Alternate Safe Shutdown Supply Verification to 24 SWP, Revision 11
2-PT-Q017F, Alternate Safe Shutdown Supply Verification to 21 Safety Injection and Residual Heat Removal Pumps, Revision 9
EN-DC-127, Control of Hot Work and Ignition Sources, Revision 15
EN-DC-128, Fire Protection Impact Reviews, Revision 10
EN-DC-161, Control of Combustibles, Revision 13
EN-DC-186, Fuse Control, Revision 2
EN-DC-330, Fire Protection Program, Revision 4
SAO-703, Fire Protection Impairment Criteria and Surveillance, Revision 35
SEP-FPP-IP-001, IPEG Fire Protection Program, Revision 4
SEP-FPP-IP-002, IPEG Fire Watch Program, Revision 2

Operations Procedures
2-AOP-SSD-1, Control Room Inaccessibility Safe Shutdown Control, Revision 23
2-ONOP-FP-001, Plant Fires, Revision 17
2-SOP-ESP-001, Local Equipment Operation and Contingency Actions, Revision 12

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

OPEX Reviews
OE-NOE-2015-30 CA-14, IN 2015-02, Antifreeze Agents in Fire Water Sprinkler Systems

Quality Assurance Audits and Self Assessments
QA-9-2016-IP-1, Fire Protection, Revision 6

System Health Reports
480Vac Systems, 1st and 3rd Qtr. 2016
IPEG Fire Protection, 2nd Quarter 2016
IPEG Fire Protection, 3rd Quarter 2016

Completed Tests, Surveillances, and Preventive Maintenance
0-ELC-420-FIR, Appendix R Emergency Light Unit Inspection, Battery Replacement, and test, Completed on 2/15/16 and 11/3/16
0-PT-M001, Fire Brigade Equipment Inventory and Inspection, Completed11/6/16 and 12/3/16
2-PT-2Y017, Penetration Fire Barrier Seal Inspection, Completed 10/12/12 and 12/14/14
2-PT-2Y041, Fire Damper Functionality, Completed 6/12/12 and 4/6/15
2-PT-3Y015A, Underground Fire Loop Flow, Completed 10/24/11 and 7/12/15
2-PT-3Y015B, Turbine Building Fire Loop Flow, 5/17/11 and 7/27/14
2-PT-A023, Fire Main Booster Pump capacity Test, Completed 4/08/14 and 8/13/15
2-PT-A040, Diesel Driven Fire Pump Capacity, Completed on 2/15/15 and 2/14/16
2-PT-A048, Rollup Fire Doors, Completed 9/8/15 and 10/17/16
2-PT-A057, U1 Smoke Detector Test, Completed 9/30/14 and 9/28/15
2-PT-M034A, 11 Fire Main Booster Pump, Completed on 7/28/16 and 8/24/16
2-PT-M034B, 12 Fire Main Booster Pump, Completed on 7/28/16, 8/24/16, and 9/22/16

2-PT-M040, Diesel Fire Pump, Completed on 9/11/16 and 10/17/16
2-PT-M049B, Appendix R Emergency Lighting (Nuclear), Completed on 9/23/16 and 10/15/16
2-PT-SA012D, Ionization Type Smoke Detector (PAB-Specific), Completed 4/18/16 and 9/26/16
2-PT-SA012D, Ionization Type Smoke Detectors (PAB), Completed 11/19/15
2-PT-SA020, Swing Fire Doors, Completed 4/18/16 and 9/26/16
PT-EM9, Fire Dampers Operability, Completed 5/1/14 and 1/6/16
PT-SA11, Diesel Generator Building Fire Detection System, Completed 1/15/16 and 8/16/16
PT-SA12A, Ionization Type Smoke Detector (Conventional), Completed 2/9/16 and 7/19/16
PT-SA12B, Ionization Type Smoke Detector (PAB), Completed 2/11/16 and 9/22/16
PT-SA17, CCR Intake Smoke Detectors and Ventilation Control, Completed 1/15/16 and 8/26/16

Transient Combustible Evaluations
16-046, SFP Equipment Area, 10/3/16
16-044, AFW Pump Room, 10/8/16
16-045, AFW Building 2nd Elevation, 10/9/16
16-047, U2 AFW Pump Room, 10/17/16
16-048, Fan House/PAB Annex, 10/19/16

Hot Work Permits
279749, U2, Turbine Bldg. 15' Col. 9 Line B-7, 9/15/16
297947, U2, Turbine Bldg. 33' Col. 3 Line B, 9/15/16
522864, U2, Telecom Room 15', 9/26/16
309854, U1, FP-1 Elbow (Tool Room) EL. 15', 10/26/16

Fire Fighting Strategies (i.e., Pre-Fire Plans)
PFP-211, General Floor Plan – Primary Auxiliary Building 80'EL., Revision 14
PFP-212, General Floor Plan – Primary Auxiliary Building 98' EL., Revision 14
PFP-253, Control Room – Control Building, Revision 13
PFP-258, EDG #21-#22-#23-Diesel Generator Building/Electrical Tunnel Exhaust Fans, Revision 5

Fire Brigade Training
I0LP-OPS-FBT003, Fire Brigade Leadership (Initial/Retraining), 9/9/16
Initial Fire Brigade Training Manual, 2016
I0LP-OPS-FBT003, Fire Brigade Annual Retraining, 8/16
I0LP-OPS-FBT003, Fire Brigade Annual Retraining, 12/16

Fire Brigade Drills and Critiques
U1 TB Appendix R EDG, 9/17/16
U2 Dock Diesel Storage Tank, 9/14/16
U2 Dryden Diving Trailers, 9/14/16
U3 NLW Chem. App., 9/18/16
U3 MBFPL0 Purifier, 9/25/16
U3 Area 15' Water Factory, 11/1/16

Large Fires and Explosions Mitigation Strategies Documents
0-AOP-SEC-3, Event Contingency Actions, Revision 3
0-SOP-ESP-002, Emergency Contingency Plan, Revision 12
0-SOP-ESP-003, Emergency Contingency Plant Strategy Attachments, Revision 1
2-SOP-ESP-001, Local Equipment Operations and Contingency Actions, Revision 4
3-SOP-ESP-001, Local Equipment Operations and Contingency Actions, Revision 9

Corrective Action Program [Condition Reports (CR)]

CR-IP2-2004-00609	CR-IP2-2007-00719	CR-IP2-2010-03184
CR-IP2-2014-00128	CR-IP2-2014-00528	CR-IP2-2014-00904
CR-IP2-2014-01970	CR-IP2-2015-00483	CR-IP2-2015-01702
CR-IP2-2015-03333	CR-IP2-2015-04087	CR-IP2-2016-00458
CR-IP2-2016-00517	CR-IP2-2016-00699	CR-IP2-2016-01146
CR-IP2-2016-02710	CR-IP2-2016-03052	CR-IP2-2016-03209
CR-IP2-2016-03554	CR-IP2-2016-05139	CR-IP2-2016-05584
CR-IP2-2016-06527	CR-IP2-2016-06584	CR-IP2-2016-06637
CR-IP2-2016-06650	CR-IP2-2016-06674	CR-IP2-2016-06737
CR-IP2-2016-06828	CR-IP2-2016-06977	CR-IP2-2016-06593*
CR-IP2-2016-06844*	CR-IP2-2016-07028*	CR-IP2-2016-07048*
CR-IP2-2016-07049*	CR-IP2-2016-07050*	CR-IP2-2016-07074*
CR-IP2-2016-07077*	CR-IP2-2016-07078*	CR-IP2-2016-07082*
CR-IP2-2016-07092*	CR-IP2-2016-07094*	CR-IP2-2016-07105*
CR-IP2-2016-07233*	CR-IP2-2016-07310*	CR-IP2-2016-07316*
CR-IP2-2016-07317*	CR-IP2-2016-07320*	CR-IP2-2016-07322*
CR-IP2-2016-07323*	CR-IP2-2016-07340*	

*NRC identified during this inspection.

Work Orders

00224629	00339098	00340641	00340644
00340653	50065602	51498409	51503416
52309599	52309622	52310161	52429908
52448198	52458897	52474186	52477866
52501024	52527196	52537922	52541985
52556636	52560550	52582200	52587735
52624553	52638317	52638848	52639020
52640117	52643882	52644044	52649255
52654544	52663061	52672476	52672477
52677506	52677933	52677934	52690147
52695005	52696115	52697773	52699588
52704374	52706670	52706673	52713556
52721451	52727166		

Miscellaneous Documents

10/32A-W001, IP2 Type 1, Fire Barrier Penetration Seal Index 9 PAB)
10/32A-W002, IP2 Type 1 Fire Barrier Penetration Seal Index (Diesel Generator Building)
CE-PS 100-79, Fireproofing of Diesel Generator Bldg., 6/21/79
Daily Plant status report, 11/29/16
Fire Protection System Impairment Summary Unit 2, Dated 11/01/16
Indian Point Unit 2 Fire Impairment Log, 11/1/16
IP2 Post-Fire Safe Shutdown OMA Timeline Validations on 12/18/12, 5/14/13, and 5/16/13
IPEG Radio System Summary Description, 2016
OAP, Operations Commitments and Policy Details, Revision 26

LIST OF ACRONYMS

10 CFR	Title 10 of the *Code of Federal Regulations*
DRS	Division of Reactor Safety
FA	Fire Area
FHA	Fire Hazards Analysis
FPP	Fire Protection Program
FZ	Fire Zone
IP	Inspection Procedure
NFPA	National Fire Protection Association
NRC	Nuclear Regulatory Commission, U.S.
UFSAR	Updated Final Safety Analysis Report