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

May 13, 2019

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

SUBJECT: INDIAN POINT NUCLEAR GENERATING, UNITS 2 AND 3 – INTEGRATED INSPECTION REPORT 05000247/2019001 AND 05000286/2019001

Dear Mr. Vitale:

On March 31, 2019, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Indian Point Nuclear Generating, Units 2 and 3. On April 18, 2019, 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 one finding of very low safety significance (Green) in this report. The finding did not involve a violation of NRC requirements.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement 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 Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Daniel L. Schroeder, Chief
Reactor Projects Branch 2
Division of Reactor Projects

Docket Nos. 05000247 and 05000286
License Nos. DPR-26 and DPR-64

Enclosure:
Inspection Report 05000247/2019001 and 05000286/2019001

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SUBJECT: INDIAN POINT NUCLEAR GENERATING, UNITS 2 AND 3 – INTEGRATED INSPECTION REPORT 05000247/2019001 AND 05000286/2019001 DATED MAY 13, 2019

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Numbers:	05000247 and 05000286
License Numbers:	DPR-26 and DPR-64
Report Numbers:	05000247/2019001 and 05000286/2019001
Enterprise Identifier:	I-2019-001-0047
Licensee:	Entergy Nuclear Northeast
Facility:	Indian Point Nuclear Generating, Units 2 and 3
Location:	450 Broadway, General Services Building Buchanan, NY 10511-0249
Inspection Dates:	January 1, 2019, to March 31, 2019
Inspectors:	B. Haagensen, Senior Resident Inspector A. Siwy, Resident Inspector J. Vazquez, Resident Inspector N. Floyd, Senior Reactor Inspector S. Wilson, Health Physicist
Approved By:	Daniel L. Schroeder, Chief Reactor Projects Branch 2 Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a quarterly inspection at Indian Point, Units 2 and 3 in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to https://www.nrc.gov/reactors/operating/oversight.html for more information. Findings and violations being considered in the NRC's assessment are summarized in the table below.

List of Findings and Violations

Failure to Adequately and Promptly Evaluate, Identify, and Correct Degradation of Offsite Power Feeder 13W93			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green FIN 05000247/2019001-01 Open/Closed	[H.14] - Conservative Bias	71111.12
The inspectors identified a Green finding (FIN) because the licensee did not adequately and promptly evaluate, identify, and correct degraded cable conditions on the 'C' phase of the 13W93 offsite power feeder prior to failure, as required, by EN-MA-138, Very Low Frequency Tan Delta and Withstand Testing of Electrical Power Cables, and EN-DC-346, Cable Reliability Program. The failure resulted in the loss of the station blackout and Appendix R diesel generator; an increase in the online risk monitor core damage frequency from green to yellow risk; and the loss of remote shutdown instrumentation and controls for decay heat removal via steam generators (21 auxiliary feedwater pump), reactor coolant system inventory control (21 and 22 residual heat removal pumps), and support equipment (23 circulating cooling water pump).			

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
LER	05000247/2018-003-00	Loss of Safety Function Due to Valve SWN-6 Actuator Failure During Service Water Header Swap	71153	Closed
LER	05000286/2017-004-01	Reactor Trip Due to Main Generator Loss of Field	71153	Closed

PLANT STATUS

Unit 2 began the inspection period at rated thermal power. On March 15, 2019, Unit 2 tripped from 100 percent rated thermal power when the main turbine tripped. The main turbine generator exciter was repaired and the unit was restarted on March 23, 2019. On March 24, 2019, Unit 2 tripped from 96 percent rated thermal power when the main turbine tripped. The main turbine generator exciter was repaired and the unit remained in a forced outage for the remainder of the inspection period.

Unit 3 operated at 100 percent power until March 10, 2019, when the unit was shutdown for a refueling outage. Unit 3 remained shutdown for the remainder of the quarter.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed plant status activities described in IMC 2515, Appendix D, "Plant Status," and conducted routine reviews using IP 71152, "Problem Identification and Resolution." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.01 - Adverse Weather Protection

Impending Severe Weather Sample (IP Section 03.03) (1 Sample)

The inspectors evaluated readiness for impending adverse weather conditions for Winter Storm Harper at Units 2 and 3 on January 18, 2019.

71111.04 - Equipment Alignment

Partial Walkdown (IP Section 02.01) (5 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

(1) 21 containment spray pump at Unit 2 on January 7, 2019
(2) 33 emergency diesel generator (EDG) at Unit 3 on January 8, 2019
(3) 21 and 22 EDGs during 23 EDG overspeed trip testing at Unit 2 on January 17, 2019
(4) 31 auxiliary feedwater train at Unit 3 on February 25, 2019
(5) 32 safety injection pump at Unit 3 on March 5, 2019

71111.04S - Equipment Alignment

Complete Walkdown (IP Section 02.02) (1 Sample)

The inspectors evaluated system configurations during a complete walkdown of the residual heat removal system at Unit 3 on March 15, 2019.

71111.05Q - Fire Protection

Quarterly Inspection (IP Section 03.01) (7 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas:

(1) Primary auxiliary building, general floor plan, 59-foot elevation (pre-fire plan (PFP)-207), at Unit 2 on February 4, 2019
(2) Primary auxiliary building, general floor plan, 68-foot elevation (PFP-208), at Unit 2 on February 4, 2019
(3) Primary auxiliary building, component cooling pump room (PFP-209), at Unit 2 on February 4, 2019
(4) Fuel storage building (PFP-217) at Unit 2 on February 4, 2019
(5) Containment building, 46-foot elevation (PFP-301), at Unit 3 on March 18, 2019
(6) Containment building, 68-foot elevation (PFP-302), at Unit 3 on March 18, 2019
(7) Containment building, 95-foot elevation (PFP-303), at Unit 3 on March 18, 2019

71111.06 - Flood Protection Measures

Inspection Activities - Underground Cables (IP Section 02.02c.) (1 Sample)

The inspectors evaluated cable submergence protection in:

(1) Manhole 4 at Unit 3 on January 2, 2019

71111.07A - Heat Sink Performance

Annual Review (IP Section 02.01) (1 Sample)

The inspectors evaluated readiness and performance of:

(1) 32 component cooling water heat exchanger at Unit 3 on January 15, 2019

71111.08P - Inservice Inspection Activities (PWR)

PWR Inservice Inspection Activities Sample (IP Section 03.01) (1 Sample)

The inspectors verified that the reactor coolant system boundary, steam generator tubes, reactor vessel internals, risk-significant piping system boundaries, and containment boundary are appropriately monitored for degradation and that repairs and replacements were appropriately fabricated, examined and accepted by reviewing the following activities from March 20 to March 28, 2019:

03.01.a - Nondestructive Examination and Welding Activities

(1) Manual ultrasonic testing of charging line 80 into the hot-leg of the reactor coolant system loop 2 performed in accordance with MRP-146, “Management of Thermal Fatigue in Normally Stagnant Non-Isolable Reactor Coolant System Branch Lines.”
(2) Remote ultrasonic testing of the original baffle-former bolts (562 of 832 total) inside the reactor vessel performed in accordance with the Indian Point Reactor Vessel Internals Inspection Program.
(3) Visual examination of the 31 hot-leg and 31 cold-leg reactor vessel nozzle to safe-end dissimilar metal butt welds.
(4) Visual examination of control rod drive mechanism thermal sleeve wear in the reactor vessel closure head performed in accordance with the Westinghouse Nuclear Safety Advisory Letter 18-1, “Thermal Sleeve Flange Wear Leads to Stuck Control Rod.”
(5) Welding activities and liquid penetrant testing associated with the localized repair of the reactor vessel flange and closure head flange seal areas under WO 00501897.

03.01.b - Pressurized-Water Reactor Vessel Upper Head Penetration Examination Activities

(1) Automated ultrasonic testing of the reactor vessel upper head, including detailed review of penetrations #2, 55, 65, and 78.
(2) Bare metal visual examination of the reactor vessel upper head, including detailed review of penetrations #2, 30, 40, 45, 50, 55, 62, and 78.

03.01.c – Pressurized-Water Reactor Boric Acid Corrosion Control Activities

(1) Boric acid evaluation 19-IP3-0043 under WO 00521031.
(2) Boric acid evaluation 19-IP3-0096 under WO 00475644.

71111.11Q - Licensed Operator Requalification Program and Licensed Operator Performance

Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (4 Samples)

(1) The inspectors observed and evaluated licensed operator performance in the control room during the control rod and shutdown rod quarterly exercise at Unit 2 on February 6, 2019, during a plant trip response at Unit 2 on March 15, 2019, and plant startup at Unit 2 on March 23, 2019.
(2) The inspectors observed and evaluated operator performance in the control room during the reactor shutdown for entry into Unit 3 refueling outage 3RFO20 on March 10 and 11, 2019
(3) The inspectors observed and evaluated licensed operator performance in the control room during the reactor coolant system cool down and transition to residual heat removal at Unit 3 on March 11, 2019.
(4) The inspectors observed and evaluated licensed operator performance in the Unit 2 control room during reactor startup, return to power, and secondary plant startup on March 23, 2019.

Licensed Operator Requalification Training/Examinations (IP Section 03.02) (2 Samples)

(1) The inspectors observed and evaluated operator performance during licensed operator requalification training scenario I2SG-LOR-AOP23 at the Unit 2 simulator on January 29, 2019.
(2) The inspectors observed and evaluated just-in-time training for the reactor shutdown in the simulator prior to Unit 3 refueling outage 3RFO20 on March 5 and 6, 2019

71111.12 - Maintenance Effectiveness

Routine Maintenance Effectiveness Inspection (IP Section 02.01) (2 Samples)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety significant functions:

(1) Control rod drive mechanism fan 22 failure at Unit 2 on January 22, 2019
(2) Review of licensee's periodic maintenance rule (a)(3) evaluation at Units 2 and 3 on February 22, 2019

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (9 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

(1) Elevated risk during 32 safety injection pump testing concurrent with 21 component cooling water heat exchanger maintenance at Unit 3 on January 15, 2019
(2) Planned yellow risk for quarterly surveillance testing on the 480 volt safety bus under-voltage relays under PT-M62B at Unit 3 on January 24, 2019
(3) Planned yellow risk for surveillance test 3PT-R20 yearly test of the PCV-1310A/B valves and temperature sensors for the auxiliary boiler feedwater pumps at Unit 3 on January 29, 2019
(4) Planned yellow risk for saturation margin monitor surveillance test 3-PC-OL51A at Unit 3 on February 7, 2019
(5) Elevated risk due to testing of the 480 volt electrical safety buses at Unit 3 on February 21, 2019
(6) Risk assessment for Unit 3 refueling outage 3RFO20 on February 24, 2018
(7) Elevated risk for work on the 32 auxiliary feedwater steam admission valve MS-PCV-1310A at Unit 3 on February 25, 2019
(8) Elevated risk with seismic hazards introduced by outage-related scaffolding erection at Unit 3 on March 8, 2019
(9) Planned yellow outage shutdown risk for core cooling, containment closure, and reactor coolant system integrity during period of lowered vessel inventory for vessel head removal at Unit 3 on March 13, 2019

71111.15 - Operability Determinations and Functionality Assessments

Sample Selection (IP Section 02.01) (9 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

(1) Fire protection valve FP-718 leak resulting in isolation of the fire header at Unit 2 (CR-IP2-2019-00015) on January 3, 2019
(2) 31 EDG operability with fuel oil day tank level control valve LCV-1207B failure to shut at Unit 3 (CR-IP3-2019-0039) on January 7, 2019
(3) 31 EDG with service water leak on lube oil cooler supply line at Unit 3 (CR-IP3-2019-00180) on January 18, 2019
(4) 23 EDG jacket water temperature and lube oil temperature out of specification at Unit 2 (CR-IP2-2019-00544) on January 31, 2019
(5) 21, 22, and 24 safety related batteries due to low cell electrolyte temperatures at Unit 2 (CR-IP2-2019-00568) on January 31, 2019
(6) Appendix R portable generators failed to run at Unit 3 (CR-IP3-2019-00436) on February 14, 2019
(7) 32 auxiliary boiler feedwater pump with stem galling on steam isolation valves 1310A and 1310B at Unit 3 (CR-IP3-2019-00589) on February 25, 2019
(8) Component cooling water and safety injection systems with unevaluated potential operability impact due to scaffolding proximity at Unit 3 (CR-IP3-2019-01140) on February 28, 2019
(9) Potential preconditioning of MOV SWN-41-2A (fan cooler unit 22 service water inlet to containment cooling coils) by lubricating valve stems prior to valve stroke time testing at Unit 2 (WO 52730089-2) on March 31, 2019

71111.18 - Plant Modifications

Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (1 Sample)

The inspectors evaluated the following temporary or permanent modifications:

(1) Engineering Change 75690 - Eliminate Single Point Vulnerabilities Associated with Turbine Thrust Bearing Failure Pressure Switches 63TB3-86P and 63TB6-86BU (permanent modification) at Unit 3

71111.19 - Post Maintenance Testing

Post Maintenance Test Sample (IP Section 03.01) (12 Samples)

The inspectors evaluated the following post maintenance tests:

(1) 31 EDG day tank fuel oil flow control valve FCV-1207B repair at Unit 3 on January 8, 2019
(2) Appendix R diesel generator following a maintenance outage at Unit 3 on February 27, 2019
(3) 32 auxiliary boiler feedwater pump steam isolation valve PCV-1310A following valve stem repair and repacking at Unit 3 on March 14, 2019

(4) 31 static inverter six-year preventative maintenance at Unit 3 on March 15, 2019
(5) 33 EDG following eight-year preventative maintenance at Unit 3 on March 19, 2019
(6) 480 voltage bus 3A eight-year preventative maintenance at Unit 3 on March 22, 2019
(7) 31 EDG following jacket water and lube oil heat exchanger tube bundle replacement at Unit 3 on March 22, 2019
(8) Component cooling water return from 32 residual heat removal pump check valve AC-MOV-750D four-year preventative maintenance at Unit 3 on March 25, 2019
(9) Component cooling water supply to reactor coolant pumps check valve AC-MOV-770 following eight-year preventative maintenance at Unit 3 on March 25, 2019
(10) Residual heat removal loop suction isolation valve AC-MOV-730 following two-year preventative maintenance at Unit 3 on March 26, 2019
(11) 32 EDG following jacket water and lube oil heat exchanger tube bundle replacement at Unit 3 on March 26, 2019
(12) SI-MOV-850C major preventative maintenance at Unit 3 on March 29, 2019

71111.20 - Refueling and Other Outage Activities

Refueling/Other Outage Sample (IP Section 03.01) (1 Sample 1 Partial)

(1) The inspectors evaluated Unit 2 forced outage 2FO19A (main generator exciter failure) activities from March 15 to 23, 2019.
(2) (Partial) The inspectors evaluated Unit 3 refueling outage 3RFO20 activities from March 11 to 31, 2019.

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Containment Isolation Valve (IP Section 03.01) (1 Sample)

(1) 3-PT-R035D, Local leak rate test for CA-PCV-1229 and 1230 containment isolation valves to the air ejectors at Unit 3 on March 4, 2019

FLEX Testing (IP Section 03.02) (1 Sample)

(1) FLEX-U3-PDG-1, FLEX phase 2 portable diesel generator 480V at Unit 3 on March 12, 2019

Inservice Testing (IP Section 03.01) (4 Samples)

(1) 2-PT-Q013-DS139, 22 fan cooler unit containment isolation valves at Unit 2 on February 19, 2019
(2) 2-PT-Q013-DS140, 23 fan cooler unit containment isolation valves at Unit 2 on March 6, 2019
(3) 3-PT-R006, Main steam safety valves lift point inservice set test at Unit 3 on March 8, 2019
(4) 3-PT-R007A, Auxiliary feedwater pumps 31, 32, and 33 full flow testing at Unit 3 on March 8 to 10, 2019

Surveillance Testing (IP Section 03.01) (6 Samples)

The inspectors evaluated the following surveillance tests:

(1) 3-PC-OL17C, 33 accumulator pressure analog component calibration at Unit 3 on January 4, 2019
(2) 2-PT-M58, Central control room ventilation area radiation monitors and control at Unit 2 on January 11, 2019
(3) 3-PT-Q116B, 32 safety injection pump functional testing at Unit 3 on January 15, 2019
(4) 2-PT-2Y008C, 23 EDG mechanical overspeed trip test at Unit 2 on January 17, 2019
(5) 3-PT-OL101B, Rod position indication analog system functional shutdown bank 'C' and shutdown bank 'D' at Unit 3 on January 30, 2019
(6) 0-MCA-416-ELC, Auxiliary boiler feed pump 23 motor condition assessment testing at Unit 2 on March 4, 2019

71114.06 - Drill Evaluation

Emergency Preparedness Drill (IP Section 02.01) (1 Sample)

The inspectors evaluated the conduct of a routine emergency preparedness drill at Unit 2 on January 23, 2019.

RADIATION SAFETY

71124.01 - Radiological Hazard Assessment and Exposure Controls

Contamination and Radioactive Material Control (IP Section 02.03) (1 Sample)

The inspectors observed the monitoring of potentially contaminated material leaving the radiological controlled area and inspected the methods and radiation monitoring instrumentation used for control, survey, and release of that material. The inspectors selected several sealed sources from inventory records and assessed whether the sources were accounted for and were tested for loose surface contamination. The inspectors evaluated whether any recent transactions involving nationally tracked sources were reported in accordance with requirements.

High Radiation Area and Very High Radiation Area Controls (IP Section 02.05) (1 Sample)

The inspectors reviewed the procedures and controls for high radiation areas, very high radiation areas, and radiological transient areas in the plant.

Instructions to Workers (IP Section 02.02) (1 Sample)

The inspectors reviewed high radiation area work permit controls and use, reviewed electronic alarming dosimeter alarms and setpoints, observed worker briefings on radiological conditions, and observed containers of radioactive materials and assessed whether the containers were labeled and controlled in accordance with requirements.

Radiation Worker Performance and Radiation Protection Technician Proficiency (IP Section 02.06) (1 Sample)

The inspectors evaluated radiation worker performance with respect to radiation protection work permit requirements. The inspectors evaluated radiation protection technicians in performance of radiation surveys and in providing radiological job coverage.

Radiological Hazard Assessment (IP Section 02.01) (1 Sample)

The inspectors conducted independent radiation measurements during walkdowns of the facility and reviewed:

(1) The radiological survey program
(2) Any changes to plant operations since the last inspection
(3) Recent plant radiation surveys for radiological work activities
(4) Air sampling and analysis
(5) Continuous air monitor use

Radiological Hazards Control and Work Coverage (IP Section 02.04) (1 Sample)

The inspectors evaluated in-plant radiological conditions and performed independent radiation measurements during facility walkdowns and observation of radiological work activities. The inspectors assessed whether posted surveys; radiation work permits; worker radiological briefings and radiation protection job coverage; the use of continuous air monitoring, air sampling, and engineering controls; and dosimetry monitoring were consistent with the present conditions. The inspectors examined the control of highly activated or contaminated materials stored within the spent fuel pool and the posting and physical controls for selected high radiation areas, locked high radiation areas, and very high radiation areas.

71124.04 - Occupational Dose Assessment

External Dosimetry (IP Section 02.02) (1 Sample)

The inspectors evaluated external dosimetry to include the following:

(1) Verification of National Voluntary Laboratory Accreditation Program accreditation
(2) Onsite storage of passive dosimeters
(3) Determine if bias for electronic alarming dosimeters are appropriate

Internal Dosimetry (IP Section 02.03) (1 Sample)

The inspectors evaluated the internal dosimetry program to include routine bioassay, special bioassay, and dose assessments.

Source Term Categorization (IP Section 02.01) (1 Sample)

The inspectors verified that the licensee has characterized the radiation types and energies being monitored and has developed appropriate scaling factors for hard-to-detect radionuclide activity and alpha radionuclides for use in internal dose assessments.

Special Dosimetric Situations (IP Section 02.04) (1 Sample)

The inspectors evaluated special dosimetric situations to include declared pregnant workers, dosimeter placement and assessment of effective dose equivalent for external exposures, shallow dose equivalent, neutron dose assessment, and dose of legal record.

71124.05 - Radiation Monitoring Instrumentation

Calibration and Testing Program (IP Section 02.02) (1 Sample)

The inspectors evaluated Entergy's calibration and testing program. The inspectors specifically assessed the following instruments and equipment:

(1) Laboratory instrumentation
(2) Whole body counters
(3) Post-accident monitoring instrumentation
(4) Portal monitors, personnel contamination monitors, and small article monitors
(5) Portable survey instruments, area radiation monitors, and air samplers/continuous air monitors
(6) Instrument calibrators
(7) Calibration and check sources
(8) Electronic alarming dosimeters

Walk Downs and Observations (IP Section 02.01) (1 Sample)

The inspectors evaluated radiation monitoring instrumentation during plant walk-downs to include the following:

(1) Portable survey instruments
(2) Radiation area monitors and continuous air monitors
(3) Personnel contamination monitors, portal monitors, and small article monitors

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

BI01: Reactor Coolant System Specific Activity Sample (IP Section 02.10) (2 Samples)

(1) Unit 2 (January 1, 2018, to December 31, 2018)
(2) Unit 3 (January 1, 2018, to December 31, 2018)

BI02: Reactor Coolant System Leak Rate Sample (IP Section 02.11) (2 Samples)

(1) Unit 2 (January 1, 2018, to December 31, 2018)
(2) Unit 3 (January 1, 2018, to December 31, 2018)

71153 - Followup of Events and Notices of Enforcement Discretion

Event Followup (IP Section 03.01) (2 Samples)

(1) The inspectors evaluated Unit 2 trip due to turbine trip and licensee's response on March 15, 2019.
(2) The inspectors evaluated Unit 2 trip due to turbine trip and licensee's response on March 24, 2019.

Event Report (IP Section 03.02) (2 Samples)

The inspectors evaluated the following licensee event reports (LERs) which can be accessed at https://lersearch.inl.gov/LERSearchCriteria.aspx:

(1) LER 05000286/2017-004-01, Unit 3 Reactor Trip Due to Main Generator Loss of Field (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19017A060)

The inspectors determined that it was not reasonable to foresee or prevent the cause discussed in the LER; therefore, no performance deficiency was identified. The inspectors also concluded that no violation of NRC requirements occurred.

The inspectors reviewed the updated LER submittal. The previous LER submittal was reviewed in Indian Point Nuclear Generating - Integrated Inspection Report 05000247/2018002 and 05000286/2018002 (ADAMS Accession No. ML19010A317).

(2) LER 05000247/2018-003-00, Loss of Safety Function Due to Valve SWN-6 Actuator Failure During Service Water Header Swap (ADAMS Accession No. ML18361A566)

The inspectors determined that it was not reasonable to foresee or prevent the cause discussed in the LER; therefore, no performance deficiency was identified. The inspectors also concluded that no violation of NRC requirements occurred.

INSPECTION RESULTS

Failure to Adequately and Promptly Evaluate, Identify, and Correct Degradation of Offsite Power Feeder 13W93			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green FIN 05000247/2019001-01 Open/Closed	[H.14] - Conservative Bias	71111.12
The inspectors identified a Green finding (FIN) because the licensee did not adequately and promptly evaluate, identify, and correct degraded cable conditions on the 'C' phase of the 13W93 offsite power feeder prior to failure, as required, by EN-MA-138, Very Low Frequency Tan Delta and Withstand Testing of Electrical Power Cables, and EN-DC-346, Cable Reliability Program. The failure resulted in the loss of the station blackout and Appendix R diesel generator; an increase in the online risk monitor core damage frequency from green to yellow risk; and the loss of remote shutdown instrumentation and controls for decay heat removal via steam generators (21 auxiliary feedwater pump), reactor coolant system			

inventory control (21 and 22 residual heat removal pumps), and support equipment (23 circulating cooling water pump).

Description: On May 29, 2018, the operators on both Units 2 and 3 entered abnormal operating procedures (2-AOP-13.8kV and 3-AOP-13.8kV, respectively) due to a loss of 13.8kV on Bus 3 (fed by offsite power feeder 13W93). The plant risk to Unit 3 was unchanged; however, Unit 2 entered an unplanned yellow risk for core damage frequency and a seven-day shutdown condition of the technical requirements manual due to the loss of the station blackout and Appendix R diesel generator. The yellow risk for Unit 2 was reduced to green risk when power was restored to Bus 3 from offsite power feeder 13W92 after approximately twenty minutes. The unplanned seven-day shutdown condition was exited after four days when the Appendix R diesel generator was isolated from the faulted feeder and reconnected to Bus 3. A total of three faults were found on 'C' phase of this cable prior to being returned to service. All of the faulted connections were repaired and the cable was tested using a high potential withstand test to ensure that no additional faults existed prior to returning the feeder to service.

The licensee committed to aging management program, Non-Environmentally Qualified (EQ) Inaccessible Medium-Voltage Cable Program, as part of their license renewal. This program includes periodic cable insulation monitoring via field testing using industry standard IEEE Standard 400.2, IEEE Guide to Field Testing of Shielded Power Cable Systems Using Very Low Frequency (less than 1 Hz), to monitor and evaluate the effects of potential degradation in non-EQ inaccessible medium-voltage cable. The licensee follows the requirements specified in EN-MA-138 and EN-DC-346 by invoking the IEEE Standard 400.2 guidelines contained in references 2.3[4] and 3 of the procedures, respectively. The objective of the non-EQ inaccessible medium-voltage cable program is to manage aging effects such that the applicable components will continue to perform their intended functions consistent with the current licensing basis through the period of extended operation.

The inspectors' review of the licensee's license renewal determined that the original license was in effect at the time of the performance deficiency and failure; therefore, the commitments of the aging management program were a self-imposed standard. NRC regulation Title 10 of the *Code of Federal Regulations* (10 CFR) 2.109 (b) states, "*If the licensee of a nuclear power plant licensed under 10 CFR 50.21(b) or 50.22 files a sufficient application for renewal of either an operating license or a combined license at least five years before the expiration of the existing license, the existing license will not be deemed to have expired until the application has been finally determined*." The original operating licenses for Units 2 and 3 were set to expire at midnight on September 28, 2013, and December 12, 2015, respectively. The NRC received the Unit 2 and 3 license renewal application on April 30, 2007, and determined it was sufficient for review on July 25, 2007. The NRC issued the renewed licenses for both units on September 17, 2018.

The licensee performed work order 52472792 on the 13.8kV feeder 13W93 on July 3, 2017, in order to satisfy the periodic inspection requirements of the Indian Point license renewal commitment for non-EQ inaccessible medium voltage cables for that credited source of offsite power. Indication of insulation degradation was apparent during testing, however, the severity and location of degradation was not determined at that time. The results of the 2012 tan delta testing compared to the 2017 tan delta testing show significant increase in the tan delta values and their standard deviations for the 'C' phase. At respectively increasing voltages of 4kV, 8kV, and 12kV, the 'C' phase tan delta values were $7.5x10^{-3}$, $8.1x10^{-3}$, and $11x10^{-3}$ in 2012 and $32.5x10^{-3}$, $35.2x10^{-3}$, and $51.2x10^{-3}$ in 2017. Additionally, the respective

standard deviations were 0.00 percent, 0.00 percent, and 0.00 percent in 2012 and 0.04 percent, 0.04 percent, and 0.06 percent in 2017.

The inspectors' review of the 2017 tan delta test documentation determined that the licensee terminated the test to implement the procedural caution statement in EN-MA-138 that, "*During testing if at any time the Standard Deviation is greater than 0.04 [percent], the test must be stopped to prevent further damage to the cable*."

IEEE Standard 400.2 provides assessment criteria for high tan delta values. "*The user can compare results between different phases of the same segment or sequential sections to better place the result in context. The user can perform additional testing in the form of a monitored withstand, non-monitored withstand, or partial discharge test should they wish to identify a localized problem*." When compared to the 'A' and 'B' phases, the difference in tan delta values and standard deviations for the 'C' phase had significantly increased between 2012 and 2017, which equates to an increased rate of degradation for the 'C' phase. Additionally, the tan delta and withstand tests were performed on the 13W93 offsite power feeder in 2012, but only the tan delta test was performed in 2017. A withstand test was not performed in 2017.

Procedure EN-MA-138 defines withstand testing as a, "*High potential test to determine whether the cable is acceptable for energizing and placing back into service*." This procedure provides two attachments for evaluating the results of tan delta and withstand testing. Attachment 9.1 requires an evaluation of the tan delta results with three potential outcomes. A result of "Good" requires no further action and the equipment can be placed back in service. A result of "Further Study Required" or "Action Required" dictate that a condition report be written and that an evaluation be performed using Attachment 9.2. The licensee evaluation of tan delta testing in 2017 via Attachment 9.1 shows that the results met the "Action Required" category. IEEE 400.2 states, "*The action required condition assessment means that the cable system has an unusually high set of tangent delta characteristics that may be indicative of poor insulation condition and should be considered for replacement or repair immediately after the test or in the near future. These results may also be used to trigger further testing*."

The three evaluation conditions provided in Attachment 9.2 cannot be properly evaluated with subsequent recommended actions absent withstand test results. The recommended actions were not adequately addressed because withstand testing was not performed. A condition report was written after exiting the tan delta test procedure because the standard deviation exceeded the procedure limit of 0.04 percent. A work order was created to have a vendor inspect and repair any degraded splices and was originally scheduled for November 20, 2017. The work order had not been completed prior to the failure of the offsite power feeder 13W93 on May 29, 2018, and was subsequently cancelled.

The offsite power electrical feeder 13W93 is not classified as safety-related. However, under the non-EQ inaccessible medium-voltage cable program, it is subject to the requirements of the renewed license for Unit 2 in which the licensee committed to applying the corrective action controls of the licensee's (10 CFR Part 50, Appendix B) Quality Assurance Program for all aging management programs and activities during the period of extended operation.

Corrective Action: On June 27, 2018, the licensee repaired the faulted connections and after successful post maintenance withstand testing, the 13W93 offsite feeder was placed back in service.

Corrective Action Reference: CR-IP3-2018-01502

Performance Assessment:

Performance Deficiency: The inspectors determined that failure to follow the requirements of EN-DC-346, EN-MA-138, and industry guidelines incorporated by reference was a performance deficiency that was within the licensee's ability to foresee and prevent. Specifically, the 13.8kV offsite power feeder 13W93 was not subjected to additional testing because the licensee did not follow the guidelines contained in references 2.3[4] and 3, respectively, IEEE Standard 400.2, IEEE Guide for Field Testing of Shielded Power Cable Systems Using Very Low Frequency (less than 1 Hz). Specifically, the licensee did not perform further testing or consider cable repair or replacement immediately after the test or in the near future when the tan delta results showed degradation in the action required range. The licensee did not recognize that withstand testing in conjunction with the tan delta test would provide reasonable assurance that the degradation was adequately and promptly identified, documented, and corrected and that the intended functions were maintained consistent with the current licensing basis through the period of extended operation. As a result, 13W93 failed while in service.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Protection Against External Factors attribute of the Mitigating Systems cornerstone. This performance deficiency affected the cornerstone objective of ensuring the reliability and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure of the 13.8kV offsite power feeder 13W93 caused the loss of the station blackout and Appendix R diesel generator; an increase in the online risk monitor core damage frequency from green to yellow risk; and unplanned entry into technical specifications for the loss of remote shutdown instrumentation and controls for decay heat removal via steam generators (21 auxiliary feedwater pump), reactor coolant system inventory control (21 and 22 residual heat removal pumps), and support equipment (23 circulating cooling water pump).

Significance: The inspectors assessed the significance of the finding using Appendix A, "Significance Determination of Reactor Inspection Findings for At - Power Situations." The inspectors used IMC 0609.04, "Initial Characterization of Findings," and IMC 0609, Appendix A, Exhibit 2, "Mitigating Systems Screening Questions," to determine that this finding did not represent an actual loss of function of one or more non-technical specification trains of equipment designated as high safety-significant in accordance with the licensee's maintenance rule program for greater than 24 hours. Therefore, the inspectors determined the finding to be of very low safety significance (Green).

Cross-Cutting Aspect: H.14 - Conservative Bias: Individuals use decision making-practices that emphasize prudent choices over those that are simply allowable. A proposed action is determined to be safe in order to proceed, rather than unsafe in order to stop. Specifically, additional testing could have determined that the 13W93 offsite power feeder was safe to return to service, rather than using the limited test results which were obtained to determine that the feeder was not unsafe to return to service.

Enforcement: Inspectors did not identify a violation of regulatory requirements associated with this finding.

EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

- On April 18, 2019, the inspectors presented the quarterly resident inspector inspection results to Anthony J. Vitale and other members of the licensee staff.
- On March 28, 2019, the inspectors presented the Unit 3 inservice inspection results to Anthony J. Vitale and other members of the licensee staff.

DOCUMENTS REVIEWED

Common Documents Used
Indian Point Units 2 and 3, Control Room Narrative Logs
Indian Point Units 2 and 3, Individual Plant Examination
Indian Point Units 2 and 3, Individual Plant Examination of External Events
Indian Point Units 2 and 3, Plan of the Day
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PFP-209, Primary Auxiliary Building, Component Cooling Pump Room, Revision 0
PFP-217, Fuel Storage Building, Revision 12
PFP-301, Containment Building, General Floor Plan, Elevation 46-Foot, Revision 8
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915424-01 to -04, Liquid Penetrant Exam Datasheets for Reactor Vessel Flange and Closure Head, dated March 25, 2019
UT-19-001, Ultrasonic Exam Datasheet for RCS Loop 2 Charging Line 80, dated March 26, 2019
VT-19-001, Visual Exam Datasheet for Hot Leg 31 Dissimilar Metal Nozzle Weld, dated March 18, 2019
VT-19-012, Visual Exam Datasheet for Cold Leg 31 Dissimilar Metal Nozzle Weld, dated March 18, 2019
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WDI-PJF-1321502-FSR-001, Field Service Report for the Indian Point Unit 3 3R20 Reactor Vessel Head Inspection, dated March 2019
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2-PT-Q028A, 21 Residual Heat Removal Pump, Revision 25
2-PT-Q089, Control Rod Exercise, Revision 9
2-PT-Q089, Control Rod Exercise, Revision 9
2-SOP-AFW-001, Auxiliary Feedwater System Operations, Revision 9
3-POP-2.1, Operation at Greater than 45 Percent Power, Revision 68
3-POP-3.1, Plant Shutdown from 45 Percent Power, Revision 53
3-POP-3.2, Plant Recovery from Hot Standby, Revision 4
3-POP-3.3, Plant Cooldown - Hot to Cold Shutdown, Revision 56
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EN-MA-133, Control of Scaffolding, Revision 19
EN-OP-119, Protected Equipment Postings, Revision 10
EN-WM-104, On Line Risk Assessment, Revision 16
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IP3-RPT-16-00035, Indian Point Unit 3 Probabilistic Safety Assessment Interim Update, Revision 0
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9321-F-20303, Flow Diagram, Fuel Oil to Diesel Generators, Revision 30
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3-PT-R007A, 31 and 33 ABFPS Full Flow Test, Revision 23
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