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

November 8, 2018

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 – INTEGRATED INSPECTION REPORT 05000247/2018003 AND 05000286/2018003

Dear Mr. Vitale:

On September 30, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Indian Point Nuclear Generating (Indian Point), Units 2 and 3. On October 31, 2018, 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.

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

If you contest the violations or significance of these NCVs, you should provide a 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, DC 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 a cross-cutting aspect assignment, 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 the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR), Part 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

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

Docket Numbers: 50-247 and 50-286
License Numbers: DPR-26 and DPR-64

Enclosure:
Inspection Report 05000247/2018003 and
05000286/2018003

cc w/encl: Distribution via ListServ

SUBJECT: INDIAN POINT NUCLEAR GENERATING – INTEGRATED INSPECTION REPORT 05000247/2018003 AND 05000286/2018003 DATED NOVEMBER 8, 2018

DISTRIBUTION: (via email)
DLew, RA (R1ORAMAIL Resource)
RLorson, DRA (R1ORAMAIL Resource)
DPelton, DRP (R1DRPMAIL Resource)
PKrohn, DRP (R1DRPMAIL Resource)
JYerokun, DRS (R1DRSMAIL Resource)
BWelling, DRS (R1DRSMAIL Resource)
MFerdas, DRP
DSchroeder, DRP
TSetzer, DRP
MHenrion, DRP
MRossi, DRP
BHaagensen, DRP, SRI
JVazquez, DRP, RI
DHochmuth, DRP, AA
CCook, RI OEDO
RidsNrrPMIndianPoint Resource
RidsNrrDorlLpl1 Resource
ROPReports Resources

DOCUMENT NAME: G:\DRP\BRANCH2\a - Indian Point\IP2&3 Inspection Reports\2018\2018-003\IP2&3 2018-003final.docx
ADAMS ACCESSION NUMBER: **ML18317A077**

☑ SUNSI Review		☑ Non-Sensitive ☐ Sensitive		☑ Publicly Available ☐ Non-Publicly Available	
OFFICE	RI/DRP	RI/DRP	RI/DRP		
NAME	BHaagensen via email	TSetzer	DSchroeder		
DATE	11/1/18	11/1/18	11/8/18		

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Numbers:	50-247 and 50-286
License Numbers:	DPR-26 and DPR-64
Report Numbers:	05000247/2018003 and 05000286/2018003
Enterprise Identifier:	I-2018-003-0076
Licensee:	Entergy Nuclear Northeast (Entergy)
Facility:	Indian Point Nuclear Generating, Units 2 and 3
Location:	450 Broadway, General Services Building Buchanan, NY 10511-0249
Inspection Dates:	July 1, 2018, to September 30, 2018
Inspectors:	B. Haagensen, Senior Resident Inspector A. Siwy, Resident Inspector J. Vazquez, Resident Inspector S. Elkhiamy, Reactor Inspector M. Modes, Senior Reactor Inspector J. Nicholson, Senior Health Physicist S. Wilson, Health Physicist K. Wood, Senior Nuclear Engineer, NRR
Approved By:	Daniel L. Schroeder, Chief Reactor Projects Branch 2 Division of Reactor Projects

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring Entergy's performance at Indian Point Nuclear Generating, Units 2 and 3, by conducting the baseline inspections described in this report 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: NRC-identified and self-revealing findings, violations, and additional items are summarized in the table below.

List of Findings and Violations

Inadequate Procedural Guidance for Spent Fuel Movement and Storage Requirements			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green Non-Cited Violation (NCV) 05000247/2018003-01 Closed	H.3 – Change Management	71152
The inspectors identified a Green NCV of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix B, Criterion V, "Procedures," when Entergy did not have appropriate documented instructions or written procedures for spent fuel movement and storage requirements adjacent to potentially degraded Boraflex panels. Specifically, configuration restrictions were not addressed in some cases and, therefore, did not comply with controls to meet the criticality analysis of record (CAOR) in 2016; and the resultant revised guidance did not accurately reflect the modeled supporting analysis.			

Containment Fan Coolers 21 and 24 Motor Cooler Elbow Through-Wall Leaks Due to Excessive Service Water Flow Rates and Safety System Functional Failures of Containment			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000247/2018003-02 Closed	None	71152
A self-revealing Green NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," was identified when Entergy did not ensure that measures were established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems, and components. Specifically, in 1998, when the former license-holder for Unit 2 decided to replace the original-construction large-radius, butt-welded elbow joints in the service water motor cooler return lines from the Unit 2 fan cooler units (FCUs) with a new design (a short-radius, socket-weld fitting), these elbow joints were not properly evaluated for suitability of application. The service water flow velocity through the modified FCU return piping was in excess of the vendor-allowable flow velocity limit, which resulted in the gradual erosion of the motor cooler elbow joints, eventually leading to through-wall leaks on an American Society of Mechanical Engineers (ASME) class III piping system inside containment, leading to breaches of containment integrity and safety system functional failures.			

Containment Fan Cooler 24 Through-Wall Service Water Leak Caused by Inadequate Application of Epoxy Coating Resulting in Corrosion and a Safety System Functional Failure of Containment			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000247/2018003-03 Closed	H.13 – Consistent Process	71152
A self-revealing Green NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified when Entergy did not ensure that activities affecting quality were prescribed by documented instructions or procedures, of a type appropriate to the circumstances, and that these activities were accomplished in accordance with these instructions, procedures or drawings. Furthermore, Entergy did not ensure that the instructions or procedures included appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. Specifically, Entergy did not ensure that the maintenance procedure for applying the internal Enecon™ epoxy coating to the 24 fan cooler main cooler supply line elbow was adequate to ensure proper epoxy coating adherence, and Entergy did not adequately verify the coating adherence prior to placing the elbow in service. This resulted in a through-wall leak and a safety system functional failure of containment.			

Inadequate Procedure for Turbine Startup Caused a Reactor Trip			
Cornerstone	Significance	Cross-Cutting Aspect	Inspection Results Section
Initiating Events	Green NCV 05000247/2018003-04 Closed	H.13 – Consistent Process	71153
A self-revealing Green NCV of Technical Specification (TS) 5.4.1, "Procedures," was identified because Entergy did not provide adequate guidance in 2-SOP-26.4, "Turbine Generator Startup, Synchronization, Voltage Control, and Shutdown." Specifically, Entergy did not provide adequate procedural direction to ensure the main turbine control oil stop valve 'Z' was in the correct position. As a result, the steam generator water level exceeded the trip setpoint for the main boiler feed pumps which led the operators to insert a manual reactor trip.			

Additional Tracking Items

Type	Issue number	Title	Report Section	Status
LER	05000247/2015001-02	Technical Specification Prohibited Condition Due to an Inoperable Containment Caused by a Service Water Pipe Leak with a Flaw Size That Results in Exceeding the Allowed Leakage Rate for Containment	71153	Closed
LER	05000247/2015004-00	Safety System Functional Failure Due to an Inoperable Containment Caused by a Flawed Elbow on the 21 Fan Cooler Unit Service Water Motor Cooling Return Pipe	71153	Closed
LER	05000247/2016010-00 and 05000247/2016010-01	Safety System Functional Failure Due to an Inoperable Containment Caused by a Through-Wall Defect in a Service Water Supply Pipe Elbow to the 24 Fan Cooler Unit	71153	Closed
LER	05000247/2018001-00	Penetration Indications Discovered During Reactor Pressure Vessel Head Inspection	71153	Closed
LER	05000247/2018002-00	Manual Reactor Trip Due to Trip of Both Main Boiler Feedwater Pumps	71153	Closed
LER	05000286/2016001-00 and 05000286/2016001-01	Safety System Functional Failure Due to an Inoperable Containment Caused by a Flaw on the 31 Fan Cooler Unit Service Water Return Coil Line Affecting Containment Integrity	71153	Closed
LER	05000286/2017003-00	Condensate Storage Tank Declared Inoperable Per Technical Specification	71153	Closed

TABLE OF CONTENTS

PLANT STATUS

Unit 2 operated at or near rated thermal power for the entire inspection period.

Unit 3 began the inspection period at rated thermal power. On July 30, 2018, Unit 3 reduced power to 50 percent after the 33 condensate pump failed. Unit 3 was returned to 100 percent on August 3, 2018, after completing repairs to the 33 condensate pump. On September 7, 2018, Unit 3 was shutdown to Mode 4 to repair a leak on the boron injection tank. Unit 3 was returned to rated thermal power on September 17, 2018. On September 18, 2018, Unit 3 was tripped from 100 percent when a steam leak on a reheater steam line to a feedwater heater occurred. The line was repaired and the unit was returned to rated thermal power on September 24, 2018, and remained at or near rated thermal power for the remainder of the inspection period.

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 Entergy's performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.04 - Equipment Alignment

Partial Walkdowns (4 Samples)

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

Unit 2

(1) 21 safety injection pump on July 20, 2018
(2) 22 safety injection pump on July 20, 2018

Unit 3

(3) 32 safety injection pump on July 19, 2018
(4) Main and reheat steam system on September 24, 2018

71111.05A/Q - Fire Protection Annual/Quarterly

Quarterly Inspection (9 Samples)

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

Unit 2

(1) Intake structure pre-fire plan (PFP-264) on August 13, 2018

Unit 3

(2) Control building exhaust fan/diesel generator air filter enclosure (PFP-354A) on July 3, 2018
(3) Electrical cable tunnels (PFP-355, PFP-356, PFP-357, and PFP-358) on July 3, 2018
(4) Safety injection pump room and main corridor (PFP-305) on July 19, 2018
(5) Component cooling pump room (PFP-306A) on July 19, 2018
(6) Containment spray pump room (PFP-306B) on July 19, 2018
(7) Mini containment and pipe tunnels, primary auxiliary building/fan house (PFP-305A), on August 6, 2018
(8) 480V switchgear room (PFP-351) on August 28, 2018
(9) Auxiliary feedwater building (PFP-365, PFP-366, PFP-367, and PFP-367A) on September 26, 2018

71111.07T - Heat Sink Performance

Heat Sink (Triennial) (4 Samples)

The inspectors evaluated exchanger/sink performance on the following components from July 16 to 18, 2018:

(1) 21 Component cooling heat exchanger, Section 02.02b
(2) 31 Component cooling heat exchanger, Section 02.02b
(3) 32 Component cooling heat exchanger, Section 02.02b
(4) Unit 3 Intake, Section 02.02d, specifically Sections 02.02d5 and 02.02d7 were completed

71111.11 - Licensed Operator Requalification Program and Licensed Operator Performance

Operator Requalification (2 Samples)

Unit 2

(1) The inspectors observed and evaluated operator requalification activity during simulator training sessions on August 23, 2018, and September 5, 2018.

Unit 3

(2) The inspectors observed and evaluated operator requalification activity during an emergency planning drill on August 1, 2018.

Operator Performance (3 Samples)

Unit 3

(1) The inspectors observed and evaluated operator performance activity during a reactor rapid downpower on July 30, 2018, and subsequent power ascension on August 3, 2018, following a condensate pump trip.
(2) The inspectors observed and evaluated operator performance activity during a reactor startup from a forced outage on September 16, 2018.
(3) The inspectors observed and evaluated operator performance activity during a plant trip on September 18, 2018, and a plant startup on September 23, 2018, following a feedwater reheater steamline break.

71111.12 - Maintenance Effectiveness

Routine Maintenance Effectiveness (4 Samples)

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

Unit 2

(1) Main turbine lube oil system on August 29, 2018

Unit 3

(2) Reheater drain system on September 20, 2018

Units 2 and 3

(3) Core exit thermocouple monitoring system on August 30, 2018
(4) 13.8kV system on August 30, 2018

71111.13 - Maintenance Risk Assessments and Emergent Work Control (4 Samples)

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

Unit 2

(1) Yellow Fire Risk for loss of LI-3101 on July 25, 2018
(2) Planned Yellow risk during gas turbine transformer maintenance on August 14, 2018

Unit 3

(3) Planned Yellow risk during emergently concurrent nuclear power range channel N-41 testing and 31 residual heat removal pump oil sampling on August 13, 2018
(4) Planned Yellow risk for 480V safety bus under-voltage and degraded-voltage testing on August 16, 2018

71111.15 - Operability Determinations and Functionality Assessments (9 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

Unit 2

(1) CR-IP2-2018-04258, Multiple core exit thermocouples failed low on July 16, 2018
(2) CR-IP2-2018-04269, Inadequate service water flow to the 23 FCU and restoration of flow balance on July 18, 2018
(3) CR-IP2-2018-05048, 21 emergency diesel generator (EDG) operability following repairs to a lube oil leak on September 6, 2018
(4) CR-IP2-2018-05069, Black start diesel functionality with degraded battery on September 7, 2018
(5) CR-IP2-2014-04414, Spent fuel pool operability on September 27, 2018

Unit 3

(6) CR-IP3-2018-01894, Safety inspection system operability with boric acid deposits identified in electrical cable tunnel on July 6, 2018
(7) CR-IP3-2018-02638, Review operability call for entry into TS 3.0.3 in response to a safety injection system leak in the boron injection tank on September 7, 2018
(8) CR-IP3-2018-02508 and CR-IP3-2018-02660, Operability decisions for motor circuit analysis (Baker™) testing results for 31 residual heat removal and 36 service water pump motors on August 27, 2018, and September 9, 2018
(9) CR-IP3-2018-02773, 480V safety bus operability with high-energy-line-break conditions in the turbine building on September 19, 2018

71111.18 - Plant Modifications (1 Sample)

The inspectors evaluated the following temporary or permanent modifications:

(1) Engineering Change Package 79305 - Boron Injection Tank Thermowell Removal (permanent modification) at Unit 3 on September 12, 2018

71111.19 - Post Maintenance Testing (8 Samples)

The inspectors evaluated post maintenance testing for the following maintenance/repair activities:

Unit 2

(1) 21 containment recirculation fan 480V breaker cubicle replacement on July 23, 2018
(2) 22 service water pump following motor replacement on September 5, 2018

Unit 3

(3) 39 service water pump 480V breaker cubicle replacement on July 26, 2018
(4) 32 EDG return to service following maintenance period on August 3, 2018
(5) 32 and 33 condensate pumps following motor and seal replacements on August 3, 2018

(6) Residual heat remover heat exchanger outlet valves following circuit breaker maintenance on August 23, 2018
(7) Hydrostatic test post maintenance testing for boron injection tank weld repairs on September 15, 2018
(8) 31 and 32 exciter air coolers following tube sleeve installation on September 16, 2018

71111.20 - Refueling and Other Outage Activities (2 Samples)

(1) The inspectors evaluated the Unit 3 forced outage (3FO18B) activities for boron injection tank repairs from September 7 to 17, 2018.
(2) The inspectors evaluated the Unit 3 forced outage (3FO18C) activities to repair the reheat steam line in containment from September 18 to 23, 2018.

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Routine (4 Samples)

(1) 3-PT-M079C, 33 EDG surveillance test and thermography at Unit 3 on August 2, 2018
(2) 3-PT-M079B, 32 EDG monthly surveillance test at Unit 3 on August 3, 2018
(3) 2-PT-M021A, 21 EDG annual thermal performance test and biannual post diagnostic test at Unit 2 on August 9, 2018
(4) 3-PT-2Y001A, 31 EDG overspeed trip test at Unit 3 on August 29, 2018

Inservice (2 Samples)

(1) 2-PT-Q013-DS021 and 2-PT-Q013-DS022, 22 containment spray pump discharge valve tests at Unit 2 on July 26, 2018
(2) 2-PT-Q024A, 21 EDG fuel oil transfer pump test at Unit 2 on August 9, 2018

Reactor Coolant System Leak Detection (1 sample)

(1) 0-SOP-LEAKRATE-001, Elevated unidentified leakage rate during charging pump maintenance at Unit 3 on September 19, 2018

Containment Isolation Valve (1 Sample)

(1) 2-PT-Q035B and 2-PT-Q013-DS038, 22 containment spray pump and header stop valve tests at Unit 2 on July 26, 2018

71114.06 - Drill Evaluation

Emergency Planning Drill (1 Sample)

The inspectors evaluated the conduct of a routine Entergy emergency planning drill at the Unit 3 Emergency Operations Facility on August 1, 2018.

Drill/Training Evolution (1 Sample)

The inspectors evaluated the conduct of a routine Entergy emergency planning NRC evaluated exercise at Unit 2 on September 25, 2018.

RADIATION SAFETY

71124.03 - In-Plant Airborne Radioactivity Control and Mitigation

Engineering Controls (1 Sample)

The inspectors evaluated airborne controls and monitoring. The inspectors observed temporary ventilation system setups and portable airborne radioactivity monitoring systems and verified Entergy's established alarm setpoints for evaluating levels of airborne for both beta and alpha emitting radionuclides.

Use of Respiratory Protection Devices (1 Sample)

The inspectors evaluated the respiratory protection program. The inspectors reviewed Entergy's as low as reasonably achievable reviews and the storage, selection, and use of respiratory protection devices and verified that air used in supplied air devices meets or exceeds "Grade D" quality. The inspectors also reviewed the qualifications of several individuals to ensure they were qualified to use respiratory protections devices.

Self-Contained Breathing Apparatus for Emergency Use (1 Sample)

The inspectors evaluated the self-contained breathing apparatus program. The inspectors verified that personnel who are required to use self-contained breathing apparatus were trained and qualified and that the control rooms were stocked with an adequate variety of respirator face pieces.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified Entergy's performance indicators submittals listed below for the period from July 1, 2017, through June 30, 2018 (10 Samples).

Unit 2

(1) Emergency AC Power Systems (MS06)
(2) High Pressure Injection Systems (MS07)
(3) Heat Removal Systems (MS08)
(4) Residual Heat Removal Systems (MS09)
(5) Cooling Water Support Systems (MS10)

Unit 3

(6) Emergency AC Power Systems (MS06)
(7) High Pressure Injection Systems (MS07)
(8) Heat Removal Systems (MS08)

(9) Residual Heat Removal Systems (MS09)
(10) Cooling Water Support Systems (MS10)

71152 - Problem Identification and Resolution

Annual Follow-Up of Selected Issues (2 Samples)

The inspectors reviewed Entergy's implementation of its corrective action program (CAP) related to the following issues:

(1) CR-IP2-2014-04414, Accelerated neutron-absorber (Boraflex) degradation in the spent fuel pit (SFP) at Unit 2
(2) CR-IP2-2015-03550, CR-IP2-2015-05755, CR-IP2-2016-06934, and CR-IP3-2016-03607, Containment FCU leaks corrective actions at Units 2 and 3

71153 – Follow-Up of Events and Notices of Enforcement Discretion

Events (2 Samples)

The inspectors evaluated response to the following events:

(1) Unit 3 shutdown to Mode 4 after an entry into TS 3.0.3 due to a leak in the boron injection tank on September 7, 2018
(2) Unit 3 shutdown following the failure of the 26C Feedwater Heater MSR drain line on September 18, 2018

Licensee Event Reports (LERs) (7 Samples)

The inspectors evaluated the following LERs:

(1) LER 05000247/2015001-02, Technical Specification Prohibited Condition Due to an Inoperable Containment Caused by a Service Water Pipe Leak with a Flaw Size That Results in Exceeding the Allowed Leakage Rate for Containment (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17248A466)

The inspectors reviewed the updated (Revision 2) LER submittal which provided an updated causal assessment for a leak on the 24 FCU motor cooler inlet line elbow. The previous LER submittals (Revisions 0 and 1) were reviewed and closed in the Indian Point Integrated Inspection Report 05000247/2016004 and 05000286/2016004 (ADAMS Accession No. ML17037C541), and an associated performance deficiency was addressed therein with Green NCV 05000247/2016004-02. The circumstances surrounding this LER are documented in the Inspection Results section, NCV 05000247/2018003-02, and Observations, Annual Follow-Up of Selected Issues.

(2) LER 05000247/2015004-00, Safety System Functional Failure Due to an Inoperable Containment Caused by a Flawed Elbow on the 21 Fan Cooler Unit Service Water Motor Cooling Return Pipe (ADAMS Accession No. ML16057A178)

The circumstances surrounding this LER are documented in the Inspection Results section, NCV 05000247/2018003-02, and Observations, Annual Follow-Up of Selected Issues.

(3) LER 05000247/2016010-00 and 05000247/2016010-01, Safety System Functional Failure Due to an Inoperable Containment Caused by a Through-Wall Defect in a Service Water Supply Pipe Elbow to the 24 Fan Cooler Unit (ADAMS Accession Nos. ML17003A008 and ML17069A170)

The circumstances surrounding this LER are documented in the Inspection Results section, NCV 05000247/2018003-03, and Observations, Annual Follow-Up of Selected Issues.

(4) LER 05000247/2018001-00, Penetration Indications Discovered During Reactor Pressure Vessel Head Inspection (ADAMS Accession No. ML18149A126)

The circumstances surrounding this LER were previously documented in Inspection Report 05000247/2018-002, NCV 05000286/2018-002-01. The inspectors concluded that no additional performance deficiencies or violations of NRC requirements were identified.

(5) LER 05000247/2018002-00, Manual Reactor Trip Due to Trip of Both Main Boiler Feedwater Pumps (ADAMS Accession No. ML18173A127)

The circumstances surrounding this LER are documented in the Inspection Results section, NCV 05000247/2018003-04.

(6) LER 05000286/2016001-00 and 05000286/2016001-01, Safety System Functional Failure Due to an Inoperable Containment Caused by a Flaw on the 31 Fan Cooler Unit Service Water Return Coil Line Affecting Containment Integrity (ADAMS Accession Nos. ML17003A007 and ML17047A463)

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

(7) LER 05000286/2017003-00, Condensate Storage Tank Declared Inoperable Per Technical Specification (ADAMS Accession No. ML17248A467)

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

Personnel Performance (1 Sample)

The inspectors evaluated response during the following non-routine evolutions or transients.

(1) Unit 3 underwent an unplanned power reduction to 45 percent on July 30, 2018, following the loss of the 32 condensate pump. Initially, following the loss of the pump, reactor power was reduced to 83 percent. However, because axial flux deviation was found to be outside of the acceptable operation limits following the downpower, operators took action to reduce power below 50 percent, in accordance with TS 3.2.3, Condition ‘C.’

OTHER ACTIVITIES – TEMPORARY INSTRUCTIONS, INFREQUENT, AND ABNORMAL

60845 - Operation of Inter-Unit Fuel Transfer Canister and Cask System

The inspectors evaluated the inter-unit wet fuel transfer canister and cask system on September 10 to 13, 2018. Specifically, the inspectors reviewed or observed the following activities:

- Fuel selection and fuel loading of the shielded transfer canister (STC)
- Heavy load movement of the loaded STC
- Closure bolting of the STC
- Helium leak test of the STC lid
- STC pressure rise test
- Radiological field surveys
- Transfer and transport evolutions

INSPECTION RESULTS

Inadequate Procedural Guidance for Spent Fuel Movement and Storage Requirements			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000247/2018003-01 Closed	H.3 – Change Management	71152

Introduction: The inspectors identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion V, "Procedures," when Entergy did not have appropriate documented instructions or written procedures for spent fuel movement and storage requirements adjacent to potentially degraded Boraflex panels. Specifically, configuration restrictions were not addressed in some cases and, therefore, did not comply with controls to meet the CAOR in 2016; and the resultant revised guidance did not accurately reflect the modeled supporting analysis.

Description: The Unit 2 SFP is composed of high-density racks with Boraflex neutron absorber panels between cells. In 2002, Unit 2 TS 3.7.13, "Spent Fuel Pit Storage," was amended to allow for soluble boron credit in the criticality analysis, due to the degradation of the Boraflex absorbers. This amendment also divided the SFP into regions and placed restrictions on fuel assemblies that could be placed in each region based on cooling time, burnup, initial enrichment, and number of integral fuel burnable absorbers. Entergy continued to perform periodic testing of the Boraflex panels through 2013 to confirm the assumptions in the CAOR. In February 2014, Entergy determined that additional panels in Region 2-2 exceeded the degradation assumptions of the CAOR and that more panels would exceed the assumptions based on absorbed dose and residency in the SFP. This issue was documented in CR-IP2-2014-04414 (see Section 4OA2 in Indian Point Integrated Inspection Report 05000247/2014003 and 05000286/2014003 (ADAMS Accession No. ML14223A045). Entergy placed administrative controls into effect to ensure the criticality (k-effective) limits of 10 CFR 50.68(b)(4) would still be met until the condition was corrected.

The administrative controls included placing additional control over boron concentration and development of configuration restrictions in procedure 0-NF-203, "Internal Transfer of Fuel Assemblies and Inserts," Revision 18, near any panels that were screened as potentially

degraded. The procedure allows the following approaches for meeting the CAOR in Region 2-2:

- Use the TS 3.7.13 loading requirements for Region 2-1 (more restrictive than Region 2-2) on both sides of a degraded Boraflex panel
- Maintain an empty cell on one side of a degraded panel
- Maintain a rod cluster control assembly in a fuel assembly on one side of a degraded panel

In 2016, the inspectors reviewed the SFP loading configuration to determine if it met the administrative controls. The inspectors noted that three degraded panels in Region 2-2 along the periphery did not meet one of the three approaches. An alternate approach was taken, taking credit for a 1.25 inch water gap between adjoining modules between cells. Entergy subsequently wrote CR-IP2-2016-01505 and completed a reanalysis to confirm the configuration is bounded by the CAOR. Based on the results of the vendor reanalysis, Entergy updated the SFP operability evaluation and revised 0-NF-203, Revision 21, with additional restrictive guidance.

Inspectors reviewed the revised guidance contained in procedure 0-NF-203, Revision 21. This guidance contained two sets of rules for storing fuel in Region 2-2 of Entergy's SFP. The first set of rules governed storage within an SFP rack or across the interface between two racks, without credit for the water gap between the racks. The second set of rules governed storage across a rack interface with credit for the water gap between the racks. This second set of rules is referred to as the "interface rules."

The interface rules were established to meet analysis conditions, such as the boundary conditions for adjacent assemblies. However, the inspectors identified that burnup requirements and required placement of empty cells or assemblies with a control rod were not sufficiently explicit to meet the analysis assumptions. Specifically, the model assumed a specific 2 x 2 array; but the procedure allowed variations in the array. Certain variations, if used in the SFP, would result in an unanalyzed level of activity and could potentially challenge SFP requirements. Additionally, the wording in the procedure did not capture the requirement that each fuel assembly has to have at least the amount of burnup required for a given assembly in Region 2-2. The wording would have allowed one or more fuel assemblies to have less burnup than that required for assemblies in Region 2-2, provided the aggregate of the four fuel assemblies along the interface exceeded the Region 2-2 requirement by 16 GWD/MT. This scenario, if used, also has the potential to increase reactivity and challenge SFP requirements. The inspectors noted that Entergy had not used these procedure steps to date at the time of NRC review.

Corrective Actions: Entergy generated CR-IP2-2016-01505 and performed a vendor calculation of the impacted cells, updated the SFP operability evaluation, and revised procedure 0-NF-203 to include additional restrictive guidance. Additionally, Entergy generated CR-IP2-2018-03316 to revise guidance in 0-NF-203 to more accurately reflect the vendor-modeled supporting analysis.

Corrective Action References: CR-IP2-2016-01505 and CR-IP2-2018-03316

Performance Assessment:

Performance Deficiency: The inspectors determined that the failure to have appropriate documented instructions or written procedures for spent fuel movement and storage requirements for configuration restrictions to meet the CAOR was a performance deficiency. This performance deficiency was reasonably within Entergy's ability to foresee and correct and should have been prevented.

Screening: The inspectors determined the performance deficiency was more than minor because it is associated with the design control attribute of the Barrier Integrity cornerstone and adversely impacted the cornerstone objective to provide reasonable assurance that physical design barriers (fuel cladding) protect the public from radionuclide releases caused by accidents or events. Specifically, by not demonstrating compliance with the CAOR, Entergy did not provide reasonable assurance that the SFP conditions would remain in compliance with k-effective subcriticality requirements and that the fuel cladding barrier would be maintained. This is similar to IMC 0612, Appendix E, Example 3.j, wherein an engineering calculation error results in a condition where there is now a reasonable doubt on the operability of a system or component, or wherein significant programmatic deficiencies are identified with an issue that could lead to worse errors if uncorrected.

Significance: The inspectors assessed the significance of this finding using IMC 0609, Attachment 4, "Phase 1, Initial Screening and Characterization of Findings," worksheet, which directs the user to IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power." From IMC 0609, Appendix A, Exhibit 3," Barrier Integrity Screening Questions," question D4, "Does the finding affect the SFP neutron absorber, fuel bundle misplacement (i.e., fuel loading pattern error) or soluble boron concentration (pressurized-water reactor only)?," the inspectors determined that the final significance must be determined using IMC 0609, Appendix M, "Significance Determination Process Using Qualitative Criteria." In accordance with Appendix M, a qualitative bounding evaluation was performed, which determined that the finding was of very low safety significance (Green) because a prior similar violation's significance bounded this finding's significance. The prior similar violation occurred at the Peach Bottom Atomic Power Station, which was documented in an integrated inspection report as NCV 05000277 and 05000278/2012002-03 (ADAMS Accession No. ML12129A016), Untimely Corrective Actions Resulted in Spent Fuel Pool Boraflex Degradation Exceeding Design Limits (EA-11-224). Peach Bottom's case involved multiple inoperable cells which contained spent fuel assemblies; whereas, in the present case, the extent of condition was much more limited. Because this violation was determined to be of very low safety significance and entered into the CAP as CR-IP2-2016-01505 and CR-IP2-2018-03316, it is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy.

Cross-Cutting Aspect: The finding had a cross-cutting aspect in the area of Human Performance, Change Management, because Entergy did not utilize a systematic process for evaluating and implementing changes, such that nuclear safety remained the overriding priority. Specifically, when making changes to 0-NF-203, the station did not ensure that all requirements were met.

Enforcement:

Violation: 10 CFR Part 50, Appendix B, Criterion V, states that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions,

procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. Entergy procedure 0-NF-203 provides the instructions to meet the requirements in the CAOR and compensates for having unconservative technical specifications.

Contrary to this requirement, Entergy had not included appropriate criteria in procedures for spent fuel assembly movement and storage in the Unit 2 SFP within Procedure 0-NF-203, "Internal Transfer of Fuel Assemblies and Inserts," Revision 21. Specifically, configuration restrictions were not addressed in some cases, and therefore did not comply with controls to meet the CAOR in 2016; and the resultant revised guidance did not accurately reflect the modeled supporting analysis. Entergy generated CR-IP2-2016-01505 and performed a vendor calculation of the impacted cells, updated the SFP operability evaluation, and revised procedure 0-NF-203 with additional restrictive guidance. Additionally, Entergy generated CR-IP2-2018-03316 to revise guidance in 0-NF-203 to more accurately reflect the vendor-modeled supporting analysis.

Disposition: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy.

Containment Fan Coolers 21 and 24 Motor Cooler Elbow Through-Wall Leaks Due to Excessive Service Water Flow Rates and Safety System Functional Failures of Containment

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000247/2018003-02 Closed	None	71152

Introduction: A self-revealing Green NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," was identified when Entergy did not ensure that measures were established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems, and components. Specifically, in 1998, when the former license-holder for Unit 2 decided to replace the original-construction large-radius, butt-welded elbow joints in the service water motor cooler return lines from the Unit 2 FCUs with a new design (a short radius, socket-weld fitting), these elbow joints were not properly evaluated for suitability of application. The service water flow velocity through the modified FCU return piping was in excess of the vendor-allowable flow velocity limit, which resulted in the gradual erosion of the motor cooler elbow joints, eventually leading to through-wall leaks on an ASME class III piping system inside containment, leading to breaches of containment integrity and safety system functional failures.

Description: Between August 11, 2015, and November 21, 2016, Unit 2 experienced two through-wall leaks on the service water motor cooler return lines to the 21 and 24 containment FCUs while operating at 100 percent reactor power. These leaks were identified when the operators noted increased unidentified leakage into containment and confirmed that the leakage was from service water coming from the following return lines:

- 24 FCU motor cooler return line: A 2-gpm leak was identified on the 24 FCU return line elbow on August 11, 2015. Entergy maintained this line in service until an

engineered clamp was installed to stop the leak. Upon inspection, the leak in the elbow was determined to have been caused by flow-accelerated corrosion because the velocity of the service water stream was higher than the allowable flow velocity in the elbow joint, as specified by the vendor (LER 0205000247/2015001-02, Technical Specification Prohibited Condition Due to an Inoperable Containment Caused by a Service Water Pipe Leak with a Flaw Size That Results in Exceeding the Allowed Leakage Rate for Containment, on July 24, 2018 (ADAMS Accession No. ML17248A466)).

- 21 FCU motor cooler return line: A 1-gpm leak was identified on the 21 FCU return line elbow on December 20, 2015. Entergy isolated service water flow to the 21 FCU and the leaking elbow was replaced. Upon inspection, the leak in the elbow was determined to have been caused by erosion/corrosion because the velocity of the service water stream was higher than the allowable flow velocity in the elbow joint, as specified by the vendor (LER 05000247/2015004-00, Safety System Functional Failure Due to an Inoperable Containment Caused by a Flawed Elbow on the 21 Fan Cooler Unit Service Water Motor Cooling Return Pipe, on February 18, 2016 (ADAMS Accession No. ML16057A178)).

In 1998, the former license-holder for Unit 2 elected to replace the large radius, butt-welded elbow joints in the Unit 2 FCU motor cooler return lines with short radius, socket-welded elbows, because of operating experience with through-wall leaks (CR-IP2-1998-06507). Subsequently, Entergy experienced through-wall leaks on the copper-nickel FCU piping, due to corrosion when in service, in 2001, 2006, and 2008. In 2009, Entergy began a project to replace all copper-nickel piping to the FCUs with AL6XN stainless steel piping to prevent further leaks due to corrosion. In 2013, Entergy cancelled this project after noting that no additional leaks had occurred since 2008.

In 2015, during the causal investigation into the above leaks, Entergy identified that the service water flow rates through the motor cooler return lines from the Unit 2 FCUs had exceeded the vendor-specified flow rate for the piping elbows by a significant amount. The measured flow rate through the FCU motor cooler elbow joints were measured at 55 to 60 gpm. The vendor-allowable flow rate through these elbows was limited to 6-feet-per-second flow velocity, which correlated to a service water flow rate of 17 gpm, to prevent erosion of the copper-nickel elbow wall.

In 1998, when the licensee replaced the Unit 2 FCU service water return line large radius elbows with socket-welded, short-radius elbows, they did not assess the vendor-specified limits on flow rates. The licensee considered this replacement as a like-for-like replacement, because the elbows were listed in the piping specification tables, even though the replacement elbows had a very different form factor. The elbow radius was much shorter, and the imposition of a socket weld on the inside of the elbow bend created a small intrusion into the flow stream; both of these differences from the original-design piping configuration created additional turbulence. Excessive turbulence in the flow stream creates cross-flows and eddy currents that can erode copper-nickel piping if the flow velocity is excessive.

Corrective Actions: All Unit 2 FCU motor cooler service water supply elbows were inspected and replaced during the refueling outage. The service water flow rates were reduced from 55-to-60 gpm to 25-to-30 gpm, which reduced the turbulence and erosion rates in the elbow joints. These corrective actions appear to have been effective, as there have been no additional leaks in the FCU service water lines since 2016.

Corrective Action References: CR-IP2-1998-06057, CR-IP2-2015-03550, CR-IP2-2015-05755, CR-IP2-2016-07188, and CR-IP2-2016-07271

Performance Assessment:

Performance Deficiency: Entergy did not ensure that measures were established to adequately control service water flow rates through the FCU motor cooler supply elbow joints and maintain these flow rates below vendor-specified limits on flow velocity. The excessive flow rates caused excessive turbulence in the elbow joints, which led to erosion of the copper-nickel elbows. Excessive flow eventually created through-wall leaks in an ASME class III piping system, which caused a breach in containment integrity and a safety system functional failure.

Screening: The inspectors determined that this self-revealing finding was within Entergy's ability to foresee and prevent. Entergy had identified that the FCU elbow joints were experiencing leaks in 2001, 2006, and 2008 but did not recognize the excessive service water flow condition. These previous leaks, although not directly caused by flow erosion, provided an opportunity to have identified the problem at an earlier date, before the flow erosion compromised the integrity of the FCU motor cooler piping elbows. Using IMC 0612, Appendix B (Issue Screening), the inspectors determined the performance deficiency was more than minor because it was associated with the design control attribute of the Barrier Integrity cornerstone, and it adversely affected the cornerstone objective of providing reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. Specifically, the FCU service water lines are the barrier between containment and the environment. A hole in the FCU service water lines during accident conditions when containment is pressurized could potentially result in the release of radioactive material into the Hudson River. These leaks represented a safety system functional failure of the containment barrier.

Significance: The inspectors assessed the significance of the finding using IMC 0609, Appendix A, Exhibit 3, and IMC 0609, Appendix H. Using Appendix A, the issue was referred to Appendix H because each FCU through-wall leak represented an open pathway in the physical integrity of reactor containment. Using Appendix H, the inspectors determined that the finding screened to Green. The finding was determined to be a Part B finding (affecting the large early release frequency but not affecting core damage frequency (CDF) because for each example, the minor reduction in service water flow due to the small leak rate did not compromise the capability of the FCUs to remove heat from containment. Using Table 4.1 and Figure 4.1 of IMC 0609, Appendix H, the finding screened to Green because CDF was not affected; the FCUs capability to remove heat from containment was not degraded. In addition, any release through the service water lines would be thoroughly scrubbed for particulates and Iodine.

Cross-Cutting Aspect: The inspectors did not assign a cross-cutting aspect for this issue because it was not indicative of current Entergy performance. The initial performance deficiency occurred in 1998, when the previous license-holder for Unit 2 did not complete an adequate design change review of replacement FCU joints. Entergy eventually took appropriate corrective action when they identified that the service water flow rates were in excess of the vendor-specified limits for the replacement FCU elbows.

Enforcement:

Violation: 10 CFR Part 50, Appendix B, Criteria III, "Design Control," requires, in part, that measures shall be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems, and components.

Contrary to the above, in 1998, the previous license-holder for Unit 2 decided to replace the original construction large-radius, butt-welded elbow joints in the service water return lines from the Unit 2 FCUs with a new design – a short radius, socket-weld fitting. These elbow joints were not properly evaluated for suitability of application. From 1999 for a period of 15 years, the service water flow rates through the modified FCU return piping were in excess of the vendor-specified flow velocity. This condition ultimately caused erosion of the elbow joints, which eventually caused through-wall leaks on an ASME class III piping system inside containment, leading to breaches of containment integrity and safety system functional failures.

Disposition: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy.

Containment Fan Cooler 24 Through-Wall Service Water Leak Caused by Inadequate Application of Epoxy Coating Resulting in Corrosion and a Safety System Functional Failure of Containment

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000247/2018003-03 Closed	H.13 - Consistent Process	71152

Introduction: A self-revealing Green NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified when Entergy did not ensure that activities affecting quality were prescribed by documented instructions or procedures, of a type appropriate to the circumstances, and that these activities were accomplished in accordance with these instructions, procedures or drawings. Furthermore, Entergy did not ensure that the instructions or procedures included appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. Specifically, Entergy did not ensure that the maintenance procedure for applying the internal Enecon™ epoxy coating to the 24 fan cooler main cooler supply line elbow was adequate to ensure proper epoxy coating adherence, and Entergy did not adequately verify the coating adherence prior to placing the elbow in service. This resulted in a through-wall leak and a safety system functional failure of containment.

Description: On November 21, 2016, a 15-gpm leak was identified on the 24 FCU main cooler service water supply line elbow inside containment, an ASME, Section XI, code class III boundary. The leaking component was a 3-inch carbon steel pipe elbow that had been previously coated with Enecon™ epoxy on the interior surfaces to prevent corrosion. The leak represented a direct release pathway from containment and was determined to be a safety system functional failure by Entergy. The cause of the leak was attributed to the failure of the Enecon™ epoxy coating to adequately adhere to the interior walls of the elbow (LER 05000247/2016010-00 and 05000247/2016010-01, Safety System Functional Failure

Due to an Inoperable Containment Caused by a Through-Wall Defect in a Service Water Supply Pipe Elbow to the 24 Fan Cooler Unit).

The FCU main cooler supply lines are made of 3-inch diameter, cement-lined carbon steel piping. The elbow was also made of carbon steel, but was internally coated with Enecon™ epoxy (not cement-lined) to prevent corrosion. Entergy's causal assessment attributed the cause of the through-wall leak to the compromise of the integrity of the Enecon™ coating. The Enecon™ coating had a small defect which allowed brackish service water to contact the carbon steel and corrode the metal. Entergy attributed the failure to an inadequate maintenance procedure, 0-SYS-409-GEN, "Belzona and Enecon™ Metal Repair Applications," which did not mandate detailed instructions or require post-coating quality control inspections. The FCU main cooler supply line was classified as ASME, Section XI, class III piping boundary.

The through-wall leak was detected by a rise in the waste holdup tank and containment sump levels. The leak was immediately isolated, and the 24 FCU was removed from service. The service water piping is part of the containment boundary, and the leak represented a safety system functional failure of containment. The leak was isolated within the outage time allowed per TS 3.6.1, and a non-emergency notification was made to the NRC for a safety system functional failure under 10 CFR 50.72(b)(3)(v) by Event Notification number 5238.

Corrective Actions: Maintenance procedure 0-SYS-409-GEN was revised, and all FCU main cooler supply line elbows were inspected during the last refueling outage. No other indications or coating failures were identified. The 24 FCU supply line elbow was weld-repaired and recoated with Enecon™ epoxy. The Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment," program was also revised to include a requirement to conduct and document a 100-percent internal lining visual inspection of all 3-inch FCU piping elbow spool pieces, when removed during future FCU cooling coil maintenance activities. These corrective actions appear to have been effective, as there have been no additional leaks in the FCU service water lines since 2016.

Corrective Action References: CR-IP2-2016-06934 and CR-IP2-2016-07271

Performance Assessment:

Performance Deficiency: Entergy failed to ensure that the procedure, 0-SYS-409-GEN, that controlled the application and quality control testing of Enecon™ epoxy coating, was adequate to ensure epoxy adherence to the safety-related pipe wall, as required, prior to placing the 24 FCU main cooler supply elbow in service.

Screening: The inspectors determined that this self-revealing finding was within Entergy's ability to foresee and prevent. Using IMC 0612, Appendix B (Issue Screening), the inspectors determined the performance deficiency was more than minor because it was associated with the design control attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone objective of providing reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. Specifically, the FCU service water line is the barrier between containment and the environment. A hole in the service water line during accident conditions when containment is pressurized could potentially result in the release of radioactive material into the Hudson River. The leak represented a safety system functional failure of the containment barrier.

Significance: The inspectors assessed the significance of the finding using IMC 0609, Appendix A, Exhibit 3, and IMC 0609, Appendix H. Using Appendix A, the issue was referred to Appendix H because the FCU through-wall leak represented an open pathway in the physical integrity of reactor containment. Using Appendix H, the inspectors determined that the finding screened to Green. The finding was determined to be a Part B finding (affecting the large early release frequency but not affecting CDF) because for each example, the minor reduction in service water flow due to the small leak rate did not compromise the capability of the FCUs to remove heat from containment. Using Table 4.1 and Figure 4.1 of IMC 0609, Appendix H, the finding screened to Green because CDF was not affected; the FCUs capability to remove heat from containment was not degraded. In addition, any release through the service water lines would be thoroughly scrubbed to reduce any radioactive particulates and iodine prior to release to the atmosphere.

Cross-Cutting Aspect: Human Performance, Consistent Process: Individuals use a consistent, systematic approach to make decisions. Risk insights are incorporated as appropriate. Specifically, Entergy did not ensure that the maintenance procedure appropriately considered the risk impact of a failure of the epoxy coating. They did not recognize that this process could affect the integrity of a safety-related component and was required to be controlled under the quality assurance program.

Enforcement:

Violation: 10 CFR Part 50, Appendix B, Criteria V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. Contrary to the above, Entergy did not provide an adequate procedure for the application of the Enecon™ epoxy coating and did not require an adequate quality control hold point inspection prior to placing the component in service.

Disposition: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy.

Inadequate Procedure for Turbine Startup Caused a Reactor Trip			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green NCV 05000247/2018003-04 Closed	H.13 – Consistent Process	71153

Introduction: A self-revealing Green NCV of TS 5.4.1, "Procedures," was identified because Entergy did not provide adequate guidance in 2-SOP-26.4, "Turbine Generator Startup, Synchronization, Voltage Control, and Shutdown." Specifically, Entergy did not provide adequate procedural direction to ensure the main turbine control oil stop valve 'Z' was in the correct position. As a result, the steam generator water level exceeded the trip setpoint for the main boiler feed pumps which led the operators to insert a manual reactor trip.

Description: On April 19, 2018, operators on Unit 2 were performing a startup of the main generator turbine to perform overspeed testing. Load limit 2 was selected to raise turbine speed, and load limit 1 was to be raised and maintained at a higher level to ensure that load

limit 2 was in control. However, unknown to operators, control oil valve 'Z' had been inadvertently closed, which removed load limit 2 from service, thereby placing load limit 1 in control. When load limit 1 was raised, the resulting increase in load limit 1 oil pressure caused the turbine stop and control valves to open rapidly. This led to an increase in steam flow from 0 to 1.0 million lbm per hour in 17 seconds with a corresponding increase in steam generator water levels from 38 percent to 73 percent. The steam generator water level increase caused a main feedwater isolation, a trip of the main boiler feed pumps, and a turbine trip. A reactor trip signal was inserted by operators in accordance with procedure 2-AOP-FW-1, "Loss of Feedwater," with reactor power at 8 percent and no main boiler feed pumps running.

Entergy performed a root cause evaluation and determined the direct cause of the event to be the misposition of the main turbine generator control oil valve 'Z'. A contributing cause was an inadequate process used to determine which equipment lineup check off lists are performed at the end of an outage. The turbine had undergone extensive maintenance during the refueling outage and there were numerous maintenance workers who worked on jobs in the near vicinity of the turbine front standard where the valve was located. Although there was no specific evidence of when the valve position was changed, a detailed search of work orders determined that the valve should not have been repositioned as the result of outage work. The decision to perform check off lists at the end of the outage that are not required is left to the judgement of operations management who did not adequately consider the risk of a valve being mispositioned in light of the extensive amount of work in the vicinity of the 'Z' valve.

Corrective Actions: Entergy repositioned the main turbine generator control oil 'Z' valve and revised procedure 2-SOP-26.4 to provide guidance to operators to check the position of the valve when starting the turbine generator. Entergy also revised IP-SMM-OU-104, "Shutdown Risk Assessment," to require a turbine control oil valve line up verification prior to startup following a refueling outage.

Corrective Action Reference: CR-IP2-2018-02806

Performance Assessment:

Performance Deficiency: The inspectors determined that not providing adequate guidance in procedure 2-SOP-26.4 was a performance deficiency that was within Entergy's ability to foresee and prevent and should have been corrected. Specifically, Entergy did not provide adequate procedural direction to ensure the turbine control oil valve was in the correct position before starting the turbine generator, which subsequently led to the operators manually inserting a reactor trip.

Screening: In accordance with IMC 0612, Appendix B (Issue Screening), this finding is more than minor because it is associated with the procedure quality attribute of the Initiating Events cornerstone and adversely affected the cornerstone objective of limiting the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the failure to provide adequate procedural direction to ensure the main turbine generator control oil valve was in the correct position before starting the main turbine generator led to operators placing the system in a configuration that increased the likelihood of events that upset plant stability of the main turbine generator to respond to load limit instrumentation.

Significance: The inspectors assessed the significance of this finding using IMC 0609.04, "Initial Characterization of Findings," and IMC 0609, Appendix A, "The Significance

Determination Process for Findings At-Power." This finding was determined to be of very low safety significance (Green) because the finding did not cause a reactor trip and the loss of

mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition.

Cross-Cutting Aspect: This finding had a cross-cutting aspect in the area of Human Performance, Consistent Process, because Entergy did not use a consistent, systematic approach to make decisions. Specifically, Entergy did not use an an adequate process to determine which equipment lineup check off lists are performed at the end of an outage. Had a consistent and adequate process for valve checks been established, rather than relying on judgement-based decision making, that process could have ensured that valves with a high trip risk would have been checked to ensure that they had not been inadvertently manipulated during outage activities.

Enforcement:

Violation: Unit 2 TS 5.4.1 requires that written procedures shall be established, implemented, and maintained as recommended by Appendix A of Regulatory Guide 1.33, Revision 2. Appendix A requires operating procedures for turbine startup. Specifically, procedure 2-SOP-26.4 did not provide adequate procedural direction to ensure the turbine control oil valve was in the correct position before starting the turbine generator, which subsequently led to the operators manually inserting a reactor trip.

Contrary to the above, Entergy did not adequately maintain operating procedure 2-SOP-26.4, "Turbine Generator Startup, Synchronization, Voltage Control, and Shutdown," by not including specific steps or precaution detail to ensure the turbine control oil valve was in the correct position before starting the turbine generator.

Disposition: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy. The disposition of this finding and associated violation closes LER 05000247/2018002-00.

Observations	**71152 Annual Follow-Up of Selected Issues**

Accelerated Neutron-Absorber (Boraflex) Degradation in the Unit 2 SFP Documented in CR-IP2-2014-04414

The inspectors reviewed CR-IP2-2014-04414, which documented Entergy's actions in response to BADGER testing (periodic testing of the Boraflex panels) that revealed panels in the Unit 2 SFP did not meet the requirements of the CAOR in Region 2-2, where Boraflex is credited. The description of the event, corrective actions, and enforcement aspects of this event are documented in the Inspection Results section, NCV 05000247/2018003-01.

The inspectors assessed Entergy's problem identification threshold, operability determination, problem analysis, extent-of-condition reviews, compensatory measures and/or administrative controls, and prioritization timeliness of corrective actions to determine whether Entergy was appropriately identifying, characterizing, and correcting problems associated with this issue and whether the planned or completed corrective actions were appropriate. The inspectors

compared the actions taken to the requirements of Entergy's CAP and 10 CFR Part 50, Appendix B, Criterion XVI, “Corrective Action.”

Entergy classified the issue (in addition to another five SFP Boraflex reviewed condition reports) as Category-C, which are “broke/fix” and require no formal evaluation. This is the lowest level of review specified by CAP procedure EN-LI-102, “Corrective Action Process.” The CAP procedural guidance for Category-C reactivity management events in place at the time classified a Category-C item as an “adverse condition classified as non-significant or a non-adverse condition” and as “a condition that has or would have minimal effect on the safe or reliable operation of the plant or personnel.” The guidance further stated that “a Category-C condition does not meet the definition of significant” and that “repeat occurrence of the problem is viewed as acceptable.”

The issue was minor because, although the condition reports were screened incorrectly and no evaluation was completed, Entergy performed all of the actions required by higher level classifications. Entergy performed vendor calculations and operability evaluations and completed all planned corrective actions. The inspectors noted that a trend of this type of misclassification has been identified in the semi-annual trends, as documented in quarterly resident reports. Entergy documented this issue in CR-IP2-2018-03306.

The inspectors reviewed extent of condition as part of this inspection. CR-IP2-2012-05966 described the results of categorization of fuel in the Unit 2 SFP. The Unit 2 TSs were non-conservative for Region 2-2 with respect to fuel assemblies greater than certain U235 enrichments, although fuel stored in the region still met 10 CFR 50.68 requirements and operability was maintained. The station planned a corrective action to perform an extent-of-condition review on Unit 3; however, no analysis or evaluation has been performed. This issue was initially documented in 2012. The inspectors identified that the corrective action was incorrectly closed to a lower-tier process and was therefore not tracked under the same requirements. EN-LI-102, “Corrective Action Process,” Revision 20, step 5.9[4]B states that the only process that a corrective action or (condition report) can be closed to is a work order with a priority of 1. Contrary to this requirement, Entergy personnel closed out the corrective action to an SFP management tracker, which is a lower-tier process. The issue was minor since the Unit 3 SFP does not use Boraflex as a neutron absorber and is not subject to the same degradation. Entergy documented this issue as CR-IP2-2018-03262.

Observations	**71152 Annual Follow-Up of Selected Issues**

Containment FCU Elbow Leaks: Units 2 and 3 experienced four service water leaks in FCU piping elbows in 2015 and 2016. The purpose of this inspection was to review the causal evaluations for potential common causes and corrective actions implemented as a result of these leaks.

Purpose: The FCUs are used to cool the containment air during power operations and during an event. The Unit 2 FCUs are supplied with service water as a cooling medium through 3-inch diameter cement-lined carbon steel piping to the main coolers (heat exchangers) and 2-inch copper-nickel lines to the motor coolers. Unit 3 has Type 904L stainless steel supply and return lines. These supply and return lines are classified as ASME, Section XI, code class III piping boundaries into containment. A leak from one of these FCU service water lines may constitute a breach of containment if the leak rate exceeds TS 3.6.1 allowable leak

rate (L_a) because the operating pressure in the service water lines is lower than the design pressure during a design basis accident inside containment.

LER Sequence: Entergy experienced a series of four leaks in the piping elbow joints that route the service water to the FCUs:

1. 24 FCU motor cooler return line on August 11, 2015 (LER 05000247/2015001-02)
2. 21 FCU motor cooler return line on December 20, 2015 (LER 05000247/2015004-00)
3. 31 FCU main cooler return line on November 3, 2016 (LER 05000286/2016001-00 and 05000286/2016001-01)
4. 24 FCU main cooler supply line on November 21, 2016 (LER 05000247/2016010-00 and 05000247/2016010-01)

Design Control: In 1998, Unit 2 experienced several through-wall leaks on the FCU motor cooler return lines. The former licensee replaced the large-radius 2-inch FCU butt-welded copper-nickel motor cooler return line elbows with socket welded elbows (CR-IP2-1998-06057). At the time, this modification was determined to be a like-for-like replacement, and the licensee did not use an engineering change package to ensure that the new design was functionally equivalent to the old design. However, the new design elbow had a much tighter bend radius and was installed using a socket-welded fitting rather than a butt-welded fitting. These differences in form factor created greater turbulence in the service water flow stream inside the new elbow joints. The elbows appeared to be eroded through-wall at the socket intrados (where the socket fitting weld is located). In 2016, while completing the causal assessment for leaks in the 21 and 24 FCUs, Entergy researched the specifications of the replacement elbows and discovered that the vendor-specified flow velocity was limited to 6 feet per second. This is equivalent to a service water flow rate of 17 gpm. The actual flow rate through the motor return line elbows was 55 to 60 gpm. As a result of over 15 years of excessive flow conditions, the copper-nickel elbows had been severely eroded by the turbulent flow stream leading to through-wall leaks. Entergy reduced the flow rate through these lines to 25 to 30 gpm and subsequently replaced all FCU motor cooler elbow fittings with new elbows during the 2016 outage. It was not possible to reduce the flow rate to under 17 gpm because this would not have provided sufficient cooling flow to the containment FCU motors to remove heat during accident conditions. However, it is expected that the new FCU elbows will adequately resist erosion and remain in service until 2020, when Unit 2 is scheduled to shut down.

24 FCU Motor Cooler Return Line Leak: When the first elbow leak (2 gpm) occurred in August 2015 on the 24 FCU motor cooler return line, Entergy assessed that the leak rate from containment to the environment would not be sufficiently high to exceed the TS 3.6.1 allowable leakage value, L_a, based on engineering judgment. The inspectors questioned this determination and issued a Green NCV (05000247/2015003-02 in Indian Point Integrated Inspection Report 05000247/2015003 and 05000286/2015003 (ADAMS Accession No. ML15316A083)) for failing to properly assess operability for the containment. In 2016, Entergy analyzed the limiting leak rate to the environment during design basis accident conditions and determined that any service water in-leakage rate greater than approximately 0.024 gpm into containment during normal operating conditions, where service water pressure is greater (at ~20 psig) than containment pressure (at ~0 psig), would exceed the TS allowable out-leakage rate, L_a, of 0.1 percent of containment air weight per day (77,677 cc/day). The leakage from containment into the environment under accident conditions (when containment is pressurized (at ~54 psig) higher than service water pressure

(at ~15 psig) operating at its design basis maximum load conditions) rendered containment inoperable and constituted a safety system functional failure.

21 FCU Motor Cooler Return Line Leak: Subsequently, when the second elbow leak (1 gpm) occurred on the 21 FCU motor cooler return line on December 20, 2015, Entergy took action to immediately isolate the leak and replaced the leaking elbow within the allowable outage time for TSs.

Violation: As a result of the leaks in 2015 on the 21 and 24 FCU motor return lines, the inspectors issued a Green NCV against 10 CFR Part 50, Appendix B, Criteria III, "Design Control" (NCV 05000247/2018003-02).

24 FCU Main Cooler Supply Line Leak: The Unit 2 FCU main cooler supply lines are 3-inch lines made of cement-lined carbon steel piping. The elbows in the supply line were coated with a layer of Enecon™ advanced polymer coating (not cement-lined) to prevent brackish water from the Hudson River from corroding the carbon steel. The flow balance is established to these lines by throttling the discharge valves to ensure proper flow rates. When a 10-gpm leak occurred on the 24 FCU main cooler supply line in November 2016, Entergy took appropriate actions to immediately isolate the line, submit an 8-hour prompt report under 10 CFR 50.72, and installed a clamp to stop the leakage until the elbow could be replaced during the next outage. When the leaking elbow was removed and inspected, there was a small defect in the Enecon™ coating that allowed Hudson River water to contact the carbon steel and corrode a small hole through the elbow. In the apparent casual analysis, Entergy reached the conclusion that a small defect in the Enecon™ coating was caused by the failure to properly apply the Enecon™ coating. Corrective actions included a change to the procedure 0-SYS-409-GEN, "Belzona and Enecon™ Metal Repair Applications," to ensure that the Enecon™ coating is properly applied and inspected to ensure that there are no defects in the coating application prior to installation and updating the qualification requirements for coating and lining inspections.

Violation: The inspectors issued a Green NCV against 10 CFR Part 50, Appendix B, Criteria V, "Procedures" (NCV 05000247/2018003-03).

31 FCU Main Cooler Supply Line Leak: The Unit 3 FCU main cooler supply lines are 3-inch lines made of Type 904L stainless steel pipe, which is not generally susceptible to corrosion by chlorides in brackish water. When a 0.16-gpm leak occurred on the 31 FCU main cooler supply line on November 3, 2016, Entergy took appropriate actions to immediately isolate the line, submit an 8-hour prompt report under 10 CFR 50.72, and install a clamp to stop the leakage until the elbow could be replaced during the next outage.

Operators noted that the containment sump water contained a higher-than-normal level of chlorides. Operator inspections of the FCU service water lines identified a 0.16-gpm through-wall leak on the 31 FCU main cooler return line on November 3, 2016. The FCU return lines on Unit 3 are 3 inches in diameter and are made of Type 904L stainless steel pipe, which is not generally susceptible to corrosion by chlorides in brackish water. However, the leak was in the heat-affected region of the elbow weld transition joint, and Entergy's causal analysis determined that the joint was likely not properly welded with the correct weld material. As a result, microbiologically-influenced corrosion corroded a pinhole through the heat-affected weld area. This failure was not associated with high-service water flow rates or lack of epoxy coating adherence. There have been very few through-wall leaks on the Unit 3 FCU service water lines since original construction, and there is little internal operating

experience with this mode of failure. The Type 904L stainless steel construction has generally made these lines impervious to corrosion. Entergy immediately isolated this leak and promptly reported it within 8 hours under 10 CFR 50.72. LER 05000286/2016001-01 (Revision 2) dated January 6, 2017, acknowledged that the condition was a safety system functional failure of containment.

There was no performance deficiency identified associated with the 31 FCU main cooler supply line leak. Entergy identified this through-wall leak as the result of deliberate observations of plant conditions during operator rounds and inspections. The leak rate was significantly smaller than the other FCU leaks. There was no violation identified. Entergy received code relief from the NRC to complete repairs.

Prompt Reporting Considerations: These four FCU leaks each constituted safety system functional failures for containment. Initially, Entergy used engineering judgment to determine that the small leak rates did not result in a failure of containment. However, in response to an NRC-issued prior violation, Green NCV 05000247/2015003-02 in Indian Point Integrated Inspection Report 05000247/2015003 and 05000286/2015003 (ADAMS Accession No. ML15316A083), Entergy conducted an engineering analysis of the effects of the service water leak rate on containment operability. The results of this analysis showed that any service water leakage that exceeded approximately 0.024 gpm would result in out-leakage from containment during design basis accident conditions in excess of TSs for containment operability and would result in a safety system functional failure. After discussing these results with the Entergy fleet, the decision was made to consider these piping failures as safety system functional failures of containment. These results were confirmed by an independent vendor analysis in August of 2018.

The 24 FCU motor cooler return line leak occurred on August 11, 2015, and was later reported as a safety system functional failure under LER 05000247/2015001-01 on September 15, 2016, over one year after the event occurred. Entergy reported the leak on the 21 FCU in LER 05000247/2015004-00 on February 18, 2016, 60 days after the event occurred, as a safety system functional failure. Although Entergy did not initially report either safety system functional failures within the 8-hour non-emergency prompt reporting requirement under 10 CFR 50.72(b)(3)(v)(C), they did ultimately report the underlying conditions under 10 CFR 50.73(a)(2)(v)(C) in their LER submittal after recognizing that the event or condition could have prevented the fulfillment of the safety function of structures or systems that are needed to control the release of radioactive material. Entergy's failure to promptly report the leaks under 10 CFR 50.72(b)(3)(v)(C) was considered to be a minor violation, in accordance with NRC enforcement guidance, because the conditions were eventually reported, and the NRC would not have taken any additional regulatory action had they been promptly reported within the 8-hour period. Entergy subsequently promptly reported the leaks on both the 24 FCU main cooler supply line (LER 05000247/2016010-00) and the 31 FCU main air cooler supply line (LER 05000286/2016001-00) as safety system functional failures.

There have been no additional service water through-wall leaks in the FCUs at either unit since 2016. As a result, the actions taken by Entergy appear to have been effective in correcting the underlying conditions.

EXIT MEETINGS AND DEBRIEFS

The inspectors confirmed that proprietary information was controlled to protect from public disclosure.

- On October 31, 2018, the inspectors presented the quarterly resident inspector inspection results to Mr. Anthony Vitale, Site Vice President and other members of the Entergy staff.

THIRD PARTY REVIEWS

The inspectors reviewed Institute of Nuclear Power Operations reports that were issued during the inspection period.

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
Indian Point Units 2 and 3, Technical Requirements Manual
Indian Point Units 2 and 3, Technical Specifications and Bases
Indian Point Units 2 and 3, Updated Final Safety Analysis Report

71111.04

Procedures
2-COL-10.1.1, Safety Injection System, Revision 36
3-COL-MS-1, Main and Reheat Steam System, Revision 28
3-COL-SI-001, Safety Injection System, Revision 44

Condition Reports (CR-IP3-)
2018-02889

71111.05A/Q

Procedures
EN-DC-161, Control of Combustibles, Revision 18

Condition Reports (CR-IP2-) (*initiated in response to inspection)
2017-03012 2018-03103 2018-04749*

Condition Reports (CR-IP3-) (*initiated in response to inspection)
2018-01894* 2018-01930* 2018-02527* 2018-02538* 2018-02889*

Maintenance Orders/Work Orders
WO 00477858

Miscellaneous
PFP-305, Safety Injection Pumps/Main Corridor – Primary Auxiliary Building, Revision 0
PFP-305A, Mini Containment and Pipe Tunnels – PAB/Fan House, Revision 0
PFP-306A, Containment Cooling Pumps, Primary Auxiliary Building, Revision 0
PFP-306B, Containment Spray Pumps, Primary Auxiliary Building, Revision 15
PFP-351, 480V Switchgear Room, Control Building, Revision 15
PFP-354A, Control Building Exhaust Fan Room and EDG Air Intake Enclosure, Revision 0
PFP-355, Lower Electrical Tunnel, Revision 5
PFP-356, Lower Electrical Penetration Area, Revision 0
PFP-357, Upper Electrical Tunnel, Revision 5
PFP-358, Upper Electrical Penetration Area, Revision 15
PFP-365, Auxiliary Feedwater Pump Room, Auxiliary Feedwater Building, Revision 15
PFP-366, Chemical Additive Room, Auxiliary Feedwater Building, Revision 13
PFP-367, Atmospheric Steam Dumps, Auxiliary Feedwater Building, Revision 5
PFP-367A, Auxiliary Feedwater Building, 64-Foot and 77-Foot Elevations, Revision 4

Transient Combustible Evaluations (*initiated in response to inspection)
18-054*

71111.07

Condition Reports (CR-IP2-)
2017-02865 2018-00892 2018-01346 2018-01979 2018-01981 2018-02068

Condition Reports (CR-IP3-)
2016-03337 2016-03346 2016-03350 2016-03360

Miscellaneous
Indian Point 89-13 Program Summary, February to March 2018

71111.11

Procedures
2-AOP-FW1, Loss of Main Feedwater, Revision 15
2-E-0, Reactor Trip or Safety Injection, Revision 8
2-E-1, Loss of Reactor or Secondary Coolant, Revision 4
2-ES-1.3, Transfer to Cold Leg Recirculation, Revision 9
2-ES-1.4, Transfer to Hot Leg Recirculation, Revision 3
2-FR-P.1, Response to Imminent Pressurized Thermal Shock, Revision 5
3-POP-1.2, Reactor Startup, Revision 58
3-POP-1.3, Plant Startup from Zero to 45 Percent Power, Revision 69
3-POP-2.1, Operation at Greater than 45 Percent Power, Revision 67
3-SOP-CVCS-003, Reactor Coolant System Boron Concentration Control, Revision 43

Condition Reports (CR-IP2-) (*initiated in response to inspection)
2018-04543 2018-04544 2018-04545 2018-04546 2018-04547 2018-04548

71111.12

Procedures
EN-DC-315, Flow Accelerated Corrosion Program, Revision 13

Drawings
9321-F-20233, Flow Diagram – Moisture Separator and Reheater Drains and Vents, Sheet 1, Revision 26
9321-F-20233, Flow Diagram – Moisture Separator and Reheater Drains and Vents, Sheet 2, Revision 15

Miscellaneous
IP3-RPT-HD-01922, Maintenance Rule Basis Document for System F40-0083 – Heater Drains, Moisture Separator Drains, and Vents System, Revision 0
IP3-RPT-Mult-01921, Maintenance Rule Basis Document for Plant Level Performance, Revision 1

71111.13

Procedures
EN-OP-119, Protected Equipment Postings, Revision 9
EN-WM-104, On Line Risk Assessment, Revision 18
IP-SMM-OP-104, Offsite Power Continuous Monitoring and Notification, Revision 13

Condition Reports (CR-IP2-)
2018-03714 2018-03779 2018-02021

Condition Reports (CR-IP3-) (*initiated in response to inspection)
2018-02339 2018-02388*

Miscellaneous
Unit 2 Equipment Out of Service on Line Risk Assessment for August 14, 2018
Unit 2 Protected Equipment Posting Log Sheet for August 14, 2018
Unit 3 Equipment Out of Service on Line Risk Assessment for August 13, 2018
Unit 3 Equipment Out of Service on Line Risk Assessment for August 16, 2018
Unit 3 Unit Log for August 13, 2018

71111.15

Procedures
2-PT-V67A, Essential Service Water Header Flow Balance, Revision 5
EN-HU-104, Technical Task Rigor and Risk, Attachment 9.6, Risk Rank Determination Form, dated September 7, 2018
EN-MA-145, Maintenance Standard for Torque Applications, Revision 9
ENN-MS-S-009-IP3, Attachment 2, Unit 3 Mission Time System List, Revision 2

Condition Reports (CR-IP2-) (*initiated in response to inspection)
2018-04258 2018-04269 2018-05048 2018-05069 2018-05504*

Condition Reports (CR-IP3-) (*initiated in response to inspection)
2012-03262 2018-01894 2018-02508 2018-02638 2018-02660

Maintenance Orders/Work Orders
WO 00501433 WO 05817384

Drawings
9321-F-27353, Flow Diagram Safety Injection System Sheet 1, Revision 44
9321-F-27503, Flow Diagram Safety Injection System Sheet 2, Revision 58
IP3-299-0007, Boron Injection Tank, Revision 1

Miscellaneous
Critical Decision Paper for MCA Testing
SWP 36 and RHR 31 Motor Test Summaries
Training Lesson Plan on ECCS

71111.18

Procedures
3-PT-R127, BIT Leakage Test, Revision 10 (with TPC)

Engineering Evaluations
EC-79305, Removal of BIT Thermowell Nozzles TW-917 and TW-918, Revision 0

71111.19

Procedures
2-PMP-004-SWS, Johnston (18EC - S Stage) Service Water Pump and Motor Replacement, Revision 13
2-PT-Q026B, 22 Service Water Pump, Revision 22
3-BKR-016-CUB, Westinghouse 480V Switchgear Cubicle Inspection and Cleaning, Revision 14
3-MCC-001-ELC, Westinghouse 480 Volt MCC Maintenance Inspection, Revision 48
3-SOP-C-002, Condensate System Operation, Revision 55
3-SOP-EL-004, Electrical Equipment Operations, Revision 42

Condition Reports (CR-IP2-) (*initiated in response to inspection)
2018-05003 2018-05039

Condition Reports (CR-IP3-) (*initiated in response to inspection)
2018-02126 2018-02157 2018-02158 2018-02474 2018-02481

Maintenance Orders/Work Orders
WO 00508289 WO 51445346 WO 52710250 WO 52711072
WO 52712979 WO 52774512 WO 52813355

Miscellaneous
Operational Decision-Making Issue, 32 Condensate Pump Leakage, Revision 1

71111.22

Procedures
0-EDG-407-ELC, Emergency and Appendix R Diesel Generator Engine Analysis/Inspection, Revision 8
2-PT-M021A, Emergency Diesel Generator 21 Load Test, Revision 33
2-PT-Q013-DS021, Valve 866C Inservice Test Data Sheet, Revision 20
2-PT-Q013-DS022, Valve 866D Inservice Test Data Sheet, Revision 20
2-PT-Q013-DS038, Valve 869B Inservice Test Data Sheet, Revision 38
2-PT-Q024A, 21 Emergency Diesel Generator Fuel Oil Transfer Pump, Revision 13
2-PT-Q035B, 22 Containment Spray Pump Test, Revision 19
3-PT-2Y001A, 31 Diesel Generator Overspeed Trip Test, Revision 6
3-PT-M079A, 21 EDG Functional Test, Revision 54
3-PT-M079A, 31 EDG Functional Test, Revision 54
3-PT-M079C, 33 EDG Functional Test, Revision 59

Condition Reports (CR-IP2-)
2018-04621 2018-04623 2018-04625 2018-04630

Condition Reports (CR-IP3-)
2017-03659 2018-00354 2018-02193 2018-02531*

Maintenance Orders/Work Orders
WO 00398191-Y WO 52683136 WO 52712053 WO 52821039-01
WO 52821039-01 WO 52828697 WO 52830515 WO 52830521
WO 53828692

Miscellaneous
Fairbanks Morse Guidance Regarding Operation of Alco 251 Engines Under Low Load Conditions, dated March 7, 2000

71114.06

Condition Reports (CR-IP2-) (*initiated in response to inspection)
2018-04521 2018-04544 2018-04546 2018-04547 2018-04548 2018-04571

Miscellaneous
IPEC ERO Team "D" Site Drill After Action Drill Report/Improvement Plan, dated August 1, 2018

71124.03

Procedures
EN-RP-501, Respiratory Protection Program, Revision 5
EN-RP-502, Inspection and Maintenance of Respiratory Protection Equipment, Revision 10
EN-RP-502-02, Flow Testing MSA Breathing Apparatus, Revision 0
EN-RP-503, Selection, Issue, and Use of Respiratory Protection Equipment, Revision 7
EN-RP-504, Breathing Air, Revision 4

Condition Reports (CR-IP2-)
2016-05509 2017-00845 2017-00912 2017-01230 2017-03100 2017-04486
2018-02499

Condition Reports (CR-IP3-)
2018-01561

Miscellaneous
IP-RPT-16-0047, 2016 Groundwater Project Units 2 and 3 Floor Drains Flow Verification and Current Condition, Revision 2
IP3LO-2016-00121, RP Program Annual Review for 2016, per 10 CFR 20.1101(c), dated June 8, 2017
Passive Monitor Sensitivity Tests, June 2016

71151

Condition Reports (CR-IP2-) (*initiated in response to inspection)
2018-04646 2018-04977

71152

Procedures
0-NF-203, Internal Transfer of Fuel Assemblies and Inserts, Revisions 17 to 21
0-SYS-409-GEN, Belzona and Enecon™ Metal Repair Applications, Revision 6
EN-DC-149R10-160804, Racklife Projections to January 2017 for Badger Testing
EN-LI-102, Corrective Action Process, Revisions 17, 20, 23, and 27
IP-RPT-15-00023, Best Estimate K for Indian Point Unit 2 Spent Fuel Pool, Revision 0
IP-SMM-AD-102, IPEC Implementing Procedure Preparation, Review and Approval, Revision15
NET-28091-000-01, Calculations to Support Loading Rules for Assemblies at Interfaces in the Indian Point U2 Spent Fuel Pool, Revision 0
PI-AA-125, Corrective Action Program Procedure, Revision 8
PI-AA-125-1003, Corrective Action Program Evaluation Manual, Revision 4

Condition Reports (CR-HQN)
2011-00267

Condition Reports (CR-IP2-) (*initiated in response to inspection)
1998-06507 2012-01141 2012-05966 2013-03676 2014-00776 2014-04414
2016-01505 2016-04959 2018-03262* 2018-03306* 2018-03316* 2018-03889*

Miscellaneous
Indian Point Unit 2 Technical Specifications
Indian Point Unit 2 UFSAR
Letter from John P. Boska to Michael A. Balduzzi, Indian Point Nuclear Generating Unit Nos. 2 and 3 – Conforming License Amendments to Incorporate the Mitigation Strategies Required by Section B.5.b of Commission Order EA-02-026, dated July 11, 2007
Letter from M. Harris (NETCO) to G. Delfini (IPEC), Extent of Condition of IP2 Boraflex Degradation and Guidance for Future Moves, dated February 25, 2014
Letter from M. Harris (NETCO) to G. Delfini (IPEC), Racklife Projections through July 2016 and Comparison to COAR Assumed Uniform Distribution and Panel Proximity for Region 2-2, dated May 20, 2016
NRC Information Notice 2011-03: Non-Conservative Critical Safety Analyses for Fuel Storage, dated February 16, 2011
Spent Fuel Pool Maps for Degraded Panels, July 2018

71153

Condition Reports (CR-IP2-) (*initiated in response to inspection)
2015-03550 2015-05755 2016-06934 2016-07188 2016-0727 2018-02806

Condition Reports (CR-IP3-) (*initiated in response to inspection)
2016-03607 2017-03513 2017-03515 2017-03555 2018-02265 2018-02266
2018-02267

Maintenance Orders/Work Orders
WO 00498158 WO 52568740 WO 52708009 WO 52709908

Calculations
IP-CALC-04-01420, FCX-0538, Calculation of Effective Degradation Years for the IP2 Reactor Vessel Head by 2R18

Engineering Evaluations
IP2-SW-DBD, Service Water System, Revision 2
LPI Report F15565-R-001, Evaluation of Wall Thinning of Fan Cooler Unit Elbow – Indian Point Energy Center – Unit 2, Revision 2, dated July 22, 2016
LPI Report LF170507, Evaluation of Service Water Type 904L Pipe Weld Pinhole Leak, 31 FCUY Return in Containment, Revision 1
Lucius Pitkin, Inc., Analysis on Relief Valve CD-123, Contract Document Number 10520627, Serial Number D00987-0006

Miscellaneous
IPP-R23-OH01-03-01, Ultrasonic Report Data Sheet
IPP-R23-PEN3ET-SCAN2-12940, Eddy Current Report Data Sheet
LER 05000247/2015001-02, Technical Specification Prohibited Condition Due to an Inoperable Containment Caused by a Service Water Pipe Leak with a Flaw Size That Results in Exceeding the Allowed Leakage Rate for Containment
LER 05000247/2015004-00, Safety System Functional Failure Due to an Inoperable Containment Caused by a Flawed Elbow on the 21 Fan Cooler Unit Service Water Motor Cooling Return Pipe
LER 05000247/2016010-00 and 05000247/2016010-01, Safety System Functional Failure Due to an Inoperable Containment Caused by a Through-Wall Defect in a Service Water Supply Pipe Elbow to the 24 Fan Cooler Unit
LER 05000247/2018001-00, Penetration Indications Discovered During Reactor Pressure Vessel Head Inspection
LER 05000247/2018002-00, Manual Reactor Trip Due to Trip of Both Main Boiler Feedwater Pumps
LER 05000286/2016001-00 and 05000286/2016001-01, Safety System Functional Failure Due to an Inoperable Containment Caused by a Flaw on the 31 Fan Cooler Unit Service Water Return Coil Line Affecting Containment Integrity
LER 05000286/2017003-00, Condensate Storage Tank Declared Inoperable Per Technical Specification

60845

Procedures
0-FTR-402-GEN, STC Movement Between Unit 2 and Unit 3, Revision 6
0-RP-RWP-430, Radiological Controls for Inter-Unit Wet Fuel Transfer, Revision 2
2-FTR-001-GEN, Unit 2 STC Unloading Operations, Revision 15
3-FTR-003-GEN, Air Pad Operation for Unit 3, Revision 3
3-FTR-006-GEN, Unit 3 STC Loading and Sealing Operations, Revision 21
3-NF-322, Fuel Selection for Wet Fuel Transfer in the Shielded Transfer Canister, Revision 3

Miscellaneous
Engineering Report No. IP-RPT-1 1-00032, Entergy Nuclear Engineering Report Title: Licensing Report on the Inter-Unit Transfer of Spent Nuclear Fuel at the Indian Point Energy Center (Non-Proprietary), Revision 5, dated December 17, 2017