



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

**REGION IV  
1600 EAST LAMAR BOULEVARD  
ARLINGTON, TEXAS 76011-4511**

April 30, 2019

Mr. John Dinelli  
Site Vice President  
Entergy Operations, Inc.  
17265 River Road  
Killona, LA 70057

**SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 – NRC INTEGRATED  
INSPECTION REPORT 05000382/2019001**

Dear Mr. Dinelli:

On March 31, 2019, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Waterford Steam Electric Station, Unit 3. On April 11, 2019, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

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

If you contest the violations or significance of the violations documented in this inspection report, 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 IV; the Director, Office of Enforcement; and the NRC resident inspector at Waterford Steam Electric Station, Unit 3.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region IV; and the NRC resident inspector at Waterford Steam Electric Station, Unit 3.

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

Sincerely,

*/RA/*

Neil F. O'Keefe, Chief  
Reactor Projects Branch D

Docket No. 05000382  
License No. NPF-38

Enclosure:

Inspection Report 05000382/2019001  
w/attachments:

1. Request for Information (Inservice Inspection)
2. Request for Information (Occupational Radiation Safety Inspection)

**U.S. NUCLEAR REGULATORY COMMISSION  
Inspection Report**

Docket Number(s): 05000382

License Number(s): NPF-38

Report Number(s): 05000382/2019001

Enterprise Identifier: I-2019-001-0002

Licensee: Entergy Operations, Inc.

Facility: Waterford Steam Electric Station, Unit 3

Location: 17265 River Road  
Killona, LA 70057

Inspection Dates: January 1, 2019 to March 31, 2019

Inspectors: B. Baca, Health Physicist  
N. Greene, PhD, Senior Health Physicist  
R. Kopriva, Senior Reactor Inspector  
J. Melfi, Acting Resident Inspector  
F. Ramirez, Senior Resident Inspector  
C. Speer, Acting Senior Resident Inspector

Approved By: Neil F. O'Keefe, Chief  
Reactor Projects Branch D  
Division of Reactor Projects

## SUMMARY

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

### List of Findings and Violations

Failure to Lock a Reactor Coolant System Drain Valve Results in Loss of Inventory during Lowered Inventory Conditions			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Initiating Events	Green NCV 05000382/2019001-01 Closed	[H.12] - Avoid Complacency	71111.13
<p>The inspectors identified Green non-cited violation of Technical Specification 6.8.1.a associated with the licensee’s failure to implement procedures for equipment control. Specifically, on January 7, 2019, the licensee failed to lock the boron management/reactor coolant system (RCS) level monitoring system isolation to reactor drain tank valve, BM-1071, when placing it into service as an RCS drain valve contrary to licensee Procedure OP-100-009, “Control of Valves and Breakers,” Revision 43. As a result, on January 10, 2019, personnel working in the area inadvertently opened BM-1071, resulting in a loss of RCS inventory during lowered inventory operations.</p>			
Inadequate Procedure Contributed to Damage to a Fuel Assembly			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000382/2019001-02 Closed	[P.3] - Resolution	71111.20
<p>The inspectors reviewed a self-revealed, Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” which occurred because procedures for handling spent fuel in the spent fuel pool (SFP) were not appropriate to the circumstances. Specifically, licensee’s procedure for placing fuel assemblies into cells in the SFP, RF-005-002, “Refueling Equipment Operation,” did not adequately verify that spent fuel would not be damaged during fuel movements. As a result, on January 21, 2019, when placing spent fuel assembly LAGA06 into the SFP cell LL30, it made contact with a deformed portion of the SFP cell and damaged the fuel assembly such that it was no longer acceptable for use in the core.</p>			

### Additional Tracking Items

Type	Issue number	Title	Report Section	Status
LER	05000382/2019-003-00	Relevant Indications Identified in Reactor Coolant Pump 1A and 2A Suction Drain Nozzle Dissimilar Metal Welds Resulting in the Condition of the Nuclear Power Plant, Including its Principal Safety Barriers, Being Seriously Degraded	71153	Closed

## PLANT STATUS

The Waterford Steam Electric Station, Unit 3, began the inspection period at 100 percent power. The plant was shut down on January 5, 2019, to begin Refueling Outage 22. On March 16, 2019, operators restarted the reactor startup, and the unit achieved full power on March 22, 2019. The unit remained at full 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 licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

## REACTOR SAFETY

### 71111.04 - Equipment Alignment

#### Partial Walkdown (IP Section 02.01) (4 Samples)

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

- (1) Shutdown cooling train A with train B out of service for maintenance on January 18, 2019
- (2) Spent fuel pool cooling train A during a period of heightened risk due to core offload on January 24, 2019
- (3) Emergency diesel generator train B with train A out of service for maintenance on February 7, 2019
- (4) Low pressure safety injection train B following system re-alignment on March 18, 2019

### 71111.05Q - Fire Protection

#### Quarterly Inspection (IP Section 03.01) (5 Samples)

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

- (1) Fire area RCB, reactor containment building general area, on January 9, 2019

- (2) Fire area RAB 2, heating and ventilation mechanical room, on January 14, 2019
- (3) Fire area RAB 39, general area, on January 14, 2019
- (4) Fire area NS-TB-001, +15' turbine generator building switchgear/east area, on February 27, 2019
- (5) Fire area NS-TB-002, +15' turbine generator building west area, on February 27, 2019

71111.08P - Inservice Inspection Activities (PWR)

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

The inspectors verified that the reactor coolant system boundary, steam generator tubes, reactor vessel internals, risk-significant piping system boundaries, and containment boundary are appropriately monitored for degradation and that repairs and replacements were appropriately fabricated, examined and accepted by reviewing the following activities from January 3, 2019, to March 22, 2019:

03.01.a - Nondestructive Examination and Welding Activities.

The Inspector directly observed or reviewed records of the following non-destructive examination activities:

(1) Magnetic Particle Examinations

- a) Reactor Coolant System. Support Skirt to Pressurizer Weld.  
Report No. ISI-MT-19-001.

(2) Ultrasonic Examinations

- a) Reactor Pressurizer. Pressurizer Safety Nozzle to Top Head Weld at 45°. Report No. ISI-UT-19-006.
- b) Reactor Pressurizer. Pressurizer Safety Nozzle to Top Head Weld at 135°. Report No. ISI-UT-19-007.
- c) Reactor Coolant System. Reactor coolant system Loop 1A Lower Cold Leg, nozzle to safe-end circumferential weld. Fully Encoded Phased Array Ultrasonic Examination of Dissimilar Metal Welds. One, unacceptable, axial planar flaw indication was identified. Report No. ISI-VE-19-009. Summary No. W3.89.21.001.
- d) Reactor Coolant System. Reactor coolant system Loop 2A Lower Cold Leg, nozzle to safe-end circumferential weld. Fully Encoded Phased Array Ultrasonic Examination of Dissimilar Metal Welds. One, unacceptable, axial planar flaw indication was identified. Report No. ISI-VE-19-013. Summary No. W3.89.21.006.
- e) Reactor Coolant System. Reactor coolant system Loop 1A Lower Cold Leg, nozzle to safe end circumferential weld. Component ID: 07-009-WOL. Report No. BOP-VE-19-002.

- f) Reactor Coolant System. Reactor coolant system Loop 2A Lower Cold Leg, nozzle to safe end circumferential weld. Component ID: 11-007-WOL. Report No. BOP-VE-19-003.
- g) Reactor Coolant System. Reactor coolant system Loop 1A Lower Cold Leg, safe end to 2 inch pipe weld. Component ID: 33-001-WOL. Report No. BOP-VE-19-004.
- h) Reactor Coolant System. Reactor coolant system Loop 2A Lower Cold Leg, safe end to 2 inch pipe weld. Component ID: 35-001-WOL. Report No. BOP-VE-19-005.

(3) Visual Examinations

- a) Moisture Barrier Inspection Inside Containment. Inner Moisture Barrier between Columns 1 and Columns 3. Report No. ISI-VT-19-003.
- b) Moisture Barrier Inspection Inside Containment. Inner Moisture Barrier between Columns 3 and Columns 5. Report No. ISI-VT-19-004.
- c) Moisture Barrier Inspection Inside Containment. Inner Moisture Barrier between Columns 5 and Columns 7. Report No. ISI-VT-19-005.
- d) Moisture Barrier Inspection Inside Containment. Inner Moisture Barrier between Columns 7 and Columns 9. Report No. ISI-VT-19-006.
- e) Moisture Barrier Inspection Inside Containment. Inner Moisture Barrier between Columns 11 and Columns 13. Report No. ISI-VT-19-008.
- f) Moisture Barrier Inspection Inside Containment. Inner Moisture Barrier between Columns 13 and Columns 15. Report No. ISI-VT-19-009.
- g) Moisture Barrier Inspection Inside Containment. Inner Moisture Barrier between Columns 15 and Columns 17. Report No. ISI-VT-19-010.
- h) Moisture Barrier Inspection Inside Containment. Inner Moisture Barrier between Columns 17 and Columns 19. Report No. ISI-VT-19-011.
- i) Moisture Barrier Inspection Inside Containment. Inner Moisture Barrier between Columns 19 and Columns 21. Report No. ISI-VT-19-012.
- j) Moisture Barrier Inspection Inside Containment. Inner Moisture Barrier between Columns 23 and Fuel Transfer Tunnel Shield Boundary. Report No. ISI-VT-19-014.
- k) Moisture Barrier Inspection Outside of Containment in Annulus. Moisture Barrier Inside Annulus 103<sup>0</sup> to 256<sup>0</sup> azimuth. Report No. ISI-VT-19-016.
- l) Moisture Barrier Inspection Outside of Containment in Annulus. Moisture Barrier Inside Annulus 207<sup>0</sup> to 360<sup>0</sup> azimuth. Report No. ISI-VT-19-017.



- m) Reactor Vessel Head Bolts. Bolted Connection Reactor Coolant MRCT0001 (Reactor Vessel Studs). Report No. ISI-VT-19-018.
- n) Main Steam. Moisture Separator Reheater Component ID: MSRR-0264A. Rigid Restraint Attachment Weld. Report No. ISI-VT-19-024.
- o) Main Steam. Moisture Separator Reheater Component ID: NSRR-0264. RAB Roof, Rigid Restraint. Report No. ISI-VT-19-025.
- p) Reactor Vessel Closure Head. Control Element Drive Mechanism Nozzles. Report No. BOP-VT-19-005.

The inspector directly observed or reviewed records of the following welding activities:

(1) Gas Tungsten Arc Weld – Manual

- a) Chemical Volume and Control System Valve Replacement. Component No. CVCMVAAA205 Valve.

(2) Gas Tungsten Arc Weld – Machine

- a) Reactor Coolant System. Weld Overlay. Reactor coolant system Loop 1A Lower Cold Leg, nozzle to safe-end circumferential weld. Component ID: 07-009-WOL.
- b) Reactor Coolant System. Weld Overlay. Reactor coolant system Loop 2A Lower Cold Leg, nozzle to safe-end circumferential weld. Component ID: 11-007-WOL.

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

The bare metal visual inspection of the reactor vessel upper head penetrations was not required to be performed during this outage as it had just been completed in Refueling Outage RF21. However, after performing a visual inspection on the reactor head for the initial boric acid walkdown and the required visual examination, VT-2, of the reactor head bolts, the inspector and licensee noted significant amounts of a dry, white, substance covering a significant area of the reactor head, flange, bolts, and control element drive mechanisms and nozzles. As a follow-up assessment of the condition identified in CR-WF3-2017-02567, a visual examination was performed on selected reactor head penetrations. This was based on a white substance on the reactor head attributed to a component cooling water leakage in RF21. This examination was performed in accordance with Entergy Procedure CEP-NDE-0955. General Electric Inspection Technologies performed a bare metal visual exam per Work Order No. 516245-04 and the examination results were documented in Report No. ISR-190112JS248. The examination coverage area included 360 degrees around the annulus of each penetration examined.

Chemical samples were taken to aid in identifying the source of leakage. Site chemical analysis results concluded the source of leakage was component cooling water, and the white residue was molybdates in the component cooling water system. Additional samples have been sent out for independent analysis. No evidence of nozzle leakage or active boron was identified during the examination. There was no discoloration,

corrosion, wastage, or staining that would represent active nozzle leakage. A light residue remains on the head, in the area of head vent piping due to access restrictions. The inspection results were acceptable.

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

17-WF3-0119	Condition Report # 17-4996	June 8, 2017
17-WF3-0120	Condition Report # 17-5233	June 19, 2017
17-WF3-0121	Condition Report # 17-5904	July 18, 2017
17-WF3-0122	Condition Report # 17-5906	July 18, 2017
17-WF3-0123	Condition Report # 17-6604	August 7, 2017
17-WF3-0124	Condition Report # 17-6643	August 8, 2017
17-WF3-0125	Condition Report # 17-6642	August 8, 2017
17-WF3-0126	Condition Report # 17-7115	August 28, 2017
17-WF3-0127	Condition Report # 17-07504	September 14, 2017
17-WF3-0128	Condition Report # 17-10007	December 12, 2017
18-WF3-0001	Condition Report # 18-0284	January 15, 2018
18-WF3-0002	Condition Report # 18-0376	January 20, 2018
18-WF3-0003	Condition Report # 18-0698	February 3, 2018
18-WF3-0004	Condition Report # 18-1219	March 1, 2018
18-WF3-0005	Condition Report # 18-1830	March 31, 2018
18-WF3-0006	Condition Report # 18-1490	March 14, 2018
18-WF3-0007	Condition Report # 18-1829	March 31, 2018
18-WF3-0008	Condition Report # 18-3372	June 14, 2018
18-WF3-0009	Condition Report # 18-3372	June 14, 2018
18-WF3-0010	Condition Report # 18-4272	July 31, 2018
18-WF3-0011	Condition Report # 18-4552	August 10, 2018
18-WF3-0012	Condition Report # 18-6352	November 11, 2018
18-WF3-0013	Condition Report # 18-6408	December 12, 2018

#### 03.01.d – Steam Generator Tube Examination Activities

1. The steam generator tube inspections were not required to be performed during this outage.

#### Identification and Resolution of Problems

The inspectors reviewed 60 condition reports which dealt with inservice inspection activities and found the corrective actions for inservice inspection issues were appropriate.

#### 71111.11Q - Licensed Operator Requalification Program and Licensed Operator Performance

##### Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (1 Sample)

The inspectors observed and evaluated licensed operator performance in the control room during plant shutdown and cooldown on January 5, 2019.

### Licensed Operator Requalification Training/Examinations (IP Section 03.02) (1 Sample)

The inspectors observed and evaluated licensed operator performance in the simulator during just in time startup training on March 8 and 10, 2019.

### 71111.12 - Maintenance Effectiveness

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

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

- (1) Containment building on February 20, 2019
- (2) Auxiliary component cooling water system on March 5, 2019

### 71111.13 - Maintenance Risk Assessments and Emergent Work Control

#### Risk Assessment and Management Sample (IP Section 03.01) (7 Samples)

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

- (1) Elevated risk due to reactor coolant system draining down to the reactor vessel flange for reactor head removal on January 9, 2019
- (2) Emergent work review due to unexpected lowering of reactor coolant system level during reduced inventory conditions on January 10, 2019
- (3) Elevated risk associated with lifting the reactor vessel head on January 11, 2019
- (4) Emergent work review due to discovery of a weld flaw associated with reactor coolant system loop 2A on January 22, 2019
- (5) Emergent work review due to the failure of the plant main computer on February 13, 2019
- (6) Emergent work review due to inadvertent lifting of a fuel assembly on February 7, 2019
- (7) Elevated risk due to reactor coolant draindown to the reactor vessel flange for reactor head installation on February 14, 2019

### 71111.15 - Operability Determinations and Functionality Assessments

#### Sample Selection (IP Section 02.01) (6 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) Operability determination associated with a weld flaw in reactor coolant system Loop 1A on January 18, 2019

- (2) Operability determination associated with startup transformer B unexpected test indications on January 28, 2019
- (3) Operability determination associated with failed containment coatings on January 29, 2019
- (4) Functionality assessment associated with excessive wear on fuel assembly upper end fitting guide posts and coil hold-down springs on February 12, 2019
- (5) Operability determination associated with cracks found in the shield building on February 26, 2019
- (6) Operability determination associated with slow open stroke times of the steam generator No. 2 atmospheric dump valve, on March 8, 2019

#### 71111.18 - Plant Modifications

##### Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (3 Samples)

The inspectors evaluated the following temporary or permanent modifications:

- (1) Temporary modification to connect loads equivalent to safety-related loads for testing of emergency diesel generator A on January 23, 2019
- (2) Permanent modification associated with ultimate heat sink motor control centers on February 14, 2019
- (3) Permanent modification associated with letdown inside containment isolation valve, CVC-103, on March 28, 2019

#### 71111.19 - Post Maintenance Testing

##### Post Maintenance Test Sample (IP Section 03.01) (6 Samples)

The inspectors evaluated the following post maintenance tests:

- (1) Component cooling water makeup pump B discharge check valve, CMU-510B, following disassembly for inspection on February 5, 2019
- (2) Containment sump pump inside containment isolation valve, SP-105, after limit switch replacement on February 6, 2019
- (3) Auxiliary feedwater pump flow control valves, EFW-223B and 229B, following system maintenance on February 7, 2019
- (4) Auxiliary component cooling water pump A following system maintenance on February 9, 2019

- (5) Low pressure safety injection pump A following system maintenance on February 12, 2019
- (6) Main steam isolation valve 2, MS-124B, following system maintenance on March 11, 2019

#### 71111.20 - Refueling and Other Outage Activities

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

The inspectors evaluated the licensee's performance during Refueling Outage 22 from January 5, 2019, to March 18, 2019.

#### 71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

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

Stroke time testing of Reactor Coolant Loop 2 shutdown cooling inside containment isolation valve, SI-405A, on January 5, 2019

##### In Service Testing (IST) (IP Section 03.01) (2 Samples)

- (1) Stroke time testing of component cooling water header B return from essential chiller isolation valve, CC-322B, on January 16, 2019
- (2) Stroke test of emergency feedwater header B check valve, EFW-2191B, on February 27, 2019

##### Routine Surveillance Testing (IP Section 03.01) (2 Samples)

- (1) Integrated test of emergency safety features and emergency diesel generator B on January 26, 2019
- (2) Containment integrated leak rate test on February 20, 2019

### **RADIATION SAFETY**

#### 71124.01 - Radiological Hazard Assessment and Exposure Controls

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

The inspectors evaluated licensee processes for monitoring and controlling contamination and radioactive material. The inspectors verified the following sealed sources are accounted for and are intact:

- The inspectors performed walk downs of the licensee's sealed sources, per the inventory provided, and had no regulatory concerns with the storage, labeling, or physical condition of the observed sources.

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

The inspectors evaluated risk-significant high radiation area and very high radiation area controls.

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

The inspectors evaluated instructions to workers including radiation work permits used to access high radiation areas:

Radiation work packages:

- RWP 20190702, Refuel 22: Disassembly of Reactor Head and All Associated Work Activities, Revision 0
- RWP 20190705, Refuel 22: Reassembly of Reactor Head and Associated Work Activities including Staging/Destaging of Equipment, Revision 0
- RWP 20190708, Refuel 22: ICI Removal/Installation/Cut Up of ICIs, Work on ICI Equipment and Replacement Swageloc Bodies, Revision 0
- RWP 20190724, Refuel 22: Waterford 3 Fuel Transfer System Maintenance and Repairs including Lower Cavity Decon Activities, Support Activities, HP Job Coverage and Surveys, Revision 0

Electronic alarming dosimeter alarms:

- No alarms of significance occurred during this period.

Labeling of containers:

- All containers observed had proper labeling.

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

The inspectors evaluated radiation worker performance and radiation protection technician proficiency.

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

The inspectors evaluated radiological hazards assessments and controls. The inspectors reviewed the following:

Radiological surveys:

- WF3-1901-0037, -35 RAB Hallway, January 2, 2019
- WF3-1901-0120, Radwaste Solidification Building, January 4, 2019

- WF3-1901-0121, FHB +46 Fuel Handling Area, January 4, 2019
- WF3-1901-0361, -11 Reactor Containment Building, January 8, 2019
- WF3-1901-0368, +46 Reactor Containment Building, January 8, 2019
- WF3-1901-0474, -4 Reactor Containment Building, January 9, 2019
- WF3-1901-0765, RAB +21 Drumming Station, January 14, 2019

Risk significant radiological work activities:

- RWP 20190702, Refuel 22: Disassembly of Reactor Head and All Associated Work Activities, Revision 0
- RWP 20190705, Refuel 22: Reassembly of Reactor Head and Associated Work Activities including Staging/Destaging of Equipment, Revision 0
- RWP 20190708, Refuel 22: ICI Removal/Installation/Cut Up of ICIs, Work on ICI Equipment and Replacement Swageloc Bodies, Revision 0

Air sample survey records:

- OL-050218-015, Air Sample: Fuel Pool Purification Pump Check Valve (FS-426) Inspection, May 2, 2018
- OL-110118-061, Air Sample: Welding Purification Ion Exchanger B Plug, November 1, 2018
- OL-121818-076, Air Sample: Chemistry Sampling of SDC B, December 18, 2018
- OL-010119-001, Air Sample: Safeguards 'A' Pump Room, January 1, 2019

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

The inspectors evaluated in-plant radiological conditions during facility walkdowns and observation of radiological work activities.

Radiological work package for areas with airborne radioactivity were reviewed via the following air sample surveys:

- OL-050218-015, Fuel Pool Purification Pump Check Valve, FS-426, Inspection, May 2, 2018
- OL-110118-061, Welding Purification Ion Exchanger B Plug, November 1, 2018
- OL-121818-076, Chemistry Sampling of shutdown cooling train B, December 18, 2018
- OL-010119-001, Safeguards 'A' Pump Room, January 1, 2019

## 71124.02 - Occupational ALARA Planning and Controls

### Implementation of ALARA and Radiological Work Controls (IP Section 02.03) (1 Sample)

The inspectors reviewed ALARA practices and radiological work controls by reviewing the following activities:

- RWP 20190613, Refuel 22: Alloy 600 Inspections in Containment and Support Activities including Decontamination and Preparation Support, Revision 0
- RWP 20190617, Refuel 22: Various Decontamination Activities in the Upper Reactor Cavity, Staging/Destaging including Change out of Tri-Nuc Filters and Underwater Vacuuming, Revision 0
- RWP 20190702, Refuel 22: Disassembly of Reactor Head and All Associated Work Activities, Revision 0
- RWP 20190708, Refuel 22: In Core Instrumentation (ICI) Removal/Installation/Cut up of ICIs, Work on ICI Equipment and Replacement Swageloc Bodies, Revision 0

### Radiation Worker Performance (IP Section 02.04) (1 Sample)

The inspectors evaluated radiation worker and radiation protection technician performance during the reactor head decontamination and disassembly, movement and cutting of in-core instrumentation, movement of the reactor upper guide structure, and Alloy 600 component inspection and testing.

## **OTHER ACTIVITIES – BASELINE**

### 71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

#### IE01: Unplanned Scrams per 7000 Critical Hours Sample (IP Section 02.01) (1 Sample)

January 1, 2018, through December 31, 2018

#### IE03: Unplanned Power Changes per 7000 Critical Hours Sample (IP Section 02.02) (1 Sample)

January 1, 2018, through December 31, 2018

#### IE04: Unplanned Scrams with Complications (USwC) Sample (IP Section 02.03) (1 Sample)

January 1, 2018, through December 31, 2018

#### OR01: Occupational Exposure Control Effectiveness Sample (IP Section 02.15) (1 Sample)

January 1, 2018, through December 31, 2018



PR01: Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual Radiological Effluent Occurrences (RETS/ODCM) Radiological Effluent Occurrences Sample. (IP Section 02.16) (1 Sample)

January 1, 2018, through December 31, 2018

71152 - Problem Identification and Resolution

Semiannual Trend Review (IP Section 02.02) (1 Sample)

The inspectors reviewed the licensee’s corrective action program for potential adverse trends that might be indicative of a more significant safety issue. The inspectors identified an observation related to a programmatic weakness in performing Maintenance Rule functional failure evaluations that is documented in the Inspections Results section below.

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

Event Report (IP Section 03.02) (1 Sample)

The inspectors evaluated the following licensee event reports (LERs):

- LER 05000382/2019-003-00, Relevant Indications Identified in Reactor Coolant Pump 1A and 2A Suction Drain Nozzle Dissimilar Metal Welds Resulting in the Condition of the Nuclear Power Plant, Including its Principal Safety Barriers, Being Seriously Degraded

The inspectors concluded that no violation of NRC requirements occurred.

**INSPECTION RESULTS**

Failure to Lock an RCS Drain Valve Results in Loss of Inventory during Lowered Inventory Conditions			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Initiating Events	Green NCV 05000382/2019001-01 Closed	[H.12] - Avoid Complacency	71111.13
The inspectors identified Green non-cited violation of Technical Specification 6.8.1.a associated with the licensee’s failure to implement procedures for equipment control. Specifically, on January 7, 2019, the licensee failed to lock the boron management/reactor coolant system (RCS) level monitoring system isolation to reactor drain tank valve, BM-1071, when placing it into service as an RCS drain valve contrary to licensee Procedure OP-100-009, “Control of Valves and Breakers,” Revision 43. As a result, on January 10, 2019, personnel working in the area inadvertently opened BM-1071, resulting in a loss of RCS inventory during lowered inventory operations.			
<u>Description:</u> On January 7, 2019, the licensee placed the reactor coolant system level monitoring system (RCSLMS) into service to support work during refueling outage 22. The RCSLMS provides redundant RCS level indication to operations personnel during outages			

when the RCS is not full. To place the RCSLMS into service, the normally-locked RCS hot leg 1 drain and drain isolation valves, RC-106 and RC-107, were opened and the boron management/RCSLMS isolation to reactor drain tank valve, BM-1071, was closed. Although BM-1071 was locked closed to prevent inadvertent mispositioning during the installation of the RCSLMS equipment, the locking mechanism was removed when the RCSLMS was placed into service.

On January 10, 2019, the licensee partially drained the RCS below the reactor vessel flange to remove the reactor vessel head. Control room operators established an RCS level control band of 18.88' to 19.5'. At 11:19 a.m., control room operators noticed RCS level dropping and a corresponding rise in reactor drain tank level. At 11:24 a.m., operators started charging pump A to restore RCS level. Indicated RCS level dropped from approximately 19' MSL to as low as 18.5', falling below the pre-prescribed band for RCS level control.

At 11:45 a.m., the licensee evacuated unnecessary personnel from the reactor containment building. At 11:51 a.m., the licensee entered OP-901-111, "Reactor Coolant System Leak," and OP-901-131, "Shutdown Cooling System Malfunction," to address the loss of inventory. At 12:16 p.m., the licensee began additional injection with high pressure safety injection pump A to restore RCS level more quickly. At 12:51 p.m., personnel dispatched to the reactor containment building to investigate the loss of level found BM-1071 open, which allowed RCS inventory to drain to the reactor drain tank. Operators closed BM-1071 to stop the loss of RCS inventory.

The licensee determined that a scaffolding crew working in the vicinity of BM-1071 partially opened the valve inadvertently, which led to the loss of RCS inventory. The licensee further determined that the pre-job brief and job site review for the scaffolding work did not identify that the risk-significant valve was in the area and was subject to potential inadvertent operation since it was located near the path to the job site, not at the job site. Additionally, the licensee found that licensee Procedure EN-OP-115-05, "Control of Components," was revised in December 2018 to require measures be used to prevent inadvertent operation of drain valves like BM-1071 in high traffic areas, but the revision to this corporate procedure was inadvertently not issued.

In their review of the event, the inspectors identified that licensee Procedure OP-100-009, "Control of Valves and Breakers," Revision 43, gave the licensee guidance for locking valves important to plant operations. Step 5.7.1.7 of OP-100-009 specifically lists "Reactor Coolant System vent and drain valves" as valves that should be locked. Procedure OP-100-009 was available to licensee personnel in their electronic system for accessing procedures, but it was not implemented to consider locking BM-1071 or similar valves in drain paths for the RCS to prevent inadvertent operation when the RCSLMS was placed into service.

In discussing the issue with licensee personnel, the inspectors found that the licensee only applied the OP-100-009 guidance to lock RCS vent and drain valves in the normal alignment. The licensee did not consider locking valves like BM-1071 that provide potential RCS vent and drain paths during temporary or off-normal alignments. However, the guidance contained in OP-100-009 is not limited to normal system alignments.

Corrective Action(s): The licensee's immediate corrective action was to place locking devices on or otherwise secure BM-1071 and other valves that provided an RCS drain path while the RCSLMS was aligned. The licensee's planned corrective actions include identifying valves in

the Reactor Containment Building that warrant additional controls such as locking devices to prevent inadvertent operation.

Corrective Action Reference(s): CR-WF3-2019-00513, CR-HQN-2019-00230, CR-WF3-2019-03986

Performance Assessment:

Performance Deficiency: The failure to follow procedure OP-100-009 and to lock drain Valve BM-1071 when placing RCSLMS into service was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Configuration Control attribute of the Initiating Events cornerstone. Specifically, the licensee did not lock BM-1071 to prevent inadvertent operation after aligning it as an RCS drain valve when placing RCSLMS into service. As a result, the valve was not protected from inadvertent opening when a scaffolding crew was working in the area. When the valve was inadvertently opened, it resulted in a loss of RCS inventory when the system was already in a reduced inventory condition.

Significance: The inspectors assessed the significance of the finding using Appendix G, "Shutdown Safety SDP." Using Appendix G, Attachment 1, Exhibit 2, "Initiating Events Screening Questions," the inspectors determined that the finding required a Phase 2 estimation because it resulted in leakage such that, if the leakage were undetected and/or unmitigated in 24 hours or less, it would cause the operating decay heat removal method to fail (e.g., level would drop below the hot leg suction of the low pressure safety injection pumps used for shutdown cooling).

Utilizing Inspection Manual Chapter 0609, Appendix G, Attachment 2, "Phase 2 Significance Determination Process Template for PWR During Shutdown," the senior reactor analyst conducted a Phase 2 approximation of the risk significance of the subject finding. The analyst made the following conclusions:

1. The finding was a precursor finding because it increased the likelihood that the operating RHR train would be lost;
2. The initiating event that best models the impact of the subject finding was a Loss of Reactor Inventory;
3. The plant operating state during the time that the finding impacted the plant was Plant Operating State 2, because water level was at reduced inventory (below the flange) and the pressurizer manway was removed; and
4. The outage was in the early time window, indicating that Plant Operating State 3 had not yet been entered for the outage.

The analyst performed the following steps from Appendix G, Attachment 2:

- Step 4.3.1: The analyst determined that the finding only impacted plant risk in Plant Operating State 2 and the Early Time Window.

Step 4.3.2: The analyst utilized Table 3, "Initiating Event Likelihood (IELs) for Loss of Inventory Precursors," to determine the estimated IEL for a loss of reactor inventory initiator. The applicable questions were answered as follows:

Time to RHR loss: Using the information provided, the analyst calculated that the drain rate during the event was approximately 1.6 feet per hour. This would have required approximately 9.8 hours to drain to midloop. Therefore, the time to loss of RHR pump suction was greater than 2 hours.

Was RCS level indication a reasonable reflection of RCS level? The analyst noted that while level indication was inaccurate during the drain, it continued to indicate a decreasing reactor water level that was greater than the actual loss of inventory. Therefore, in consultation with the resident inspector, the analyst answered this question, "YES."

Can leak path be readily identified within ½ time to loss of RHR? The analyst noted that under the actual conditions it took operators 92 minutes to identify and isolate the source of the leak. Therefore, the analyst answered this question, "YES."

Can drain path be isolated by at least one functional valve such that a train of RHR can be restarted? Because operators were able to isolate the drain path and maintain the RHR system running during the actual drain, the analyst answered this question, "YES."

Based on these four answers, Table 3 estimated the IEL as being in the magnitude of  $10^{-4}$ , or 4.

Step 4.3.3: In accordance with this step, the analyst used Worksheet 6, "SDP for a PWR Plant – Loss of Inventory in Plant Operational State 2 (RCS Vented) to perform the risk estimation.

The analyst determined the function credit for each top event in Worksheet 6.

Mitigation Credit for Loss of Reactor Inventory Initiator		
Top Event	Basis for Success Credit	Credit
Injection before Core Damage	There were multiple, diverse trains of injection available during the subject draining event. Also, level indication and core exit thermocouple output were available. The time to core damage was greater than 3 hours without injection. The analyst determined that this function was limited by operator error.	4
Terminate Leak Path before RWST Depletion	At least one valve was available to isolate the leak and this path would not prevent operation of decay heat removal. This provided an equipment credit of 3. The time to refueling water storage tank (RWST) depletion was significantly longer than 10 hours. Therefore, operator credit was 3.	3

Decay Heat Removal Recovery	All equipment necessary to vent an RHR pump and restart it before RWST depletion was available, including inlet and outlet temperature indication and RHR flow indication. The time to RWST depletion was greater than 10 hours. The analyst determined that this function was limited by operator error.	3
Borated Water Makeup to RWST	There was sufficient equipment available for operators to makeup to the RWST before RWST depletion and core damage, including RWST level indication and a low level alarm. The time to RWST depletion and subsequent core damage was greater than 13 hours. The analyst determined that this function was limited by operator error.	2

Using the initiating event likelihood and the mitigation credit documented above, the analyst quantified the results of the core damage sequences recorded on Worksheet 6. The following results were documented:

Worksheet 6 Results			
Core Damage Sequence	IEL	Mitigation Credit	Result
Loss of Reactor Inventory with Failure to Recover RHR and Failure to Makeup to the RWST before Core Damage	4	3 + 2	9
Loss of Reactor Inventory with Failure to Stop the Leak Before RWST Depletion and Failure to Makeup to the RSWT before Core Damage	4	3 + 2	9
Loss of Reactor Inventory with a Failure of RCS Injection Before Core Damage	4	4	8

Based on these results, the analyst determined that the change in core damage frequency associated with the finding was less than  $1 \times 10^{-7}$ . Therefore, the finding is of very low safety significance (Green).

Cross-cutting Aspect: H.12 - Avoid Complacency: Individuals recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Individuals implement appropriate error reduction tools. The finding had a cross-cutting aspect in the area of human performance associated with avoiding complacency because individuals did not recognize and plan for the possibility of mistakes, latent issues, and inherent risk even while expecting successful outcomes. Specifically, the licensee did not recognize the inherent risk of potentially mispositioning BM-1071 or other valves that could drain the RCS when changing from the normal RCS lineup and only applied guidance for locking valves to normal rather than off-normal equipment alignments.

**Enforcement:**

Violation: Technical Specification 6.8, "Procedures and Programs," Section 1.a, requires, in part, that procedures shall be established, implemented and maintained covering, the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2. Regulatory Guide 1.33, "Quality Assurance Program Requirements," Revision 2, Appendix A,

Section 1.c, requires that instructions be established for “Equipment control (e.g., locking and tagging).” The licensee established licensee procedure OP-100-009, “Control of Valves and Breakers,” Revision 43, to meet the Regulatory Guide 1.33 requirement. Step 5.7.1.7 of licensee Procedure OP-100-009 directs that “Reactor Coolant System vent and drain valves” should be locked.

Contrary to the above, on January 7, 2019, after installing temporary RCS level monitoring equipment as part of Refueling Outage 22, the licensee did not lock reactor coolant system drain valve BM-1071. As a result, on January 10, 2019, personnel working in the area inadvertently opened BM-1071, leading to an unexpected loss of RCS inventory during lowered inventory operations.

Enforcement Action: This violation is being treated as a Non-Cited Violation, consistent with Section 2.3.2 of the Enforcement Policy.

**Inadequate Procedure Contributed to Damage to a Fuel Assembly**

Cornerstone	Significance	Cross-cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000382/2019001-02 Closed	[P.3] - Resolution	71111.20

The inspectors reviewed a self-revealed, Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” which occurred because the licensee did not prescribe procedures for handling spent fuel in the spent fuel pool (SFP) that were appropriate to the circumstances. Specifically, licensee’s procedure for placing fuel assemblies into cells in the SFP, RF-005-002, “Refueling Equipment Operation,” was not appropriate to the circumstances because it did not ensure that spent fuel would not be damaged during fuel movements. As a result, on January 21, 2019, when placing spent fuel Assembly LAGA06 into the SFP cell LL30, it made contact with a deformed portion of the SFP cell and damaged the fuel assembly such that it was no longer acceptable for use in the core.

Description: On January 21, 2019, during Refueling Outage 22, the licensee attempted to place spent fuel assembly LAGA06 into SFP cell LL30. When lowering the fuel assembly into the cell, the SFP handling machine hoist stopped and an underload condition occurred. An overload condition occurred when the licensee attempted to raise the fuel assembly. After initial troubleshooting, the licensee moved the assembly laterally and was able to raise it smoothly without issue. The licensee then placed the assembly in an alternate SFP cell.

Subsequent inspection of LAGA06 identified damage on one face of the assembly. The licensee found damage on the bottom grid strap, on two fuel pins, and on the top grid. Although the assembly was intended to be reloaded into the core, the licensee determined LAGA06 was not suitable for continued operation. The licensee reconstituted the fuel pins into a new fuel assembly to address the damage prior to reloading the bundle in the core.

The licensee inspected SFP cell LL30 found damage to the top edge of one wall of the cell, which was bent inwards. The licensee determined that the deformation was the cause of the damage to LAGA06 when it was lowered into the fuel cell.

The licensee's fuel movements in the SFP are governed by Procedure RF-005-002, "Refueling Equipment Operation," Revision 341. Step 5.3.2.3.16 requires the licensee to "verify location is acceptable for insertion or removal of fuel assembly (i.e., little or no damage to the fuel rack)" when placing a fuel assembly into a SFP cell. The licensee's fuel handling personnel indicated that the procedural step is achieved with visual examinations from the SFP handling machine without the use of cameras or other tools. Procedure RF-005-002 does not provide any specific criteria, method, or other means for performing this verification.

The licensee previously identified multiple instances regarding fuel assemblies interacting with portions of the SFP cells:

- CR-WF3-2015-01763 documented damage found to cell NN31 discovered while placing a fuel assembly
- CR-WF3-2014-02346 documented damage found to cell EE30 discovered while placing a fuel assembly
- CR-WF3-2014-02206 documented damage found to cell RR36 discovered after placing a fuel assembly
- CR-WF3-2014-00610 documented the inability to remove a fuel assembly from cell XX37 due to rack damage

The inspectors reviewed the corrective actions from the previous instances and determined that in each case the licensee had not taken action to assure that the procedural requirements of RF-005-002 associated with moving fuel assemblies in the SFP were adequate prevent damage to the fuel assemblies.

Corrective Action(s): The licensee's immediate corrective actions were to procedurally prohibit SFP cell LL30 for use and to reconstitute fuel bundle LAGA06. The licensee's planned future corrective actions include revising RF-005-002 to require the use of a camera during movements in the SFP to aid in positioning of fuel assemblies prior to placing them into SFP cells to more easily identify conditions that could damage fuel assemblies. The licensee plans to also implement a task to perform a detailed inspection of SFP cells prior to each outage to identify pre-existing rack damage or other conditions that could damage fuel assemblies.

Corrective Action Reference(s): CR-WF3-2019-01244

Performance Assessment:

Performance Deficiency: The failure to prescribe procedures for placing spent fuel into SFP cells that were appropriate to the circumstances was a performance deficiency. Specifically, the procedure did not include adequate instructions to ensure that spent fuel rack would not damage the fuel prior to placing a bundle in the rack.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Procedure Quality attribute of the Barrier Integrity cornerstone. Specifically, the failure to prescribe procedures appropriate to the circumstances for handling spent fuel in the SFP resulted in damage to a fuel assembly.

Significance: The inspectors assessed the significance of the finding using Appendix A, "Significance Determination of Reactor Inspection Findings for At - Power Situations". Using Exhibit 3, "Barrier Integrity Screening Questions," Section D, "Spent Fuel Pool," the inspectors determined the finding to be of very low safety significance (Green), because the performance deficiency did not affect fuel pool temperature or level, did not affect neutron absorber capability or result in a fuel assembly being misplaced, and did not cause mechanical damage to fuel clad with a detectable release of radionuclides.

The inspectors were initially directed by IMC 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," to IMC 0609 Appendix G, "Shutdown Operations Significance Determination Process," to assess the significant of the finding. However, the inspectors did not find any applicable criteria to evaluate this issue in Appendix G. As allowed by IMC 0609, Appendix M, "Significance Determination Process Using Qualitative Criteria," the inspectors used alternate significance determination tools to assess the finding. Using IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power."

Cross-cutting Aspect: P.3 - Resolution: The organization takes effective corrective actions to address issues in a timely manner commensurate with their safety significance. The finding had a cross-cutting aspect in the area of Problem Identification and Resolution associated with resolution because the licensee did not take effective corrective actions to address issues in a timely manner commensurate with their safety significance. Specifically, the licensee has documented the potential for damaged fuel pool rack locations to interact with fuel assemblies multiple times in the past but did not ensure that the corrective actions taken were effective to prevent subsequent interactions between fuel assemblies and the spent fuel pool rack that could lead to fuel damage.

Enforcement:

Violation: Title 10 of the Code of Federal Regulations, Part 50, Appendix B, Criterion 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."

Contrary to the above, as of January 21, 2019, the licensee's procedure for placing spent fuel assemblies into spent fuel pool rack locations, an activity affecting quality, was not appropriate to the circumstances. Specifically, licensee Procedure RF-005-002, "Refueling Equipment Operation," Revision 341, did not contain adequate instructions to ensure that fuel rack locations were acceptable for insertion of spent fuel assemblies. Step 5.3.2.3.16 required refueling personnel to verify that spent fuel rack locations were "acceptable for insertion or removal of assembly. (i.e. little or no damage to the fuel rack)", but did not prescribe any means or criteria for making that determination. As a result, on January 21, 2019, when placing a spent fuel assembly LAGA06 into the spent fuel pool rack location LL30, the fuel assembly made contact with a deformed portion of the spent fuel pool rack and damaged the fuel assembly such that it was not in an acceptable condition for use in the core.

Enforcement Action: This violation is being treated as a Non-Cited Violation, consistent with Section 2.3.2 of the Enforcement Policy.



Observation	71152
<p>The inspectors identified an adverse trend involving Maintenance Rule function failure evaluations. As part of the Maintenance Rule program, the licensee established functional failure criteria for the containment function that included any failure of a containment isolation valve to meet its operational leakage limit or any failure that could prevent a containment isolation valve from closing. The inspectors identified three instances where containment isolation valves failed local leak rate testing, but those failures were not evaluated against the applicable functional failure criteria:</p> <ul style="list-style-type: none"> <li>• CR-WF3-2019-00982 documented a failed local leak rate test for the reactor coolant system loop one shutdown cooling system suction inside containment isolation valve and suction header pressure equalizing valve, SI-405B and SI-4052B</li> <li>• CR-WF3-2019-01281 documented a failed local leak rate test for the component cooling water return inside containment isolation valve backup air supply valve, SA-9085</li> <li>• CR-WF3-2019-01303 documented a failed local leak rate test for the containment annulus purge inside annulus and inside containment valves, CAP-103 and CAP-104</li> </ul> <p>For each failure identified above, the valves were evaluated against the maintenance rule functional failure criteria for the system they were explicitly assigned to (i.e., SI-405B was evaluated against the safety injection system criteria), but were not evaluated against the applicable containment building system criteria. After discussing the issue with the licensee, the inspectors found that the licensee did not establish any formal system to assure that equipment failures are evaluated against all applicable Maintenance Rule. Instead, condition reports are reviewed by system engineering personnel to perform functional failure reviews. It is left up to the engineers to determine which Maintenance Rule criteria apply through knowledge, experience, and judgement. In the case of the above condition reports, the system engineers repeatedly failed to recognize that the containment building criteria applied to the subject valves. This condition represented a programmatic weakness in the licensee's Maintenance Rule program. However, the inspectors noted that accounting for these functional failures would not result in the containment building system being reclassified from Maintenance Rule (a)(2) to (a)(1).</p> <p>The licensee captured the inspector's observation in condition report CR-WF3-2019-03069. The licensee's immediate corrective action was to perform functional failure determinations for the identified condition reports. The licensee also planned to take action to assess the extent of condition for potentially missed functional failure determinations and to address the potential programmatic weakness in their Maintenance Rule program.</p>	

## **EXIT MEETINGS AND DEBRIEFS**

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

- On January 11, 2019, the inspector presented the ISI inspection to Mr. J. Dinelli and other members of the licensee staff.
- On January 18, 2019, the inspector presented the baseline radiation safety inspection results to Mr. J. Dinelli and other members of the licensee staff.
- On April 2, 2019, the inspector presented the ISI re-exited to Mr. W. Steelman and other members of the licensee staff.
- On April 11, 2019, the inspector presented the quarterly resident inspector inspection results to Mr. J. Dinelli and other members of the licensee staff.

## DOCUMENTS REVIEWED

### 71111.04 – Equipment Alignment

Procedures Number	Title	Revision
OP-002-006	Fuel Pool Cooling and Purification	320
OP-009-002	Emergency Diesel Generator	348
OP-009-005	Shutdown Cooling	40
OP-009-008	Safety Injection System	41

### 71111.05 – Fire Protection

Procedures Number	Title	Revision
RCB-001	Waterford S.E.S Prefire Strategy RCB General Area	11
RAB 2-001	Waterford S.E.S Prefire Strategy Elev. +46.00 RAB(RCA) H&V Mechanical Room	13
RAB 39-001	Waterford S.E.S Prefire Strategy Elev. -35.00 RAB(RCA) General Area	13
NS-TB-001	Waterford S.E.S Prefire Strategy TB +15.00' East Including Turbine Building Switchgear, Feedwater Pump "B", Instrument and Station Air Compressors	4
NS-TB-002	Waterford S.E.S Prefire Strategy TB +15.00' West Including Feedwater Pump "A", Auxiliary Feedwater Pump, Main Lube Oil Storage Tank and Condensate Pump	3

71111.08 - Inservice Inspection Activities

Condition Reports

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CR-WF3-2017-02868	CR-WF3-2017-03650	CR-WF3-2017-00466	CR-WF3-2017-03503
CR-WF3-2017-03329	CR-WF3-2017-04039	CR-WF3-2017-03409	CR-WF3-2017-05007
CR-WF3-2017-06550	CR-WF3-2017-06956	CR-WF3-2017-07012	CR-WF3-2017-07366
CR-WF3-2017-09316	CR-WF3-2017-08962	CR-WF3-2017-07387	CR-WF3-2017-09286
CR-WF3-2017-07436	CR-WF3-2017-02767	CR-WF3-2017-08141	CR-WF3-2017-02768
CR-WF3-2017-01710	CR-WF3-2017-01674	CR-WF3-2017-00233	CR-WF3-2017-01790
CR-WF3-2017-00314	CR-WF3-2017-01791	CR-WF3-2017-00602	CR-WF3-2017-01964
CR-WF3-2017-00849	CR-WF3-2017-01971	CR-WF3-2017-00888	CR-WF3-2017-02323
CR-WF3-2017-01147	CR-WF3-2017-02544	CR-WF3-2017-01176	CR-WF3-2017-02596
CR-WF3-2017-01244	CR-WF3-2017-02696	CR-WF3-2017-01605	CR-WF3-2017-02698
CR-WF3-2018-01005	CR-WF3-2018-02367	CR-WF3-2018-03627	CR-WF3-2018-03946
CR-WF3-2018-05076	CR-WF3-2018-05157	CR-WF3-2018-05866	CR-WF3-2018-01858
CR-WF3-2018-04649	CR-WF3-2018-04663	CR-WF3-2018-04854	CR-WF3-2018-04908
CR-WF3-2018-05569	CR-WF3-2018-00290	CR-WF3-2018-00340	CR-WF3-2018-00459
CR-WF3-2018-00527	CR-WF3-2018-00558	CR-WF3-2018-00580	CR-WF3-2018-00808

Work Orders

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475217-01	480840	499227	480436	481611	52794849	480836
495866						

Boric Acid  
Evaluations

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Number	Title	Date
17-WF3-0119	Condition Report #17-4996	06/08/2017
17-WF3-0120	Condition Report #17-5233	06/19/2017
17-WF3-0121	Condition Report #17-5904	07/18/2017
17-WF3-0122	Condition Report #17-5906	07/18/2017
17-WF3-0123	Condition Report #17-6604	08/07/2017
17-WF3-0124	Condition Report #17-6643	08/08/2017
17-WF3-0125	Condition Report #17-6642	08/08/2017
17-WF3-0126	Condition Report #17-7115	08/28/2017
17-WF3-0127	Condition Report #17-07504	09/14/2017
17-WF3-0128	Condition Report #17-10007	12/12/2017

Boric Acid  
Evaluations

Number	Title	Date
18-WF3-0001	Condition Report #18-0284	01/15/2018
18-WF3-0002	Condition Report #18-0376	01/20/2018
18-WF3-0003	Condition Report #18-0698	02/03/2018
18-WF3-0004	Condition Report #18-1219	03/01/2018
18-WF3-0005	Condition Report #18-1830	03/31/2018
18-WF3-0006	Condition Report #18-1490	03/14/2018
18-WF3-0007	Condition Report #18-1829	03/31/2018
18-WF3-0008	Condition Report #18-3372	06/14/2018
18-WF3-0009	Condition Report #18-3372	06/14/2018
18-WF3-0010	Condition Report #18-4272	07/31/2018
18-WF3-0011	Condition Report #18-4552	08/10/2018
18-WF3-0012	Condition Report #18-6352	11/11/2018
18-WF3-0013	Condition Report #18-6408	12/12/2018

Calculations

Number	Title	Revision
ECM-19-001	Waterford 3 Cold Leg Drain Nozzle Weld Overlay Design Calculation	3

Drawings

Number	Title	Revision
1900073.510	Waterford Steam Electric Station, Unit 3, Cold Leg Drain Nozzle Weld Overlay Design	0
7-DH-22A Sht. 1	Large Pipe Isometric Decay Heat Removal to Reactor	14
7-DH-23 Sht. 1	Large Pipe Isometric Decay Heat Removal to Reactor	21
E-74470-761-001	Material Identification	5
E-74470-771-014	Primary Pipe Assembly	6

Engineering  
Change

Number	Title	Revision
EC-81233	Emergent RF22 Structural Weld Overlay (SWOL) repairs for two Cold Leg drain welds. (Ref: CR-WF3-2019-00967 and CR-WF3-2019-01041)	2

Procedures Number	Title	Revision
CEP-NDE-0404	Manual Ultrasonic Examination of Ferritic Piping Welds (ASME XI)	8
CEP-NDE-0423	Manual Ultrasonic Examination of Austenitic Piping Welds (ASME XI)	8
CEP-NDE-0497	Manual Ultrasonic Examination of Welds in Vessels (Non-App. VIII)	7
CEP-NDE-0504	Ultrasonic Examination of Small Bore Diameter Piping for Thermal Fatigue Damage	5
CEP-NDE-0641	Liquid Penetrant Examination (PT) for ASME Section XI	8
CEP-NDE-0731	Magnetic Particle Examination (MT) for ASME Section XI	6
CEP-NDE-0901	VT-1 Examination	6
CEP-NDE-0902	VT-2 Examination	8
CEP-NDE-0903	VT-3 Examination	6
CEP-NDE-0955	Visual Examination (VE) of Bare-Metal Surfaces	303
CEP-PT-001	ASME Section XI Pressure Testing Program	308
EN-DC-319	Boric Acid Corrosion Control Program (BACCP)	11
EN-DC-328	Entergy Nuclear Welding Program	4
EPRI-DMW-PA-1	Procedure for Manual Phased Array Ultrasonic Examination of Dissimilar Metal Welds	6
EPRI-WOL-PA-1	Procedure for Manual Phased Array Ultrasonic Examination of Weld Overlaid Similar and Dissimilar Metal Welds	4
LMT-07-PAUT-005	Performance of Phased Array Instrument Screen Height and amplitude Control Linearity Checks	1
LMT-08 EPRI-DMW-1	Procedure for Manual Phased Array Ultrasonic Examination of Dissimilar Metal Welds	0
LMT-08-EPRI-WOL-1	Procedure for Manual Phased Array Ultrasonic Examination of Weld Overlaid Similar and Dissimilar Metal Welds	0
LMT-08-PAUT-005	Performance of Phased Array Instrument Screen Height and Amplitude Control Linearity Checks	0
LMT-10-PAUT-002	Manual Phased Array Ultrasonic Examination and Austenitic and Ferritic Piping Welds	1
LMT-10-PAUT-007	Fully Encoded Phased Array Ultrasonic Examination of Dissimilar Metal Piping Welds	3
LMT-10-PAUT-011	Fully Encoded Phased Array Ultrasonic Examination of Weld Overlaid Similar and Dissimilar Metal Piping Welds	1
LMT-10-PAUT-019	Manual Phased Array Ultrasonic Examination of	0

Procedures Number	Title	Revision
	Dissimilar Metal Piping Welds	
LMT-08-PAUT-005	Performance of Phased Array Instrument Screen Height and Amplitude Control Linearity Checks	0
SEP-BAC-WF3-001	Waterford 3 Boric Acid Corrosion Control Program (BACCP) Program Section	2
SEP-ISI-104	Program Section for ASME Section XI, Division 1 WF3 Inservice Inspection Program	7
SEP-CISI-104	Program Section for ASME Section XI, Division 1 WF3 Containment Inservice Inspection Program	2
SEP-PT-WF3-001	Waterford 3 Inservice Inspection Pressure Testing (PT) Program Section	0

Miscellaneous Documents Number	Title	Date
LO-WLO-2012-00028	Self-Assessment. Pressure Testing Program	07/12/2012
LO-WLO-2012-00046	Self-Assessment. Snapshot Assessment of the Waterford 3 Welding and Section XI Repair/Replacement Programs.	10/05/2012
LO-WLO-2012-00078	Self-Assessment. RF22 WF3 Inservice Inspection Pre-NRC Inspection Assessment	09/28/2018

71111.11 – Licensed Operator Requalification Program and Licensed Operator Performance

Condition Reports

CR-WF3-2019-00367 CR-WF3-2019-00178

Procedures Number	Title	Revision
CE-002-002	Maintaining Condensate and Feedwater Chemistry	306
EN-DC-202	NEI 03-08 Materials Initiative Process	7
EN-DC-317	Steam Generator Program	10
NE-002-003	Post-Refueling Startup Testing Control	24
OP-002-005	Chemical and Volume Control	62
OP-002-005	Chemical and Volume Control	63
OP-003-003	Condensate	308
OP-003-035	Auxiliary Feedwater	310
OP-010-003	Plant Startup	347

Procedures Number	Title	Revision
OP-010-005	Plant Shutdown	334
OP-010-006	Outage Operations	332

71111.12 – Maintenance Effectiveness

Condition Reports

CR-WF3-2019-01814	CR-WF3-2019-01718	CR-WF3-2019-00982	CR-WF3-2019-00168
CR-WF3-2018-01993	CR-WF3-2017-03493	CR-WF3-2017-08203	CR-WF3-2019-03069
CR-WF3-2019-01303	CR-WF3-2019-01281		

Procedures Number	Title	Revision
EN-DC-203	Maintenance Rule Program	4
EN-DC-204	Maintenance Rule Scope and Basis	4
EN-DC-205	Maintenance Rule Monitoring	6
EN-DC-206	Maintenance Rule (A)(1) Process	3

71111.13 – Maintenance Risk and Emergent Work

Condition Reports

CR-WF3-2019-00336	CR-WF3-2019-00338	CR-WF3-2019-00520	CR-WF3-2019-01041
CR-WF3-2019-00518	CR-WF3-2019-00513	CR-HQN-2019-00230	

Procedures Number	Title	Revision
EN-HU-106	Procedure and Work Instruction Use and Adherence	7
EN-MA-119	Material Handling Program	33
EN-OP-115-05	Operation of Components	1
EN-OU-108	Shutdown Safety Management Program (SSMP)	9
MM-008-001	Inside Maintenance Access Hatch and Outside Maintenance Access Hatch Shield Door Opening, Inspection, and Closing	13
OI-037-000	Operation's Risk Assessment Guideline	313
OP-001-003	Reactor Coolant System Drain Down	319
OP-010-006	Outage Operations	32
OP-100-009	Control of Valves and Breakers	43
RF-001-009	Reactor Head	314



Procedures Number	Title	Revision
UNT-007-008	Control of Heavy and Critical Loads	321
UNT-007-008	Control of Heavy and Critical Loads	322

Miscellaneous Documents Number	Title	Date
	RF-22 Outage Report	01/05/2019

Calculations Number	Title	Revision
EC 23453	Waterford 3 RCS Time-to-Boil due to LOSDC at Various Levels and Temperature	0
ECS00-007	PSA-Study Calc – Basis for Qualitative Level 2, Eternal Events, and Non-PSA SSC Guidance	2

71111.15 – Operability Determination and Functionality Assessments

Condition Reports

CR-WF3-2019-00967	CR-WF3-2019-01304	CR-WF3-2019-01580	CR-WF3-2019-01826
CR-WF3-2019-01711	CR-WF3-2019-02638	CR-WF3-2019-02640	CR-WF3-2019-03025
CR-WF3-2019-03026			

Procedures Number	Title	Revision
EN-OP-104	Operability Determination Process	16

Miscellaneous Documents Number	Title	Revision
WF3-ME-09-00007	Flaw Evaluation of CE Design RCP Suction and Discharge, and Safety Injection Nozzle Dissimilar-Metal Welds	0

Vendor Documents Number	Title	Date
PE-19-14	Functionality Assessment of CE16NFG Upper End Fitting Guide Post and Coil Holddown Spring Wear As-Found Condition at Waterford Unit 3, End of Cycle 22	02/09/2019

71111.18 – Plant Modifications

Condition Reports

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CR-WF3-2018-01471 CR-WF3-2019-03302

Work Orders

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520785-15

Procedures Number	Title	Revision
EN-DC-136	Temporary Modifications	18
EN-DC-149	Acceptance of Vendor Documents	14

Miscellaneous Documents Number	Title	Revision or Date
EC 08996	Load Temporary 125KVA SUPS and Disable Shunt Trip on ID EBKR2572 for Surveillance Testing During OP-903-115 and OP-903-116	0
EC 74123	Computer/Security SUPS Upgrade (Parent)	0
4158549	Engineering Order 4158549	03/16/2019
EC-82101	Leak Repair CVC-103 Body to Bonnet	0

71111.19 – Post Maintenance Testing

Condition Reports

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CR-WF3-2019-00225 CR-WF3-2019-00234 CR-WF3-2019-03139 CR-WF3-2019-03140

Work Orders

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52780171 52496259 52776777 52813702

Procedures Number	Title	Revision
OP-903-014	Emergency Feedwater Flow Verification	314
OP-903-033	Cold Shutdown IST Valve Tests	52
OP-903-050	Component Cooling Water and Auxiliary Component Cooling Water Pump and Valve Operability Test	41
OP-903-119	Secondary Auxiliaries Quarterly ISI Valve Test	34
OP-903-121	Safety System Quarterly IST Operability Tests	19

## 71111.20 – Refueling and Outage Activities

### Condition Reports

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CR-WF3-2019-03370	CR-WF3-2019-00367	CR-WF3-2019-00178	CR-WF3-2015-01763
CR-WF3-2019-01244	CR-WF3-2015-08122	CR-WF3-2019-01341	CR-WF3-2019-01421
CR-WF3-2019-01459	CR-WF3-2019-01477		

### Procedures

Number	Title	Revision
EN-FAP-OU-001	Outage Position Fundamentals	2
EN-FAP-OU-105	Outage Execution	7
EN-OU-108	Shutdown Safety Management Program (SSMP)	9
EN-RE-302	PWR Reactivity Maneuver	5
NE-002-030	Initial Criticality	307
OI-041-000	Operations Outage Guide	17
OP-001-003	Reactor Coolant System Drain Down	319
OP-010-003	Plant Startup	347
OP-010-005	Plant Shutdown	334
OP-010-006	Outage Operations	331
PLG-009-014	Conduct of Planned Outages	315
RF-002-001	New Fuel Receipt	326
RF-005-001	Fuel Movement	321
RF-005-002	Refueling Equipment Operation	341

### Drawings

Number	Title	Revision
1564-8353	Refueling Machine Hoist Assembly	3
5817-14348, sheet 7	Hoist Fuel Hoist Box Assembly	0

## 71111.22 – Surveillance Testing

### Condition Reports

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CR-WF3-2019-00165	CR-WF3-2019-00880	CR-WF3-2019-01534	CR-WF3-2019-01535
CR-WF3-2019-01572	CR-WF3-2019-01524	CR-WF3-2019-01514	CR-WF3-2019-02208

## Work Orders

52550737

Procedures Number	Title	Revision
OP-903-027	Containment Closeout Inspection	305
OP-903-033	Cold Shutdown IST Valve Tests	52
OP-903-116	Train B Integrated Emergency Diesel Generator/Engineering Safety Features Test	47
OP-903-116	Train B Integrated Emergency Diesel Generator/Engineering Safety Features Test	48
PE-005-001	Containment Integrated Leak Rate Test	302
PE-005-001	Containment Integrated Leak Rate Test	303
PE-005-001	Containment Integrated Leak Rate Test	304

### Miscellaneous Documents

Number	Title	Date
	Waterford 3 2019 ILRT Test Report	03/2019
Letter W3F1-92-0473	Review of NRC Information Notice 92-20, "Inadequate Local Leak Rate Testing"	12/22/1992

## 71124.01 – Radiological Hazard Assessment and Exposure Controls

### Condition Reports

CR-WF3-2017-03340	CR-WF3-2018-00506	CR-WF3-2018-02332	CR-WF3-2018-02915
CR-WF3-2018-04095	CR-WF3-2018-04512	CR-WF3-2018-06188	CR-WF3-2018-06202
CR-WF3-2018-06296	CR-WF3-2019-00037	CR-WF3-2019-00513	CR-WF3-2019-00737
CR-WF3-2019-00869			

Procedures Number	Title	Revision
EN-LI-114	Regulatory Performance Indicator Process	12
EN-RE-220	PWR Control of Miscellaneous Material in the Spent Fuel Pool	03
EN-RP-100	Radiation Worker Expectations	12
EN-RP-101	Access Control for Radiologically Controlled Areas	15
EN-RP-108	Radiation Protection Posting	21
EN-RP-121	Radioactive Material Control	15
EN-RP-143	Source Control	13

#### Audits and Self-Assessments

Number	Title	Date
	Benchmark Report: Facility Visit, Tour, Observations at Catawba	05/24/2018
LO-WLO-2017-00070	Pre-NRC Self-Assessment: Radiation Safety – Public and Occupational – IP 71124.01 Access Control to Radiologically Significant Areas	12/06/2018

#### Radiation Work Permits

Number	Title	Revision
20190702	Refuel 22 – Disassembly of Reactor Head and All Associated Work Activities	00
20190705	Refuel 22 – Reassembly of Reactor Head and Associated Work Activities including Staging/Destaging of Equipment	00
20190708	Refuel 22 – ICI Removal/Installation/Cut Up of ICIs, Work on ICI Equipment and Replacement Swageloc Bodies	00
20190724	Refuel 22 – Waterford 3 Fuel Transfer System Maintenance and Repairs including Lower Cavity Decon Activities, Support Activities, HP Job Coverage and Surveys	00

#### Radiological Surveys

Number	Title	Date
WF3-1901-0037	-35 RAB Hallway	01/02/2019
WF3-1901-0120	Radwaste Solidification Building	01/04/2019
WF3-1901-0121	FHB +46 Fuel Handling Area	01/04/2019
WF3-1901-0361	-11 Reactor Containment Building	01/08/2019
WF3-1901-0368	+46 Reactor Containment Building	01/08/2019
WF3-1901-0474	-4 Reactor Containment Building	01/09/2019
WF3-1901-0765	RAB +21 Drumming Station	01/14/2019

#### Air Sample Surveys

Number	Title	Date
OL-050218-015	Air Sample: Fuel Pool Purification Pump Check Valve (FS-426) Inspection	05/02/2018
OL-110118-061	Air Sample: Welding Purification Ion Exchanger B Plug	11/01/2018
OL-121818-076	Air Sample: Chemistry Sampling of SDC B	12/18/2018
OL-010119-001	Air Sample: Safeguards 'A' Pump Room	01/01/2019

Miscellaneous Documents

Number	Title	Date
2016-2000	Waterford 3 STM Alarm Setpoint Evaluation	03/24/2016
	Comparison of Detection Limits Using Argos, Gem5, TEM and Pancake Probe	07/11/2017
WO 52798853-01	Semi-Annual Sealed Source Leak Test	06/12/2018
WO 52827432-01	Semi-Annual Sealed Source Leak Test	12/06/2018
NRC Form 748	NSTS Annual Inventory Reconciliation Form	01/01/2019
	Ready for Issue High, Locked High, and Very High Radiation Area Key Inventory	01/15-17/2019
	RF22 Rapid Trending Report	01/15-18/2019

71124.02 – Occupational ALARA Planning and Controls

Condition Reports

CR-WF3-2018-5439	CR-WF3-2018-5568	CR-WF3-2018-5720	CR-WF3-2018-5780
CR-WF3-2018-6299	CR-WF3-2018-0772		

Procedures

Number	Title	Revision
EN-RP-102	Radiological Control	6
EN-RP-105	Radiological Work Permits	18
EN-RP-110	ALARA Program	14
EN-RP-110-02	Elemental Cobalt Sampling	0
EN-RP-110-03	Collective Radiation Exposure (CRE) Reduction Guidelines	4
EN-RP-110-04	Radiation Protection Risk Assessment Process	7
EN-RP-110-06	Outage Dose Estimating and Tracking	1
HP-001-114	Control of Temporary Shielding	17

Radiation Work Permits, ALARA Planning, In-Progress Reviews

Number	Title	Revision
20190401	REFUEL 22 – Air Operated Valve (AOV)/Motor Operated Valve(MOV) Valve Group Contaminated and Clean System Valve Work Outside the Reactor Containment Building	0
20190613	REFUEL 22 - Alloy 600 Inspections in Containment and support activities including Decontamination and Preparation Support	0
20190617	REFUEL 22 - Various decon activities in the Upper Reactor Cavity, Staging/Destaging including Change out of Tri-Nuc Filters and	0

Radiation Work Permits, ALARA Planning, In-Progress Reviews

Number	Title	Revision
	Underwater Vacuuming. NO Entry into any posted Locked High Radiation Areas	
20190702	REFUEL 22 - Disassembly of Reactor Head and All Associated Work Activities	0
20190705	REFUEL 22 - Reassembly of Reactor Head and Associated Work Activities including Staging/Destaging of Equipment	0
20190724	REFUEL 22 - Waterford 3 Fuel Transfer System Maintenance and Repairs including Lower Cavity Decon Activities, Support Activities, HP Job Coverage and Surveys	0

Radiation Surveys

Number	Title	Date
WF3-1705-0127	RAB-35 Center Wing Area: Valve BM-110	05/03/2017
WF3-1705-0285	RAB-35 Center Wing Area: SI MVAA602B	05/06/2017
WF3-1901-0833	RAB-4 Letdown Heat Exchanger: CVC-113B	01/15/2019
WF3-1901-0885	RAB-4 Letdown Heat Exchanger: CVC-113A	01/17/2019

Miscellaneous Documents

Number	Title	Date
	RF21 RP Critique/Lessons Learned	09/20/2017
	WF3 2019 Radiation Work Permit Totals (millirem)	01/13/2019
	WF3 Site Dose Totals Online/Outage for the past 3 years (dose in Person-Rem)	01/09/2019
EN-RW-104	Scaling Factors – 10 CFR Part 61 Waste Stream Sample Screening and Evaluation	02/02/2108

71151 – Performance Indicator Verification

Condition Reports

CR-WF3-2018-6202    CR-WF3-2018-6296

Procedures

Number	Title	Revision
EN-LI-114	Regulatory Performance Indicator Process	12
EN-RP-101	Access Control for Radiologically Controlled Areas	15

Miscellaneous Documents

Number	Title	Date
W3F1-2018-0024	NRC Performance Indicator (PI) Data – 1 <sup>st</sup> Quarter 2018 ROP Data	04/12/2018
W3F1-2018-0042	NRC Performance Indicator (PI) Data – 2 <sup>nd</sup> Quarter 2018 ROP Data	07/13/2018
W3F1-2018-0066	NRC Performance Indicator (PI) Data – 3 <sup>rd</sup> Quarter 2018 ROP Data	10/21/2018
W3F1-2019-0003	NRC Performance Indicator (PI) Data – 4 <sup>th</sup> Quarter 2018 ROP Data	01/10/2018
	EN-LI-114 Regulatory Performance Indicator Process – NRC Performance Indicator Technique/Data Sheet: WF3 2018 First Quarter	04/03 and 12/2018
	EN-LI-114 Regulatory Performance Indicator Process – NRC Performance Indicator Technique/Data Sheet: WF3 2018 Second Quarter	07/02 and 03/2018
	EN-LI-114 Regulatory Performance Indicator Process – NRC Performance Indicator Technique/Data Sheet: WF3 2018 Third Quarter	10/03 and 08/2018
	EN-LI-114 Regulatory Performance Indicator Process – NRC Performance Indicator Technique/Data Sheet: WF3 2018 Fourth Quarter	01/01/2019

71152 – Identification & Resolution of Problems

Condition Reports

CR-WF3-2019-00982   CR-WF3-2019-01281   CR-WF3-2019-01303   CR-WF3-2019-03069

Procedures Number	Title	Revision
EN-DC-203	Maintenance Rule Program	4
EN-DC-205	Maintenance Rule Monitoring	6
EN-DC-206	Maintenance Rule (A)(1) Process	3
STA-001-002	Containment Purge Valve Leakage Test	303
STA-001-004	Local Leak Rate Test (LLRT)	316
STA-001-005	Leakage Testing of Air and Nitrogen Accumulators for Safety Related Valves	320



71153 – Event Notification and Follow-up

Condition Reports

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CR-WF3-2019-00967

Vendor

Documents

Number	Title	Revision
1900073.405	Acceptability Evaluation for RCS Operation for the Cold Leg Drain Nozzle-to-Safe End Dissimilar Metal Welds (07-009 and 11-007) Axial Indication at Waterford Steam Electric Plant, Unit 3 to Support Past Operability Determination	A

## PAPERWORK REDUCTION ACT STATEMENT

This letter does not contain new or amended information collection requirements subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). Existing information collection requirements were approved by the Office of Management and Budget, Control Number 31500011. The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid Office of Management and Budget control number.

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

**Information Request  
November 13, 2018  
Notification of Inspection and Request for Information  
Waterford Steam Electric Station, Unit 3  
NRC Inspection Report 05000382/2019001**

### INSERVICE INSPECTION DOCUMENT REQUEST

Inspection Dates: January 4 - 12, 2019

Inspector: Ronald A. Kopriva

#### A. Information Requested for the In-Office Preparation Week

The following information should be sent to the Region IV office in hard copy or electronic format or via a secure document management service, in care of Ron Kopriva, by December 28, 2018, to facilitate the selection of specific items that will be reviewed during the onsite inspection week. The inspector will select specific items from the information requested below and then request from your staff additional documents needed during the onsite inspection week (Section B of this enclosure). We ask that the specific items selected from the lists be available and ready for review on the first day of inspection. Please provide requested documentation electronically if possible. If requested documents are large and only hard copy formats are available, please inform the inspector(s), and provide subject documentation during the first day of the onsite inspection.

If you have any questions regarding this information request, please call the inspector as soon as possible.

On January 4, 2019, a reactor inspector from the Nuclear Regulatory Commission's (NRC) Region IV office will perform the baseline inservice inspection at Waterford Steam Electric Station, Unit 3, using NRC Inspection Procedure 71111.08, "Inservice Inspection Activities." Experience has shown that this inspection is a resource intensive inspection both for the NRC inspector and your staff. The date of this inspection may change dependent on the outage schedule you provide. In order to minimize the impact to your onsite resources and to ensure a productive inspection, we have enclosed a request for documents needed for this inspection. These documents have been divided into two groups. The first group (Section A of the enclosure) identified information to be provided prior to the inspection to

ensure that the inspector is adequately prepared. The second group (Section B of the enclosure) identifies the information the inspector will need upon arrival at the site. It is important that all of these documents are up to date and complete in order to minimize the number of additional documents requested during the preparation and/or the onsite portions of the inspection.

We have discussed the schedule for these inspection activities with your staff and understand that our regulatory contact for this inspection will be Ms. Maria Zamber of your licensing organization. The tentative inspection schedule is as follows:

Preparation week: December 28, 2018 – January 3, 2019  
Onsite dates: January 4 - 12, 2019

Our inspection dates are subject to change based on your updated schedule of outage activities. If there are any questions about this inspection or the material requested, please contact the lead inspector Ronald A. Kopriva at (817) 200-1104. ([email to: ron.kopriva@nrc.gov](mailto:ron.kopriva@nrc.gov)).

#### A.1 ISI/Welding Programs and Schedule Information

1. A detailed schedule (including preliminary dates) of:
  - 1.1. Nondestructive examinations planned for ASME Code Class Components performed as part of your ASME Section XI, risk informed (if applicable), and augmented inservice inspection programs during the upcoming outage.
  - 1.2. Examinations planned for Alloy 82/182/600 components that are not included in the Section XI scope (If applicable)
  - 1.3. Examinations planned as part of your boric acid corrosion control program (Mode 3 walkdowns, bolted connection walkdowns, etc.)
  - 1.4. Welding activities that are scheduled to be completed during the upcoming outage (ASME Class 1, 2, or 3 structures, systems, or components)
2. A copy of ASME Section XI Code Relief Requests and associated NRC safety evaluations applicable to the examinations identified above.
  - 2.1. A list of ASME Code Cases currently being used to include the system and/or component the Code Case is being applied to.
3. A list of nondestructive examination reports which have identified recordable or rejectable indications on any ASME Code Class components since the beginning of the last refueling outage. This should include the previous Section XI pressure test(s) conducted during start up and any evaluations associated with the results of the pressure tests.
4. A list including a brief description (e.g., system, code class, weld category, nondestructive examination performed) associated with the repair/replacement activities of any ASME Code Class component since the beginning of the last outage and/or planned this refueling outage.

5. If reactor vessel weld examinations required by the ASME Code are scheduled to occur during the upcoming outage, provide a detailed description of the welds to be examined and the extent of the planned examination. Please also provide reference numbers for applicable procedures that will be used to conduct these examinations.
6. Copy of any 10 CFR Part 21 reports applicable to structures, systems, or components within the scope of Section XI of the ASME Code that have been identified since the beginning of the last refueling outage.
7. A list of any temporary non-code repairs in service (e.g., pinhole leaks).
8. Please provide copies of the most recent self-assessments for the inservice inspection, welding, and Alloy 600 programs.
9. A copy of (or ready access to) most current revision of the inservice inspection program manual and plan for the current interval.
10. Copy of NDE procedures for NDE that will be used during the outage.
11. Copy of overarching site procedure for welding.

#### A.2 Reactor Pressure Vessel Head

There are no Reactor Pressure Vessel Head inspections planned during this scheduled outage.

#### A.3 Boric Acid Corrosion Control Program

1. Copy of the procedures that govern the scope, equipment and implementation of the inspections required to identify boric acid leakage and the procedures for boric acid leakage/corrosion evaluation.
2. Please provide a list of leaks (including code class of the components) that have been identified since the last refueling outage and associated corrective action documentation. If during the last cycle, the unit was shutdown, please provide documentation of containment walkdown inspections performed as part of the boric acid corrosion control program.

#### A.4 Steam Generator Inspections

There are no Steam Generator Tube inspections planned during this scheduled outage. It is our understanding that you will be opening the secondary side of the Steam Generators for inspection and measurements for the Feedwater Ring modification. We would like to obtain information as to your inspection scope and planned activities.

#### A.5 Additional Information Related to all Inservice Inspection Activities

1. A list with a brief description of inservice inspection, and boric acid corrosion control program related issues (e.g., Condition Reports) entered into your corrective action

program since the beginning of the last refueling outage. For example, a list based upon data base searches using key words related to piping such as: inservice inspection, ASME Code, Section XI, NDE, cracks, wear, thinning, leakage, rust, corrosion, boric acid, or errors in piping examinations.

2. Provide training (e.g. Scaffolding, Fall Protection, FME, Confined Space) if they are required for the activities described in A.1 through A.3.
3. Please provide names and phone numbers for the following program leads:

- Inservice inspection (examination, planning)
- Containment exams
- Reactor pressure vessel head exams
- Snubbers and supports
- Repair and replacement program
- Licensing
- Site welding engineer
- Boric acid corrosion control program

#### DOCUMENTS UPON REQUEST

Inservice Inspection / Welding Programs and Schedule Information

Updated schedules for inservice inspection/nondestructive examination activities, including planned welding activities, and schedule showing contingency repair plans, if available.

For ASME Code Class welds selected by the inspector please provide copies of the following documentation (as applicable) for each subject weld:

Weld data sheet (traveler).

Weld configuration and system location.

Applicable welding procedures used to fabricate the welds.

Copies of procedure qualification records (PQRs).

Welder's performance qualification records (WPQ).

Nonconformance reports for the selected welds (If applicable).

Radiographs of the selected welds and access to equipment to allow viewing radiographs (if radiographic testing was performed).

Preservice and inservice examination records for the selected welds.

Readily accessible copies of nondestructive examination personnel qualifications records for reviewing.

For ultrasonic examination procedures qualified in accordance with ASME Code, Section XI, Appendix VIII, provide documentation supporting the procedure qualification (e.g. the

EPRI performance demonstration qualification summary sheets). Also, include qualification documentation of the specific equipment to be used (e.g., ultrasonic unit, cables, and transducers including serial numbers) and nondestructive examination personnel qualification records.

### Reactor Pressure Vessel Head

There are no Reactor Pressure Vessel Head inspections planned during this scheduled outage.

### Boric Acid Corrosion Control Program

1. Please provide boric acid walk down inspection results, an updated list of boric acid leaks identified so far this outage, associated corrective action documentation, and overall status of planned boric acid inspections.
2. Please provide any engineering evaluations completed for boric acid leaks identified since the end of the last refueling outage. Please include a status of corrective actions to repair and/or clean these boric acid leaks. Please identify specifically which known leaks, if any, have remained in service or will remain in service as active leaks.

### Steam Generator Inspections

There are no Steam Generator Tube inspections planned during this scheduled outage. It is our understanding that you will be opening the secondary side of the Steam Generators for inspection and measurements for the Feedwater Ring modification. We would like to obtain information as to your inspection scope and planned activities.

### Codes and Standards

1. Ready access to (i.e., copies provided to the inspector(s) for use during the inspection at the onsite inspection location, or room number and location where available):
  - Applicable Editions of the ASME Code (Sections V, IX, and XI) for the inservice inspection program and the repair/replacement program.
2. Copy of the performance demonstration initiative (PDI) generic procedures with the latest applicable revisions that support site qualified ultrasonic examinations of piping welds and components (e.g., PDI-UT-1, PDI-UT-2, PDI-UT-3, PDI-UT-10, etc.).
3. Boric Acid Corrosion Guidebook Revision 1 – EPRI Technical Report 1000975.

**The following items are requested for the  
Occupational Radiation Safety Inspection  
at Waterford-3**

**Dates of Inspection: 01/14/2019 to 01/18/2019**

**Integrated Report 2019001**

Inspection areas are listed in the attachments below.

Please provide the requested information on or before **Thursday, January 03, 2019**.

Please submit this information using the same lettering system as below. For example, all contacts and phone numbers for Inspection Procedure 71124.01 should be in a file/folder titled "1-A," applicable organization charts in file/folder "1-B," etc.

The information should be provided in electronic format or a secure document management service. If information is placed on *ims.certrec.com*, please ensure the inspection exit date entered is at least 30 days later than the onsite inspection dates, so the inspectors will have access to the information while writing the report.

In addition to the corrective action document lists provided for each inspection procedure listed below, please provide updated lists of corrective action documents at the entrance meeting. The dates for these lists should range from the end dates of the original lists to the day of the entrance meeting.

If more than one inspection procedure is to be conducted and the information requests appear to be redundant, there is no need to provide duplicate copies. Enter a note explaining in which file the information can be found.

If you have any questions or comments, please contact Natasha Greene at 817-200-1154 or via e-mail at [Natasha.Greene@nrc.gov](mailto:Natasha.Greene@nrc.gov).

**PAPERWORK REDUCTION ACT STATEMENT**

This letter does not contain new or amended information collection requirements subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). Existing information collection requirements were approved by the Office of Management and Budget, control number 3150-0011.

**1. Radiological Hazard Assessment and Exposure Controls (71124.01) and Performance Indicator Verification (71151)**

Date of Last Inspection: **January 22, 2018**

- A. List of contacts and telephone numbers for the Radiation Protection Organization Staff and Technicians, as well as the Licensing/Regulatory Affairs staff. Please include area code and prefix. If work cell numbers are appropriate, then please include them as well.
- B. Applicable organization charts including position or job titles. Please include as appropriate for your site, Site Management, RP, Chemistry, Maintenance (I&C), Engineering, and Emergency Protection. (Recent pictures are appreciated.)
- C. Copies of audits, self-assessments, LARs, and LERs written since the last inspection date, related to this inspection area
- D. Procedure indexes for the radiation protection procedures and other related disciplines.
- E. Please provide procedures related to the following areas noted below. Additional procedures may be requested by number after the inspector reviews the procedure indexes.
  - 1. Radiation Protection Program
  - 2. Radiation Protection Conduct of Operations, if not included in #1.
  - 3. Personnel Dosimetry
  - 4. Posting of Radiological Areas
  - 5. High Radiation Area Controls
  - 6. RCA Access Controls and Radiation Worker Instructions
  - 7. Conduct of Radiological Surveys
  - 8. Radioactive Source Inventory and Control
  - 9. Fuel Pool Inventory Access and Control
- F. Please provide a list of NRC Regulatory Guides and NUREGs that you are currently committed to relative to this program. Please include the revision and/or date for the commitment and where this may be located in your current licensing basis documents.
- G. Please provide a summary list of corrective action documents (including corporate and sub-tiered systems) since the last inspection date.
  - 1. Initiated by the radiation protection organization
  - 2. Assigned to the radiation protection organization

NOTE: These lists should include a description of the condition that provides sufficient detail that the inspectors can ascertain the regulatory impact, the significance level assigned to the condition, the status of the action (e.g., open, working, closed, etc.) and the search criteria used. Please provide in document formats which are “sortable” and “searchable” so that inspectors can quickly and efficiently determine appropriate sampling and perform word searches, as needed. (Excel spreadsheets are the preferred format.) If codes are used, please provide a legend for each column where a code is used.

- H. List of radiologically significant work activities scheduled to be conducted during the inspection period. (If the inspection is scheduled during an outage, please also include a list of work activities greater than 1 rem, scheduled during the outage with the dose



estimate for the work activity.) Please include the radiological risk assigned to each activity.

- I. Provide a summary of any changes to plant operation that have resulted or could result in a significant new radiological hazard. For each change, please provide the assessment conducted on the potential impact and any monitoring done to evaluate it.
- J. List of active radiation work permits and those specifically planned for the on-site inspection week.
- K. Please provide a list of air samples taken to verify engineering controls and a separate list for breathing air samples in airborne radiation areas or high contamination work areas. Please include the RWP the breathing air sampling supports.
- L. Please provide the current radioactive source inventory, listing all radioactive sources that are required to be leak tested. Indicate which sources are deemed 10 CFR Part 20, Appendix E, Category 1 or Category 2. Please indicate the radioisotope, initial and current activity (w/assay date), and storage location for each applicable source.
- M. The last two leak test results for all required/applicable radioactive sources that have failed its leak test within the last two years. Provide any applicable condition reports.
- N. A list of all non-fuel items stored in the spent fuel pools, and if available, their appropriate dose rates (Contact / @ 30cm)
- O. A list of radiological controlled area entries greater than 100 millirem, since the last inspection date. The list should include the date of entry, some form of worker identification, the radiation work permit used by the worker, dose accrued by the worker, and the electronic dosimeter dose alarm set-point used during the entry (for Occupational Radiation Safety Performance Indicator verification in accordance with IP 71151).
- P. A list describing VHRAs and TS HRAs (> 1 rem/hour) that are current and historical. Include their current status, locations, and control measures.
- Q. Temporary effluent monitor locations and calibrations (AMS-4) used to monitor normally closed doors or off-normal release points (e.g., equipment hatch or turbine heater bay doors). Include any CRs associated with this monitoring or instrumentation.

## 2. Occupational ALARA Planning and Controls (71124.02)

Date of Last Inspection: **September 10, 2018**

- A. List of contacts and telephone numbers for ALARA program personnel, as well as the Licensing/Regulatory Affairs staff. Please include area code and prefix. If work cell numbers are appropriate, then please include them as well.
- B. Applicable organization charts including position or job titles. Please include as appropriate for your site, Site Management, RP, Chemistry, Maintenance (I&C), Engineering, and Emergency Protection. (Recent pictures are appreciated.)
- C. Copies of audits, self-assessments, LARs, and LERs, written since the date of last inspection, focusing on ALARA
- D. Procedure index for ALARA Program procedures and other related disciplines.
- E. Please provide specific procedures related to the following areas noted below. Additional Specific Procedures may be requested by number after the inspector reviews the procedure indexes.
  - 1. ALARA Program
  - 2. ALARA Planning
  - 3. ALARA Reviews
  - 4. ALARA Committee
  - 5. Radiation Work Permit Preparation
- F. Please provide a list of NRC Regulatory Guides and NUREGs that you are currently committed to relative to this program. Please include the revision and/or date for the commitment and where this may be located in your current licensing basis documents.
- G. Please provide a summary list of corrective action documents (including corporate and sub-tiered systems) written since the date of last inspection, related to the ALARA program, including exceeding RWP Dose Estimates.

NOTE: These lists should include a description of the condition that provides sufficient detail that the inspectors can ascertain the regulatory impact, the significance level assigned to the condition, the status of the action (e.g., open, working, closed, etc.) and the search criteria used. Please provide in document formats which are “sortable” and “searchable” so that inspectors can quickly and efficiently determine appropriate sampling and perform word searches, as needed. (Excel spreadsheets are the preferred format.) If codes are used, please provide a legend for each column where a code is used.
- H. List of work activities (RWPs) greater than 1 rem, since date of last inspection, including the original dose estimates and actual doses accrued. (Excel format preferred). Please provide all revisions/changes, as well as any related RWPs that support the work activity.
- I. List of active work activities (RWPs) that will be in use while we are onsite, including the dose and dose rate settings, and if available, the planned dose. Include planning documents and surveys. Include radiological risk assessments and proposed control measures.

- J. Site dose totals for the past 3 years (based on dose of record). Also provide the current year-to-date (YTD) collective radiation exposure (CRE). In addition, please provide another document that separates the online and outage doses for the past 3 years.
- K. Most recent assessment of your isotopic mix, including the hard-to-detect radionuclides and alpha hazards. Include a list of new and historical exposure issues (radiological source term or high exposure areas/activities).
- L. If available, provide a copy of the lessons learned from the most recently completed outage for each unit. Include a summary list of any associated corrective action documents and the current status of any corrective actions assigned.
- M. Please provide the methods/reports that are in your process to meet the requirements of 10 CFR 20.1101(c) for periodic review of your RP program.
- N. Current exposure trends (BRAC dose rates and/or source term information).

J. Dinelli

SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 – NRC INTEGRATED  
INSPECTION REPORT 05000382/2019001 – April 30, 2019

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**ADAMS ACCESSION NUMBER: ML19122A121**

SUNSI Review      ADAMS:       Non-Publicly Available       Non-Sensitive      Keyword:  
By:       Yes     No       Publicly Available       Sensitive      NRC-002

OFFICE	SRI:DRP/D	SRI:DRP/D	RI:DRP/D	TL:DRS/IPAT	BC:DRS/EB1	BC:DRS/EB2
NAME	FRamirez	CSpeer	JMelfi	RKellar	VGaddy	GPick
SIGNATURE	FCR	CAS	JFM	RLK	vgg	GAP
DATE	4/26/19	4/25/19	4/26/19	4/29/19	4/29/19	4/26/19
OFFICE	BC:DRS/RCB	BC:DNMS/RIB	BC:DRS/OB	BC:DRP/D		
NAME	NMakris	GWarnick	GWerner	NO'Keefe		
SIGNATURE	NM	JFK for	GEW	NFO		
DATE	4/29/19	4/30/19	04/29/19	4/30/19		

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