UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE RD, STE 102
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

August 9, 2023

Charles McFeaters
President and Chief Nuclear Officer
PSEG Nuclear. LLC
P.O. Box 236
Hancocks Bridge, NJ 08038

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNITS 1 AND 2 – INTEGRATED INSPECTION REPORT 05000272/2023002 AND 05000311/2023002

Dear Charles McFeaters:

On June 30, 2023, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Salem Nuclear Generating Station, Units 1 and 2. On July 20, 2023, the NRC inspectors discussed the results of this inspection with David Sharbaugh, Site Vice President, and other members of your staff. The results of this inspection are documented in the enclosed report.

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

If you contest the violations or the significance or severity 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 I; the Director, Office of Enforcement; and the NRC Resident Inspector at Salem Nuclear Generating Station, Units 1 and 2.

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 I; and the NRC Resident Inspector at Salem Nuclear Generating Station, Units 1 and 2.

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

Sincerely,

Brice A. Bickett

Digitally signed by Brice A. Bickett
Date: 2023.08.09 07:40:41 -04'00'

Brice A. Bickett, Chief
Projects Branch 3
Division of Operating Reactor Safety

Docket Nos. 05000272 and 05000311
License Nos. DPR-70 and DPR-75

Enclosure:
As stated

cc w/ encl: Distribution via LISTSERV

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNITS 1 AND 2 – INTEGRATED INSPECTION REPORT 05000272/2023002 AND 05000311/2023002 DATED AUGUST 9, 2023

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Numbers:	05000272 and 05000311
License Numbers:	DPR-70 and DPR-75
Report Numbers:	05000272/2023002 and 05000311/2023002
Enterprise Identifier:	I-2023-002-0033
Licensee:	PSEG Nuclear. LLC
Facility:	Salem Nuclear Generating Station, Units 1 and 2
Location:	Hancocks Bridge, NJ
Inspection Dates:	April 1, 2023 to June 30, 2023
Inspectors:	J. Ambrosini, Nuclear Engineer J. Dolecki, Senior Resident Inspector N. Floyd, Senior Reactor Inspector E. Garcia, Resident Inspector J. Kulp, Senior Reactor Inspector S. Mercurio, Emergency Preparedness Inspector S. Veunephachan, Health Physicist D. Werkheiser, Senior Reactor Analyst
Approved By:	Brice A. Bickett, Chief Projects Branch 3 Division of Operating Reactor Safety

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting an integrated inspection at Salem Nuclear Generating Station, Units 1 and 2, 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.

List of Findings and Violations

Inadequate Fire Risk Assessment and Management to Protect Systems, Structures, or Components (SSCs) Relied Upon for Safe Shutdown			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000272,05000311/2023002-01 Open/Closed	[H.5] - Work Management	71111.13
Inspectors identified a finding of very low safety significance (Green) and associated non-cited violation (NCV) of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.65(a)(4) when PSEG did not adequately assess and manage the risk of planned maintenance activities. Specifically, PSEG did not adequately assess and manage the fire risk at Unit 1 while having the Unit 2 23 charging positive displacement pump (PDP) unavailable, storing transient combustibles in the protected areas while fire doors separating the areas were impaired.			

Inadequate Risk Assessment of Switchyard Activities			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green NCV 05000311/2023002-02 Open/Closed	[H.8] - Procedure Adherence	71111.13
Inspectors identified a finding of very low safety significance (Green) and associated NCV of 10 CFR 50.65(a)(4) when PSEG did not perform an adequate risk assessment prior to performing switchyard maintenance activities. Specifically, inspectors determined PSEG did not appropriately consider the risk impacts if a failure occurred during switchyard circuit breaker manipulations or re-evaluate that risk assessment after scheduling changes resulted in irradiated fuel moves overlapping with these switchyard maintenance activities. As a result, on April 7, 2023, during the switchyard maintenance activities, a circuit breaker failed to close resulting in a partial loss of offsite power and the corresponding losses to components powering the fuel moves and to the 2C vital instrument bus (VIB) powering components important to shutdown safety.			

Additional Tracking Items

None.

PLANT STATUS

Unit 1 began the inspection period at rated thermal power and remained at or near rated thermal power for the remainder of the inspection period.

Unit 2 began the inspection period at approximately 17 percent rated thermal power. On April 1, 2023, operators shutdown Unit 2 for planned refueling outage 26 (S2R26). On April 24, 2023, operators commenced reactor startup. On April 25, 2023, during power ascension and when rated thermal power was at approximately 18 percent, operators shutdown Unit 2 due to an elevated main turbine bearing temperature. Following investigation and repairs, on April 27, 2023, operators commenced reactor startup. The unit returned to rated thermal power on April 30, 2023, and operated at or near rated thermal power for the remainder of the inspection period.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed activities described in IMC 2515, Appendix D, "Plant Status," observed risk significant activities, and completed on-site portions of IPs. 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 03.01) (3 Samples)

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

(1) Unit 2, 2C VIB during use of temporary power source, on April 1 through 2, 2023
(2) Unit 2, emergency core cooling systems boration injection flow path during reduced reactor cooling system inventory, on April 18, 2023
(3) Unit 1, 12 control rod drive motor-generator set while train was protected, on June 21, 2023

71111.05 - Fire Protection

Fire Area Walkdown and Inspection (IP Section 03.01) (6 Samples)

The inspectors evaluated the implementation of the fire protection program by conducting a walkdown and performing a review to verify program compliance, equipment functionality, material condition, and operational readiness of the following fire areas:

(1) Unit 2, reactor coolant pump oil collection systems, on April 1, 2023
(2) Unit 1, 4kV switchgear and battery rooms, FP-SA-1531, on April 4, 2023
(3) Unit 2, mechanical penetration area elevation 78', FP-SA-2547, on April 14, 2023
(4) Unit 2, charging pumps and spray additive tank area 84’ elevation, FP-SA-2544, on April 24, 2023
(5) Unit 2, spent fuel/component cooling heat exchanger and pump area 84’ elevation, FP-SA-2542, on April 24, 2023
(6) Unit 2, fuel handling building elevations 100' and 130', FP-SA-2201, on May 8, 2023

71111.06 - Flood Protection Measures

Flooding (IP Section 03.01) (1 Sample)

(1) The inspectors evaluated internal flooding mitigation protections in the Unit 2, electrical penetration area elevation 78’, on April 1, 2023.

71111.07A - Heat Exchanger/Sink Performance

Annual Review (IP Section 03.01) (1 Sample)

The inspectors evaluated readiness and performance of:

(1) Unit 2, 22 safety injection pump lube oil cooler, on April 11, 2023

71111.08P - Inservice Inspection Activities (PWR)

The inspectors verified that the reactor coolant system (RCS) boundary, 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 at Unit 2 from April 3 to April 14, 2023.

PWR Inservice Inspection Activities - Nondestructive Examination and Welding Activities (IP Section 03.01) (1 Sample)

The inspectors verified that the following nondestructive examination and welding activities were performed appropriately:

(1)
- Dye Penetrant Examination of Containment Penetration 66 (52-PT-23-010)
- Dye Penetrant Examination of Containment Penetration 66A (52-PT-23-009)
- Ultrasonic Examination of Safety Injection Pipe to Branch Connection 10-SJ-1211-21 (S2-UT-23-002)
- Encoded Phased Array Examination of #23 Safe End to Nozzle Dissimilar Metal Weld (S2-VE-23-002)
- Review of flaw accepted by evaluation in previous outage: 23 Inlet Nozzle-to-Safe End Dissimilar Metal Weld Inner Diameter Connected Flaw (70220273)

PWR Inservice Inspection Activities - Vessel Upper Head Penetration Inspection Activities (IP Section 03.02) (1 Sample)

The inspectors verified that the license conducted the following vessel upper head penetration inspections and addressed any identified defects appropriately:

(1)
- Bare Metal Visual Examination of Reactor Pressure Vessel Upper Head (S2-VE-23-001)

PWR Inservice Inspection Activities Sample - Boric Acid Corrosion Control Inspection Activities (IP Section 03.03) (1 Sample)

The inspectors verified the licensee is managing the boric acid corrosion control program through a review of the following evaluations:

(1)
- Containment Initial Entry and Boric Acid Walkdown on April 1, 2023
- Evaluations and Corrective Action Program Documents Reviewed: 70220096, 70228685, 70163253, 20933326, 20932138, 20933327, 20932979

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)

(1) The inspectors observed Unit 2 operations' personnel during reactor startup activities, including mode changes and reactivity manipulations on April 23 through 24, 2023.

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

(1) The inspectors observed a Unit 2 simulator evaluation that included a grid disturbance, an isolable steam leak in the letdown line, and a faulted steam generator on May 1, 2023.

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (1 Sample)

The inspectors evaluated the effectiveness of maintenance to ensure the following SSCs remain capable of performing their intended function:

(1) Unit 1, component cooling water system due to in-leakage from source containing radioactivity (Notification (NOTF) 20927308/Order 70228061)

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management (IP Section 03.01) (4 Samples)

The inspectors evaluated the accuracy and completeness of risk assessments for the following planned and emergent work activities to ensure configuration changes and appropriate work controls were addressed:

(1) Unit 2, elevated shutdown risk (Yellow) due to lowered inventory in RCS during scheduled RCS drain down and reactor head removal, during week of April 2 through 4, 2023
(2) Unit 1, risk assessment and management actions in 4160V switchgear 64' elevation during scheduled 23 charging pump out of service, fire door impairments, and transient combustibles stored in area, during week of April 4, 2023 (Work Orders (WOs) 60152862, 30367204, and 30364632)
(3) Unit 2, risk assessment and management actions prior to work activities that resulted 2-3 13kV circuit breaker failure to close and associated loss of 2F and 2G 4kV group buses and 2C VIB, on April 7, 2023 (NOTF 20933654/Order 70229005)
(4) Unit 2, elevated shutdown risk (Orange) due to reduced inventory in RCS (mid-loop) during scheduled RCS drain down, vacuum fill, and vent, on April 17 through 18, 2023

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (4 Samples)

The inspectors evaluated the licensee's justifications and actions associated with the following operability determinations and functionality assessments:

(1) Unit 2, 2C emergency diesel generator (EDG) due to inadvertent trip of differential relay, on April 10 through 11, 2023 (NOTF 20933599)
(2) Unit 2, pressurizer safety relief valve, 2PR3, due to valve lifting at an unsatisfactory setpoint of 2398 psig, on April 14, 2023 (NOTF 20934131)
(3) Unit 2, fire penetration seal on piping upstream of 22SJ49, residual heat removal discharge to cold leg, due to sheet metal boot not flush with wall, on April 17, 2023 (NOTF 20934075)
(4) Unit 1, RCS leakage due to indications of in-leakage and radioactivity of component cooling water, on May 29, 2023 (NOTF 20927308)

71111.18 - Plant Modifications

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

The inspectors evaluated the following temporary or permanent modifications:

(1) Design Equivalent Change: Repair Degraded Auxiliary Feedwater System Piping Anchor WS103 (DCP 80134203)

71111.20 - Refueling and Other Outage Activities

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

(1) The inspectors evaluated Unit 2 refueling outage 2R26 activities from April 1 through April 28, 2023.

71111.24 - Testing and Maintenance of Equipment Important to Risk

The inspectors evaluated the following testing and maintenance activities to verify system operability and/or functionality:

Post-Maintenance Testing (PMT) (IP Section 03.01) (7 Samples)

(1) Unit 1, 12 chiller following repair to address system tripping on low superheat, on March 20, 2023 (NOTF 20930454)
(2) Unit 2, 2C VIB inverter following modification to digital inverter, on April 11 through 12, 2023 (WO 60152862)
(3) Unit 2, 2C EDG service water cooling inlet valve, 2SW39, after actuator and solenoid 2SV592 replacement, on April 13, 2023 (WO 30317553/NOTF 20933380)
(4) Unit 2, pressurizer power-operated relief valve, 2PR2, after repairing leak-by, on April 15, 2023 (WOs 60153046 and 50231684)
(5) Unit 2, 23 main steam isolation valve following corrective maintenance to repair open limit switch indication and valve drifting closed issues, on April 25, 2023 (WOs 60152566, 30357574, and 50232115)
(6) Unit 2, 23 chiller following corrective maintenance to repair a leak in the evaporator and compressor replacement, on May 22, 2023 (WO 60157664)
(7) Units 1 and 2, station blackout air compressor after overhaul work window, on June 30, 2023 (work orders 30382652, 30306312, and 30330540)

Surveillance Testing (IP Section 03.01) (3 Samples)

(1) Unit 2, S2.OP-ST.RHR-0005, “Inservice Testing Residual Heat Removal Valves and Orifices,” on April 16, 2023
(2) Unit 2, S2.OP-LR.SA-0001, "Type B & C Leak Rate Test 2SA119 & 2SA591," on April 21, 2023
(3) Unit 2, ER-AA-380, "Primary Containment Leakrate Testing Program," on April 21, 2023

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

(1) Unit 2, ER-AA-410-1002, "Air Operated Valve Testing Requirements" for diagnostic testing of the 2VC5 valve on April 22, 2023

71114.02 - Alert and Notification System Testing

Inspection Review (IP Section 02.01-02.04) (1 Sample)

(1) As a result of the 2020 COVID-19 Public Health Emergency, the licensee requested and received an exemption to reschedule their biennial emergency preparedness exercise from 2020 to 2021. The inspectors performed the emergency preparedness program inspection scheduled for 2021 in its place, then performed emergency preparedness exercise inspections in 2021 and 2022.

The inspectors evaluated the licensee's maintenance and testing of the Alert and Notification System on June 5 through June 9, 2023, for the period of September 2020 through May 2023.

71114.03 - Emergency Response Organization Staffing and Augmentation System

Inspection Review (IP Section 02.01-02.02) (1 Sample)

(1) The inspectors evaluated the readiness of the licensee's Emergency Preparedness Organization on June 5 through 9, 2023.

71114.04 - Emergency Action Level and Emergency Plan Changes

Inspection Review (IP Section 02.01-02.03) (1 Sample)

(1) The inspectors evaluated the following submitted Emergency Action Level and Emergency Plan changes:
- 2022-18, EP-SA-325-207, Security, Editorial Changes to add Event Descriptions to the Security Contingency Event Table for EALs U1.1, HA1, and HS1.1
- 2022-20, EP-SA-325-204, EAL Technical Basis – Irradiated Fuel Events
- 2023-06, EP-AA-125-1001, EP Performance Indicator Guidance
- 2023-07, Transfer of Land Ownership, Wind Port Project

This evaluation does not constitute NRC approval.

71114.05 - Maintenance of Emergency Preparedness

Inspection Review (IP Section 02.01 - 02.11) (1 Sample)

(1) The inspectors evaluated the licensee's maintenance and testing of the emergency preparedness program on June 5 through 9, 2023, for the period of September 2020 through May 2023.

RADIATION SAFETY

71124.01 - Radiological Hazard Assessment and Exposure Controls

Radiological Hazard Assessment (IP Section 03.01) (1 Sample)

(1) The inspectors evaluated how the licensee identifies the magnitude and extent of radiation levels and the concentrations and quantities of radioactive materials and how the licensee assesses radiological hazards.

Instructions to Workers (IP Section 03.02) (1 Sample)

(1) The inspectors evaluated how the licensee instructs workers on plant-related radiological hazards and the radiation protection requirements intended to protect workers from those hazards.

Contamination and Radioactive Material Control (IP Section 03.03) (2 Samples)

The inspectors observed/evaluated the following licensee processes for monitoring and controlling contamination and radioactive material:

(1) Licensee surveys of potentially contaminated material leaving the radiological control area
(2) Workers exiting the radiological control area at Unit 2 during refueling outage 2R26

Radiological Hazards Control and Work Coverage (IP Section 03.04) (4 Samples)

The inspectors evaluated the licensee's control of radiological hazards for the following radiological work:

(1) 2WL477 relief valve breach and replacement
(2) PR4 safety relief value breach and replacement
(3) 2CV6 breach and valve replacement
(4) Trinuke filter survey and movement

High Radiation Area and Very High Radiation Area Controls (IP Section 03.05) (3 Samples)

The inspectors evaluated licensee controls of the following High Radiation Areas and Very High Radiation Areas:

(1) Unit 2, Containment, 78 foot elevation, reactor sump door, very high radiation area
(2) Unit 1, Auxiliary Building, 122 foot elevation, volume control tank, locked high radiation area
(3) Unit 1, Auxiliary Building, 64 foot elevation, No. 12 hold up tank, locked high radiation area

Radiation Worker Performance and Radiation Protection Technician Proficiency (IP Section 03.06) (1 Sample)

(1) The inspectors evaluated radiation worker and radiation protection technician performance as it pertains to radiation protection requirements.

71124.08 - Radioactive Solid Waste Processing & Radioactive Material Handling, Storage, and Transportation

Radioactive Material Storage (IP Section 03.01) (2 Samples)

The inspectors evaluated the licensee’s performance in controlling, labeling and securing the following radioactive materials:

(1) Radioactive materials containers in the Units 1 and 2 outside storage yards
(2) Part 37 radioactive materials and selected sealed sources

Radioactive Waste System Walkdown (IP Section 03.02) (2 Samples)

The inspectors walked down the following accessible portions of the solid radioactive waste systems and evaluated system configuration and functionality:

(1) Solid radioactive waste system
(2) Radioactive liquid processing systems

Waste Characterization and Classification (IP Section 03.03) (2 Samples)

The inspectors evaluated the following characterization and classification of radioactive waste:

(1) Dewatered bead resin shipment number 23-056. U.S. Department of Transportation Description: UN3321, Radioactive Material 7, LSA II, RQ, Fissile excepted. Waste Class B
(2) Dry active waste shipment number 23-057, U.S. Department of Transportation Description: UN3321, Radioactive Material 7, LSA II, Waste Class A Unstable

Shipping Records (IP Section 03.05) (4 Samples)

The inspectors evaluated the following non-excepted radioactive material shipments through a record review:

(1) Shipment number 23-056, UN3321, LSA II, Class B dewatered bead resin
(2) Shipment number 23-042, UN3321, LSA II, Class B dewatered bead resin
(3) Shipment number 23-040, UN3321, LSA II, Class B dewatered bead resin
(4) Shipment number 23-057, UN3321, LSA II, Class AU dry active waste

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

IE01: Unplanned Scrams per 7000 Critical Hours (IP Section 02.01) (2 Samples)

(1) Unit 1, April 1, 2022 through March 31, 2023
(2) Unit 2, April 1, 2022 through March 31, 2023

IE03: Unplanned Power Changes per 7000 Critical Hours (IP Section 02.02) (2 Samples)

(1) Unit 1, April 1, 2022 through March 31, 2023
(2) Unit 2, April 1, 2022 through March 31, 2023

IE04: Unplanned Scrams with Complications (USwC) (IP Section 02.03) (2 Samples)

(1) Unit 1, April 1, 2022 through March 31, 2023
(2) Unit 2, April 1, 2022 through March 31, 2023

EP01: Drill/Exercise Performance (DEP) (IP Section 02.12) (1 Sample)

(1) April 1, 2022 through March 31, 2023

EP02: Emergency Response Organization Drill Participation (IP Section 02.13) (1 Sample)

(1) April 1, 2022 through March 31, 2023

EP03: Alert And Notification System Reliability (IP Section 02.14) (1 Sample)

(1) April 1, 2022 through March 31, 2023

71152S - Semiannual Trend Problem Identification and Resolution

Semiannual Trend Review (Section 03.02) (1 Sample)

(1) The inspectors reviewed the licensee's corrective action program for potential adverse trends that might be indicative of a more significant safety issue.

INSPECTION RESULTS

<table>
<tr><td colspan="4">Inadequate Fire Risk Assessment and Management to Protect Systems, Structures, or Components (SSCs) Relied Upon for Safe Shutdown</td></tr>
<tr><td>Cornerstone</td><td>Significance</td><td>Cross-Cutting Aspect</td><td>Report Section</td></tr>
<tr><td>Mitigating Systems</td><td>Green
NCV 05000272,05000311/2023002-01
Open/Closed</td><td>[H.5] - Work Management</td><td>71111.13</td></tr>
<tr><td colspan="4">Inspectors identified a finding of very low safety significance (Green) and associated non-cited violation (NCV) of Title 10 of the Code of Federal Regulations (10 CFR) 50.65(a)(4) when PSEG did not adequately assess and manage the risk of planned maintenance activities. Specifically, PSEG did not adequately assess and manage the fire risk at Unit 1 while having the Unit 2 23 charging positive displacement pump (PDP) unavailable, storing transient combustibles in the protected areas while fire doors separating the areas were impaired.</td></tr>
<tr><td colspan="4">Description: 10 CFR 50.65(a)(4) states, “before performing maintenance activities (including but not limited to surveillance, post-maintenance testing, and corrective and preventive maintenance), the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities.” Regulatory Guide (RG) 1.160, “Monitoring the Effectiveness of Maintenance at Nuclear Power Plants,” Revision 4, endorses Revision 4f of Nuclear Management and Resources Council (NUMARC) 93-01, “Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants” for licensees to use to, in part, meet 10 CFR 50.65(a)(4). NUMARC 93-01, Section 11.3.3, states, in part, that the scope of hazard groups to be considered for assessment includes internal events, internal floods, and internal fires. RG 1.160 states that “each plant is required by 50.48, ‘Fire Protection,’ to identify one train of safe shutdown capability free of fire damage, such that the plant can be safety shutdown in the event of a fire” and “when maintenance activities are conducted on the protected train, the staff’s position is that licensees should follow the guidance in Section 11.3.4.3 of NUMARC 93-01.” NUMARC 93-01, Section 11.3.4.2, states, in part, that when mitigation equipment is removed from service, the 50.65(a)(4) program should include consideration of these risks with respect to fire, as they are not covered by existing fire protection regulations and can have a risk impact.

PSEG developed the programmatic standard SC.ER-PS.FP-0001-A4 “Fire Events in Maintenance Rule (a)(4) Risk Evaluations,” to incorporate 10 CFR 50.65(a)(4) with the Appendix R program at Salem, in order to provide direction to PSEG staff on assessing and managing specific SSCs for additional fire risk impacts. SC.EP-PS.FP-0001-A4 identifies the SSCs that are considered in-scope necessary to mitigate a fire event and identifies risk</td></tr>
</table>

management actions (RMAs) to be implemented to reduce the likelihood that a fire event could lead to core damage or could significantly complicate credited safe shutdown strategies. As stated in SC.ER-PS.FP-0001-A4, operator actions in accordance with Appendix R to achieve and maintain Hot Standby include establishing reactor coolant pump seal injection and aligning charging system for RCS inventory control. One success path to support reactor coolant pump seal injection and RCS inventory control is via the unaffected unit charging PDP. From SC.ER-PS.FP-0001-A4, “the PDP was identified to be one of the most risk significant components at Salem from a fire protection perspective.” “Without availability of the PDP, there is no success path for supplying reactor coolant pump seal injection in the event of a fire at numerous locations in the plant.” As such, when Salem operators render one charging PDP unavailable, PSEG staff will protect specific areas of the plant, including the 4160V switchgear room, to ensure all actions can be performed to achieve and maintain Hot Standby conditions. This protection strategy requires designating the area as a ‘fire in a(4) area’ and establishing the RMAs described in SC.ER-PS.FP-0001-A4, Attachment 4, and implemented by OP-SA-108-116, “Operability Assessment and Equipment Control Program.” As stated in SC.ER-PS.FP-0001-A4 and OP-SA-108-116, RMAs include briefings with each on-coming shift, minimizing transient combustibles and initiators, posting signage of the fire in a(4) area, and daily fire barrier reviews. PSEG staff perform an evaluation and documents when these RMAs, as well as any alternative RMAs needed (e.g., continuous, hourly, or daily fire watches), in OP-SA-108-116, Attachment 3, “Out-Of-Service Post-Fire Safe Shutdown Equipment Risk Management Actions.” After the RMAs are initially established, and signed off as implemented, PSEG staff performs the actions within SC.FP-SV.ZZ-0058, “Inspection of Class 1 Fire Doors and Safety- Related Areas for Transient Combustibles,” daily to supplement the initial RMAs previously established, perform inspections of fire areas, and to identify any deficiencies in these areas. SC.FP-SV.ZZ-0058 includes, in part, actions within fire in a(4) areas to “ensure that fire barriers are present and in good working order” and to remove transient combustibles from area or consult with fire protection engineering to reduce the risk of the transient combustibles. SC.FP-SV.ZZ-0058, Attachment 5, “Risk Management Actions Status Board,” can also be completed if requested by Operations to demonstrate the RMAs are being performed.

On March 31, 2023, PSEG established the Unit 1, 4160V switchgear area (1FA-AB-64A/B), as a ‘fire in a(4) area’ for the planned 23 charging pump unavailability window, to reduce the likelihood that a fire event could lead to core damage or could significantly complicate credited safe shutdown strategies. As stated in the 1FA-SA-64A/B fire plan, “a fire in this area could significantly affect these components that make up divisions of redundant safety shutdown systems and are essential for plant operation and safe shutdown.” Also on March 31, 2023, as documented in OP-SA-108-116, Attachment 3, PSEG staff performed an a(4) risk evaluation and implemented initial RMAs for this fire in a(4) area.

On April 4 through 5, 2023, inspectors performed a walkdown of the Units 1 and 2, 4160V switchgear areas, which are located adjacent to each other with two fire doors separating the areas. At the time of the inspectors’ walkdown, Unit 2 was in a refueling outage and planned maintenance activities in the area included 2C VIB inverter replacement and 2C 125 VDC battery replacement (WOs 60152862, 30367204, and 30364632). The inspectors identified transient combustibles stored, and permitted, in the 4160V switchgear areas (transient combustible permits (TCPs) included TCP-S1-2023-017, 029, and 033; and TCP-S2-2023-039 and 107) and that the fire doors separating the Units 1 and 2, 4160V switchgear areas (B4-1 and B2-1), were posted with fire impairment permits (Fire Impairments FPIP-S1-2023-015 and 005) with at least one of the doors (B4-1) held open. Inspectors also identified that

cabling was running through the fire door (B4-1) pathway, which would not allow the door to be shut.

During the time the inspectors visited the area, PSEG had established a daily (once per 24 hours) fire watch as a compensatory measure for the fire door impairments, in accordance with FP-SA-003, and posted signage to designate the Unit 1, 4160V switchgear area, as a 'fire in a(4) area,' in accordance with OP-SA-108-116. The signage stated, in part, "storage of transient combustibles is restricted in this area" and, if transient combustibles are required, "contact work control center/control room supervisor." Also, during this same time, PSEG was performing SC.FP-SV.ZZ-0058 daily to, in part, inspect these areas, perform compensatory measures established within FP-SA-003, and perform RMAs established within OP-SA-108-116. Inspectors also noted SC.FP-SV.ZZ-0058, Attachment 5, was not being documented as completed for this time frame.

Based on the April 4 through 5, 2023, walkdowns and a review of PSEG's assessment and management as a it relates to 10 CFR 50.65(a)(4), inspectors determined PSEG did not appropriately follow OP-SA-108-116, Sections 4.1 and 4.5, to perform an a(4) risk assessment and establish RMAs to account for all relevant fire risk hazards associated with removing an SSC in the scope of the 'fire in a(4)' program from service (i.e., 23 charging PDP) and the planned maintenance activities (e.g., WOs 60152862, 30367204, and 30364632). Inspectors identified the completed OP-SA-108-116, Attachment 3, did not consider storing transient combustibles in the fire in a(4) area while fire doors separating the areas were impaired; and, as a result, did not establish alternative RMAs. PSEG's firewatches were predicated solely on the fire door impairments within FP-SA-003 and the evaluation using OP-SA-108-116, Attachment 3, was predicated solely on the Unit 2 PDP being out of service, as such the risk considering all the fire hazards in this area due to these work activities was not analyzed within an a(4) risk assessment. Inspectors determined PSEG only performed Step 4.1.8.2 and did not follow the remaining steps within Sections 4.1 and 4.5, to include the multiple fire protection SSCs out of service within OP-SA-108-116, Attachment 3. Inspectors also identified that the March 31, 2023, version of OP-SA-108-116, Attachment 3, stated initial RMAs for this fire in a(4) area were marked as complete but TCPs and fire door impairments were not identified as fire risk impacts during performance of these initial RMAs. Also, subsequent performance of the RMAs in accordance with SC.FP-SV.ZZ-0058, did not appropriately identify the fire risk hazards. As a result, from March 31, 2023, to the time inspectors performed the walkdown on April 4 through 5, 2023, inspectors identified that PSEG had not appropriately recognized the fire risk hazards in accordance with SC.FP-SV.ZZ-0058 and OP-SA-108-1116 due to having fire door impairments part of the fire in a(4) area or that transient combustibles were stored in and near the fire in a(4) area.

Corrective Actions: PSEG staff revised the completed OP-SA-108-116, Attachment 3, on April 6, 2023, to include the fire impairments and stored transient combustibles and, as a result, changed the fire watches to hourly.

PSEG staff initiated actions to review the OP-SA-108-116, FP-SA-003, and FP-AA-002, "Fire Protection Program," procedures as it relates to fire in a(4) area program and to make changes to the procedures as needed. PSEG generated NOTF 20940929 to capture this NCV and develop corrective actions, including evaluating the 'fire in a(4) program' as it compares to NUMARC 93-01.

Corrective Action References: 20933428, 20933657, 20938307, and 20940929

Performance Assessment:

Performance Deficiency: Inspectors determined that PSEG's failure to adequately assess and manage risk prior to maintenance activities, as required by 10 CFR 50.65(a)(4), as implemented by OP-SA-108-116, was a performance deficiency because it was within PSEG's ability to foresee and correct and should have been prevented. Specifically, inspectors determined starting on March 31, 2023, PSEG did not follow OP-SA-108-116, Sections 4.1 and 4.5, to perform an a(4) risk assessment for the account for all relevant fire risk hazards in the area to assess for RMAs.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Protection Against External Factors attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors determined PSEG's failure to perform an appropriate a(4) risk assessment representative of plant conditions at the time resulted in an insufficient understanding of the likelihood that a fire event could lead to core damage or could significantly complicate credited safe shutdown strategies. Inspectors reviewed the examples in IMC 0612, Appendix E, and determined the more than minor disposition discussed in Example 8.d to be similar to this issue because PSEG staff failed to correctly account for the multiple impairments that would adversely affect equipment used to mitigate a fire event.

Significance: The inspectors assessed the significance of the finding using IMC 0609 Appendix K, "Maintenance Risk Assessment and Risk Management SDP." With assistance from a regional Senior Reactor Analyst (SRA), the inspectors used Flowchart 1, "Assessment of Risk Deficit," because the finding is related to inadequate risk assessment and RMAs. The finding pertains to PSEG's qualitative fire risk only. Flowchart 1 requires the determination of incremental core damage probability deficit (ICDPD) and incremental large early release probability deficit (ILERPD). The SRA used risk insights to estimate and bound the risk deficit by performing a bounding quantification of fire risk for the affected areas (i.e., AB-64A/B, 84A/B/C) with a 7-day exposure time. For this quantification the SRA used Systems Analysis Program for Hands-On Integrated Reliability Evaluations (SAPHIRE), Version 8.2.8, and the Salem Standardized Plant Analysis Risk (SPAR) model, Version 8.80, which included pre-build fire event trees, and IMC 0609, Appendix F, "Fire Protection Significance Determination Process."

The SRA made the conservative assumption that transient combustibles could ignite and spread to the adjacent areas. Though PSEG conducted a partial risk analysis and established some RMAs, the SRA further assumed that no mitigation was provided by these actions nor the suppression systems for the affected areas. The SRA used the transient ('high') combustible fire frequency of 1.4E-3/year from IMC 0609, Appendix F, Attachment 4, which bounds the increase in fire ignition frequency. The estimated ICDPD is the sum of the incremental conditional core damage probabilities for the affected areas multiplied by the transient fire frequency (5 fire areas) multiplied by the exposure time: (1.1E-4 * 5 * 1.4E-3 * 7/365 = 1E-8). This is considered an upper bound estimate considering the conservative assumptions. All dominant cutset LERF factors were zero, therefore, ILERPD is considered not appliable. The estimated risk deficit is less and 1E-6 and per IMC 0609, Appendix K, Flowchart 1, this finding screens to Green.

Cross-Cutting Aspect: H.5 - Work Management: The organization implements a process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority. The work process includes the identification and management of risk commensurate to the work and the need for coordination with different groups or job activities. Inspectors determined PSEG did not consider the relevant fire hazards with Unit 2 charging PDP unavailable while activities in the areas were being performed, including the 125 VDC battery replacements and 2C VIB inverter modification.

Enforcement:

Violation: 10 CFR 50.65(a)(4) states, in part, that before performing maintenance activities, the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities. PSEG uses OP-AA-108-116 to, in part, meet this requirement.

OP-SA-108-116, Sections 4.1.8 and 4.1.9, state, in part, that activities involving the planned removal of Appendix R or SSCs scoped for the 'fire in a(4)' program are to be assessed for risk and compensatory measures are to be implemented according to the a(4) risk assessment. Section 4.1.8 also states, in part, for activities involving Appendix R related SSCs to perform Section 4.5 in parallel. OP-SA-108-116, Section 4.5, states, in part, that RMAs are to be established and implemented for post-shutdown equipment.

Contrary to this, from March 31, 2023 to April 6, 2023, when PSEG removed the 23 charging PDP from service, an Appendix R SSC that is scoped into the fire in a(4) program and required to achieve and maintain the plant in Hot Shutdown in the event of a fire, PSEG did not adequately assess and manage the increase in risk of maintenance activities in the Units 1 and 2, 4160V switchgear areas. Inspectors determined PSEG did not perform an a(4) assessment for the risk impacts of having the 23 charging pump out of service with fire doors impaired and transient combustibles stored nearby, as required by Sections 4.1.8, 4.1.9, and 4.1.5 of OP-SA-108-116.

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

Inadequate Risk Assessment of Switchyard Activities			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green NCV 05000311/2023002-02 Open/Closed	[H.8] - Procedure Adherence	71111.13

Inspectors identified a finding of very low safety significance (Green) and associated NCV of 10 CFR 50.65(a)(4) when PSEG did not perform an adequate risk assessment prior to performing switchyard maintenance activities. Specifically, inspectors determined PSEG did not appropriately consider the risk impacts if a failure occurred during switchyard circuit breaker manipulations or re-evaluate that risk assessment after scheduling changes resulted in irradiated fuel moves overlapping with these switchyard maintenance activities. As a result, on April 7, 2023, during the switchyard maintenance activities, a circuit breaker failed to close resulting in a partial loss of offsite power and the corresponding losses to components powering the fuel moves and to the 2C vital instrument bus (VIB) powering components important to shutdown safety.

Description: Salem Unit 2 offsite power is supplied through multiple step-down transformers, the 500kV-to-13kV one thru four station power transformers (SPTs) and the 13kV-to-4kV 21 thru 24 SPTs. The 21 and 22 SPTs supply power to the 2E, 2F, 2G, and 2H group non-safety-related electrical buses and 23 and 24 SPT supply power to the 2A, 2B, 2C vital safety-related electrical buses.

Salem Unit 2 entered a scheduled refueling outage on April 1, 2023. On April 1 through 2, 2023, PSEG removed the 2C EDG, 23 SPT, and 2C 4kV vital bus from service for scheduled maintenance. To manage the risk with these activities on-going, PSEG protected the 3 SPT, 24 SPT, 2A EDG, 2A vital buses, 2B EDG, and 2B vital buses. The 230V vital buses provide power through an uninterruptable power supply (UPS) to the 115V VIB in the control room. The 2C VIB powers approximately 1/4 of the instruments in the control room, including one of two spent fuel pool level indications (2LA20743), 1 of 2 residual heat removal/component cooling water heat exchanger flow indications (FI601A), and one of four power range nuclear instrumentations (2N43). On April 4, 2023, using a temporary change configuration, PSEG established temporary power to the 2C VIB through the 22 SPT and 2G 230V group bus for scheduled replacement of the 2C UPS inverter. On April 5, 2023, PSEG commenced removing fuel from the reactor core (WO 30365824-0030), which is considered a “core alteration” in accordance with technical specifications and was categorized as “high risk” in accordance with OP-AA-107, “Integrated Risk Management.” This fuel offload was initially scheduled to complete on April 6, 2023, at 9:00pm. Then through schedule coordination the 2 SPT was scheduled to be removed from service, starting on April 6, 2023, at 9:00pm.

On April 7, 2023, PSEG staff began to remove the 2 SPT from service as part of a tagout activity associated with scheduled circuit breaker maintenance (WOs 30372014 and 30372016) by realigning the 13kV bus in the Salem switchyard. The realignment was to maintain the 22 SPT in service. PSEG performed this activity in accordance with SC.OP-SO.13-0002, "2, 12 and 22 Station Power Transformers Operation." While removing the 2 SPT from service, at approximately 3:16am, the 13kV 2-3 breaker failed to close which resulted in the loss of the 22 SPT and the corresponding 2F and 2G group electrical buses. Because the other two remaining group electrical buses, the 2E and 2H, had been previously removed from service for other maintenance, this resulted in a loss of all four group buses, or what is referred to as a partial loss of offsite power. Additionally, the safety-related 2C VIB power was lost because of the temporary change configuration alignment. Core alterations had not been suspended prior to this 2 SPT activity, so because the group buses power the fuel handling building, power to the crane was lost while a fuel assembly was in the mast of the crane.

Inspectors reviewed PSEG’s investigation included within the 70229005 evaluations. PSEG identified the original schedule for the refueling outage had a coordination to ensure the tagout switchyard activity and the fuel moves were not overlapped but the coordination between the two activities was not maintained. After the start of the refueling outage, the coordination between the activities was removed, which allowed the activities to overlap. Schedule changes in the fuel offload activities resulted in extending past the original date of April 6, 2023 and into the original start time for the switchyard activities. PSEG determined that communication between work groups regarding these two activities was insufficient to identify the changes to the schedule and the risk-related discussions about these overlapping activities were not had. Specifically, PSEG stated the 2 SPT switchyard activity was not included in the outage control center (OCC) priority schedule, nor was this activity identified during daily reviews conducted by outage management in accordance with OU-AA-101-1005, “PSEG Nuclear Outage Scheduling.” PSEG also did not include risk insights for what

potentially could occur during this tagout or during performance of the SC.OP-SO.13-0002 procedure.

Inspectors determined PSEG did not follow their phased process to assess and manage these work activities in accordance with OP-AA-107, “Integrated Risk Management.” Inspectors determined PSEG staff did not adequately assess the risk of performing the 2 SPT switchyard maintenance activity with the conditions at the time (Phase 1 of OP-AA-107), develop RMAs based on the assessed risk (Phase 2 of OP-AA-107), and validate the risk prior to performing the work activity (Phase 3 of OP-AA-107). The switchyard activity is not exempt from a risk classification, and therefore, requires a risk classification/pre-screening in accordance with OP-AA-107. That risk classification is to be completed by the P1.15b, “Tagout Approval Milestone,” which is several weeks prior to the start of the outage. Inspectors identified PSEG did not pre-screen this work activity. Phase 1 of OP-AA-107 (i.e., Section 4.2) states, in part, to classify the risk within Attachment 1 or 2 and to re-evaluate the risk of performing the maintenance activity if the conditions of the plant are different than the conditions initially planned for, or different than when the activity was last performed. Inspectors identified the last work activity to remove the 2 SPT from service was in January 2022 (WO 60152295) while both units were online and no temporary power to the VIBs. Further, Attachment 1 states, in part, that activities, if performed incorrectly, would degrade the ability of Operations to monitor or control critical plant equipment during a period it is required, such as during fuel alterations, are to be screened as high risk. Inspectors also identified that Attachment 1 states, in part, that work that could cause an impact to a key safety function (KSF) are to be screened as high risk. Phase 2 of OP-AA-107, Section 4.3, states to develop RMAs based on the risk determined within Phase 1. Phase 3 of OP-AA-107 (i.e., Section 4.4) states, in part, that risk is to be validated and the responsible work group is to ensure sufficient information is provided to Operations to determine integrated plant or system impact prior to performing the work activity. Inspectors determined PSEG did not appropriately follow Sections 4.2 and 4.4 to classify the risk for the switchyard activity and validate that risk considering the group buses were powering the 2C VIB and fuel handling equipment prior to performing the activity.

Inspectors determined PSEG did not assess and manage the risk of these activities in accordance with shutdown risk procedures OU-AA-103, "Shutdown Safety Management Plan," and OU-SA-105, “Shutdown Safety Management Program – Salem Annex.” OU-AA-103 and OU-SA-105 discuss the importance of maintaining and protecting offsite power sources during outage activities, especially during higher risk evolutions. Inspectors identified OU-SA-105, Section 4.6, and OU-AA-103, Sections 4.3 and 4.4, state, in part, that a risk assessment is to be performed each shift and when outage schedule changes occur and that high risk activities, like fuel offloading, are to be reviewed by the OCC each shift. As such, inspectors determined PSEG did not follow OU-SA-105, Step 4.6, or OU-AA-103, Steps 4.3 and 4.4, to perform a risk assessment after outage schedule changes resulted in the fuel offloading extending longer than originally planned and into the April 6 through 7, 2023, nightshift. PSEG assesses and manages the risk of a loss of offsite power sources during shutdown conditions using a safety functional assessment tree (SFAT) for AC power. One input impacting this SFAT is whether there are switchyard work activities in progress. OU-AA-103 and OU-SA-105 state, in part, that switchyard work activities are activities that increase the potential for initiating a loss of offsite power and could impact any KSF, and “particular care should be taken to ensure that work that could potentially affect the availability of offsite power is reviewed for its effect on the DEFENSE-IN-DEPTH of the electrical power system during critical plant evolutions.” PSEG had determined the fuel alteration as a critical plant evolution. Based on this, inspectors determined the work activity to remove the 2 SPT from

service should have been considered switchyard work; and managed as such because whether the work activity involved personnel physically in the switchyard or not, any work involving switchyard components includes an inherent increase in the potential loss of AC power. In this case, the 2 SPT was powering a spent fuel pool indication (2LA20743), which is an input to the spent fuel pool inventory KSF. As such, inspectors determined that manipulating switchyard circuit breakers from the control room while there were high risk fuel moves on-going had the potential to initiate a loss of offsite power and impact a KSF. This potential risk was made evident when a circuit breaker failed to close during these manipulations.

Inspectors determined PSEG did not appropriately perform a risk assessment with the consideration of the group buses powering the 2C VIB and the on-going fuel moves prior to performing the switchyard maintenance activities. Inspectors identified that PSEG did not pre-screen the risk of taking the 2 SPT out of service or re-evaluate that risk after changes in the fuel moves schedule, as required by OP-AA-107 and OU-SA-105. Inspectors determined operators did not recognize the 2 SPT work activity could impact fuel moves or that these activities could have been classified as switchyard work because the activity can affect KSFs. As such, the inspectors determined PSEG failed to manage the associated risk of the switchyard activity. As a result, the failure of the 2-3 breaker impacted fuel moves and VIB indications in the control room.

Corrective Actions: Following the loss of the 22 SPT and associated group buses, PSEG operators entered S2.OP-AB.LOOP-0003, “Partial Loss of Off-Site Power,” and S2.OP-AB.114-0003, “Loss of 2C 115V Vital Instrument Bus,” and re-energized the 22 SPT to establish power to the group buses and the 2C VIB.

PSEG generated NOTF 20933654 and associated evaluation 70229005 to document and evaluate the event. Specifically, PSEG conducted evaluations within 70229005 to assess the risk decision-making and organizational management prior to the event.

Corrective Action References: 20933654, 20933952, 20935264, and 20940889

Performance Assessment:

Performance Deficiency: Inspectors determined PSEG’s failure to adequately assess and manage the risk prior to maintenance activities, as required by 10 CFR 50.65(a)(4), as implemented by OP-AA-107 and OU-SA-105, was a performance deficiency because it was within their ability to foresee and correct and should have been prevented. Inspectors determined PSEG failed to recognize that this was a recurring activity that had different conditions than when the activity was last performed.

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 and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, inspectors determined PSEG personnel failed to perform an adequate risk assessment of the maintenance activity related to the 2 SPT with fuel moves on-going at Unit 2. This maintenance activity resulted in a failure of a circuit breaker to close and the associated loss of all non-safety-related group buses and the loss of the safety-related 2C VIB. The loss of the group buses resulted in a loss of power to on-going fuel moves while fuel was in the mast of the crane and the loss of the 2C VIB, which includes approximately 1/4 of safety-related instruments in the control room becoming unreadable

such as the spent fuel pool indication (2LA20743) that is an input to a KSF. Inspectors reviewed the examples in IMC 0612, Appendix E, and determined the more than minor disposition discussed in Example 8.d to be similar to this issue because a risk assessment was not performed to correctly account for the loss of the 2C VIB and power to the fuel move activities.

Significance: The inspectors assessed the significance of the finding using IMC 0609 Appendix G, “Shutdown Safety SDP.” Specifically, inspectors used IMC 0609, Appendix G, Attachment 1, Exhibit 2, to assess the significance of the finding because it pertains to the Initiating Events cornerstone. As a result, inspectors determined the finding screens to Green because, in part, it does not increase the likelihood of a shutdown initiating event, the refuel canal/cavity was flooded and upper internals were not installed at the time, and the event did not result in-leakage.

Cross-Cutting Aspect: H.8 - Procedure Adherence: Individuals follow processes, procedures, and work instructions. Inspectors determined that PSEG personnel did not effectively review procedures and instructions before performing the switchyard work activities to validate they were appropriate for the current conditions of the plant and that any required changes to include risk insights were completed before implementation.

Enforcement:

Violation: 10 CFR 50.65 (a)(4) states, in part, that before performing maintenance activities (including but not limited to surveillance, post-maintenance testing, and corrective and preventive maintenance), the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities.

The licensee uses, in part, a combination of OP-AA-107 and OU-SA-105 to assess and manage the risk of proposed maintenance activities during outage conditions. OP-AA-107, Section 4.2, states, in part, that the work activity, including tagging, is to be classified for risk using Attachment 1 or 2. OP-AA-107, Section 4.2, also states, in part, that recurring activities, are to be verified to be no different than when the activity was last performed. OU-SA-105, Section 4.6, states, in part, that a risk assessment is to be performed once per shift and when changes to the schedule occur. OP-AA-107, Section 4.4, states, in part, that the responsible work group ensures sufficient information to show the integrated plant or system impact and Operations is to validate the risk assessment prior to performing the work.

Contrary to the above, on April 7, 2023, inspectors determined PSEG did not perform an appropriate risk assessment for a switchyard activity or re-evaluate the risk of the switchyard activity after the conditions of plant changed with fuel moves on-going prior to performing the switchyard activity. Specifically, on April 7, 2023, inspectors determined PSEG did not appropriately perform a risk assessment for the 2 SPT maintenance activity with the consideration of risks to the 2C VIB and fuel moves or validate that risk prior to performing the switchyard activity as required.

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

Observation: Semiannual Trend Review	71152S

The inspectors reviewed PSEG's corrective action program for trends that might be indicative of a more significant safety issue. The inspectors verified that PSEG was evaluating issues for potential trends; however, inspectors identified an emerging trend regarding the implementation of troubleshooting activities in accordance with MA-AA-716-004, "Conduct of Troubleshooting."

PSEG uses procedure MA-AA-716-004 to perform maintenance activities on safety-related equipment involved in troubleshooting to determine the direct cause of a plant system, component, or sub-component failure or degradation. Procedure MA-AA-716-004 defines troubleshooting as a systematic approach to test and/or measure planning and data collection that results in high confidence that the cause of a system, component, and/or sub-component failure or degradation has been determined and normal operation will be restored upon resolution of the failure/degradation cause.

Inspectors reviewed a sampling of troubleshooting activities to assess the adherence to MA-AA-716-004. Inspectors noted recent NOTFs documenting concerns with adherence to MA-AA-716-004, including 20885886, 20931061, and 20932923. Based on additional review, inspectors identified other instances PSEG did not appropriately adhere to aspects of the procedure described above. Specifically, inspectors identified the following:

- (NOTFs 20933599 and 20932070) 2C EDG lockouts that occurred on April 10 through 11, 2023. PSEG staff documented one troubleshooting log in response to this condition, which was focused on a suspected degraded relay and signed off as complete on April 11, 2023. However, PSEG determined the relay was not the cause. Inspectors noted that PSEG identified additional degraded conditions occurred during troubleshooting of this event (e.g., DC ground and battery not connected to DC bus) but PSEG did not record troubleshooting work instructions pertaining to the investigation of these additional symptoms.
- (NOTFs 20933713 and 20932055) 2A EDG failure to shutdown from the control room on April 2 through 3, 2023. Inspectors identified PSEG staff did not develop or record troubleshooting work instructions pertaining to the investigation of this symptom.
- (NOTFs 20933380 and 20933851) service water cooling to 2C EDG valve, 23SW39, did not open as required during start of EDG on April 8, 2023. Inspectors identified PSEG staff did not develop or record troubleshooting work instructions pertaining to the investigation of this symptom.
- (NOTF 20927308 and 20928947) PSEG staff identified in-leakage to Unit 1, component cooling water on February 14, 2023. Inspectors identified PSEG staff did not develop or record troubleshooting work instructions pertaining to the investigation of this symptom. Inspectors also identified PSEG pursued Focused Troubleshooting but did not do so using the troubleshooting logs.

Based on the above examples, inspectors determined PSEG staff did not appropriately follow MA-AA-716-004 to develop troubleshooting work instructions and maintain those plans as records within field troubleshooting logs. Inspectors determined that in lieu of using field troubleshooting logs, PSEG staff used a combination of software, emails, and information within NOTFs to perform the troubleshooting activities, which inspectors determined is not consistent with MA-AA-716-004 requirements for work instructions that affect safety-related equipment. As a result, inspectors determined there is an emerging trend in adherence to MA-AA-716-004 that, absent correction, could lead to component failure or degradation not

being identified and resolved, and a lack of records available to show evidence of activities affecting quality. These examples were independently evaluated in accordance with the guidance in IMC 0612, Appendix B, “Issue Screening,” and Appendix E, “Examples of Minor Issues.” The inspectors determined the issues were not of more than minor significance because a cornerstone objective was not adversely affected and therefore are not subject to enforcement action in accordance with the NRC’s Enforcement Policy. PSEG captured this observation within NOTF 20940825.

EXIT MEETINGS AND DEBRIEFS

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

- On April 13, 2023, the inspectors presented the IP 71124.01 inspection results to Richard DeSanctis, Plant Manager, and other members of the licensee staff
- On June 8, 2023, the inspectors presented the emergency preparedness program inspection results to David Mannai, Executive Director Regulatory Affairs and Nuclear Oversight, and other members of the licensee staff
- On July 20, 2023, the inspectors presented the integrated inspection results to David Sharbaugh, Site Vice President, and other members of the licensee staff
- On June 29, 2023, the inspectors presented the IP 71124.08 inspection results to Richard DeSanctis, Plant Manager, and other members of the licensee staff

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.04	Engineering Changes	80131784	Salem Unit 2 Vital 2C Inverter Replacement - MR90 Temporary Power	12/07/2022
71111.05	Corrective Action Documents Resulting from Inspection	20932902		
71111.05	Corrective Action Documents Resulting from Inspection	20934182	3 Penetrations in Unit 2 Lower BIT Room Did Not Have Sheet Metal Enclosures Flush Against Wall	04/17/2023
71111.05	Corrective Action Documents Resulting from Inspection	20935050	Transient Combustibles Identified in a4 Fire Risk Area 84' Elevation of Auxiliary Building	04/26/2023
71111.06	Miscellaneous	SA-PRA-012	Internal Flood Evaluation Summary Notebook	Revision 6
71111.06	Procedures	S1(2).OP-AB.SW-0001	Loss of Service Water Header Pressure	Revision 18
71111.06	Procedures	S1(2).OP-AB.ZZ-0002	Flooding	Revision 4
71111.07A	Corrective Action Documents Resulting from Inspection	20935215	As-left Condition Within Work Instruction Inaccurately Stated Endbells Were Replaced	05/02/2023
71111.12	Corrective Action Documents Resulting from Inspection	20939963	CCW Rad Monitor Greater Than 100 CPM Change in Consecutive Shifts, Meeting the ACM Acceptance Criteria to Entered S1.OP-AB.CC-0001	06/29/2023
71111.13	Corrective Action Documents	20933654/20933858	13kV 2-3 Breaker Fail to Close Bus Swap	04/07/2023
71111.13	Corrective Action Documents	20933952	Leadership Review Board Held on 04/11 in Response to Loss of Group Buses During 22 SPT Switching	04/11/2023
71111.13	Corrective Action	20935264	Request to Revise OP-AA-107 to Have All Bus Switching	05/02/2023

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Documents		to Outages to Screen to Medium Risk	
71111.13	Corrective Action Documents Resulting from Inspection	20932896	Protected Equipment Barriers Not Maintained	04/04/2023
71111.13	Corrective Action Documents Resulting from Inspection	20933428	Transient Combustibles in Fire in a(4) Area	04/04/2023
71111.13	Corrective Action Documents Resulting from Inspection	20933657	Potential gas within fire in a(4) area program	04/10/2023
71111.13	Corrective Action Documents Resulting from Inspection	20938307	Potential Gap May Exist Within Maintenance Rule (a)(4) Program and NUMAR 93-01	06/12/2023
71111.13	Corrective Action Documents Resulting from Inspection	20940929	NRC Identified Not Adhering to Maintenance Rule (a)(4) for Fire Risk Assessment and Management	07/17/2023
71111.13	Drawings	205333	Unit 2 Spent Fuel Cooling	Revision 28
71111.13	Drawings	228474	Units 1 and 2 Fuel Handling Area Pool Controls	Revision 0
71111.13	Miscellaneous	NUMARC 93-01	Industry Guidelines for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants	Revision 4f
71111.13	Miscellaneous	Regulatory Guide 1.160	Monitoring the Effectiveness of Maintenance of Maintenance at Nuclear Power Plants	Revision 4
71111.13	Miscellaneous	SC.ER-PS.FP-0001-A4	Fire Events in Maintenance Rule (a)(4) Risk Evaluations	Revision 0
71111.13	Procedures	FP-AA-001	Fire Protection Impairment Program	Revision 5
71111.13	Procedures	FP-AA-015	Compensatory Measure Firewatch Program	Revision 9
71111.13	Procedures	FP-SA-003	Actions for Inoperable Fire Protection - Salem Station	Revision 7
71111.13	Procedures	OP-AA-107	Integrated Risk Management	Revision 1
71111.13	Procedures	OP-SA-108-116	Operability Assessment and Equipment Control Program	Revision 1

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71111.13	Procedures	OU-SA-105	Shutdown Safety Management Program - Salem Annex	Revision 14
71111.13	Procedures	S.OP-SO.CVC-0006(Q)	Boron Concentration Control	Revision 26
71111.13	Procedures	S2-CRM-003	Shutdown Model Basis for SGS Unit 2	Revision 10
71111.13	Procedures	S2.OP-AB.115-0003(Q)	Loss of 2C 115V Vital Instrument Bus	Revision 18
71111.13	Procedures	S2.OP-AB.LOOP-0003(Q)	Partial Loss of Offsite Power	Revision 7
71111.13	Procedures	SC.FP-SV.ZZ-0058(Q)	Inspection of Class 1 Fire Doors and Safety-Related Areas for Transient Combustibles	Revision 22
71111.13	Procedures	SC.OP-SO.13-0012(Q)	2, 12, and 22 Station Power Transformers Operation	Revision 24
71111.13	Work Orders	Tagout S2500-2 SPT 2R26	Support for 2CDC3AX35 and 2DDC2AX19 Breaker Maintenance	
71111.15	Corrective Action Documents Resulting from Inspection	20934075	Drawing 605820 Contains Floor Elevation Error	04/19/2023
71111.15	Drawings	205231, Sheet 3	Unit 1 Component Cooling	Revision 46
71111.15	Miscellaneous	70228061, condition monitoring and contingency plan 23-002	Unit 1 CC System Primary Leakage	02/16/2023
71111.15	Work Orders	50210355	2PR3 Pressurizer Safety Relief Valve Pressure Lift Testing	04/12/2023
71111.15	Work Orders	50221565	2PR5 Pressurizer Safety Relief Valve Pressure Lift Testing	04/18/2023
71111.15	Work Orders	50233381	2PR4 Pressurizer Safety Relief Valve Pressure Lift Testing	04/18/2023
71111.18	Calculations	1A-AFSA-WS103	Design Calculation for 1A-AFSA-WS103	Revision 2
71111.20	Corrective Action Documents	20933041	21HD9 Failed to Open During Cooldown Resulting in 21 MSR Shell Level High Alarm	03/31/2023
71111.20	Corrective Action Documents	20933326	Boric Acid Leak Near 21 RCP Flange	04/03/2023
71111.20	Corrective Action Documents	20933327	Boric Acid Leak Near 23 RCP Flange	04/03/2023
71111.20	Corrective Action	20933353	Foreign Material in Pressurizer Safety Relief Valve 2PR3	04/05/2023

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	Documents		Due to Inappropriate Gaske Material Used	
71111.20	Corrective Action Documents	20933440	FM found in 2C EDG Lube Oil Strainer	04/05/2023
71111.20	Corrective Action Documents	20933931	RCP Seal Injection Filter Replacement Frequency	04/12/2023
71111.20	Corrective Action Documents	20934223	FME Discovered in Pressurizer Safety Relief Valve 2PR4 Discharge	04/14/2023
71111.20	Corrective Action Documents	20934224	FME Discovered in Pressurizer Safety Relief Valve 2PR5 Discharge	04/14/2023
71111.20	Corrective Action Documents	20934425	FME (Glass) Discovered in Reactor Cavity	04/16/2023
71111.20	Corrective Action Documents	20934767	Dry Discolored Boric Acid Identified on Three Reactor Vessel Lower Penetrations	04/22/2023
71111.20	Corrective Action Documents	20935040	#12 Bearing Elevated Temperature and Vibrations Increased During Initial Turbine Roll Coming Out of Refueling Outage	04/25/2023
71111.20	Corrective Action Documents Resulting from Inspection	20932896	NRC Identified Barriers for Protected Equipment Not Properly Applied	04/03/2023
71111.20	Corrective Action Documents Resulting from Inspection	20933620*		
71111.20	Corrective Action Documents Resulting from Inspection	20933859	Unit 2 Narrative Log Inappropriately Showed Abnormal Operating Procedure Entry for Adverse Air Temperature	04/13/2023
71111.20	Procedures	OP-AA-108-108	Unit Restart Review	Revision 14
71111.20	Procedures	OU-AA-103	Shutdown Safety Management Program	Revision 26
71111.20	Procedures	S2.OP-IO.ZZ-0004	Power Operation	Revision 88
71111.20	Procedures	S2.OP-SO.RC-0006(Q)	Draining the Reactor Coolant System Less Than 101 FT EL with Fuel in the Vessel	Revision 42
71111.24	Corrective Action	20897290	Pressurizer Relief Valve Temperature Rise	05/16/2022

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	Documents			
71111.24	Corrective Action Documents	20932070	2C EDG Breaker Trip	04/10/2023
71111.24	Corrective Action Documents	20933316	Delay of S2.OP-ST.RHR-005 Performance Due to 2C Vital Bus Outage	04/04/2023
71111.24	Corrective Action Documents	20933840	Air Operated Valve Does Not Meet Diagnostic Test Criteria Due to Weak or Damaged Spring	04/12/2023
71111.24	Corrective Action Documents Resulting from Inspection	20939148	Documentation for the Corrected Air Operated Valve Test Setup	06/08/2023
71111.24	Procedures	ER-AA-380	Primary Containment Leakrate Testing Program	Revision 11
71111.24	Procedures	ER-AA-410-1002	Air Operated Valve Testing Requirements	Revision 9
71111.24	Procedures	MA-AA-743-3101	Air Operated Valve Diagnostic Testing and Evaluation	Revision 1
71111.24	Procedures	S2.OP-SO.115-0013	2C Vital Instrument Bus UPS System Operation	Revision 13
71111.24	Procedures	S2.OP-ST.CH-0004(Q)	Chilled Water System - Chillers	Revision 26
71111.24	Procedures	S2.OP-ST.MS-0003(Q)	Steam Line Isolation and Response Time Testing	Revision 21
71111.24	Procedures	SC.OP-PT.CA-0001(Q)	SBO Diesel Control Air Compressor Test	Revision 18
71111.24	Work Orders	30335348		
71111.24	Work Orders	30365576		
71111.24	Work Orders	50233434		
71111.24	Work Orders	60142151		
71114.02	Miscellaneous		Final 2005 REP-10 Design Review Report, PSEG Salem and Hope Creek Generating Stations	Revision 1
71114.05	Miscellaneous		PSEG Nuclear LLC Emergency Plan	
71152S	Corrective Action Documents	20887236	Performance Gaps with Troubleshooting Process Identified	10/26/2021
71152S	Corrective Action Documents	20931061	Lessons Learned from Troubleshooting and Repair of Security Breaker	03/21/2023
71152S	Corrective Action	20932923	12 Chiller Tripped During 13 Chiller Testing	03/29/2023

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	Documents			
71152S	Corrective Action Documents	20933599/20932070	2C EDG Breaker Tripped and Diesel Unit Trip Relay Tripped (Locked Out and Unavailable)	04/10/2023
71152S	Corrective Action Documents	20933713	2A EDG Emergency Stop Pushbutton Did Not Stop EDG from Control Room	04/12/2023
71152S	Corrective Action Documents Resulting from Inspection	20940825	NRC Identified Trend of Not Adhering to Troubleshooting Program	07/17/2023