UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE RD, STE 102
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January 24, 2023

Eric Carr
President and Chief Nuclear Officer
PSEG Nuclear, LLC – N09
P.O. Box 236
Hancocks Bridge, NJ 08038

SUBJECT: HOPE CREEK GENERATING STATION – INTEGRATED INSPECTION REPORT 05000354/2022004

Dear Eric Carr:

On December 31, 2022, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Hope Creek Generating Station. On January 18, 2023, the NRC inspectors discussed the results of this inspection with Robert DeNight, Site Vice President, and other members of your staff. The results of this inspection are documented in the enclosed report.

No findings or violations of more than minor significance were identified during this inspection.

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: 2023.01.24 07:21:24 -05'00'

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

Docket No. 05000354
License No. NPF-57

Enclosure:
As stated

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SUBJECT: HOPE CREEK GENERATING STATION – INTEGRATED INSPECTION REPORT 05000354/2022004 DATED JANUARY 24, 2023

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Number:	05000354
License Number:	NPF-57
Report Number:	05000354/2022004
Enterprise Identifier:	I-2022-004-0034
Licensee:	PSEG Nuclear, LLC
Facility:	Hope Creek Generating Station
Location:	Hancocks Bridge, NJ
Inspection Dates:	October 1, 2022 to December 31, 2022
Inspectors:	J. Dolecki, Senior Resident Inspector J. Patel, Senior Resident Inspector D. Beacon, Resident Inspector J. Demarshall, Senior Operations Engineer T. Fish, Senior Operations Engineer N. Floyd, Senior Reactor Inspector L. Grimes, Resident Inspector M. Hardgrove, Senior Project Engineer S. Wilson, Senior Health Physicist
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 Hope Creek Generating Station, 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

No findings or violations of more than minor significance were identified.

Additional Tracking Items

None.

PLANT STATUS

The Hope Creek Generating Station (Hope Creek) began the inspection period offline during scheduled refueling outage H1R24. Hope Creek started up on October 28, 2022 and reached rated thermal power (RTP) on November 5, 2022. Subsequently, on November 5, 2022, reactor power was lowered to approximately 70 percent RTP for a rod pattern adjustment (RPA) and returned to RTP on November 6, 2022. On November 11, 2022, reactor power was lowered to 70 percent RTP to support an RPA. Hope Creek maintained 85 percent RTP following the RPA to perform maintenance on the 'C' reactor feed pump. Following the maintenance, on November 16, 2022, Hope Creek returned to RTP and remained at or near RTP 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

71111.01 - Adverse Weather Protection

Seasonal Extreme Weather (IP Section 03.01) (1 Sample)

(1) The inspectors evaluated the station’s readiness for operating during winter seasonal conditions from December 1 through 5, 2022

71111.04 - Equipment Alignment

Partial Walkdown (IP Section 03.01) (4 Samples)

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

(1) High-pressure coolant injection (HPCI) system on November 8, 2022
(2) 'A' core spray subsystem on November 29, 2022
(3) 'B' filtration, recirculation, and ventilation system on November 30, 2022
(4) 'D' emergency diesel generator on December 29, 2022

Complete Walkdown (IP Section 03.02) (1 Sample)

(1) 'A' safety and turbine auxiliary cooling system during the week of December 19, 2022

71111.05 - Fire Protection

Fire Area Walkdown and Inspection (IP Section 03.01) (4 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) Main turbine and control valves areas in pre-fire plan FP-HC-3151 on October 4, 2022
(2) Control, equipment, heating, ventilation, air conditioning, inverter, and battery rooms in pre-fire plan FP-HC-3562 on November 18, 2022
(3) Motor control center area, safeguard instrument rooms and reactor auxiliaries cooling system pumps and heat exchanger area in pre-fire plan FP-HC-3423 on December 1, 2022
(4) Control equipment mezzanine area in pre-fire plan FP-HC-3542 on December 21, 2022

71111.07A - Heat Exchanger/Sink Performance

Annual Review (IP Section 03.01) (1 Sample)

The inspectors evaluated readiness and performance of:

(1) 'A1' and 'A2' safety auxiliaries cooling system heat exchangers during refueling outage H1R24 on October 13, 2022

71111.08G - Inservice Inspection Activities (BWR)

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

(1) The inspectors verified that the reactor coolant system 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 from October 3 to October 7, 2022:

03.01.a - Nondestructive Examination and Welding Activities.

- Manual ultrasonic testing of the N4E feedwater nozzle to reactor vessel shell weld, RPV1-N4E (NDE Report HCGS-VE-22-006) and nozzle inner radius, RPV1-N4EIR (NDE Report HCGS-VE-22-002).
- Manual ultrasonic testing of the N4F feedwater nozzle to reactor vessel shell weld, RPV1-N4F (NDE Report HCGS-VE-22-021) and nozzle inner radius, RPV1-N4FIR (NDE Report HCGS-VE-22-013).
- Manual ultrasonic testing of the reactor water clean-up system elbow to pipe weld, 1-BG-6DBA-001-28 (NDE Report HCGS-UT-22-003).
- Manual ultrasonic testing of two reactor vessel bottom head drain line components:
    - 90 degree elbow, 1-BG-100-641-L1, FAC# G052 (WO 60128181)

    - 2 inch x 4 inch expander, 1-BG-110-641-E1, FAC# G097 (WO 30358242)
- General visual examinations of the containment, including accessible portions of the drywell and torus surfaces (NDE Report HCGS-VE-22-002).
- Visual examinations of the in-vessel components, including a sample of the jet pumps, core spray piping and spargers, and feedwater brackets (Work Order 50228080).
- Welding activities associated with the replacement of reactor water clean-up system piping located between the regenerative heat exchangers, under Work Order 60143044. This included magnetic particle testing of six field welds, FW1 through FW6.

71111.11A - Licensed Operator Requalification Program and Licensed Operator Performance

Requalification Examination Results (IP Section 03.03) (1 Sample)

(1) The inspectors reviewed and evaluated the licensed operator examination failure rates for the requalification annual operating exams administered August through September 2022.

71111.11B - Licensed Operator Requalification Program and Licensed Operator Performance

Licensed Operator Requalification Program (IP Section 03.04) (1 Sample)

(1) Biennial Requalification Written Examinations

The inspectors evaluated the quality of the licensed operator biennial requalification written examinations administered November through December 2022.

Annual Requalification Operating Tests

The inspectors evaluated the adequacy of the facility licensee's annual requalification operating test administered September 12 through 16, 2022.

Administration of an Annual Requalification Operating Test

The inspectors evaluated the effectiveness of the facility licensee in administering requalification operating tests required by 10 CFR 55.59(a)(2) and that the facility licensee is effectively evaluating their licensed operators for mastery of training objectives.

Requalification Examination Security

The inspectors evaluated the ability of the facility licensee to safeguard examination material, such that the examination is not compromised.

Remedial Training and Re-examinations

The inspectors evaluated the effectiveness of remedial training conducted by the licensee, and reviewed the adequacy of re-examinations for licensed operators who did not pass a required requalification examination.

Operator License Conditions

The inspectors evaluated the licensee's program for ensuring that licensed operators meet the conditions of their licenses.

Control Room Simulator

The inspectors evaluated the adequacy of the facility licensee's control room simulator in modeling the actual plant, and for meeting the requirements contained in 10 CFR 55.46.

Problem Identification and Resolution

The inspectors evaluated the licensee's ability to identify and resolve problems associated with licensed operator performance.

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 and evaluated licensed operator performance in the main control room during reactor startup following the H1R24 refueling outage on October 28, 2022

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

(1) The inspectors observed and evaluated licensed operator performance in the simulator during a training exercise on November 29, 2022

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (3 Samples)

The inspectors evaluated the effectiveness of maintenance to ensure the following structures, systems, and components remain capable of performing their intended function:

(1) Containment penetration overcurrent protection breakers during the week of November 28, 2022
(2) Remote shutdown panel following indication and control issues identified during surveillance testing on December 6, 2022
(3) HPCI system overspeed trip diaphragm control valve following diaphragm failure and replacement on December 15, 2022

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management (IP Section 03.01) (5 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) Emergent troubleshooting and subsequent removal of two fuel assemblies and a control blade that were found stuck during H1R24 refueling operations on October 11, 2022
(2) Planned inoperability of one offsite power source and two emergency diesel generators during H1R24 on October 14, 2022
(3) Emergent reactor coolant chemistry excursion due to condenser tube leak on October 18, 2022
(4) Emergent work and unavailability of 'C' reactor feedwater pump during the week of November 13, 2022
(5) Planned inoperability of the 'B' control room emergency filtration system on December 19, 2022

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (5 Samples)

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

(1) HPCI system following identification of governor drive mechanism gear tolerances out of specification on October 25, 2022
(2) Reactor coolant system following elevated conductivity due to a condenser tube leak during H1R24 on October 31, 2022
(3) Safety relief valves following identification of pitting on pilot valve bellows on November 3, 2022
(4) 'A' emergency diesel generator following the identification of an oversized capacitor on the electronic speed control module on November 9, 2022
(5) Residual heat removal system following discovery of a jumper installed in a logic terminal for the shutdown cooling isolation valves on December 1, 2022

71111.18 - Plant Modifications

Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (2 Samples)

The inspectors evaluated the following temporary or permanent modifications:

(1) Reactor water cleanup bottom head drain suction isolation temporary modification during the week of October 3, 2022
(2) 'B' station service water pump temporary modification to install plugs to prevent external pump leakage on October 28, 2022

71111.19 - Post-Maintenance Testing

Post-Maintenance Test (IP Section 03.01) (7 Samples)

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

(1) CD481 and CD482 class 1E inverter replacements on October 6, 2022

(2) Reactor core isolation cooling system steam admission valve repair on October 25, 2022
(3) Safety relief valve main body and pilot valve replacements during H1R24 on November 1, 2022
(4) Control rod blade and drive mechanism replacements during H1R24 on November 1, 2022
(5) HPCI system governor assembly maintenance on November 2, 2022
(6) 'C' reactor feedwater pump outboard journal bearing replacement on November 15, 2022
(7) 'B' control room emergency filtration system preventive maintenance on December 20, 2022

71111.20 - Refueling and Other Outage Activities

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

(1) The inspectors evaluated refueling outage H1R24 activities from September 28 through October 30, 2022

71111.22 - Surveillance Testing

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

Surveillance Tests (other) (IP Section 03.01) (3 Samples)

(1) HC.OP-ST.KJ-0007, Integrated emergency diesel generator 1CG400 test on October 14, 2022
(2) HC.OP-IS.EG-0003, 'C' safety and turbine auxiliary cooling system pump in-service test on November 9, 2022
(3) HC.OP-IC.BH-0003, Standby liquid control pump AP208 in-service test on November 28, 2022

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

(1) HC.OP-LR.AB-0001/2/3/4, Main steam isolation valve local leak rate tests on October 5, 2022

FLEX Testing (IP Section 03.02) (1 Sample)

(1) SH.OP-PT.FLX-0005, Testing Godwin diesel driven portable pump HL160M on November 3, 2022

71114.06 - Drill Evaluation

Select Emergency Preparedness Drills and/or Training for Observation (IP Section 03.01) (1 Sample)

(1) The inspectors observed an emergency preparedness focused area drill on November 22, 2022

Drill/Training Evolution Observation (IP Section 03.02) (1 Sample)

The inspectors evaluated:

(1) The inspectors evaluated a simulator training evolution for licensed operators, with associated emergency classification performance criteria, on November 16, 2022

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 controlled area (RCA).
(2) Workers exiting the RCA during a refueling outage.

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) Reactor water cleanup system pipe section removal in heat exchanger room. RWP 30.
(2) Safety relief pilot valve removal in drywell. RWP 17.
(3) Refueling activities on the refuel floor. RWP 8.
(4) Control rod drive removal and replacements. RWP 13.

High Radiation Area and Very High Radiation Area Controls (IP Section 03.05) (4 Samples)

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

(1) Reactor water cleanup heat exchanger room locked high radiation area access controls.
(2) Drywell personnel hatch locked high radiation area access controls.

(3) Drywell equipment hatch locked high radiation area access controls.
(4) Control of highly activated items stored in the spent fuel pool.

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

Shipment Preparation (IP Section 03.04) (1 Sample)

(1) The inspectors observed the preparation of radioactive shipment HC22-085, Type A package containing a safety relief valve.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

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

(1) October 1, 2021 through September 30, 2022

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

(1) October 1, 2021 through September 30, 2022

71152A - Annual Follow-up Problem Identification and Resolution

Annual Follow-up of Selected Issues (Section 03.03) (1 Sample)

The inspectors reviewed the licensee’s implementation of its corrective action program related to the following issues:

(1) 'C' station service water pump vibration levels in the alert range during the week of November 21, 2022

71152S - Semiannual Trend Problem Identification and Resolution

Semiannual Trend Review (Section 03.02) (1 Sample)

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

INSPECTION RESULTS

Observation: Annual Follow-up - 'C' Station Service Water (SSW) System Elevated Vibrations	71152A

The inspectors evaluated PSEG's corrective actions associated with elevated vibration levels on the safety-related 'C' SSW pump. The condition and corrective actions completed were documented in PSEG's corrective action program (CAP) under notifications (NOTFs) 20898722, 20905320, 20910533, 20910855, 20910856, 20911114, 20915740, and 20918430. PSEG performed an operability evaluation (70224461) and determined the 'C' SSW pump was able to fulfill its specified safety functions with the degraded condition. PSEG also completed an equipment reliability evaluation 70224588, which determined that internal pump degradation was the direct cause of the elevated vibration levels. Subsequently, PSEG replaced the pump shaft sleeve and coupling under work order 60155398, and pump vibration levels were restored to an acceptable range.

Additionally, the inspectors performed a walkdown of the SSW system to assess material conditions and to determine whether PSEG was appropriately identifying conditions adverse to quality, documenting them in the CAP, and correcting them commensurate with their safety significance. On November 8, 2022, the inspectors identified additional concrete spalling on the 'C' SSW pump concrete pedestal, which was previously related to a Green non-cited violation documented in inspection report 05000354/2022002 (ADAMS Accession No. ML22221A177). PSEG documented inspectors' concerns in NOTF 20920533, performed equipment walkdowns, and determined the additional spalled concrete was bounded by the technical evaluation performed under 70222204 and did not impact the operability of the pump. Additionally, on November 8, 2022, the inspectors identified surface corrosion and flaking on the 'D' SSW pump strainer discharge flange piping, which PSEG had not previously identified or evaluated in the CAP. PSEG entered this issue in NOTF 20922228 and promptly evaluated it. PSEG performed an ultrasonic thickness examination of the area and identified that the area of concern was well above the minimum wall thickness requirements. Therefore, the condition did not impact the 'D' SSW pump's ability to perform its safety function. Additionally, PSEG applied a coating material to protect the area from further degradation.

The NRC inspectors did not identify any findings or violations of more than minor significance.

Observation: Semi-annual trend observation	71152S

The inspectors performed a semi-annual review of site issues to identify trends that might indicate the existence of more significant safety concerns. As part of this review, the inspectors included repetitive or closely related issues documented by PSEG in their CAP database, trend reports, major equipment problem lists, system health reports, and maintenance or CAP backlogs. The inspectors recognized potentially developing trends related to PSEG’s control and implementation of maintenance and work activities. These potential trends and examples of issues that inform them are outlined below.

Inspectors noted challenges related to control of spare and replacement parts:

- Emergency diesel generator relay parts were identified to have multiple material master (MMs) identifiers or the same part (20910406).
- Inconsistencies between actual parts and specified MMs, related to Swageloks, were identified (20909956).
- A review of critical MMs identified that 96 of 6000 critical MMs had no spare parts in stock (20915342).

- Fire protection component MMs were incorrectly classified as non-safety-related for procurement (PC4) (20916138).
- A HPCI diaphragm control valve diaphragm had multiple MMs which contributed to an incorrect part being installed (20919653).

Inspectors noted challenges related to control or performance of maintenance and work activities:

- The HPCI system turbine governor valve failed to open during testing after oil inlet and outlet lines were inadvertently switched during governor maintenance (20919466).
- An incorrect HPCI diaphragm was obtained (related to MM issue above) and installed which resulted in diaphragm failure during subsequent testing (20919653).
- Electrical jumpers were not removed as required by procedure prior to reactor mode changes made during startup from refueling outage RF24 (20913155).
- Flaws in condenser tubes were not identified during refueling outage RF24 maintenance activities, potentially contributing to subsequent chemistry control challenges (20918698).

Inspectors noted challenges related to work order record retention:

- Multiple work packages could not be located in records management systems (20912400, 20924320).
- Multiple records were not sent to records management in a timely manner (20915479, 20918099).

The NRC inspectors did not identify any findings or violations of more than minor significance during this review.

EXIT MEETINGS AND DEBRIEFS

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

- On October 11, 2022, the inspectors presented the radiological hazard assessment and radwaste inspection results to Jim Priest, Director of Operations, and other members of the licensee staff.
- On October 21, 2022, the inspectors presented the in-service inspection results to Ken Knaide, Vice President of Engineering, and other members of the licensee staff.
- On January 18, 2023, the inspectors presented the integrated inspection results to Robert DeNight, Site Vice President, and other members of the licensee staff.

THIRD PARTY REVIEWS

Inspectors reviewed Institute on Nuclear Power Operations reports that were issued during the inspection period.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.01	Work Orders	30370005	Station preparation for seasonal readiness, HC.OP-GP.ZZ-0003	Revision 33
71111.08G	Corrective Action Documents Resulting from Inspection	NOTF 20917912		
	Miscellaneous	ISI-HC-LTP4-PLAN	ISI Program Plan Fourth Ten-Year Inspection Interval	Revision 4
		ISI-HC-LTP4-RISI	Code Case N-716-1 Fourth Interval First Periodic Update	Revision 1
71111.22	Procedures	SH.OP-PT.FLX-0480	Godwin diesel drive portable pump	11/03/2022
	Work Orders	30370224	Godwin diesel drive portable pump H1FLX-10-G-2026	11/27/2022
71152S	Corrective Action Documents Resulting from Inspection	20924702 20924958		