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

August 3, 2023

Charles McFeaters
President and Chief Nuclear Officer
PSEG Nuclear, LLC - N09
P.O. Box 236
Hancocks Bridge, NJ 08038

SUBJECT: HOPE CREEK GENERATING STATION – BIENNIAL PROBLEM IDENTIFICATION AND RESOLUTION INSPECTION REPORT 05000354/2023010

Dear Charles McFeaters:

On July 11, 2023, the U.S. Nuclear Regulatory Commission (NRC) completed a problem identification and resolution inspection at your Hope Creek Generating Station (Hope Creek) and 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.

The NRC inspection team reviewed the station's problem identification and resolution program and the station's implementation of the program to evaluate its effectiveness in identifying, prioritizing, evaluating, and correcting problems, and to confirm that the station was complying with NRC regulations and licensee standards for problem identification and resolution programs. Based on the samples reviewed, the team determined that your staff's performance in each of these areas adequately supported nuclear safety.

The team also evaluated the station's processes for use of industry and NRC operating experience information and the effectiveness of the station's audits and self-assessments. Based on the samples reviewed, the team determined that your staff's performance in each of these areas adequately supported nuclear safety.

Finally, the team reviewed the station's programs to establish and maintain a safety conscious work environment, and interviewed station personnel to evaluate the effectiveness of these programs. Based on the team's observations and the results of these interviews the team found no evidence of challenges to your organization's safety conscious work environment. Your employees appeared willing to raise nuclear safety concerns through at least one of the several means available.

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: 2023.08.03 09:32:11 -04'00'

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

Docket No. 05000354
License No. NPF-57

Enclosure:
As stated

cc w/ encl: Distribution via LISTSERV

SUBJECT: HOPE CREEK GENERATING STATION (HOPE CREEK) – BIENNIAL PROBLEM IDENTIFICATION AND RESOLUTION INSPECTION REPORT 05000354/2023010 DATED AUGUST 3, 2023

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Number:	05000354
License Number:	NPF-57
Report Number:	05000354/2023010
Enterprise Identifier:	I-2023-010-0014
Licensee:	PSEG Nuclear, LLC
Facility:	Hope Creek Generating Station
Location:	Hancocks Bridge, NJ
Inspection Dates:	June 12, 2023 to July 11, 2023
Inspectors:	S. Haney, Senior Resident Inspector J. Brand, Reactor Inspector B. Dyke, Operations Engineer C. Khan, Senior Project Engineer
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 a biennial problem identification and resolution inspection at Hope Creek Generating Station (Hope Creek), 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.

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 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.

OTHER ACTIVITIES – BASELINE

71152B - Problem Identification and Resolution

Biennial Team Inspection (IP Section 03.04) (1 Sample)

(1) The inspectors performed a biennial assessment of the effectiveness of PSEG's Problem Identification and Resolution program, use of operating experience, self-assessments and audits, and safety conscious work environment.

- Problem Identification and Resolution Program Effectiveness: The inspectors assessed the effectiveness of PSEG's Problem Identification and Resolution program in identifying, prioritizing, evaluating, and correcting problems. The inspectors also conducted a five-year review of the station service water system. The corrective actions for the following non-cited violations and findings were evaluated as part of the assessment: NCV 05000354/2021012-02, FIN 05000354/2021003-01, FIN 05000354/2021004-01, NCV 05000354/2022010-01, NCV 05000354/2022002-01, and NCV 05000354/2022002-03.

- Operating Experience: The inspectors assessed the effectiveness of PSEG's processes for use of operating experience.

- Self-Assessments and Audits: The inspectors assessed the effectiveness of PSEG's identification and correction of problems identified through audits and self-assessments.

- Safety Conscious Work Environment: The inspectors assessed the effectiveness of the station's programs to establish and maintain a safety conscious work environment.

INSPECTION RESULTS

Assessment	71152B
Problem Identification and Resolution Program Effectiveness: The inspectors determined that PSEG's problem identification and resolution program for Hope Creek was generally effective and adequately supported nuclear safety and security.	

Identification: The team reviewed a sample of issues that have been processed through PSEG's problem identification and resolution program since the last biennial team inspection, including significant conditions adverse to quality, conditions adverse to quality, non-cited violations of regulatory requirements and other documented findings. The team determined that, in general, the station identified issues and entered them into the corrective action program at a low threshold.

Prioritization and Evaluation: Based on the samples reviewed, the team determined that, in general, PSEG appropriately prioritized and evaluated issues commensurate with the safety significance of the identified problem. In most cases, PSEG appropriately screened notifications (NOTFs) for operability and reportability, categorized notifications by significance, and assigned actions to the appropriate department for evaluation and resolution. However, the team identified one minor violation, regarding the evaluation of a degraded condition in the Hope Creek service water intake structure. The minor violation is documented below.

Corrective Action: The team determined that the overall problem identification and resolution program performance related to resolving problems was effective. In most cases, PSEG developed and implemented corrective actions to resolve problems in a timely manner. However, the team identified one minor violation regarding a planned long term corrective action. The minor violation is documented below.

Assessment	71152B
Operating Experience: The team determined that PSEG appropriately evaluated industry operating experience for its relevance to Hope Creek. In most cases, PSEG appropriately incorporated both external and internal operating experience into plant procedures and processes. However, the team identified one minor performance deficiency regarding an operating experience review performed in an equipment reliability evaluation. The minor performance deficiency is documented below.	

Assessment	71152B
Self-Assessment and Audits: The team reviewed a sample of self-assessments and audits, including self-assessments and audits of the PSEG corrective action and quality assurance programs to determine whether they appropriately assessed performance and identified areas for improvement. In most cases, the team concluded that PSEG had an effective self-assessments and audits process, and that the issues identified by those self-assessments and audits were addressed. However, the team identified one observation regarding a recommendation identified in the Focused Area Self-Assessment performed in preparation for this inspection. The observation is documented below.	

Assessment	71152B
Safety Conscious Work Environment: To determine whether underlying factors exist that would produce a reluctance to raise nuclear safety concerns, the team conducted interviews with 22 employees from a cross-section of the organization, including the Operations, Maintenance, Engineering, Security, Chemistry, Radiation Protection, and Emergency Preparedness departments. The team also interviewed the Employee Concerns Program managers and reviewed the Employee Concerns Program case log and select case files. The team also reviewed nuclear safety culture meeting minutes and the results of the most recently performed safety culture assessment. The team did not identify issues that represented challenges to the free flow of information, nor any underlying factors that could	

produce a reluctance to raise nuclear safety concerns. Based on inspection interviews and insights obtained from safety culture and other relevant assessments, the conditions at Hope Creek were conducive to a Safety Conscious Working Environment.

Minor Performance Deficiency	71152B

Minor Performance Deficiency: Equipment reliability evaluation (Order 70224588), was conducted to review elevated ‘C' station service water pump vibration levels. The equipment reliability evaluation determined with high confidence that the stuffing box shaft sleeve chrome oxide coating degraded, and the chipped, delaminated coating created foreign material that entered the shaft bearing. Step 4.10.1 of LS-AA-125-1001, “Cause Analysis,” states “To be most effective, PERFORM Operating Experience (OE) reviews twice: once prior to cause determination and again after causes have been identified.” The equipment reliability evaluation conducted broad searches on the terms “Elevated Vibrations, large vertical pump, service water pump.” The equipment reliability evaluation did not perform more focused operating experience searches after the cause had been identified.

As a result, relevant operating experience was not documented in the equipment reliability evaluation or recognized by the evaluation team. For example, the Generic Equivalent Replacement Change Package performed in 1999 that accepted the chrome oxide coating for application at Hope Creek documented that Salem and Millstone station experience has shown chrome oxide coating separates from base metal when used as a wear surface at the stuffing box location. Additionally, the NRC issued NCV 05000311/2018-002-01, "Inadequate Design Change for Service Water Pumps" in NRC Inspection Report 05000311/2018002 (ML18207A221) for chromium oxide delamination in the Salem 26 service water pump for which Salem performed an equipment reliability evaluation (Order 70199758). Further, Salem performed item equivalency evaluation (Order 80124207) in 2019 to accept Ultimet laser cladding for use at Salem.

Screening: The inspectors determined the performance deficiency was minor. This issue is captured in NOTF 20939922. This performance deficiency was evaluated in accordance with the guidance in Inspection Manual Chapter (IMC) 0612, Appendix B, “Issue Screening,” and Appendix E, “Examples of Minor Issues.” The inspectors determined this issue was not of more than minor significance because the condition would have been corrected. Specifically, engineers identified cracking on the 'C' station service water pump shaft sleeve coating in December 2021 and wrote NOTF 20893348 prior to any elevated vibration conditions on the pump. The Equipment Reliability Action Tracking Items process (N2 NOTF 20893609 and Order 70221150) drove the review of the shaft sleeve coating change independently, prior to the performance of the equipment reliability evaluation.

Minor Violation	71152B

Minor Violation: Equipment reliability evaluation (Order 70224588), "'C' Station Service Water Pump Elevated Vibration Levels," was conducted by PSEG to evaluate a high vibration condition in the 'C' station service water pump resulting from delamination of a chrome oxide coating on the pump's stuffing box shaft sleeve. Long term corrective action 70224588-0140 is planned to replace the chrome oxide coated stuffing box shaft sleeve chrome oxide coating with upgraded Ultimet laser cladding on all four station service water pumps. Engineering evaluated the change to the new Ultimet laser cladding (Order 70221150) and incorrectly determined that no item equivalency evaluation was necessary.

Screening: The inspectors determined the performance deficiency was minor. This issue is captured in NOTF 20939922. This performance deficiency was evaluated in accordance with the guidance in Inspection Manual Chapter (IMC) 0612, Appendix B, “Issue Screening,” and Appendix E, “Examples of Minor Issues.” The inspectors determined this issue was not of more than minor significance because it did not adversely affect any cornerstone objectives since the shaft sleeves with Ultimet laser cladding have not yet been installed in the Hope Creek station service water system.

Enforcement: 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” requires that measures be established for the selection and review of materials for suitability of application. PSEG procedure CC-AA-300, "Procurement Engineering Support Activities," Revision 5, Step 4.1.1, Item 3, requires the station to perform an item equivalency evaluation to document the acceptability of non-identical replacement items by evaluating form, fit, and function. VCC-AA-3000, "Standard Item Equivalency," Revision 0, defines Form as, "The physical characteristics, material composition, design ratings, dimensions, code applicability, QA requirements, and NRC requirements associated with an item."

Contrary to the above, on May 19, 2022, PSEG evaluated the material composition change of the service water stuffing box shaft sleeve coating from chrome oxide to Ultimet laser cladding and incorrectly determined an item equivalency evaluation was not required.

This failure to comply with 10 CFR Part 50, Appendix B, Criterion III, constitutes a minor violation that is not subject to enforcement action in accordance with the NRC’s Enforcement Policy.

Minor Violation	71152B

Minor Violation: During a walkdown of the 'A' and 'C' station service water pump room in the service water intake structure, the inspectors identified that the support frame of H1EA -10-C-514, Service Water Pump Lube Oil Control Panel, was severely corroded. The support of the control panel is subjected to wetted conditions from pump packing and strainer leakage. The panel is nonsafety-related equipment which houses spray wash flow indication components, but is in close proximity to the safety-related, Seismic Category I, 'A' and 'C' Service Water Strainers (1AF-509 and 1CF-509), and is therefore designed to meet Seismic II/I requirements. A Seismic II/I interaction is a condition that could potentially reduce the capability of a Seismic Category I structure, system or component to perform its safety-related function as a result of the structural failure of an adjacent non-Category I structure, system or component during a safe shutdown earthquake. DE-PZ.ZZ-0011, "Seismic II/I Program," Section 2.0.C states that, “Structures, systems and components in the proximity of safety-related items shall be designed and constructed so as to not fail during [a safe shutdown earthquake] in such a way that they cause the safety-related items to fail to perform their function.”

A number of notifications have documented this condition dating back to 2012 and as recently as 2022. A seismic and structural evaluation of the panel's degraded condition was last performed in 2014. NOTF 20897820 was written in 2022, stating that continued degradation could result in the potential loss of the panel's Seismic II/I design function. Operations performed a functionality assessment of the condition and determined that the 'A' station service water system remained operable because the spray wash flow indication is not required for system operability. OP-AA-108-115, "Operability Determination & Functionality Assessments," Step 4.4.2.5 directs that an operability determination should include the potential effect of the degraded condition on the affected structure, system or component's

ability to perform specified safety functions. Step 4.4.3.1 notes that plant specific design basis events should be considered when performing operability determinations. While the functionality assessment of notification 20897820 evaluated the loss of the spray wash flow indications and the impact of their loss on the station service water system, a review of the Seismic II/I interaction and potential loss of the panel's Seismic II/I design function was not performed.

PSEG conducted engineering walkdowns in response to the inspectors' questions confirmed the support frame had further degraded from corrosion since its last evaluation performed in 2014, and determined that the anchor bolts cannot perform their function. PSEG performed technical evaluation (Order 70230018) and Operable with Engineering Justification and subsequently determined that panel 10-C-514 is structurally adequate in its current condition to meet Seismic II/I requirements and not impact any nearby safety-related equipment.

Screening: The inspectors determined the performance deficiency was minor. This issue is captured in NOTF 20939945. This performance deficiency was evaluated in accordance with the guidance in Inspection Manual Chapter (IMC) 0612, Appendix B, “Issue Screening,” and Appendix E, “Examples of Minor Issues.” The inspectors determined this issue was not of more than minor significance because it did not adversely affect any cornerstone objectives since the panel remained structurally adequate to meet Seismic II/I requirements.

Enforcement: 10 CFR Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings.

PSEG programmatic standard DE-PZ.ZZ-0011, "Seismic II/I Program," Section 12.0 states in part that the Quality Assurance Program describes the requirements to assure the control of activities affecting the safety-related function of structures, systems or components at Hope Creek Generating Station as required by 10 CFR 50, Appendix B, and that those requirements shall apply to activities related to the Seismic II/I program.

OP-AA-108-115, "Operability Determination & Functionality Assessments," Step 4.4.2.5 directs that an operability determination should include the potential effect of the degraded condition on the affected structure, system or component's ability to perform specified safety functions. Step 4.4.3.1 notes that plant specific design basis events should be considered when performing operability determinations.

Contrary to the above, on February 25, 2022, the functionality assessment of notification 20897820 documenting service water control panel support channel corrosion did not evaluate the Seismic II/I interaction or the potential loss of the panel's Seismic II/I design function.

This failure to comply with 10 CFR Part 50, Appendix B, Criterion V, constitutes a minor violation that is not subject to enforcement action in accordance with the NRC’s Enforcement Policy.

Observation: Self-Assessment Safety Conscious Work Environment Policy Recommendation Not Addressed	71152B
As a part of the Focused Area Self-Assessment (Order 70227854) performed in March in preparation for this inspection, a pulsing survey was sent to gather additional safety conscious work environment insights. The responses identified that 100 percent of the respondents indicated that they are willing to raise safety concerns and that they were also all aware that PSEG Nuclear has a safety conscious work environment policy. There was some variation however, identified in the responses on what the safety conscious work environment policy is. The Focused Area Self-Assessment subsequently recommended that the fleet reinforce the safety conscious work environment policy, LS-AA-3, "Safety Conscious Work Environment," via a Nuclear Communication. This recommendation was not captured as an action in the report or as an assignment in the order, and no Nuclear Communication was issued to the fleet. The interviews conducted with PSEG personnel by the team during this inspection confirmed that site personnel are willing to raise safety concerns and identified a similar variation in responses regarding the safety conscious work environment policy. The Focused Area Self-Assessment recommendation was a missed opportunity to reinforce the safety conscious work environment policy at the fleet level. This issue is captured in NOTF 20939007, and communications regarding the PSEG safety conscious work environment policy were distributed in the Hope Creek Weekly Alignment Package on June 19, 2023 and in a Nuclear Communication on June 22, 2023.	

EXIT MEETINGS AND DEBRIEFS

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

- On July 11, 2023, the inspectors presented the biennial problem identification and resolution inspection results to Robert DeNight, Site Vice President, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71152B	Corrective Action Documents	20398027 20577490 20616574 20644637 20666626 20781588 20781588 20867692 20877063 20878950 20879321 20880247 20880344 20885221 20897820 20897899 20898182 20898243 20899016 20907120 20907137 20909712 20910533 20910533 20920455 20922956 20924488 20931449 20936699		
71152B	Corrective Action Documents Resulting from	20937867 20939006 20939007		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Inspection	20939182 20939183 20939184 20939185 20939187 20939190 20939191 20939192 20939193 20939194 20939195 20939196 20939197 20939201 20939336 20939339 20939341 20939428 20939494 20939679 20939804 20939922 20939934 20939935 20939945 20939960 20939974 20939975 20940451 20940471 20940506		
71152B	Drawings	M-10-1, Sheet 1	Hope Creek Generating Station, Service Water	60
71152B	Drawings	M-10-1, Sheet 2	Hope Creek Generating Station, Service Water	47
71152B	Drawings	M-10-1, Sheet 3	Hope Creek Generating Station, Service Water	34

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71152B	Drawings	M-10-1, Sheet 4	Hope Creek Generating Station, Service Water	0
71152B	Engineering Changes	Generic Equivalent Replacement Change Package 4ER-0165	Equivalency Replacement HC SW Shaft Sleeve Chrome-plating	05/14/1999
71152B	Miscellaneous	10855-G-052	Seismic II/I Evaluation Program for the Hope Creek Generating Station	4
71152B	Miscellaneous	DE-PZ.ZZ-0011	Seismic II/I Program	0
71152B	Procedures	CC-AA-300	Procurement Engineering Support Activities	4
71152B	Procedures	CC-AA-300-1001	Item Equivalency Evaluations	3
71152B	Procedures	CC-AA-309-101	Engineering Technical Evaluations	13
71152B	Procedures	CC-AA-320-011	Transient Loads	1
71152B	Procedures	FP-AA-011	Control of Transient Combustible Material	7
71152B	Procedures	HC.ER-PS.FP-0001-A5	Programmatic Standard for Fire Protection	0
71152B	Procedures	HC.IC-GP.ZZ-0115	Transmitter Isolation/Restoration Procedure Sensitive Rack Instrumentation, Instrument Rack 10C005 - RPV Channel C	16
71152B	Procedures	HU-AA-1084	Station Event-Free Clock Program	4
71152B	Procedures	LS-AA-1003	NRC Inspection Preparation and Response	18
71152B	Procedures	LS-AA-115	Operating Experience Program	21
71152B	Procedures	LS-AA-120	Issue Identification and Screening Process	23
71152B	Procedures	LS-AA-120	Issue Identification and Screening Process	24
71152B	Procedures	LS-AA-125	Corrective Action Program	28
71152B	Procedures	LS-AA-125-1001	Cause Analysis	22
71152B	Procedures	LS-AA-3	Safety Conscious Work Environment	1
71152B	Procedures	LS-AA-4000	Nuclear Safety Culture Monitoring	6
71152B	Procedures	MA-AA-1001	Technical Fundamental Skills	2
71152B	Procedures	MA-AA-716-004	Conduct of Troubleshooting	15
71152B	Procedures	MA-AA-716-004	Conduct of Troubleshooting	16
71152B	Procedures	MA-AA-716-100	Maintenance Alterations Process	13
71152B	Procedures	OP-AA-107	Integrated Risk Management	0
71152B	Procedures	OP-AA-108-115	Operability Determinations	6

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71152B	Procedures	OP-AA-108-115	Operability Determinations	8
71152B	Procedures	OP-AA-108-115-1002	Supplemental Considerations for On-Shift Operability Determinations	2
71152B	Procedures	PIA-018	Root Cause Evaluation Template	4
71152B	Procedures	PIA-035	Cause Analysis Manual	6
71152B	Procedures	PIA-036	Equipment Reliability Evaluation (ERE)	8
71152B	Procedures	VCC-AA-3000	Standard Item Equivalency Process, NISP-EN-02	0
71152B	Procedures	WC-AA-105	Work Activity Risk Management	12
71152B	Work Orders	30185282 30340883 50196833 50235036 50236755 50237633 50238434 50240257 50242039 60060811 60087495 60096784 60105959 60128469 60150259 70054662 70064658 70198964 70199758 70218377 70218387 70219712 70220690 70220691 70221150 70222139		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		70223906 70224525 70224588 70226516 70226871 70227209 70227854 70224461 70230018 80118982 80124207 80134488		