UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, ILLINOIS 60532-4352

August 8, 2024

Rod Penfield
Site Vice President
Vistra Operations Company, LLC
Perry Nuclear Power Plant
10 Center Road, P.O. Box 97
Perry, OH 44081

SUBJECT: PERRY NUCLEAR POWER PLANT – INTEGRATED INSPECTION REPORT 05000440/2024002

Dear Rod Penfield:

On June 30, 2024, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Perry Nuclear Power Plant. On July 11, 2024, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

One finding of very low safety significance (Green) is documented in this report. This finding did not involve a violation of NRC requirements.

A licensee-identified violation which was determined to be of very low safety significance and Severity Level IV is documented in this report. We are treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violation or the significance or severity of the violation 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 III; the Director, Office of Enforcement; and the NRC Resident Inspector at Perry Nuclear Power Plant.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement 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 III; and the NRC Resident Inspector at Perry Nuclear Power Plant.

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* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

Stoedter, Karla signing on behalf of Hartman, Thomas on 08/08/24

Thomas C. Hartman, Acting Branch Chief
Reactor Projects Branch 2
Division of Operating Reactor Safety

Docket No. 05000440
License No. NPF-58

Enclosure:
As stated

cc w/ encl: Distribution via LISTSERV®

Letter to Rod Penfield from Thomas C. Hartman dated August 8, 2024.

SUBJECT: PERRY NUCLEAR POWER PLANT – INTEGRATED INSPECTION REPORT 05000440/2024002

<u>DISTRIBUTION</u>:
Michelle Simmons
RidsNrrPMPerry Resource
RidsNrrDorlLpl3
RidsNrrDroIrib Resource
Jack Giessner
Mohammed Shuaibi
Diana Betancourt-Roldan
Allan Barker
David Curtis
Jonathan Feibus
R3-DORS

ADAMS ACCESSION NUMBER: ML24214A188

☒ SUNSI Review		☒ Non-Sensitive ☐ Sensitive		☒ Publicly Available ☐ Non-Publicly Available	
OFFICE	RIII	RIII			
NAME	RNg:anm	KStoedter for THartman			
DATE	08/07/2024	08/08/2024			

U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Number:	05000440
License Number:	NPF-58
Report Number:	05000440/2024002
Enterprise Identifier:	I-2024-002-0063
Licensee:	Vistra Operations Company, LLC
Facility:	Perry Nuclear Power Plant
Location:	Perry, OH
Inspection Dates:	April 01, 2024, to June 30, 2024
Inspectors:	J. Beavers, Senior Resident Inspector V. Myers, Senior Health Physicist T. Ospino, Resident Inspector
Approved By:	Thomas C. Hartman, Acting Branch Chief Reactor Projects Branch 2 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 Perry Nuclear Power Plant, 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. A licensee-identified non-cited violation is documented in report section: 71111.18.

List of Findings and Violations

Shutdown Due to Exceeding Technical Specification Unidentified Reactor Coolant System Leakage Limit			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green FIN 05000440/2024002-01 Open/Closed	[P.3] - Resolution	71153
The inspectors identified a finding of very low safety significance (Green) for the licensee's failure to properly identify and scope work on the 'A' reactor recirculating pump suction valve packing located in the drywell into refueling outage 19.			

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
LER	05000440/2024-001-00	LER 2024-001-00 for Perry Nuclear Power Plant, Operation of the Residual Heat Removal Loops B and C "Alternate Keep Fill" Configuration Was Prohibited by Technical Specifications and Resulted in an Unanalyzed Condition	71153	Closed

PLANT STATUS

Unit 1 began the inspection period at rated thermal power. On May 11, 2024, the plant shutdown for a planned maintenance outage to replace ‘B’ reactor recirculating pump seals and restored to full power operation on May 18, 2024. On May 23, 2024, the plant shut down for a forced maintenance outage to address identified and unidentified reactor coolant system leakage in the drywell and was restored to full power on May 27, 2024. The plant operated at or near rated thermal power for the remainder of the inspection period with occasional power derates related to heat and humidity.

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

Impending Severe Weather Sample (IP Section 03.02) (2 Samples)

(1) The inspectors evaluated the adequacy of the overall preparations to protect risk-significant systems from total solar eclipse on April 8, 2024.
(2) The inspectors evaluated the adequacy of the overall preparations for summer readiness to protect risk-significant systems from heat related issues on week of June 17, 2024.

71111.04 - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (1 Sample)

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

(1) Review of the residual heat removal (RHR) ‘B’ alignment at the 574′ elevation on April 24, 2024

71111.05 - Fire Protection

Fire Area Walkdown and Inspection Sample (IP Section 03.01) (2 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) fire zone 1AB-1E, RHR B 574' elevation room on April 24, 2024
(2) fire zone 1RB-1C-1C, drywell at the 599' and 583' elevations on May 12, 2024

Fire Brigade Drill Performance Sample (IP Section 03.02) (1 Sample)

(1) The inspectors evaluated the quarterly announced fire drill on April 16, 2024.

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 control room during plant shutdown on May 10 and 11, 2024.

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

(1) The inspectors observed and evaluated an evaluated simulator scenario on April 9, 2024.

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (2 Samples)

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

(1) steam bypass control system issues following maintenance outage on May 12, 2024
(2) reactor water cleanup delta flow timer on May 11, 2024

Quality Control (IP Section 03.02) (1 Sample)

The inspectors evaluated the effectiveness of maintenance and quality control activities to ensure the following SSC remains capable of performing its intended function:

(1) ‘B’ reactor recirculating pump seal replacement on May 11 through 17, 2024

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (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) remote shutdown operability test, work order #200902588
(2) ‘B’ emergency service water pump outage, work order #20090138
(3) shutdown risk assessment for maintenance outage beginning May 11, 2024
(4) shutdown risk assessment for maintenance outage beginning May 23, 2024
(5) division 3 emergency diesel generator activities due to the water intrusion during the storm on May 18, 2024

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (7 Samples)

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

(1) bus XH11 undervoltage relay
(2) ‘E’ intermediate range monitor operability assessment
(3) steam bypass pressure control system functional assessment
(4) reactor water cleanup system delta flow isolation functional assessment
(5) high pressure core spray operability assessment
(6) division 3 emergency diesel generator undervoltage relay operability assessment
(7) division 3 emergency diesel generator water intrusion operability assessment

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) permanent modification implementation of procedural allowance for use of alternate keep fill regarding residual heat removal system on April 11, 2024
(2) review of engineering change package 24-1051-001 on May 14, 2024

71111.20 - Refueling and Other Outage Activities

Refueling/Other Outage Sample (IP Section 03.01) (2 Samples)

(1) The inspectors evaluated the planned maintenance outage activities associated with ‘B’ reactor recirculating pump seal leakage from May 11 to May 19, 2024.
(2) The inspectors evaluated the forced maintenance outage activities associated with ‘A’ reactor recirculating pump suction valve packing leak from May 23 to May 27, 2024.

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) division 1 T9 isolation transformer replacement on January 26, 2024
(2) 'G' average power range monitor 24-volt power supply replacement of on May 8, 2024
(3) 'A' reactor feed pump turbine solenoid valve replacement between May 12 and 17, 2024
(4) 'B' control rod drive pump maintenance finished on May 14, 2024
(5) 'B' reactor recirculating pump seal replacement finished on May 16, 2024
(6) 'A' reactor recirculating pump suction valve leak during forced cold shutdown between May 23 and May 26, 2024
(7) division 1 emergency diesel generator lube oil temperature module replacement on June 11, 2024

Surveillance Testing (IP Section 03.01) (6 Samples)

(1) remote shutdown operability test (24 months) between April 16 and 18, 2024
(2) breaker EH1205 ground over current calibration on April 24, 2024
(3) transformer LH-1-B deluge testing on May 12, 2024
(4) reactor cooldown surveillance on May 11, 2024
(5) reactor core isolation cooling valve and flow controller position verification surveillance on May 15, 2024
(6) transformer LH-1-C deluge testing on May 13, 2024

Inservice Testing (IST) (IP Section 03.01) (1 Sample)

(1) 'D' and 'E' main steam isolation valve closure channels response time surveillance (24 month) on April 10, 2024

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

(1) containment atmospheric monitoring isolation valves testing on May 12, 2024

71114.06 - Drill Evaluation

Additional Drill and/or Training Evolution (2 Samples)

The inspectors evaluated:

(1) multifacility tabletop drill on April 30, 2024
(2) multifacility tabletop drill on June 11, 2024

RADIATION SAFETY

71124.03 - In-Plant Airborne Radioactivity Control and Mitigation

Permanent Ventilation Systems (IP Section 03.01) (1 Sample)

The inspectors evaluated the configuration of the following permanently installed ventilation systems:

(1) control room emergency recirculation ventilation system

Temporary Ventilation Systems (IP Section 03.02) (1 Sample)

The inspectors evaluated the configuration of the following temporary ventilation systems:

(1) auxiliary building sump ventilation

Use of Respiratory Protection Devices (IP Section 03.03) (1 Sample)

(1) The inspectors evaluated the licensee's use of respiratory protection devices.

Self-Contained Breathing Apparatus for Emergency Use (IP Section 03.04) (1 Sample)

(1) The inspectors evaluated the licensee's use and maintenance of self-contained breathing apparatuses.

71124.04 - Occupational Dose Assessment

Source Term Characterization (IP Section 03.01) (1 Sample)

(1) The inspectors evaluated licensee performance as it pertains to radioactive source term characterization.

External Dosimetry (IP Section 03.02) (1 Sample)

(1) The inspectors evaluated how the licensee processes, stores, and uses external dosimetry.

Internal Dosimetry (IP Section 03.03) (2 Samples)

The inspectors evaluated the following internal dose assessments:

(1) internal dose assessment for CR-2023-01912
(2) internal dose assessment for CR-2023-01488

Special Dosimetric Situations (IP Section 03.04) (2 Samples)

The inspectors evaluated the following special dosimetric situations:

(1) use of effective dose equivalent for reactor water clean up work
(2) declared pregnant workers

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

MS05: Safety System Functional Failures (SSFFs) Sample (IP Section 02.04) (1 Sample)

(1) Unit 1 (April 1, 2023, through March 31, 2024)

MS06: Emergency AC Power Systems (IP Section 02.05) (1 Sample)

(1) Unit 1 (April 1, 2023, through March 31, 2024)

MS07: High Pressure Injection Systems (IP Section 02.06) (1 Sample)

(1) Unit 1 (April 1, 2023, through March 31, 2024)

71152A - Annual Follow-Up Problem Identification and Resolution

Annual Follow-Up of Selected Issues (Section 03.03) (4 Samples)

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

(1) 'B' recirculating pump seal
(2) nuclear closed cooling system effluent pathway
(3) tritium presence in groundwater
(4) steam head stud assembly modification pins

71152S - Semiannual Trend Problem Identification and Resolution

Semiannual Trend Review (Section 03.02) (2 Samples)

(1) The inspectors reviewed the licensee's corrective action program to identify trends in work planning and execution issues that might be indicative of a more significant safety issue.
(2) The inspectors reviewed the licensee's corrective action program to identify trends in engineering procedural compliance that might be indicative of a more significant safety issue.

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

Event Follow-up (IP Section 03.01) (3 Samples)

(1) The inspectors evaluated loss of reactor water cleanup safety function and licensee's response on May 16, 2024.
(2) The inspectors evaluated the required shutdown due to exceeding technical specification unidentified reactor coolant system leakage limit and licensee's response on May 23, 2024.

(3) The inspectors evaluated the potential water intrusion into the division 3 emergency diesel generator during severe weather and licensee's response on June 18, 2024.

Event Report (IP Section 03.02) (2 Samples)

The inspectors evaluated the following licensee's event reporting determinations to ensure it complied with reporting requirements.

(1) LER 05000440/2024-001-00, (ADAMS Accession No. ML24172A162). The inspection conclusions associated with this LER are documented in this report under Inspection Results Section 71111.18. This LER is closed.
(2) LER 05000440/2024-002-00, (ADAMS Accession No. ML24179A014). The inspection conclusions associated with this LER are documented in this report under Inspection Results Section 71153. This LER is closed.

INSPECTION RESULTS

Licensee-Identified Non-Cited Violation	71111.18
This violation of very low safety significance was identified by the licensee and has been entered into the licensee corrective action program and is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.	
The ROP's significance determination process does not specifically consider the regulatory process impact in its assessment of licensee performance. Therefore, it is necessary to address this violation which impedes the NRC's ability to regulate using traditional enforcement to adequately deter non-compliance. Violation: Technical Specification (TS) 3.5.1, "ECCS-Operating," Condition C states, "Two ECCS injection subsystems inoperable," Required Action C.1 states, "Restore once ECCS injection/spray subsystem to OPERABLE status," within 72 hours; Condition D states, "Required Action and associated Completion of Condition A, B, or C not met," Required Action D.1 states, "Be in MODE 3" in 12 hours, Required Action D.2 states, " Be in MODE 4," in 36 hours. Contrary to the above, the plant was not in Mode 3 in 12 hours and Mode 4 in 36 hours after the completion time for TS Limiting Condition for Operation (LCO) 3.5.1- required action C.1 was not met on March 30th, 2024, at 8:15 p.m. With the Division II waterleg pump, and by extension Division II B/C Residual Heat Removal (RHR) operability not being restored until March 30th, 2024, at 8:32 p.m. that period was greater than the allowed completion time by the limiting condition for operation provided in TS LCO 3.5.1. Violation: 10 CFR 50.59(d)(1) requires the licensee to maintain records of changes in the facility, of changes in procedures, and of tests and experiments made pursuant to 10 CFR 50.59(c). These records must include a written evaluation which provides the bases for the determination that the change, test, or experiment does not require a license amendment pursuant to paragraph (c)(2) of this section. Per the Updated Safety Analysis Report, Section 6.3.2.2.5, use of the condensate storage tank water head, that is alternate keepfill, is only allowed for initial fill of the residual heat removal system and does not mention its use for maintaining the fill of the system. The waterleg pump is used to ensure that the discharge lines are full up to the isolation valves and to ensure no gas voids occur within the piping. The section also mandates that a high	

point vent procedure be performed after stopping and re-starting the waterleg pump. Contrary to the above, between February 22, 2024, and April 11, 2024, the licensee failed to maintain records of changes in procedures made pursuant 10 CFR 50.59(c). Specifically, the licensee failed to provide a written evaluation to provide a basis for why Revision 80 of SOI-E12, Residual Heat Removal System, which removed the requirement for RHR to be declared inoperable when on alternate keepfill, did not require prior NRC approval. The licensee did not provide a basis for why the change would not result in more than a minimal increase in the likelihood of occurrence of a malfunction of an SSC important to safety.
Significance: Green. The inspectors screened the finding using IMC 0609 Appendix A, “The Significance Determination Process (SDP) for Findings At-Power,” Exhibit 2 - Mitigating Systems Screening Questions, section A, Mitigating SSCs and PRA Functionality (except Reactivity Control Systems). The inspectors answered ‘yes’ to question 1 as probability risk assessment functionality was maintained and that resulted in screening the issue to Green. Severity: Severity Level IV. Since the violation resulted in a condition that was determined to have very low safety significance (Green), the traditional enforcement violation was determined to be a Severity Level IV violation, consistent with the example in paragraph 6.1.d.2 of the NRC Enforcement Policy.
Corrective Action References: CR-2024-03160

Observation: ‘B’ Recirculating Pump Seals	71152A
The inspectors performed an in-depth review of the ‘B’ reactor recirculating pump seal and impact on drywell identified and unidentified leakage rates, the associated apparent cause evaluation, and implemented and planned corrective actions. The ‘B’ reactor recirculating pump seal pressures and drywell leakage rates degraded from December 2023 to May 2024. The licensee developed an Operational Decision-Making Instruction (ODMI) procedure to ensure trending and termination criteria were established. In May 2024, a planned maintenance outage was conducted starting May 11, 2024, and the seal was successfully replaced. The plant was restored to operation on May 17, 2024. Failure analysis included seal post-mortem disassembly, inspections, pictures, vendor discussions, comparisons with industry seal documentation and an apparent cause evaluation in accordance with the licensee’s corrective action program. The licensee’s cause evaluation concluded that the ‘B’ reactor recirculating pump seal damage resulted from particulate in the seal purge water passing through the filters into the seal cavities and scratching the highly polished seal faces. Once scratched, water leaked through from the high-pressure side to the low-pressure side, started to flash to steam and cut the softer carbon seal face. Steam cutting resulted in more leakage, more leakage results in more damage in a self-perpetuating, degrading trend. An Equipment Failure Analysis Checklist (EFAC), pointed to an inadequate design of seal purge filters. Current vendor recommendations best practices documents call out filters to remove particulate sized 1 micron and larger. Existing filters were 3–5 micron absolute. Multiple other issues such as pump shuttling, stray currents/residual magnetism, and low-pressure operation were identified as contributors to poor mechanical seal health. The corrective actions developed include an engineering modification to change	

seal purge filters from existing 3–5 micron absolute to a filter 1 micron or better to meet recently developed industry best practices and vendor recommendations. An engineering evaluation request, EER #601451631, was submitted to engineering on May 21, 2024, regarding this plant modification. Additionally, a procedure change request was submitted to minimize reactor recirculation pump operating time with the reactor vessel at low pressure (<50 psig). The inspectors determined that the issues associated with the reactor recirculating pump seals were not reasonably within the licensee's ability to foresee and correct and not a performance deficiency. The licensee's effort in the apparent cause evaluation, including the corrective actions, were determined to be adequate, and the inspectors identified no more-than minor findings or violations associated with the product.

Observation: Shroud Head Stud Assembly Modification Pins	71152A
The inspectors performed an in-depth review of the shroud head stud assembly modification (SHSAM) anti-rotating/locking pins, the associated Operational Decision Making Instruction (ODMI) procedure, and the impact of both the May 11, 2024, and May 23, 2024, reactor plant cold shutdown maintenance outages on the pins. These modification pins replaced the stud locking function originally provided by the shroud head stud bolts. During refueling outage 19 in 2023, two of the 16 active SHSAM pins showed significant wear. An evaluation was performed by General Electric Hitachi (GEH) engineering that concluded the design condition for the SHSAM connections will be met as long as reactor water temperature does not reduce below 150 degrees Fahrenheit (F). Given the potential necessity to reduce reactor water temperature below 150 degrees F in support of a forced or planned maintenance outage prior to the next refueling outage in 2025, the GEH evaluation indicated that there could be preload assurance challenges to the SHSAM studs at locations #10 and #11. The licensee-developed ODMI procedure concluded that if there was an unplanned outage requiring reactor water temperature to be reduced below 150 degrees F, the licensee management would have to make a decision as to whether or not to perform inspections of the affected SHSAM bolts to check for any loss of preload. Both May 2024 reactor plant cold shutdown maintenance outages met this threshold. Option one was to remove the reactor head and inspect the SHSAM pins in question. The second option was to implement monitoring criteria to identify degrading steam separator performance or equipment abnormalities during reactor plant startup. Both outage recoveries used the second option. The licensee decisions were noted to be "not without risk," as no analysis exists justifying less than 16 active SHSAMs precluding separator movement during a seismic event for example. The inspectors reviewed the ODMI, GEH Engineering Evaluation 007N6957, and the associated licensee technical assessments for the SHSAM pin issue. The inspectors also observed both reactor startup evolutions and noted no indication of jet pump abnormalities or recirculating pump suction temperature abnormalities during startup that would indicate shroud head or steam separator functional challenges and potential steam bypass. Though not a safety function, the failure of the SHSAM pins could lead to an initiating event sequence requiring immediate plant shutdown. The event sequence would have been sufficiently guided by existing off normal instruction procedures. The inspectors evaluated the issues associated with the steam head stud assembly modification pins due to the cold shutdown and identified no more-than minor findings or violations.	

Observation: Trends in Work Planning and Execution	71152S

The inspectors performed a semiannual review of a potential adverse trend in the licensee's corrective action program to work planning and execution issues that might be indicative of a more significant safety issue.

Included in this sample were the following corrective action program documents:

- CR 2024-02730, "NEIL Notification for Fire Impairment expected to exceed 90 days"
- CR 2024-02868, "Non-Critical PM Deep-In-Grace Indicator Projecting Negative Trend"
- CR 2024-03125, "Seismic Monitoring Inoperable Greater than 30 Days"
- CR 2024-03280, "Potential non-like-for-like oil from vendor in starting air compressor"
- CR 2024-04401, "NEIL Notification made for three Fire Impairments expected to exceed 90 days"
- Multiple corrective action program entry items associated with technical support center uninterruptable power supply
- Multiple corrective action program entry items associated with emergency core cooling system water leg pumps

During the inspection period, the inspectors evaluated more than a dozen instances of both safety and support system maintenance delayed or scheduled deep into grace periods. The tracking and prioritization of such maintenance backlog challenges the resolution of issues and presents potential for the issues to be incorrectly prioritized or inadvertently forgotten altogether. Known maintenance items have challenged a number of the reactor oversight process safety cornerstones during the inspection period, and it is the inspector's perspective that the planning and execution of maintenance activities continue to add to an overall maintenance backlog that have a potential to postpone support and safety system impacting maintenance. The safety culture common language associated behavior was WP.1- Work Management: "The organization implements a process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority. Specifically, the work process includes the identification and management of risk commensurate to the work." The inspectors completed the objectives of the inspection procedure and trended the behavior to consider potential safety culture weaknesses and discussed with the licensee about taking appropriate actions before significant performance degradation occurs as stated in NUREG–2165, "Safety Culture Common Language." The issues addressed in this inspection were not identified to be more than minor since the licensee implemented appropriate contingencies and all equipment remained functional.

Observation: Trends in Engineering Procedural Compliance	71152S

The inspectors performed a semiannual review of a potential adverse trend in the licensee's corrective action program in engineering procedural compliance issues that might be indicative of a more significant safety issue.

Included in this sample were the following corrective action program documents:

• CR 2024-00602, "Code Required Actions Not Taken For ESW Pump B Vibrations in Alert Range"

• CR 2024-00605, "Code Required Actions Not Taken For HPCS WATER LEG Pump Vibrations in Alert Range"

• CR 2024-00794, "Increased Vibrations on Emergency Closed Cooling Pump 'B'"

• CR 2024-00814, "Pressure indicator 1E22-R0001 for High Pressure Core Spray suction found out of calibration"

• CR 2024-01312, "MMD-Drift Limit Exceeded for SIV-B21-T0138B"

• CR 2024-01387, “Code Required Actions Not Taken For LPCS & RHR A Waterleg Pump Vibrations in Alert Range” • CR 2024-01388, “Code Required Actions Not Taken For FPCC Pump B Vibrations in Alert Range” • CR 2024-02321, “Nonconservative Design Inputs used in Design Calculation B13-30” • CR 2024-02449, “Code Required Actions Not Taken in a Timely Manner” During the inspection period, the inspectors evaluated nine instances of both safety and support system maintenance code challenges. The inspectors followed the documented corrective action program issues from the first quarter of 2024 with observations of engineering training, both initial and continuing training, as well as engineering operational experience meetings. Engineering ownership of plant design in maintenance activities and in plant change evaluations was notably emphasized. The inspectors noted several instances where the necessary challenges regarding design basis were demonstrated by various engineering staff in both the maintenance and plant change processes. It is the inspectors’ perspective that the potential adverse trend in behavior that initiated this sample has largely been and continues to be addressed by the licensee and that better collaboration between the maintenance, operations, engineering, work planning, and management would accelerate the desired performance by all groups. The safety culture common language associated behavior was PA.3 Teamwork: “Individuals and workgroups communicate and coordinate their activities within and across organizational boundaries to ensure nuclear safety is maintained. Specifically, individuals demonstrate a strong sense of collaboration and cooperation in connection with projects and operational activities, and individuals work as a team to provide peer-checks, verify certifications and training, ensure detailed safety practices, actively peer coach new personnel, and share tools and publications.” The inspectors completed the objectives of the inspection procedure and trended the behavior to consider potential safety culture weaknesses and discussed with the licensee about taking appropriate actions before significant performance degradation occurs as stated in NUREG–2165, “Safety Culture Common Language.” The issues addressed in this inspection were not identified to be more than minor.

Shutdown Due to Exceeding Technical Specification Unidentified Reactor Coolant System Leakage Limit			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green FIN 05000440/2024002-01 Open/Closed	[P.3] - Resolution	71153
The inspectors identified a finding of very low safety significance (Green) for the licensee’s failure to properly identify and scope work on the ‘A’ reactor recirculating pump suction valve packing located in the drywell into refueling outage 19.			
<u>Description</u>: On May 23, 2024, Perry Nuclear Power Plant, Unit 1 initiated a manual shutdown and entered a forced maintenance outage of the reactor plant when drywell unidentified leakage exceeded the Technical Specification (TS) limit. The event caused no potential degradation of the plant’s level of safety and no release of radioactive material. The resident inspector staff responded and was present, informed, and monitored the plant and personnel performance during the event. The NRC evaluated the event and documented its initial assessment in an NRC Management Directive -(MD) 8.3 document, “-Decision Documentation for Reactive			

Inspection," available via ADAMS Accession Number ML24185A226. The NRC concluded a reactive inspection on this issue was not warranted since operator performance was as expected, and the estimated leakage remained within the makeup capability of permanently installed plant equipment.

As documented in Event Notification (EN) 57136 submitted to the NRC on May 23, 2024, TS Action 3.4.5. condition B, unidentified Reactor Coolant System (RCS) leakage exceeds 5 gallons per minute, was entered on May 23, 2024, at 0000 with a required action to reduce leakage to within limits within 4 hours, due by 0400 on May 23, 2024. This required action to reduce leakage was not completed within the required time; therefore, a technical specification required shutdown was initiated and reported as a 4-hour, non-emergency notification per 10 CFR 50.72(b)(2)(i).

After reactor shutdown and discovery of the source of the leak, the licensee estimated 12 gallon per minute (gpm) leakage from the 'A' reactor recirculating pump suction valve stem packing and into the valve's leak off detection line. This valve is designed for isolation during maintenance activities and has no protective features. From the leak off line, approximately 7.7 gpm leaked into the drywell general spaces through a flange leak in an inline, glass flow gauge and eventually condensed into the drywell floor drain sump as unidentified leakage. The remaining leakage passed through the glass flow gauge via the normal leak off flow path and into the drywell equipment drain sump as identified leakage.

The plant was then placed in Mode 3, which is a hot shutdown condition, as required by technical specification actions. The licensee opened the reactor recirculating pump suction valve against its backseat and closed a manual isolation valve in the leak off line, upstream of the degraded flange, and inside the approved code boundary for normal operating reactor pressure and temperature. There was no indication that this degradation has any generic implication nor repetitive failure. From the initial leak identification and plant shutdown to the leak isolation and plant restoration, operators and equipment responded as expected. A post-maintenance inspection at normal operating pressure was completed with no indications of identified or unidentified leakage from the 'A' reactor recirculating pump suction valve or supporting systems. A complete repair of the reactor recirculating pump suction valve packing is scheduled for the next refueling outage in 2025.

The inspectors determined appropriate TS conditions and actions were complied with, including entry into a 12-hour shutdown statement, as well as the regulatory notification requirements. The inspectors review of the licensee's emergency plan identified no emergency action level thresholds were exceeded. No more-than minor findings were identified with the licensee's performance and event response efforts.

The inspectors evaluated historical causal and corrective actions taken on the 'A' reactor recirculating pump suction valve stem packing. In 2013, the initial indications of valve first stage packing issues were identified, with rising temperatures in the leak off line temperature monitor accompanied with very low volumetric changes in the identified leakage well below TS action levels. In 2020, the leak off line temperature again showed a rise in the first stage packing, with similar very low volumetric changes in the identified leakage well below TS action levels. During the refueling outage of spring, 2023, the valve in question remained out of the priority work regarding repairs. The licensee's outage scope identification and control procedure requires items that need to be done during an outage, such as tasks designed to mitigate plant transients and items that cannot be repaired during operation to be included in the outage. Given the history and potential of this valve, the inspectors identified that

NOBP-OM-4009, Outage Scope Identification and Control, was not appropriately applied to prevent this TS forced shutdown event. The licensee’s root cause investigation came to similar conclusions and the inspectors identified no issues with the licensee's root cause. Corrective Actions: The licensee has planned a number of corrective actions, which include: • develop and implement an engineering change package to eliminate leak off line for 1B33F0023A in conjunction with eliminating 3-stage packing configuration in refueling outage 1R20, and • develop and implement a site valve packing preventive maintenance program for inaccessible locations while online. Corrective Action References: CR-2024-04658
Performance Assessment: Performance Deficiency: The inspectors determined that the licensee’s failure to repair the degrading ‘A’ reactor recirculating pump suction valve packing before causing excessive unidentified reactor coolant system leakage into the drywell and requiring a technical specification shutdown of the reactor plant was a performance deficiency. Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the RCS Equipment and Barrier Performance attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. The inspectors compared the issue to the examples and guidance in IMC 0612, Appendix E, “Examples of Minor Issues.” Specifically, the failure to address the degrading packing caused a technical specification required reactor plant shutdown and is similar to example 4.g of Appendix E. Significance: The inspectors assessed the significance of the finding using IMC 0609 Appendix A, “The Significance Determination Process (SDP) for Findings At-Power.” The inspectors screened the finding using Exhibit 3 - Barrier integrity Screen Questions, section B, Reactor Coolant system (RCS) Boundary. The inspectors answered ‘no’ to the question, which results in screening the issue to Green. Cross-Cutting Aspect: P.3 - Resolution: The organization takes effective corrective actions to address issues in a timely manner commensurate with their safety significance. Specifically, deferrals of corrective actions are minimized; when required, due dates are extended using an established process that appropriately considers safety significance.
Enforcement: Inspectors did not identify a violation of regulatory requirements associated with this finding.

Observation: Water Intrusion into the Division 3 Emergency Diesel Generator During Severe Weather	71153
On June 18, 2024, Perry Nuclear Power Plant, Unit 1, entered the off normal instruction for severe weather. During a down pour of rain, water from the diesel generator building roof and exhaust hallway was able to make its way down the exhaust manifold into the division 3 diesel generator room. As part of the off normal instructions, plant equipment was assessed, and water was observed running down the division 3 diesel engine and on the electrical	

portion of the generator. The impacted diesel generator was in standby readiness at the time. The event caused no other potential degradation the plant's level of safety, and no release of radioactive material to the environment. The resident inspector staff responded and was present, informed, and monitored the plant and personnel performance during event decisions and actions. The NRC evaluated the event and documented its initial assessment in MD 8.3 Decision Documentation for Reactive Inspection available via ADAMS Accession Number ML24199A151. The NRC concluded a reactive inspection for this issue was not warranted since the resident inspector had already obtained a significant amount of information regarding the event and its potential causes, the event impact was limited to a single train of emergency power and the system it supplied, and operator performance during and following the event was expected.

As documented in Event Notification 57181 submitted June 19, 2024, Technical Specification (TS) Action 3.8.1 condition B, one required diesel generator inoperable, was entered on June 18, 2024, at 1640, with a required action to restore to operable status, due by 1640 on June 21, 2024. Therefore, this condition was reported as an 8-hour, non-emergency notification per 10 CFR 50.72(b)(3)(v)(C) and 10 CFR 50.72(b)(3)(v)(D). However, the notification was reported about 15 hours after the event rather than the required 8 hours. The inspectors and regional NRC staff maintained observation and understanding of the events during the entire sequence and were not impacted in their regulatory oversight functions.

While in the TS required actions, the division 3 diesel generator was removed from service, tagged out, visually inspected, and electrical tested. The generator was verified dry and electrical insulation was determined to be acceptable and capable of providing the proper insulation to ground to allow the diesel generator to run without compromising cables or capabilities to perform its safety function. On June 20, 2024, the division 3 diesel generator was declared operable and returned to standby readiness.

The inspectors determined appropriate TS conditions and actions were complied with regarding event response, except for a delayed regulatory notification, which had no impact on regulatory response or decision making as the resident staff was present and regional management continuously appraised. Regarding the delayed notification, the station generated a corrective action item entry with actions to clarify in-house guidance regarding the notification regulatory requirements associated with these instrument functions and applicability. Given the significance of and circumstances surrounding the matter, the inspectors characterized this performance deficiency as a minor violation of 10 CFR 50.72(b)(3)(v)(C) and 10 CFR 50.72(b)(3)(v)(D). The inspectors identified no more-than minor findings with the licensee's event response and performance efforts; however additional NRC inspection regarding event cause and corrective actions is ongoing and will be documented in a subsequent report.

EXIT MEETINGS AND DEBRIEFS

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

- On July 11, 2024, the inspectors presented the integrated inspection results to R. Penfield, and other members of the licensee staff.
- On June 11, 2024, the inspectors presented the radiation protection inspection results to R. Penfield, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.01	Miscellaneous	2024 NOP-WM-2002	Certification of Summer Readiness	06/27/2024
71111.04	Procedures	VLI-E12	Residual Heat Removal System	04/24/2024
71111.05	Fire Plans	1RB-1C-1c	Drywell	05/12/2024
		FZ 1AB-1E	Unit 1 – RHR – B System 574″ – 10″ Elevation	04/24/2024
	Procedures	FPI-A-B02	Fire Brigade Drills	04/17/2024
71111.12	Corrective Action Documents	CR 2024-04251	RWCU Delta Flow Timer Is Locked in Alarm Due to Incorrect RWCU Feed Return Reading	05/11/2024
		CR 2024-04281	C85/N32 Module #2 Tripped Red Light is on in The Control Room Indicating Potential Problem with Turbine Control or Steam Bypass System	05/17/2024
		CR 2024-04389	Annunciator System Ground	05/15/2024
		CR 2024-04417	Broke Condenser Vacuum Leading to 3.5 Hour Startup Delay	05/16/2024
		CR 2024-04419	Procedural Issues Delayed Plant Mode Change	05/16/2024
		CR 2024-04534	Reactor Pressure Regulator Setpoint Lower Than Normal	05/19/2024
71111.13	Corrective Action Documents	CR 2024-052358	Water Leakage in Division 3 Diesel Generator Room	06/18/2024
		CR 2024-05266	Late NRC Notification of a Condition Could Prevent the Fulfillment of a Safety Function	06/19/2024
	Procedures	NOP-OP-1005-01	Shutdown Defense in Depth for ‘B’ Recirculation Pump Seal Outage	7
	Work Orders	WO 200902588	Remote Shutdown Operability Test	04/16/2024
		WO 200910138	ESW B Start Time Faster Than LAIZ/CR	04/24/2024
71111.15	Corrective Action Documents	CR 2024-03640	Under/Overvoltage Relay Trip Target Locked In	04/24/2024
		CR 2024-04246	Intermediate Range Monitor “E” Indication Erratic and Not Able to range properly	05/11/2024
		CR 2024-04251	RWCU Delta Flow Timer is locked in Alarm due to Incorrect RWCU Feed Return Reading	05/11/2024
		CR 2024-04283	Steam Bypass Pressure Control C85 Two Pumps Running Alarm Not Functional	05/12/2024
		CR 2024-04391	HPCS Alternate Keepfill Basis/Regulatory Applicability Determination Concerns	05/15/2024
		CR 2024-04405	RWCU Delta Flow Are High	05/15/2024

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		CR 2024-04460	Reactor Water Cleanup Leak Detection was Bypassed Due to Erratic Indications	05/16/2024
		CR 2024-04460	Reactor Water Cleanup Leak Detection was Bypassed Due to Erratic Indications	05/17/2024
		CR 2024-04484	Erratic High RWCU Delta Flow Readings	05/17/2024
		CR 2024-04950	Div 3 EDG UV Relay Out of Tech Spec Allowable Limits	06/05/2024
	Procedures	ICI-C-C51-0003	Intermediate Range Monitoring (IRM) Voltage Preamplifier Calibration	4
		IMI-E06-0009	Filling and Venting RWCU Differential High Flow Instruments	05/16/2024
71111.18	Corrective Action Documents	CR 2024-02947	Potentially Inadequate Review of RHR Alternate Keep-fill Allowance in SOI-E12, Rev. 80	04/04/2024
		CR 2024-03160	10 CFR 50.59 Review Committee - Failed Product	04/11/2024
	Engineering Changes	ECP 24-1051-001	Removal of Saf-T-Climb Ladder in ESWPH	1
	Procedures	10 CFR 50.59 Screen 24-00297	Residual Heat Removal System	0
71111.24	Corrective Action Documents	CR 2020-09332	New Replacement T8 & T9 Transformer Brackets Not Same as Existing	12/09/2020
		CR 2022-08793	Unable to Locate Parts for Work Orders (200471341 & 200471343)	11/16/2022
		CR 2024-00642	Trip of Reactor Feed Pump Turbine B	01/24/2024
		CR 2024-01619	CRD Pump B Oil Leak	02/29/2024
		CR 2024-04181	False Division 1 DG Lube Oil Temperature High Alarm	05/09/2024
		CR 2024-04656	Post Walkdown Leak Identified in the Drywell	05/23/2024
	Engineering Changes	ECP 21-0186-012	Change The GR-5 (50G) Set Point Time Delay From 2 Cycles to 6 Cycles for Relay PY-1R22Q0714	0
	Engineering Evaluations	EER 601451897	Provide Backseat Torque-Recirc Suction	05/24/2024
	Procedures	GEI-0001	Performing Insulation Resistance Checks	17
		GEI-0001	Performing Insulation Resistance Checks	01/25/2024
		GEI-0007A	Instructions For Cable and Wire Terminations	01/25/2024
		GEI-0104	Maintenance and Calibration of Ground Fault Relays Type GR-5	6
		SVI-B21-T1176	RCS Heatup and Cooldown Surveillance	01/26/2016

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		SVI-C51-T0030G	APRM G Channel Calibration for 1C51-K605G	16
		SVI-C61-T1201	Remote Shutdown Panel 1C61-P001 Control Operability Test RHR A, ESW A, ECC A, and Division 1 Diesel Generator	04/16/2024
		SVI-E31-T0101-A	RCIC Steam Supply Pressure Low Channel A Calibration for 1E31-N085A	8
		SVI-E51-T1269	RCIC System Valve and Flow Controller Position Verification	14
	Work Orders	WO 200814068	(IPO-36) Replace PS413	05/08/2024
		WO 200854169	PTI-P54P0064B LH-1-B Spray Flow Test (24M) Water Spray Flow Test for Unit 1 Interbus Transformer “B”	05/12/2024
		WO 200864759	PTI-P54P0064C LH-1-C Spray Flow Test (24M) Water Spray Flow Test for Unit 1 Interbus Transformer “C”	05/13/2024
		WO 200865391	SVI-E51T1269 RCIC Vlv & Flow Controller (31D) RCOIC System Valve and Flow Controller Position Verification	04/15/2024
		WO 200902569	SVI-C71T0253D 1 (24M-STB) MSIV Closure Channel D and E RPS Response Time For 1C71A-k3D and 1C71A-K3E	04/10/2024
		WO 200902611	SVI-E31T0101A 1 (24M) RCIC Steam Supply Pressure Low Channel A Calibration For 1E31-N085A 4/18/2024	04/18/2024
		WO 200916180	“No Work Description Detailed”	04/25/2024
		WO 200920690	SVI -SVI-D23T2001 1 (92D) (C/S) Containment Atmosphere Monitoring Isolation Valve Operability Test	05/12/2024
		WO 200937876	Replace RFPT A Solenoid Valve, 1N27F0406A, 1N27F0408A, 1N27F0412A and, 1N27F0413A Cables in the Week Ending	05/19/2024
		WO 200939485	Determine Cause/Repair CRD Pump Oil Leak	05/14/2024
		WO 200939485	“SUPERSEDED”	03/14/2024
		WO 200944907	Determine the Cause of the False Div 1 DG LO Temp. HI Alarm and Repair/Replace Parts as Required	06/12/2024
		WO 200946699	Repair Leak at Site Flow Indicator	05/24/2024
71124.03	Corrective Action Documents	CR-2023-09046	SCBA Failed Function Test	12/08/2023
	Corrective Action Documents Resulting from	CR-2024-03966	Use Of Zero Value in Procedures Related to HEPA and Vacuum Units	05/02/2024

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Inspection			
	Miscellaneous		Posi3 USB Test Results	09/06/2023
		G-GEN-SCBA_FEN	M7 Firehawk SCBA Respirator Qualification Records for Various Individuals	04/02/2024
		PNPP 8269	Respirator Inspection Records	02/02/2024
	Procedures	NOP-OP-4303	Respirator Quantitative Fit Test	09
		NOP-OP-4310	FireHawk M7 Self Contained Breathing Apparatus	11
	Work Orders	200864338	Control Room Emergency Recirculation Subsystem A Flow and Filter Operability Test	02/14/2023
		200864339	Control Room Emergency Recirculation Subsystem B Flow and Filter Operability Test	12/28/2022
71124.04	Corrective Action Documents	CR-2024-01169	Higher Than Expected Shallow and Eye Dose On TLD	02/14/2024
	Corrective Action Documents Resulting from Inspection	CR-2024-02892	Potential Issues with NRC Form 5s When EDEx Is Involved	04/03/2024
	Miscellaneous	NOP-OP-4204-04	Effective Dose Equivalent Dose Determination Form	02/15/2024
		NOP-OP-4205-02	TLD/SRD Deviation Investigation Report	02/01/2024
		RPS-23-006	EDEX Plan for RWCU Repair	0
	Procedures	NOP-OP-4204	Special External Exposure Monitoring	12
		NOP-OP-4205	Dose Assessment	11
		NOP-OP-4206	Bioassay Program	05
	Radiation Work Permits (RWPs)	230357	RWCU Seal Weld	0
		230505	Scaffolding Work in Drywell	0
		230903	IVVI Activities	0
71152A	Corrective Action Documents	CR 2024-04257	Reactor Recirculation Pump B Seal Pressures and Drywell Leakage Rates Have Degraded from December 2023 to May 2024 Resulting a Plant Outage for Seal Replacement	05/11/2024
	Engineering Evaluations	601449458	De-tensioned SHSAM Risks	05/08/2024
71153	Corrective Action Documents	CR 2024-04458	Late NRC Notification of Loss of Safety Function	05/16/2024
		CR 2024-04458	Late NRC Notification of Loss of Safety Function	05/16/2024

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		CR 2024-04460	Reactor Water Cleanup Leak Detection was Bypassed Due to Erratic Indications	05/14/2024
		CR 2024-04484	Erratic High RWCU Delta Flow Readings	05/17/2024
	Miscellaneous	EN 57130	Reactor Water Cleanup System Isolation Channel Inoperable	05/16/2024
		EN 57136	Technical Specification Required Shutdown	05/23/2024
		EN 57181	Inoperability of Division 3 Diesel Generator Supporting High Pressure Core Spray	06/19/2024
		ODMI PY-24-03	SHSAM Pins 10 and 11 Degraded	1