



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION III  
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August 5, 2015

Mr. Anthony Vitale  
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Palisades Nuclear Plant  
27780 Blue Star Memorial Highway  
Covert, MI 49043-9530

**SUBJECT: PALISADES NUCLEAR PLANT NRC INTEGRATED  
INSPECTION REPORT 05000255/2015002**

Dear Mr. Vitale:

On June 30, 2015, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Palisades Nuclear Plant. The enclosed report documents the results of this inspection, which were discussed on July 14, 2015, with you and other members of your staff.

Based on the results of this inspection, one NRC-identified and one self-revealed finding of very low safety significance were identified. Both of these findings involved violations of NRC requirements. Further, inspectors documented two licensee-identified violations which were determined to be of very low safety significance in this report. However, because of their very low safety significance and because the issues were entered into your corrective action program, the NRC is treating the violations as non-cited violations (NCVs) in accordance with Section 2.3.2 of the NRC Enforcement Policy.

If you contest the subject or severity of an NCV, 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 a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission-Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector Office at the Palisades Nuclear Plant. In addition, if you disagree with the cross-cutting aspect assigned to any finding 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 Regional Administrator, Region III, and the NRC Resident Inspector at the Palisades Nuclear Plant.

A. Vitale

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In accordance with Title 10 of the *Code of Federal Regulations* (CFR) 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

Eric Duncan, Chief  
Branch 3  
Division of Reactor Projects

Docket No. 50-255  
License No. DPR-20

Enclosure:  
IR 05000255/2015002  
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 50-255  
License No: DPR-20

Report No: 05000255/2015002

Licensee: Entergy Nuclear Operations, Inc.

Facility: Palisades Nuclear Plant

Location: Covert, MI

Dates: April 1 through June 30, 2015

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Enclosure

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## SUMMARY OF FINDINGS

Inspection Report (IR) 05000255/2015002, 04/01/2015–06/30/2015; Palisades Nuclear Plant; Maintenance Effectiveness; and In-Plant Airborne Radioactivity Control and Mitigation.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. Two Green findings were identified by the inspectors. The findings were considered non-cited violations (NCVs) of U.S. Nuclear Regulatory Commission (NRC) regulations. The significance of inspection findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects Within the Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated July 9, 2013. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5, dated February 2014.

### Cornerstone: Mitigating Systems

Green. An NRC-identified finding of very low safety significance and an associated NCV of Title 10 of the *Code of Federal Regulations* (CFR) 50.65(a)(1) was identified for the failure to take appropriate corrective actions for the charging system, while in Maintenance Rule (a)(1) status, when performance or condition goals were not met. Specifically, on April 2, 2015, the front cap of the 'B' charging pump cracked, causing volume control tank (VCT) level and pressure to lower, most likely due to excessive local cavity pressures in the pump caused by the suction accumulator pressure being out of specification. Accumulator pressures being out of specification, which causes pressure oscillations and vibrations in the charging pumps and their associated suction and discharge piping, was a similar cause to previous maintenance rule system functional failures that occurred in 2013 and 2014, which transitioned the system to (a)(1) status in July 2014. The licensee documented the issue in their corrective action program (CAP), conducted an equipment apparent cause evaluation (EACE) for the most recent failure, and revised the Maintenance Rule (a)(1) Action Plan to address the on-going issues with the suction and discharge accumulators.

The inspectors determined that the performance deficiency was more than minor in accordance with IMC 0612 because it was associated with the Equipment Performance attribute of the Mitigating Systems Cornerstone and adversely impacted the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The charging system provides the critical safety functions of pressure and inventory control in the emergency operating procedures. The finding screened as having very low safety significance (i.e., Green) based on answering "No" to all the screening questions under the Mitigating Structures, Systems, and Components (SSCs) and Functionality section of the significance determination process (SDP). The finding had a cross-cutting aspect of Evaluation in the Problem Identification and Resolution area. Specifically, the organization did not thoroughly evaluate previous data on the suction and discharge accumulators pressures being out of specification and what affect that may have on the system. Also, when the accumulator pressures were found out of specification, sometimes that information was not documented in condition reports (CRs), nor were the preventive maintenance (PM)

frequencies re-evaluated in a technical and rigorous manner to ensure the correct PM activities were being conducted on these components in a timely manner to assure system reliability [P.2]. (Section 1R12)

### **Cornerstone: Occupational Radiation Safety**

Green. A self-revealed finding of very low safety significance and an associated NCV of Technical Specification (TS) 5.4.1 was identified for insulation work activities during the refueling outage associated with pressurizer spray valve CV-1057. Specifically, prior to the work beginning, the licensee determined that the use of powered air purifying respirators would be required to minimize worker dose and maintain exposures as-low-as-reasonably-achievable (ALARA), but the work was performed using only face shields, and as a result a worker was contaminated externally and internally. Corrective actions included creation of an administrative requirement to revise any radiation work permit (RWP) task that required respiratory protection to more clearly state the requirements.

The inspectors determined that the performance deficiency was more than minor in accordance with IMC 0612 because it was associated with the Program and Process attribute of the Occupational Radiation Safety Cornerstone and adversely affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation. Specifically, the failure to wear required respiratory protection during the reinsulating of CV-1057 resulted in personal contamination and the intake of radioactive material. The inspectors concluded that the radiological hazards had the potential to result in higher exposures to the individuals had the circumstances been slightly altered. The finding was determined to be of very low safety significance (Green) in accordance with IMC 0609, Appendix C, "Occupational Radiation Safety Significance Determination Process," because it was not an ALARA planning issue, there was neither an overexposure nor a substantial potential for an overexposure, and the licensee's ability to assess dose was not compromised. The inspectors concluded that the cause of the issue involved a cross-cutting aspect in the area of Human Performance, Basis for Decisions. Specifically, the bases for operational decisions were communicated in a timely manner. [H.10] (Section 2RS3)

### **Other Findings**

Violations of very low safety or security significance or Severity Level IV that were identified by the licensee have been reviewed by the NRC. Corrective actions taken or planned by the licensee have been entered into the licensee's CAP. These violations and CAP tracking numbers are listed in Section 4OA7 of this report.

## REPORT DETAILS

### Summary of Plant Status

The plant operated at or near full power for the entire inspection period.

#### 1. REACTOR SAFETY

##### **Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity**

#### 1R01 Adverse Weather Protection (71111.01)

##### .1 Readiness of Offsite and Alternate AC Power Systems

##### a. Inspection Scope

The inspectors verified that plant features and procedures for operation and continued availability of offsite and alternate alternating current (AC) power systems during adverse weather were appropriate. The inspectors reviewed the licensee's procedures affecting these areas and the communication protocols between the transmission system operator (TSO) and the plant to verify that the appropriate information was being exchanged when issues arose that could impact the offsite power system. Examples of aspects considered in the inspectors' review included:

- coordination between the TSO and the plant during off-normal or emergency events;
- explanations for the events;
- estimates of when the offsite power system would be returned to a normal state; and
- notifications from the TSO to the plant when the offsite power system was returned to normal.

The inspectors also verified that plant procedures addressed measures to monitor and maintain the availability and reliability of both the offsite AC power system and the onsite alternate AC power system prior to or during adverse weather conditions. Specifically, the inspectors verified that the licensee's procedures addressed the following:

- actions to be taken when notified by the TSO that the post-trip voltage of the offsite power system at the plant would not be acceptable to assure the continued operation of the safety-related loads without transferring to the onsite power supply;
- compensatory actions identified to be performed if it would not be possible to predict the post-trip voltage at the plant for the current grid conditions;
- re-assessment of plant risk based on maintenance activities which could affect grid reliability or the ability of the transmission system to provide offsite power; and
- communications between the plant and the TSO when changes at the plant could impact the transmission system, or when the capability of the transmission system to provide adequate offsite power was challenged.

Documents reviewed are listed in the Attachment to this report. The inspectors also reviewed Corrective Action Program (CAP) items to verify that the licensee was

identifying adverse weather issues at an appropriate threshold and entering them into their CAP in accordance with station corrective action procedures.

This inspection constituted one readiness of offsite and alternate AC power systems sample as defined in Inspection Procedure (IP) 71111.01–05.

b. Findings

No findings were identified.

.2 Summer Seasonal Readiness Preparations

a. Inspection Scope

The inspectors performed a review of the licensee’s preparations for summer weather for selected systems, including conditions that could lead to an extended drought.

During the inspection, the inspectors focused on plant-specific design features and the licensee’s procedures used to mitigate or respond to adverse weather conditions. Additionally, the inspectors reviewed the Updated Final Safety Analysis Report (UFSAR) and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant-specific procedures. Documents reviewed are listed in the Attachment to this report. The inspectors also reviewed CAP items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their CAP in accordance with station corrective action procedures. The inspectors’ reviews focused specifically on the following plant systems:

- station power;
- ultimate heat sink; and
- turbine and auxiliary building ventilation systems.

This inspection constituted one seasonal adverse weather sample as defined in IP 71111.01–05.

b. Findings

No findings were identified.

.3 Readiness for Impending Adverse Weather Condition – Geo-Magnetic Storm Forecast

a. Inspection Scope

A geo-magnetic storm disturbance with a K-index greater than or equal to seven with the potential to influence the plant was forecast on June 22, 2015. The inspectors reviewed the licensee’s preparations for the impending weather conditions and conducted independent walkdowns of the plant’s AC power systems. The inspectors verified that plant procedures for the reliability and continued availability of the offsite and onsite power systems were appropriate. The inspectors also reviewed the licensee’s communications protocols between the TSO and the plant to verify that the appropriate information was being exchanged in a timely manner when issues arose to take any necessary actions. Documents reviewed are listed in the Attachment to this Report.

This inspection constituted one readiness for impending adverse weather condition sample as defined in IP 71111.01–05.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

.1 Quarterly Partial System Walkdowns

a. Inspection Scope

The inspectors performed partial system walkdowns of the following risk-significant systems:

- 'A'/'B' instrument air compressors with 'C' instrument air train out-of-service for maintenance;
- station power system; and
- 'B' low pressure safety injection train.

The inspectors selected these systems based on their risk significance relative to the Reactor Safety Cornerstones at the time they were inspected. The inspectors attempted to identify any discrepancies that could impact the function of the system and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, system diagrams, the UFSAR, technical specification (TS) requirements, outstanding work orders (WOs), condition reports (CRs), and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment to this report.

These activities constituted three partial system walkdown samples as defined in IP 71111.04–05.

b. Findings

No findings were identified.

.2 Semi-Annual Complete System Walkdown

a. Inspection Scope

On May 22 through May 28, 2015, the inspectors performed a complete system alignment inspection of the component cooling water (CCW) system to verify the functional capability of the system. This system was selected because it was considered

both safety-significant and risk-significant in the licensee's probabilistic risk assessment. The inspectors walked down the system to review mechanical and electrical equipment lineups; electrical power availability; system pressure and temperature indications; component labeling; component lubrication; component and equipment cooling; hangers and supports; operability of support systems; and to ensure that ancillary equipment or debris did not interfere with equipment operation. A review of a sample of past and outstanding WOs was performed to determine whether any deficiencies significantly affected the system function. In addition, the inspectors reviewed the CAP database to ensure that system equipment alignment problems were being identified and appropriately resolved. Documents reviewed are listed in the Attachment to this report.

These activities constituted one complete system walkdown sample as defined in IP 71111.04–05.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

a. Inspection Scope

The inspectors conducted fire protection walkdowns which were focused on the availability, accessibility, and the condition of firefighting equipment in the following risk-significant plant areas:

- Fire Area 23: Turbine Building, 625' Elevation;
- Fire Area 4: 1–C Switchgear Room;
- Fire Area 2: Cable Spreading Room;
- Auxiliary Building hose reels and racks used for compensatory measures with #20 hose reel out-of-service for maintenance; and
- Fire Area 3: 1–D Switchgear Room.

The inspectors reviewed areas to assess if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant, effectively maintained fire detection and suppression capability, maintained passive fire protection features in good material condition, and implemented adequate compensatory measures for out-of-service, degraded or inoperable fire protection equipment, systems, or features in accordance with the licensee's fire plan. The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the plant's Individual Plant Examination of External Events with later additional insights, their potential to impact equipment which could initiate or mitigate a plant transient, or their impact on the plant's ability to respond to a security event. Using the documents listed in the Attachment to this report, the inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed; that transient material loading was within analyzed limits; and fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified that minor issues identified during the inspection were entered into the licensee's CAP.

These activities constituted five quarterly fire protection inspection samples as defined in IP 71111.05–05.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Resident Inspector Quarterly Review of Licensed Operator Requalification

a. Inspection Scope

On June 16, 2015, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator requalification training to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- licensed operator performance;
- crew's clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms;
- correct use and implementation of procedures;
- control board manipulations;
- oversight and direction from supervisors; and
- ability to identify and implement appropriate TS actions and Emergency Plan actions and notifications.

The crew's performance in these areas was compared to pre-established operator action expectations and successful critical task completion requirements. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one quarterly licensed operator requalification program simulator sample as defined in IP 71111.11.

b. Findings

No findings were identified.

2 Resident Inspector Quarterly Observation During Periods of Heightened Activity or Risk

a. Inspection Scope

On May 2, 2015, the inspectors observed the Control Room Operators respond to a seismic event. This was an activity that required heightened awareness and was related to increased risk. The inspectors evaluated the following areas:

- licensed operator performance;
- crew's clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms;

- correct use and implementation of procedures;
- control board manipulations;
- oversight and direction from supervisors; and
- ability to identify and implement appropriate TS actions and Emergency Plan actions and notifications.

The performance in these areas was compared to pre-established operator action expectations, procedural compliance, and task completion requirements. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one quarterly licensed operator heightened activity/risk sample as defined in IP 71111.11-05.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

The inspectors evaluated degraded performance issues involving the following risk-significant systems:

- charging system;
- seismic monitor; and
- diesel generator fuel oil transfer system.

The inspectors reviewed events in which ineffective equipment maintenance had resulted in valid or invalid automatic actuations of engineered safeguards systems and independently verified the licensee's actions to address system performance or condition problems in terms of the following:

- implementing appropriate work practices;
- identifying and addressing common cause failures;
- scoping of systems in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.65(b) of the maintenance rule;
- characterizing system reliability issues for performance;
- charging unavailability for performance;
- trending key parameters for condition monitoring;
- ensuring 10 CFR 50.65(a)(1) or (a)(2) classification or re-classification; and
- verifying appropriate performance criteria for structures, systems, and components (SSCs)/functions classified as (a)(2), or appropriate and adequate goals and corrective actions for systems classified as (a)(1).

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified maintenance effectiveness issues were entered into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment to this report.

This inspection constituted three quarterly maintenance effectiveness samples as defined in IP 71111.12-05.

b. Findings

Introduction: An NRC-identified finding of very low safety significance (Green) and an associated NCV of 10 CFR 50.65(a)(1) was identified for the failure to take appropriate corrective action for the charging system, while in Maintenance Rule (a)(1) status, when performance or condition goals were not met. Specifically, on April 2, 2015, the front cap of the 'B' charging pump cracked, causing volume control tank (VCT) level and pressure to lower, most likely due to excessive local cavity pressures in the pump caused by the suction accumulator pressure being out of specification. Accumulator pressures being out of specification, which causes pressure oscillations and vibrations in the charging pumps and their associated suction and discharge piping, was a similar cause to previous maintenance rule system functional failures that occurred in 2013 and 2014, which transitioned the system to a Maintenance Rule (a)(1) status in July 2014.

Description: On April 2, 2015, a leak was identified on the 'B' Charging Pump (P-55B) after control room operators noticed VCT level and pressure lowering at a greater rate than previous trends. The pump was secured and VCT level and pressure stabilized. The front center cap for the center cylinder of the pump, which is a positive displacement pump, was identified to be cracked, allowing primary coolant system (PCS) water to leak into the pump cubicle. The front center cap was replaced and the other two adjacent caps were visually inspected and showed no signs of cracking. These caps come as part of the pump block assembly and were normally not replaced separate from the block.

The licensee's equipment apparent cause evaluation (EACE) determined this cap failure to be a premature failure since the block for the 'B' pump was last replaced in 2000 and the site had never experienced cap failures before this event. Existing PM WOs were reviewed to determine potential causes of the premature cap cracking. It was identified that the suction and discharge accumulators for P-55B had as-found pressures out of specification several times since July 2010, when the PM frequency was last changed to a shorter interval as part of a previous Maintenance Rule (a)(1) Action Plan. After consultation with the pump vendor, it was determined that internal cavitation was the direct cause of premature failures similar to the front cap crack. Internal cavitation was expected if the suction accumulators were not within pressure specifications. This corroborated with reports from plant personnel on banging noises heard and vibrations seen on the charging system piping while the system was in operation. These symptoms had also been identified on the discharge piping of the system, as documented in previous charging system failures associated with cracks in welds of the discharge flush manifold piping and block weld failures at the flush nipple line. These previous system failures are what transitioned the charging system into a Maintenance Rule (a)(1) category in June 2014 (there were five failures of this type).

The PM frequency had changed many times since July 2010, when it was originally scheduled to be 45 days between accumulator pressure checks. This was a corrective action to address previous charging system maintenance rule functional failures since it was determined to be a contributing factor to those failures; being the primary system parameter that was causing excessive vibrations and fatigue. Since the charging system was not classified as safety-related and was low critical in Maintenance Rule

space, the PMs were performed on an as-needed basis for most of the work associated with the charging system (largely based on run-time for the specific components). The accumulator checks were scheduled on a pre-determined frequency, but due to their classification, could be changed as desired. There had been many CRs written over the past two years since the charging system returned to a Maintenance Rule (a)(2) status in July 2013 and through the more recent failures in 2014, which indicated that the suction and discharge accumulator as-found pressures were out of specification when taken for the PM. More often than not, this was the case. The PM frequency also varied anywhere from 45 to 180 days between checks during this time frame. Information was gathered from similarly designed systems in the industry on PM frequencies and material used in the accumulators to try to improve system performance and correct the increased vibrations and pressure oscillations seen. This information was reviewed in conjunction with the EACE findings and was incorporated into the Maintenance Rule (a)(1) Action Plan, as well as corrective actions assigned to address the system failure causes.

Analysis: The inspectors determined that not taking appropriate corrective actions to meet system performance or monitoring goals while the charging system was in a Maintenance Rule (a)(1) status was a performance deficiency that warranted a significance determination.

The inspectors determined that the performance deficiency was more than minor in accordance with Inspection Manual Chapter (IMC) 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," dated September 7, 2012, because it affected the Equipment Performance attribute of the Mitigating Systems cornerstone and adversely impacted the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The charging system provided the critical safety functions of pressure and inventory control in the emergency operating procedures. The finding was screened in accordance with IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," Exhibit 1, "Initiating Events Screening Questions," dated July 1, 2012. The finding screened as having very low safety significance (i.e., Green) based on answering "No" to all the screening questions under the Mitigating SSCs and Functionality section of the SDP.

The finding had a cross-cutting aspect of Evaluation in the Problem Identification and Resolution area. Specifically, the organization did not thoroughly evaluate previous CRs written on the suction and discharge accumulators pressures being out of specification and what affect that may have on the system. Also, when the accumulator pressures were found of specification, sometimes that information was not documented in CRs, nor were the PM frequencies re-evaluated in a technical and rigorous manner to ensure the correct preventive maintenance was being conducted on these components [P.2].

Enforcement: Title 10 CFR 50.65(a)(1) states, in part, that when the performance or condition of a SSC does not meet established goals, appropriate corrective action shall be taken.

Contrary to the above, on April 2, 2015, the front cap of the 'B' charging pump cracked most likely due to excessive local cavity pressures in the pump caused by the suction accumulator pressures being out of specification. Accumulator pressures being out of specification, which causes pressure oscillations and vibrations in the charging pumps

and their associated suction and discharge piping, was a similar cause to previous maintenance rule system functional failures that occurred in 2013 and 2014, which transitioned the system to a Maintenance Rule (a)(1) status in July 2014. Because this violation was of very low safety significance and it was entered into the licensee's CAP as CR-PLP-2015-1388, it is being treated as a NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (**NCV 05000255/2015002-01, Failure to Take Appropriate Corrective Action for the Charging System While in Maintenance Rule (a)(1) Status**).

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)

a. Inspection Scope

The inspectors reviewed the licensee's evaluation and management of plant risk for the maintenance and emergent work activities affecting risk-significant and safety-related equipment listed below to verify that the appropriate risk assessments were performed prior to removing equipment for work:

- Increased station risk the week of April 13–17, 2015, due to 'B' high pressure safety injection pump, P-66B, surveillance test and control valve maintenance concurrent with diving activities near the traveling water screens;
- Increased station risk the week of April 20–24, 2015, due to right train control room ventilation system preventive maintenance window concurrent with 1-2 diesel generator 24-hour load run surveillance test;
- Emergent work for the failure of P-18A, 'A' fuel oil transfer pump, level control system to T-25B, 1-2 diesel generator day tank; and
- Increased risk for P-7C, 'C' service water pump, maintenance window.

These activities were selected based on their potential risk significance relative to the Reactor Safety Cornerstones. As applicable for each activity, the inspectors verified that risk assessments were performed as required by 10 CFR 50.65(a)(4) and were accurate and complete. When emergent work was performed, the inspectors verified that the plant risk was promptly reassessed and managed. The inspectors reviewed the scope of maintenance work, discussed the results of the assessment with the licensee's probabilistic risk analyst or shift technical advisor, and verified plant conditions were consistent with the risk assessment. The inspectors also reviewed TS requirements and walked down portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

Documents reviewed during this inspection are listed in the Attachment to this report.

These maintenance risk assessments and emergent work control activities constituted four samples as defined in IP 71111.13-05.

b. Findings

No findings were identified.

1R15 Operability Determinations and Functional Assessments (71111.15)

a. Inspection Scope

The inspectors reviewed the following issues:

- 1-1 diesel generator fuel injection pump, 7L, scoring and resistance to movement;
- Feedwater Heater E-6B outlet temperature reading three degrees low;
- Breaker for battery rooms exhaust fan not passing acceptance criteria of PM; and
- Bus 1C relay 150A/151A Z-phase seismic restraint screw stripped.

The inspectors selected these potential operability issues based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the evaluations to ensure that TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TS and UFSAR to the licensee's evaluations to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations. Additionally, the inspectors reviewed a sample of corrective action documents to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the Attachment to this report.

This operability inspection constituted four samples as defined in IP 71111.15-05.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18)

a. Inspection Scope

The inspectors reviewed the following modification:

- spent fuel pool level indication post-Fukushima modification.

The inspectors reviewed the configuration changes and associated 10 CFR 50.59 safety evaluation screening against the design basis, the UFSAR, and the TSs, as applicable, to verify that the modification did not affect the operability or availability of the affected system. The inspectors, as applicable, observed ongoing and completed work activities to ensure that the modification was installed as directed and consistent with the design control documents; the modification operated as expected; post-modification testing adequately demonstrated continued system operability, availability, and reliability; and that operation of the modification did not impact the operability of any interfacing systems. As applicable, the inspectors verified that relevant procedure, design, and licensing documents were properly updated. Lastly, the inspectors discussed the plant modification with operations, engineering, and training personnel to ensure that the

individuals were aware of how the operation with the plant modification in place could impact overall plant performance. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one permanent plant modification sample as defined in IP 71111.18–05.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed the following post-maintenance (PM) activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- testing of the diesel fuel oil transfer pump, P–18A, following breaker replacement;
- control room ventilation modulating damper, D–2, replacement;
- valve stroke and timing test for CV–1004 after replacement of position switches;
- quarterly surveillance test and pump checks for P–7C, ‘C’ service water pump following maintenance; and
- spent fuel pool level indication instrumentation checks following post-Fukushima modification.

These activities were selected based upon the SSC’s ability to impact risk. The inspectors evaluated these activities for the following (as applicable): the effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed; acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate; tests were performed as written in accordance with properly reviewed and approved procedures; equipment was returned to its operational status following testing (temporary modifications or jumpers required for test performance were properly removed after test completion); and test documentation was properly evaluated. The inspectors evaluated the activities against the TSs, the UFSAR, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to ensure that the test results adequately ensured that the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with post-maintenance tests to determine whether the licensee was identifying problems and entering them in the CAP and that the problems were being corrected commensurate with their importance to safety. Documents reviewed are listed in the Attachment to this report.

This inspection constituted five post-maintenance testing samples as defined in IP 71111.19–05.

b. Findings

No findings were identified.

## 1R22 Surveillance Testing (71111.22)

### a. Inspection Scope

The inspectors reviewed the test results for the following activities to determine whether risk-significant systems and equipment were capable of performing their intended safety function and to verify testing was conducted in accordance with applicable procedural and TS requirements:

- QO–19B, High Pressure Safety Injection Pump and ESS Check Valve Operability Test (Inservice Test) (IST);
- RO–128–2, Diesel Generator 1-2 24-Hour Load Run Surveillance (Routine);
- RO–146, 'B' CCW Pump Comprehensive Test (Routine);
- MI–27E, Functional Check of PCS Low Temperature Overpressure System (Routine); and
- QO–20, Low Pressure Safety Injection Pumps IST 'A' Train (Routine).

The inspectors observed in-plant activities and reviewed procedures and associated records to determine the following:

- did preconditioning occur;
- were the effects of the testing adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- were acceptance criteria clearly stated, demonstrate operational readiness, and consistent with the system design basis;
- was plant equipment calibration correct, accurate, and properly documented;
- were as-left setpoints within required ranges; and was the calibration frequency in accordance with TSs, the UFSAR, procedures, and applicable commitments;
- was measuring and test equipment calibration current;
- was test equipment used within the required range and accuracy; and were applicable prerequisites described in the test procedures satisfied;
- did test frequencies meet TS requirements to demonstrate operability and reliability; were tests performed in accordance with the test procedures and other applicable procedures; were jumpers and lifted leads controlled and restored where used;
- was test data and results accurate, complete, within limits, and valid;
- was test equipment removed after testing;
- where applicable for inservice testing activities, was testing performed in accordance with the applicable version of Section XI, American Society of Mechanical Engineers code, and were reference values consistent with the system design basis;
- where applicable, were test results not meeting acceptance criteria addressed with an adequate operability evaluation or was the system or component declared inoperable;
- where applicable for safety-related instrument control surveillance tests, were reference setting data accurately incorporated in the test procedure;
- where applicable, were actual conditions encountering high resistance electrical contacts such that the intended safety function could still be accomplished;
- had prior procedure changes not provided an opportunity to identify problems encountered during the performance of the surveillance or calibration test;

- was equipment returned to a position or status required to support the performance of its safety functions; and
- were all problems identified during the testing appropriately documented and dispositioned in the CAP.

Documents reviewed are listed in the Attachment to this report.

This inspection constituted four routine surveillance testing samples and one inservice testing sample as defined in IP 71111.22, Sections–02 and–05.

b. Findings

No findings were identified.

1EP2 Alert and Notification System Evaluation (71114.02)

a. Inspection Scope

The inspectors held discussions with Emergency Preparedness (EP) staff regarding the operation, maintenance, and periodic testing of the primary and backup Alert and Notification System (ANS) in the plume pathway Emergency Planning Zone. The inspectors reviewed monthly trend reports and siren test failure records from August 2013 through May 2015. Information gathered during document reviews and interviews was used to determine whether the ANS equipment was maintained and tested in accordance with Emergency Plan Commitments and Procedures. The inspectors also observed a weekly test of the ANS system. Documents reviewed are listed in the Attachment to this report.

This ANS evaluation inspection constituted one sample as defined in IP 71114.02–06.

b. Findings

No findings were identified.

1EP3 Emergency Response Organization Staffing and Augmentation System (71114.03)

a. Inspection Scope

The inspectors reviewed and discussed with plant EP staff the Emergency Plan Commitments and Procedures for Emergency Response Organization (ERO) on-shift and augmentation staffing levels. A sample of the approximately 12 ERO training records of personnel assigned to key and support positions were reviewed to determine the status of their training as it related to their assigned ERO positions. The inspectors reviewed the ERO Augmentation System and activation process, the primary and alternate methods of initiating ERO activation, unannounced off-hour augmentation tests from August 2013 through May 2015, and the provisions for maintaining the plant's ERO roster.

The inspectors reviewed a sample of corrective actions related to the facility's ERO staffing and Augmentation System Program and activities from August 2013 through

May 2015 to determine whether corrective actions were completed in accordance with the site's CAP. Documents reviewed are listed in the Attachment to this report.

This ERO staffing and augmentation system inspection constituted one sample as defined in IP 71114.03–06.

b. Findings

No findings were identified.

1EP5 Maintenance of Emergency Preparedness (71114.05)

a. Inspection Scope

The inspectors reviewed a sample of nuclear oversight staff's audits of the EP Program to determine whether these independent assessments met the requirements of 10 CFR 50.54(t). The inspectors also reviewed critique reports and samples of CAP records associated with the 2014 Biennial Exercise, as well as various EP drills conducted, in order to determine whether the licensee fulfilled its drill commitments and to evaluate the licensee's efforts to identify, track, and resolve concerns identified during these activities.

The inspectors reviewed a sample of EP items and corrective actions related to the facility's EP Program and activities from August 2013 through May 2015 to determine whether corrective actions were completed in accordance with the site's CAP. Documents reviewed are listed in the Attachment to this report.

This correction of EP weaknesses and deficiencies inspection constituted one sample as defined in IP 71114.05–06.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine licensee emergency drill on May 27, 2015, to identify any weaknesses and deficiencies in the classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the Control Room Simulator, the Technical Support Center, and the Operations Support Center to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the licensee drill critique to compare any inspector-observed weakness with those identified by the licensee staff in order to evaluate the critique and to verify whether the licensee staff was properly identifying weaknesses and entering them into the CAP. As part of the inspection, the inspectors reviewed the drill package and other documents listed in the Attachment to this report.

This EP drill inspection constituted one sample as defined in IP 71114.06–06.

b. Findings

No findings were identified.

**2. RADIATION SAFETY**

2RS3 In-Plant Airborne Radioactivity Control and Mitigation (71124.03)

This inspection constituted one complete sample as defined in IP 71124.03–05.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed the plant's UFSAR to identify areas of the plant designed as potential airborne radiation areas, and any associated ventilation systems or airborne monitoring instrumentation. Instrumentation review included continuous air monitors (continuous air monitors and particulate-iodine-noble-gas-type instruments) used to identify changing airborne radiological conditions such that actions to prevent an overexposure may be taken. The review included an overview of the Respiratory Protection Program, and a description of the types of devices used. The inspectors reviewed UFSAR, TS's, and emergency planning documents to identify location and quantity of respiratory protection devices stored for emergency use.

The inspectors reviewed the licensee's procedures for maintenance, inspection, and use of respiratory protection equipment including self-contained breathing apparatus (SCBA), as well as procedures for air quality maintenance.

The inspectors reviewed any reported performance indicators (PIs) related to unintended dose resulting from intakes of radioactive material.

b. Findings

No findings were identified.

.2 Engineering Controls (02.02)

a. Inspection Scope

The inspectors reviewed the licensee's use of permanent and temporary ventilation to determine whether the licensee uses ventilation systems as part of its engineering controls (in lieu of respiratory protection devices) to control airborne radioactivity. The inspectors reviewed procedural guidance for use of installed plant systems, such as containment purge, spent fuel pool ventilation, and auxiliary building ventilation, and assessed whether the systems are used, to the extent practicable, during high-risk activities (e.g., using containment purge during cavity floodup).

The inspectors selected installed ventilation systems used to mitigate the potential for airborne radioactivity, and evaluated whether the ventilation airflow capacity, flow path (including the alignment of the suction and discharges), and filter/charcoal unit efficiencies, as appropriate, were consistent with maintaining concentrations of airborne

radioactivity in work areas below the concentrations of an airborne area to the extent practicable.

The inspectors selected temporary ventilation system setups (high-efficiency particulate air/charcoal negative pressure units, down draft tables, tents, metal “Kelly buildings,” and other enclosures) used to support work in contaminated areas. The inspectors assessed whether the use of these systems is consistent with licensee procedural guidance and as-low-as-reasonably-achievable (ALARA) concept.

The inspectors reviewed airborne monitoring protocols by selecting installed systems used to monitor and warn of changing airborne concentrations in the plant, and evaluated whether the alarms and setpoints were sufficient to prompt licensee/worker action to ensure that doses are maintained within the limits of 10 CFR Part 20 and the ALARA concept.

The inspectors assessed whether the licensee had established trigger points (e.g., the Electric Power Research Institute’s “Alpha Monitoring Guidelines for Operating Nuclear Power Stations”) for evaluating levels of airborne beta-emitting (e.g., plutonium-241), and alpha-emitting radionuclides.

b. Findings

No findings were identified.

.3 Use of Respiratory Protection Devices (02.03)

a. Inspection Scope

For those situations where it was impractical to employ engineering controls to minimize airborne radioactivity, the inspectors assessed whether the licensee provided respiratory protective devices such that occupational doses were ALARA. The inspectors selected work activities where respiratory protection devices were used to limit the intake of radioactive materials, and assessed whether the licensee performed an evaluation concluding that further engineering controls were not practical, and that the use of respirators was ALARA. The inspectors also evaluated whether the licensee had established means (such as routine bioassay) to determine if the level of protection (protection factor) provided by the respiratory protection devices during use was at least as good as that assumed in the licensee’s work controls and dose assessment.

The inspectors assessed whether respiratory protection devices used to limit the intake of radioactive materials were certified by the National Institute for Occupational Safety and Health/Mine Safety and Health Administration or had been approved by the NRC per 10 CFR 20.1703(b). The inspectors selected work activities where respiratory protection devices were used. The inspectors evaluated whether the devices were used consistent with their National Institute for Occupational Safety and Health/Mine Safety and Health Administration certification or any conditions of their NRC approval.

The inspectors reviewed records of air testing for supplied-air devices and SCBA bottles to assess whether the air used in these devices met or exceeded Grade D quality. The inspectors reviewed plant breathing air supply systems to determine whether they met the minimum pressure and airflow requirements for the devices in use.

The inspectors selected several individuals qualified to use respiratory protection devices and assessed whether they had been deemed fit to use the devices by a physician.

The inspectors selected several individuals assigned to wear a respiratory protection device and observed them donning, doffing, and functionally checking the device as appropriate. Due to limited in-field observations, the inspectors reviewed training curricula for users of respiratory protection devices.

The inspectors selected multiple respiratory protection devices staged and ready for use in the plant or stocked for issuance for use. The inspectors assessed the physical condition of the device components (mask or hood, harnesses, air lines, regulators, air bottles, etc.) and reviewed records of routine inspection for each. The inspectors selected several of the devices and reviewed records of maintenance on the vital components (e.g., pressure regulators, inhalation/exhalation valves, hose couplings). The inspectors reviewed the respirator vital components maintenance program to ensure that the repairs of vital components were performed by the respirators' manufacturer.

b. Findings

Failure to Wear Prescribed Respiratory Protection

Introduction: A finding of very low safety significance (Green) and an associated NCV of TS 5.4.1(a) was self-revealed during insulation activities associated with pressurizer spray valve CV-1057 during the Refueling Outage Number 23 (1R23) refueling outage. Specifically, prior to the work starting, the licensee determined that the use of powered air purifying respirators (PAPRs) would be required to minimize worker dose and maintain exposures ALARA, but the work was performed using only face shields and a worker was contaminated externally and internally.

Description: On January 20, 2014, Palisades Nuclear Plant began refueling outage 23 (1R23). During the dayshift on January 20, 2014, an ALARA specialist performed a total effective dose equivalent (TEDE) evaluation to assess the benefit of using respiratory protection for insulation work on pressurizer spray valve CV-1057. This evaluation determined that the use of PAPR would be appropriate to maintain exposure ALARA to the workers that performed insulation activities on CV-1057. Consequently, a respiratory permit was created and inserted in the file for radiation work permit (RWP) 2014-0421, "1R23 Insulation Activities;" however, the RWP was not revised, nor was a field change completed to notify RWP users of this requirement.

Work to reinsulate CV-1057 was performed during the nightshift on January 20, 2014. The radiation protection technician and work crew reviewed RWP 2014-0421, which noted "Respiratory Protection Not Required," and performed the work in a face shield. One of the workers subsequently alarmed the personal contamination monitors and required whole-body counter analysis to assess internal exposure.

The inspectors reviewed the TEDE-ALARA Evaluation and noted the assessment was completed using an airborne concentration of 261 percent of the derived air concentrations; however, the inspectors could not determine if this was from an actual air sample—either current or historical—or extrapolated from loose contamination levels. Although the mathematical evaluation indicated that the total dose might be lower if

respirators were not used, the use of PAPRs with hoods was prescribed due to high contamination levels with an alpha component associated with CV-1057, and noted a high potential for negative impact after the insulation work was completed.

The inspectors reviewed RWP 2014-0421 and noted that it was broadly written to include all insulation activities inside containment. The RWP was divided into multiple tasks and the inspectors could not identify the appropriate task for CV-1057 without reviewing supplemental spreadsheets to identify that Task 4 authorized work and prescribed requirements for insulation activities on CV-1057. The inspectors confirmed that the RWP was not revised, nor was an Attachment 9.6 RWP Field Change Form included in the file.

The inspectors reviewed procedure EN-RP-105, "Radiological Work Permits." The inspectors noted that the procedure stated that an RWP revision was based upon changes in work scope which made the RWP controls insufficient, unless the changes met the criteria for field change. Additionally, the procedure stated that RWP Field Changes were used to change protective requirements on a case-by-case basis and were limited to a particular entry or specific evolution within a job.

Analysis: The inspectors determined that this issue of concern was a performance deficiency. Specifically, the use of PAPR protection was prescribed for insulation work activities on CV-1057, but was not utilized during the work activity. This resulted in a personal contamination event with unplanned or unintended internal radiological exposure. The inspectors determined that the cause of the performance deficiency was reasonably within the licensee's ability to foresee and correct, and should have been prevented.

The finding was not subject to traditional enforcement since the incident did not have a significant safety consequence, did not impact the NRC's ability to perform its regulatory function, and was not willful.

The inspectors determined that the performance deficiency was more than minor in accordance with IMC 0612 because it was associated with the Program and Process attribute of the Occupational Radiation Safety Cornerstone and adversely affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation. Specifically, the failure to use required respiratory protection resulted in unplanned and unintended intakes of radioactive material to personnel performing insulation work on CV-1057. The inspectors also concluded that the radiological hazards present had the potential to result in higher exposures to these refuel floor workers had the circumstances been slightly altered. The inspectors also reviewed the guidance in IMC 0612, Appendix E, "Examples of Minor Issues," and did not identify any examples similar to the performance issue. The finding was assessed using IMC 0609, Appendix C and Occupational Radiation Safety SDP and was determined to be of very low safety significance (i.e., Green) because: (1) it was not an ALARA planning issue; (2) there was neither an overexposure nor a substantial potential for an overexposure; and (3) the licensee's ability to assess dose was not compromised.

The licensee's evaluation of this issue determined that a primary contributor was ineffective communication between shifts by radiation protection and not identifying that the completed TEDE Evaluation and Respiratory Permit were in the RWP. Consequently, the inspectors concluded that the cause of the issue involved a

cross-cutting aspect in the area of Human Performance, Basis for Decisions. Specifically, the basis for this operational decision was not communicated in a timely manner. [H.10]

**Enforcement:** Technical Specification 5.4.1.a required, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, dated February 1978. Section 7.e.1 of Regulatory Guide 1.33, Revision 2, Appendix A, included procedures for Access Control to Radiation Areas, which included an RWP System. Station procedure EN-RP-105, "Radiological Work Permits," Revision 14, implemented the requirements of Regulatory Guide 1.33, Section 7.e.1. Specifically, Step 5.7.1 of EN-RP-105 stated that RWP Field Changes were used to change the protective requirements on a case by case basis, and were limited to a specific evolution within the job.

Contrary to the above, on January 20, 2014, the licensee failed to document new respiratory protection requirements through an RWP Field Change for reinstallation of insulation on CV-1057 using RWP 2014-0421, Task 4. Since this failure to comply with TS 5.4.1.a was of very low safety significance and was entered into the licensee's CAP as CR-PLP-2014-00402, this violation is being treated as a NCV consistent with Section 2.3.2 of the NRC Enforcement Policy (**NCV 05000255/2015002-02 Failure to Wear Prescribed Respiratory Protection**).

.4 Self-Contained Breathing Apparatus for Emergency Use (02.04)

a. Inspection Scope

Based on the UFSAR, TSs, and emergency operating procedure requirements, the inspectors reviewed the status and surveillance records of SCBAs staged in-plant for use during emergencies. The inspectors reviewed the licensee's capability for refilling and transporting SCBA air bottles to and from the control room, and operations support center during emergency conditions.

The inspectors selected several individuals on control room shift crews and from designated departments currently assigned emergency duties (e.g., onsite search and rescue duties) to assess whether control room operators and other emergency response and radiation protection personnel (assigned in-plant search and rescue duties or as required by emergency operating procedures or the emergency plan) were trained and qualified in the use of SCBAs (including personal bottle change out). The inspectors evaluated whether personnel assigned to refill bottles were trained and qualified for that task.

The inspectors determined whether appropriate mask sizes and types were available for use (i.e., in-field mask size and type match what was used in fit-testing). The inspectors determined whether on-shift operators had facial hair that would interfere with the sealing of the mask to the face and whether vision correction (e.g., glasses inserts or corrected lenses) was available as appropriate.

The inspectors reviewed the past 2 years of maintenance records for select SCBA units used to support operator activities during accident conditions and designated as "ready for service" to assess whether any maintenance or repairs on any SCBA unit's vital components were performed by an individual, or individuals, certified by the

manufacturer of the device to perform the work. The vital components typically are the pressure-demand air regulator and the low-pressure alarm. The inspectors reviewed the onsite maintenance procedures governing vital component work to determine if any inconsistencies exist with the SCBA manufacturer's recommended practices. For those SCBAs designated as "ready for service," the inspectors determined whether the required, periodic air cylinder hydrostatic testing was documented and up-to-date, and the retest air cylinder markings required by the U.S. Department of Transportation were in place.

b. Findings

No findings were identified.

.5 Problem Identification and Resolution (02.05)

a. Inspection Scope

The inspectors evaluated whether problems associated with the control and mitigation of in-plant airborne radioactivity were being identified by the licensee at an appropriate threshold, and were properly addressed for resolution in the licensee's CAP. The inspectors assessed whether the corrective actions were appropriate for a selected sample of problems involving airborne radioactivity and were appropriately documented by the licensee.

b. Findings

No findings were identified.

2RS5 Radiation Monitoring Instrumentation (71124.05)

This inspection constituted one complete sample as defined in IP 71124.05-05.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed the plant's UFSAR to identify radiation instruments associated with monitoring area radiological conditions including airborne radioactivity, process streams, effluents, materials/articles, and workers. Additionally, the inspectors reviewed the instrumentation, and the associated Technical Specification requirements for post-accident monitoring instrumentation, including instruments used for remote emergency assessment.

The inspectors reviewed a listing of in-service survey instrumentation including air samplers and small article monitors, along with instruments used to detect and analyze workers' external contamination. Additionally, the inspectors reviewed personnel contamination monitors and portal monitors, including whole-body counters, to detect workers' internal contamination. The inspectors reviewed this list to assess whether an adequate number, and type of instruments were available to support operations.

The inspectors reviewed licensee and third-party evaluation reports of the Radiation Monitoring Program since the last inspection. These reports were reviewed for insights into the licensee's program, and to aid in selecting areas for review ("smart sampling").

The inspectors reviewed procedures that govern instrument source checks and calibrations, focusing on instruments used for monitoring transient high radiological conditions, including instruments used for underwater surveys. The inspectors reviewed the calibration and source check procedures for adequacy and as an aid to smart sampling.

The inspectors reviewed the area radiation monitor alarm setpoint values, and setpoint bases as provided in the Technical Specifications and the Final Safety Analysis Report.

The inspectors reviewed effluent monitor alarm setpoint bases, and the calculational methods provided in the Offsite Dose Calculation Manual.

b. Findings

No findings were identified.

.2 Walkdowns and Observations (02.02)

a. Inspection Scope

The inspectors walked down effluent radiation monitoring systems, including at least one liquid and one airborne system. Focus was placed on flow measurement devices, and all accessible point-of-discharge liquid and gaseous effluent monitors of the selected systems. The inspectors assessed whether the effluent/process monitor configurations aligned with Offsite Dose Calculation Manual descriptions and observed monitors for degradation and out-of-service tags.

The inspectors selected portable survey instruments that were in use or available for issuance, and assessed calibration and source check stickers for currency as well as instrument material condition and operability.

The inspectors observed licensee staff performance as the staff demonstrated source checks for various types of portable survey instruments. The inspectors assessed whether high-range instruments were source checked on all appropriate scales.

The inspectors walked down area radiation monitors and continuous air monitors to determine whether they were appropriately positioned relative to the radiation sources or areas they were intended to monitor. Selectively, the inspectors compared monitor response (via local or remote control room indications) with actual area conditions for consistency.

The inspectors selected personnel contamination monitors, portal monitors, and small article monitors and evaluated whether the periodic source checks were performed in accordance with the manufacturer's recommendations and licensee procedures.

b. Findings

No findings were identified.

.3 Calibration and Testing Program (02.03)

Process and Effluent Monitors

a. Inspection Scope

The inspectors selected effluent monitor instruments (such as gaseous and liquid) and evaluated whether channel calibration and functional tests were performed consistent with radiological effluent Technical Specifications/Offsite Dose Calculation Manual. The inspectors assessed whether: (a) the licensee calibrated its monitors with National Institute of Standards and Technology traceable sources; (b) the primary calibrations adequately represented the plant nuclide mix; (c) when secondary calibration sources were used, the sources were verified by the primary calibration; and (d) the licensee's channel calibrations encompassed the instrument's alarm set-points.

The inspectors assessed whether the effluent monitor alarm setpoints were established as provided in the Offsite Dose Calculation Manual and station procedures.

For changes to effluent monitor setpoints, the inspectors evaluated the basis for changes to ensure that an adequate justification existed.

b. Findings

No findings were identified.

Laboratory Instrumentation

a. Inspection Scope

The inspectors assessed laboratory analytical instruments used for radiological analyses to determine whether daily performance checks and calibration data indicated that the frequency of the calibrations was adequate, and there were no indications of degraded instrument performance.

The inspectors assessed whether appropriate corrective actions were implemented in response to indications of degraded instrument performance.

b. Findings

No findings were identified.

Whole-Body Counter

a. Inspection Scope

The inspectors reviewed the methods and sources used to perform whole body count functional checks before daily use of the instrument, and assessed whether check sources were appropriate and aligned with the plant's isotopic mix.

The inspectors reviewed whole-body count calibration records since the last inspection, and evaluated whether calibration sources were representative of the plant source term and that appropriate calibration phantoms were used. The inspectors looked for anomalous results or other indications of instrument performance problems.

b. Findings

No findings were identified.

Post-Accident Monitoring Instrumentation

a. Inspection Scope

Inspectors selected containment high-range monitors, and reviewed the calibration documentation since the last inspection.

The inspectors assessed whether an electronic calibration was completed for all range decades above 10 rem/hour, and whether at least 1 decade at or below 10 rem/hour was calibrated using an appropriate radiation source.

The inspectors assessed whether calibration acceptance criteria were reasonable; accounting for the large measuring range and the intended purpose of the instruments.

The inspectors selected effluent/process monitors that were relied on by the licensee in its emergency operating procedures as a basis for triggering emergency action levels (EALs), and subsequent emergency classifications, or to make protective action recommendations during an accident. The inspectors evaluated the calibration and availability of these instruments.

The inspectors reviewed the licensee's capability to collect high-range, post-accident iodine effluent samples.

As available, the inspectors observed electronic and radiation calibration of these instruments to assess conformity with the licensee's calibration and test protocols.

b. Findings

No findings were identified.

Portal Monitors, Personnel Contamination Monitors, and Small Article Monitors

a. Inspection Scope

For each type of these instruments used on site, the inspectors assessed whether the alarm setpoint values were reasonable under the circumstances to ensure that licensed material is not released from the site.

The inspectors reviewed the calibration documentation for each instrument selected, and discussed the calibration methods with the licensee to determine consistency with the manufacturer's recommendations.

b. Findings

No findings were identified.

Portable Survey Instruments, Area Radiation Monitors, Electronic Dosimetry, and Air Samplers/Continuous Air Monitors

a. Inspection Scope

The inspectors reviewed calibration documentation for at least one of each type of instrument. For portable survey instruments and area radiation monitors, the inspectors reviewed detector measurement geometry and calibration methods and had the licensee demonstrate use of its instrument calibrator as applicable. The inspectors conducted comparison of instrument readings versus an NRC survey instrument if problems were suspected.

As available, the inspectors selected portable survey instruments that did not meet acceptance criteria during calibration or source checks to assess whether the licensee had taken appropriate corrective action for instruments found significantly out of calibration (e.g., greater than 50 percent). The inspectors evaluated whether the licensee had evaluated the possible consequences of instrument use since the last successful calibration or source check.

b. Findings

No findings were identified.

Instrument Calibrator

a. Inspection Scope

As applicable, the inspectors reviewed the current output values for the licensee's portable survey and area radiation monitor instrument calibrator unit(s). The inspectors assessed whether the licensee periodically measures calibrator output over the range of the instruments used through measurements by ion chamber/electrometer.

The inspectors assessed whether the measuring devices had been calibrated by a facility using National Institute of Standards and Technology traceable sources, and whether corrective factors for these measuring devices were properly applied by the licensee in its output verification.

b. Findings

No findings were identified.

Calibration and Check Sources

a. Inspection Scope

The inspectors reviewed the licensee's Title 10, CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," source term to assess whether calibration sources used were representative of the types and energies of radiation encountered in the plant.

b. Findings

No findings were identified.

.4 Problem Identification and Resolution (02.04)

a. Inspection Scope

The inspectors evaluated whether problems associated with radiation monitoring instrumentation were being identified by the licensee at an appropriate threshold, and were properly addressed for resolution in the licensee's CAP. The inspectors assessed the appropriateness of the corrective actions for a selected sample of problems documented by the licensee that involve radiation monitoring instrumentation.

b. Findings

No findings were identified.

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08)

This inspection constituted one complete sample as defined in IP 71124.08-05.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed the solid radioactive waste system description in the Final Safety Analysis Report, the Process Control Program, and the recent Radiological Effluent Release Report for information on the types, amounts, and processing of radioactive waste disposed.

The inspectors reviewed the scope of quality assurance audits in this area since the last inspection to gain insights into the licensee's performance, and inform the "smart sampling" inspection planning.

b. Findings

No findings were identified.

.2 Radioactive Material Storage (02.02)

a. Inspection Scope

The inspectors selected areas where containers of radioactive waste are stored, and evaluated whether the containers were labeled in accordance with 10 CFR 20.1904, "Labeling Containers," or controlled in accordance with 10 CFR 20.1905, "Exemptions to Labeling Requirements".

The inspectors assessed whether the radioactive material storage areas were controlled and posted in accordance with the requirements of 10 CFR Part 20, "Standards for Protection Against Radiation." For materials stored or used in the controlled or unrestricted areas, the inspectors evaluated whether they were secured against unauthorized removal and controlled in accordance with 10 CFR 20.1801, "Security of Stored Material," and 10 CFR 20.1802, "Control of Material Not in Storage".

The inspectors evaluated whether the licensee established a process for monitoring the impact of long term storage (e.g., buildup of any gases produced by waste decomposition, chemical reactions, container deformation, loss of container integrity, or re-release of free-flowing water) that was sufficient to identify potential unmonitored, unplanned releases or nonconformance with waste disposal requirements.

The inspectors selected containers of stored radioactive material, and assessed for signs of swelling, leakage, and deformation.

b. Findings

No findings were identified.

.3 Radioactive Waste System Walkdown (02.03)

a. Inspection Scope

The inspectors walked down accessible portions of select radioactive waste processing systems to assess whether the current system configuration and operation agreed with the descriptions in the UFSAR, Offsite Dose Calculation Manual, and Process Control Program.

The inspectors reviewed administrative and/or physical controls (i.e., drainage and isolation of the system from other systems) to assess whether the equipment which is not in service or abandoned in place would not contribute to an unmonitored release path and/or affect operating systems or be a source of unnecessary personnel exposure. The inspectors assessed whether the licensee reviewed the safety significance of systems and equipment abandoned in place in accordance with 10 CFR 50.59, "Changes, Tests, and Experiments".

The inspectors reviewed the adequacy of changes made to the radioactive waste processing systems since the last inspection. The inspectors evaluated whether changes from what is described in the Final Safety Analysis Report were reviewed and documented in accordance with 10 CFR 50.59, as appropriate, and to assess the impact on radiation doses to members of the public.

The inspectors selected processes for transferring radioactive waste resin and/or sludge discharges into shipping/disposal containers, and assessed whether the waste stream mixing, sampling procedures, and methodology for waste concentration averaging were consistent with the Process Control Program, and provided representative samples of the waste product for the purposes of waste classification as described in 10 CFR 61.55, "Waste Classification".

For those systems that provide tank recirculation, the inspectors evaluated whether the tank recirculation procedures provided sufficient mixing.

The inspectors assessed whether the licensee's Process Control Program correctly described the current methods and procedures for dewatering and waste stabilization (e.g., removal of freestanding liquid).

b. Findings

No findings were identified.

.4 Waste Characterization and Classification (02.04)

a. Inspection Scope

The inspectors selected the following radioactive waste streams for review:

- Dry Active Waste; and
- Primary Resin.

For the waste streams listed above, the inspectors assessed whether the licensee's radiochemical sample analysis results (i.e., "10 CFR Part 61" analysis) were sufficient to support radioactive waste characterization as required by 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste." The inspectors evaluated whether the licensee's use of scaling factors and calculations to account for difficult-to-measure radionuclides was technically sound, and based on current 10 CFR Part 61 analysis for the selected radioactive waste streams.

The inspectors evaluated whether changes to plant operational parameters were taken into account to: (1) maintain the validity of the waste stream composition data between the annual or biennial sample analysis update; and (2) assure that waste shipments continued to meet the requirements of 10 CFR Part 61 for the waste streams selected above.

The inspectors evaluated whether the licensee had established and maintained an adequate quality assurance program to ensure compliance with the waste classification and characterization requirements of 10 CFR 61.55 and 10 CFR 61.56, "Waste Characteristics."

b. Findings

No findings were identified.

.5 Shipment Preparation (02.05)

a. Inspection Scope

The inspectors reviewed shipment packaging, surveying, labeling, marking, placarding, vehicle checks, emergency instructions, disposal manifest, shipping papers provided to the driver, and licensee verification of shipment readiness. The inspectors assessed whether the requirements of applicable transport cask certificate of compliance had been met. The inspectors evaluated whether the receiving licensee was authorized to receive the shipment packages. The inspectors evaluated whether the licensee's procedures for cask loading and closure procedures were consistent with the vendor's current approved procedures.

The inspectors reviewed radiation worker performance during the conduct of radioactive waste processing, and radioactive material shipment preparation and receipt activities. The inspectors assessed whether the shippers were knowledgeable of the shipping

regulations and whether shipping personnel demonstrated adequate skills to accomplish the package preparation requirements for public transport with respect to

- As appropriate, the licensee's response to NRC Bulletin 79-19, "Packaging of Low-Level Radioactive Waste for Transport and Burial," dated August 10, 1979; and
- Title 49 CFR Part 172, "Hazardous Materials Table, Special Provisions, Hazardous Materials Communication, Emergency Response Information, Training Requirements, and Security Plans," Subpart H, "Training."

Due to limited opportunities for direct observation, the inspectors reviewed the technical instructions presented to workers during routine training. The inspectors assessed whether the licensee's training program provided training to personnel responsible for the conduct of radioactive waste processing and radioactive material shipment preparation activities.

b. Findings

No findings were identified.

.6 Shipping Records (02.06)

a. Inspection Scope

The inspectors evaluated whether the shipping documents indicated the proper shipper name; emergency response information and a 24-hour contact telephone number; accurate curie content and volume of material; and appropriate waste classification, transport index, and UN number for the following radioactive shipments:

- PLP-2013-RW-003;
- PLP-2014-RW-014;
- PLP-2014-RM-020;
- PLP-2014-RM-055; and
- PLP-2014-RM-062.

Additionally, the inspectors assessed whether the shipment placarding was consistent with the information in the shipping documentation.

b. Findings

No findings were identified.

.7 Identification and Resolution of Problems (02.07)

a. Inspection Scope

The inspectors assessed whether problems associated with radioactive waste processing, handling, storage, and transportation, were being identified by the licensee at an appropriate threshold, were properly characterized, and were properly addressed for resolution in the licensee CAP. Additionally, the inspectors evaluated whether the corrective actions were appropriate for a selected sample of problems documented by the licensee that involve radioactive waste processing, handling, storage, and transportation.

The inspectors reviewed results of selected audits performed since the last inspection of this program and evaluated the adequacy of the licensee's corrective actions for issues identified during those audits.

b. Findings

No findings were identified.

4. **OTHER ACTIVITIES**

**Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness, Public Radiation Safety, Occupational Radiation Safety, and Security**

4OA1 Performance Indicator Verification (71151)

.1 Unplanned Power Changes Per 7000 Critical Hours

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Power Changes Per 7000 Critical Hours (IE03) PI for the period from the second quarter 2014 through the first quarter 2015. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator narrative logs, CRs, maintenance rule records, event reports and NRC Integrated IRs for the period of April 1, 2014, through March 31, 2015, to validate the accuracy of the submittals. The inspectors also reviewed the licensee's CR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one unplanned power changes per 7000 critical hours sample as defined in IP 71151-05.

b. Findings

No findings were identified.

.2 Safety System Functional Failures

a. Inspection Scope

The inspectors sampled licensee submittals for the Safety System Functional Failures PI (MS-05) for the period from the third quarter 2014 through the first quarter 2015. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73" definitions and guidance, were used. The inspectors reviewed the licensee's operator narrative logs, operability assessments, maintenance rule records, maintenance WOs, CRs, event reports, and NRC Integrated IRs for the period of July 1, 2014, through March 31, 2015, to validate the accuracy of

the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one safety system functional failures sample as defined in IP 71151-05.

b. Findings

No findings were identified.

.3 Drill/Exercise Performance

a. Inspection Scope

The inspectors sampled licensee submittals for the Drill and Exercise Performance (DEP) PI for the period from the fourth quarter 2014 through the first quarter 2015. PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment PI Guideline," Revision 7, were used to determine the accuracy of the PI data reported during those periods. The inspectors reviewed the licensee's records and processes, including procedural guidance on assessing opportunities for the PI, assessments of PI opportunities during pre-designated control room simulator training sessions, performance during the 2014 Biennial Exercise, and performance during other drills associated with the PI to validate the accuracy of the submittals. The inspectors also reviewed the licensee's CR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one DEP sample as defined in IP 71151-05.

b. Findings

No findings were identified.

.4 Emergency Response Organization Readiness

a. Inspection Scope

The inspectors sampled licensee submittals for the ERO Readiness for the period from the fourth quarter 2014 through the first quarter 2015. PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment PI Guideline," Revision 7, were used to determine the accuracy of the PI data reported during those periods. The inspectors reviewed the licensee's records and processes including procedural guidance on assessing opportunities for the PI; performance during the 2014 Biennial Exercise and other drills; and revisions of the roster of personnel assigned to key ERO positions to validate the accuracy of the submittals. The inspectors also reviewed the licensee's CR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one ERO readiness sample as defined in IP 71151-05.

b. Findings

No findings were identified.

.5 Alert and Notification System Reliability

a. Inspection Scope

The inspectors sampled licensee submittals for the ANS Reliability PI for the period from the fourth quarter 2014 through the first quarter 2015. PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment PI Guideline," Revision 7, were used to determine the accuracy of the PI data reported during those periods. The inspectors reviewed the licensee's records and processes including procedural guidance on assessing opportunities for the PI and results of periodic ANS operability tests to validate the accuracy of the submittals. The inspectors also reviewed the licensee's CR database to determine whether any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one ANS reliability sample as defined in IP 71151-05.

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems (71152)

**Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness, Public Radiation Safety, Occupational Radiation Safety, and Security**

.1 Routine Review of Items Entered into the Corrective Action Program

a. Inspection Scope

As part of the various baseline IPs discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify they were being entered into the licensee's CAP at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. Attributes reviewed included: identification of the problem was complete and accurate; timeliness was commensurate with the safety significance; evaluation and disposition of performance issues, generic implications, common causes, contributing factors, root causes, extent-of-condition reviews, and previous occurrences reviews were proper and adequate; and that the classification, prioritization, focus, and timeliness of corrective actions were commensurate with safety and sufficient to prevent recurrence of the issue. Minor issues entered into the licensee's CAP as a result of the inspectors' observations are included in the Attachment to this report.

These routine reviews for the identification and resolution of problems did not constitute any additional inspection samples. Instead, by procedure they were considered an

integral part of the inspections performed during the quarter and documented in Section 1 of this report.

b. Findings

No findings were identified.

.2 Daily Corrective Action Program Reviews

a. Inspection Scope

In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's CAP. This review was accomplished through inspection of the station's daily condition report packages.

These daily reviews were performed by procedure as part of the inspectors' daily plant status monitoring activities and, as such, did not constitute any separate inspection samples.

b. Findings

No findings were identified.

.3 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment issues, but also considered the results of daily inspector CAP item screening discussed in Section 40A2.2 above, licensee trending efforts, and licensee human performance results. The inspectors' review nominally considered the 6-month period of January 2015 through June 2015, although some examples expanded beyond those dates where the scope of the trend warranted.

The review also included issues documented outside the normal CAP in major equipment problem lists, repetitive and/or rework maintenance lists, departmental problem/challenges lists, system health reports, quality assurance audit/surveillance reports, self-assessment reports, and Maintenance Rule assessments. The inspectors compared and contrasted their results with the results contained in the licensee's CAP trending reports. Corrective actions associated with a sample of the issues identified in the licensee's trending reports were reviewed for adequacy.

This review constituted one semi-annual trend inspection sample as defined in IP 71152-05.

b. Observations

The inspectors reviewed CRs, causal evaluations, corrective actions, and plant health committee meeting minutes associated with improving equipment reliability and system

health. The inspectors also conducted an independent search of CRs to identify significant equipment issues that occurred between January 2013 and June 2015 to determine if commonalities existed with respect to causes or organizational and programmatic components related to the issues. A trend identified by external assessors this quarter was that even though the site's equipment reliability index value was high, there were challenges to systems important to safety, some of which were long-standing or were not appropriately assessed for risk. A potential contributing factor to this was identified by a different external assessment at the end of 2014 in which engineering rigor to troubleshoot and address consequential equipment failures was not always sufficient. The inspectors had developed a similar trend based on inspection findings and observations over the same time period.

Some significant equipment failures with certain organizational and programmatic components were assessed in a common cause analysis that determined commonalities between the issues related to inadequate task barriers, insufficient detail in work packages, inadequate challenges across organizations to identify risk, and inadequate interface among organizations. The inspectors' independent review of CRs identified additional equipment failures that were not assessed in the common cause analysis. These equipment issues had commonalities of inadequate preventive maintenance/job scopes, inadequate parts or age-related parts failures, programmatic/process weaknesses, and improper risk recognition that contributed to insufficient troubleshooting or corrective actions to prevent repeat failures. Also, some of these issues did not have definitive causes and were long-standing issues without resolution due to not identifying causes. In a few cases these issues had been repeat failures. More extensive troubleshooting was planned in the future for most of these issues, but they remained vulnerabilities until adequately corrected with the causes appropriately addressed. There were also corrective actions open to address deficiencies in these areas that had not yet been fully implemented. However, a combination of the aforementioned issues had led to equipment problems challenging systems important to safety.

The licensee recently focused on improving equipment reliability by more effectively utilizing the Plant Health Committee and decreasing the backlog of critical equipment repairs required. Systems in Maintenance Rule (a)(1) status have been discussed on a more frequent basis and WOs to repair long-standing issues were being tracked at every meeting. Emergent station concerns were also discussed. The committee had re-focused station leadership attention on risk-significant system and component issues to further inter-organizational teamwork to resolve issues in a more timely fashion

#### .4 Annual Follow-Up of Selected Issues: Primary Coolant Pump Operation

##### a. Inspection Scope

The operation of the primary coolant pumps (PCPs) in a manner that resulted in flow cavitation was the subject of an NRC-identified NCV documented in Section 1R15 of Palisades IR 2012003. The inspectors continued their review of licensee corrective actions to address the NCV this quarter. The licensee, in conjunction with Westinghouse, performed a detailed analysis and system model of the operation of the PCPs during startup and shutdown conditions to evaluate the operating limits and site procedures for the pumps. This analysis was intended to determine if a nexus existed

between certain plant operating conditions and PCP performance issues that had been identified.

From this analysis, it was determined that the way in which the PCPs were started and operated during plant startups could cause the pumps to operate outside the manufacturer's design conditions for a prolonged period of time (this was the subject of the documented NCV from 2012). Recommendations were made to consider revising the system operating procedures for sequencing pump operation during these conditions and also to re-evaluate TS limitations that may be limiting the combination of pumps that could be operated together. The TS limitations could also affect the alignments of pumps operated during plant shutdowns. The licensee assessed these recommendations, as well as others discussed in the analysis and entered the issues into the CAP. The inspectors reviewed these corrective actions which were intended to revise the system operating procedures and assess the feasibility of a TS change. There were also corrective actions to inspect the 'B' PCP, which was the only pump remaining to have a refurbished impeller potentially with missing pieces. This inspection was planned for RFO 25 in the spring of 2017.

This review constituted one in-depth problem identification and resolution sample as defined in IP 71152-05.

b. Findings

No findings were identified.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153)

.1 Notice of Unusual Event for Seismic Activity

a. Inspection Scope

The inspectors reviewed the plant's response to a Notice of Unusual Event (NOUE) for an earthquake that occurred about 60 miles from the plant on May 2, 2015. The inspectors responded to the site after the NOUE was declared to observe the licensee's actions to assess any impact on the plant from the seismic activity. No impacts to the plant were identified by the plant operators or the NRC inspectors who conducted an independent walkdown of the site. The inspectors also reviewed plant process computer data, the licensee's abnormal operating procedures, and EP implementation procedures to validate appropriate actions were taken and notifications were made. Documents reviewed are listed in the Attachment to this report.

This event follow-up review constituted one sample as defined in IP 71153-05.

b. Findings

One licensee-identified NCV of very low safety significance was identified during this inspection and is documented in Section 4OA7 of this report.

#### 4OA6 Management Meetings

##### .1 Exit Meeting Summary

On July 14, 2015, the inspectors presented the inspection results to Mr. A. Vitale, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

##### .2 Interim Exit Meetings

Interim exits were conducted for:

- The inspection results for the area of ALARA with Mr. A. Vitale, Site Vice President, and other members of the licensee staff on March 13, 2015;
- The inspection results for the areas of radiation monitoring instrumentation; and radioactive solid waste processing and radioactive material handling, storage, and transportation with Mr. A. Williams, General Manager Plant Operations, and other members of the licensee staff on April 24, 2015;
- The inspection results for the area of in-plant airborne radioactivity control and mitigation with Mr. A. Vitale, Site Vice President, and other members of the licensee staff on May 14, 2015; and
- The results of the EP Program inspection with Mr. A. Williams, General Manager Plant Operations, and other members of the licensee staff on June 5, 2015.

The inspectors confirmed that none of the potential report input discussed was considered proprietary. Proprietary material received during the inspection was returned to the licensee.

#### 4OA7 Licensee-Identified Violations

The following violations of very low safety significance (Green) or Severity Level IV was identified by the licensee and are violations of NRC requirements which meet the criteria of the NRC Enforcement Policy for being dispositioned as NCVs.

- Title 10 CFR 50.54(q)(2) requires that a holder of a nuclear power reactor operating license follow and maintain the effectiveness of an emergency plan that meets the requirements in 10 CFR Part 50, Appendix E and the planning standards of 10 CFR 50.47(b). Title 10 CFR Part 50.47(b)(4) states, "A standard emergency classification and action level scheme, the bases of which includes facility system and effluent parameters, is in use by the nuclear facility licensee, and State and local response plans call for reliance on information provided by facility licensees for determinations of minimum initial offsite response measures." Section 4.1 of the Palisades Site Emergency Plan states, in part, that a conservative philosophy for classification shall be used to declare the highest classification for which an EAL has been exceeded and that Palisades EALs can be found in the "Site Emergency Plan, Supplement 1 – EAL Wall Charts." Site Emergency Plan, Supplement 1 – EAL Wall Charts requires, in

part, the declaration of an Unusual Event for EAL HU 1.1 for a seismic event if identified by both: (1) earthquake felt in plant, and (2) National Earthquake Information Center. The Palisades EAL Technical Basis defines a “felt earthquake” as, “An earthquake of sufficient intensity such that: (a) the vibratory ground motion is felt at the nuclear plant site and recognized as an earthquake based on a consensus of control room operators on duty at the time, and (b) for plants with operable seismic instrumentation, the seismic switches of the plant are activated.”

Contrary to the above, on May 2, 2015, the licensee control room staff declared EAL HU 1.1 without meeting the threshold criteria stated in the EAL. Specifically, the control room staff based the Notification of Unusual Event declaration on outside personnel reports and information from the National Earthquake Center, but without the consensus of control room operators on duty at the time or a valid recorded indication on the operable seismic instrumentation.

The NRC determined that the EAL Overclassification, which resulted in no unnecessary protective action recommendations, was of very low safety significance (i.e., Green) as specified in IMC 0609, EP Significance Determination Process, Appendix B, Figure 5.4–1, Significance Determination for Ineffective EALs and Overclassification. As such the NRC determined this to be an NCV in accordance with Section 2.3.2 of the Enforcement Policy. The licensee entered this issue into their CAP as CR 2015–08137.

- The licensee identified an NCV of TS 5.4.1, “Procedures” for an inadequate procedure that failed to ensure all of the regulatory requirements for fit testing of respiratory protection were satisfied before use.

Technical Specification 5.4.1 required, in part, that written procedures shall be established, written, and maintained for respiratory protection. The licensee’s procedure governing respirator fit testing was EN–RP–505, “Portacount Respirator Fit Testing,” and provided the fleet standard for performing personnel respirator fit testing for tight-fitting respirators. Title 29 CFR 1910.134, “Respiratory Protection.” Specifically, 29 CFR 1910.134(f)(8) states that, “Fit testing of tight-fitting atmosphere-supplying respirators and tight-fitting PAPRs shall be accomplished by performing quantitative or qualitative fit testing in the negative pressure mode, regardless of the mode of operation (negative or positive pressure) that is used for respiratory protection.”

Contrary to the above, on June 2, 2013, multiple respirator fit tests of tight fitting PAPRs were performed in only the positive pressure mode. The inspectors reviewed IMC 0609, Appendix C, “Occupational Radiation Safety Significance Determination Process,” dated August 19, 2008. The inspectors determined that it was not an ALARA planning issue, there was neither an overexposure nor a substantial potential for an overexposure, and the licensee’s ability to assess dose was not compromised. Therefore the finding screened as having very low safety significance (i.e., Green). The licensee entered this issue into their CAP as CR–PLP–2013–2469.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee

- A. Vitale, Site Vice President
- A. Williams, General Manager Plant Operations
- B. Baker, Operations Manager Support
- D. Corbin, Operations Manager
- R. Craven, Senior Manager Production
- B. Dotson, Licensing Specialist
- O. Gustafson, Regulatory and Performance Improvement Director
- J. Hardy, Regulatory Assurance Manager
- J. Haumersen, Senior Manager Projects
- D. Malone, Emergency Preparedness Manager
- J. Miller, Chemistry Manager
- T. Mulford, Operations Manager Shift
- W. Nelson, Training Manager
- K. O'Connor, Design Manager
- C. Plachta, NOS Manager
- P. Russell, Engineering Director
- D. Watkins, Radiation Protection Manager

#### NRC

- E. Duncan, Chief, Reactor Projects Branch 3

## LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

### Opened

05000255/2015002-01	NCV	Failure to Take Appropriate Corrective Action for the Charging System While in Maintenance Rule (a)(1) Status (Section 1R12)
05000255/2015002-02	NCV	Failure to Wear Prescribed Respiratory Protection (Section 2RS3.3)

### Closed

05000255/2015002-01	NCV	Failure to Take Appropriate Corrective Action for the Charging System While In Maintenance Rule (a)(1) Status (Section 1R12)
05000255/2015002-02	NCV	Failure to Wear Prescribed Respiratory Protection (Section 2RS3.3)

### Discussed

None

## LIST OF DOCUMENTS REVIEWED

The following is a partial list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspector reviewed the documents in their entirety, but rather that selected sections or portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

### 1R01 Adverse Weather

- Admin 4.00, Operations Organization, Responsibilities and Conduct, Revision 37
- Admin 4.02, Control of Equipment, Revision 73
- AOP-38, Acts of Nature, Revision 3
- AOP-6, Loss of Condenser Vacuum, Revision 1
- ARP-1, Turbine Condenser and Feedwater Scheme, EK-01 (C-11), Revision 75
- ARP-13, 345 kV Switchyard Scheme EK-50, Revision 54
- ARP-2, Generator Scheme EK-03 (C-11), Revision 54
- CR-PLP-2014-03047, Turbine Building Fresh Air Fan Louvers Would Not Open Fully, May 15, 2014
- CR-PLP-2015-01246, Engineering Monitoring of E-30B Cooling Tower, March 24, 2015
- CR-PLP-2015-01279, Recommendation to Add Cross Bracing to Cooling Tower E-30B, March 26, 2015
- CR-PLP-2015-01989, Generated to Drive Two Studies to Ensure Transformer Health and Transformer Oil Collection System Integrity, May 14, 2015
- CR-PLP-2015-02008, EX-6 Dissolved Gas Analyzer (AM-2306) Indicated Acetylene Level Reached Alarm Setpoint on Two Occasions, May 14, 2015
- CR-PLP-2015-02217, AM-2303 Gas-In-Oil Monitor is Experiencing A Persistent Oil Flow Blockage, May 28, 2015
- CR-PLP-2015-02221, Bird's Nest in Metal Structure Associated with EX-07, Safeguards Transformer 1.1, May 28, 2015
- CR-PLP-2015-02389, Work in Covert Plant Switchyard Tripped Both Units, June 9, 2015
- CR-PLP-2015-02575, Received EK-0334 Switchyard Critical Trouble and EK-0336 Switchyard ACB Trip Unexpectedly Resulting in the Momentary Loss of Switchyard Feed From Argenta 1 and Argenta 2, June 23, 2015
- DBD 6.01, Grid Interface Topical Report, Revision 4
- DBD 6.02, 345kV Switchyard, Revision 4
- FSAR Chapter 8, Section 8.3, Station Distribution, Revision 31
- SOP-23, Attachment 10, Warm Weather Checklist, Revision 48
- SOP-30, Attachment 6, Station Poser System Checklist, Revision 76
- SOP-30, Station Power, Revision 75
- SOP-30, Station Power, Revision 75
- SOP-32, 345kV Switchyard, Revision 37
- WO 53553017, Task 1, Warm Weather Checklist

### 1R04 Equipment Alignment

- Admin 4.02, Control of Equipment, Revision 73
- AOP-32, Loss of Containment Integrity, Revision 0
- AOP-36, Loss Of Component Cooling, Revision 0
- CR-PLP-2014-003075, CCW Surge Tank has a Lowering Trend, May 18, 2014

- CR-PLP-2014-00468, During QO-6 CV-0910 (CCW Supply to Cont) Failed to Meet Its Close Stroke Time Requirement, January 22, 2014
- CR-PLP-2014-00598, While Stroking Open CV-0950, ESS Pumps Seal CLG Return to CCW, for QO-6, the Closed Position Indication Switch Stuck, January 24, 2014
- CR-PLP-2014-00607, CK-CC910 (CCW Supple to Containment Check Valve) Showed Signs of Wear During Valve Inspections, September 30,2015
- CR-PLP-2014-00610, CCW Surge Tank level was Lowering at a Rate of Approximately 1 Percent An Hour, January 25, 2014
- CR-PLP-2014-01329, Manual Valves are Not Isolating the 'B' Shutdown Cooling Heat Exchanger, February 13, 2014
- CR-PLP-2014-02367, P-52C, Inboard Bearing Oiler for P-52C, 'C' CCW pump Was Not Working Properly when Draining the Oil, April 2, 2014
- CRPLP-2014-03090, CV-0821, CCW Heat Exchanger E-54A Temp Control Positioner Has a Small Air Leak, May 19, 2014
- CR-PLP-2014-03457, A Packing Leak was Identified on CV-0909, Letdown HX E-58 CCW Outlet, June 18, 2014
- CR-PLP-2014-03881, When Filling CCW P-52B Inboard Pump Bearing Reservoir with Oil, the Wrong Oil was Used, July 28, 2014
- CR-PLP-2014-01290, Unexpected Lowering Trend of the CCW Surge Tank, February 11, 2014
- CR-PLP-2014-03910, Severity Level 2 Air Leak on PCV-0944A Pressure Control, July 29, 2014
- CR-PLP-2014-03957, Non-Safety Related Fasteners Installed in CCW Pump P-52A Pump-Motor Coupling in 2010, August 1, 2014
- CR-PLP-2014-03959, Non-Safety Related Fasteners Installed in CCW Pump P-52B Pump-Motor Coupling in 2012 and 2008, August 1, 2014
- CR-PLP-2014-04068, Oil is Leaking from the Inboard Pump Bearing on P-52B, August 12, 2014
- CR-PLP-2014-04452, When Performing Post-Maintenance Test for MV-CC945, P-52C CCW Pump Discharge Valve, the Valve was Only Able to be Moved Approximately 10 percent in the Closed Direction, September 11, 2014
- CR-PLP-2014-05017, Oilers Installed on the CCW Pumps, P-52A/B/C, are Non-Safety Related, October 16, 2014
- CR-PLP-2014-05276, E-54A 'A' CCW Heat Exchanger North End Bell Flange Leak has Increased, December 7, 2014
- CR-PLP-2014-05825, During Review of IST Technical Specification Surveillance Procedure QO-15 Test Results, It was Identified that Since the 1R23 Refueling Outage, the Differential Pressure for Each of the CCW Pumps (P52A, P-52B and P-52C) Have Been Averaging Approximately 2 psid Higher than the Trended Value Prior to the Refueling Outage, December 15, 2014
- CR-PLP-2014-PLP-2014-01850, FI-0971, CCW to P-55A, is Reading Below its eSOMS Minimum Specification, March 3, 2014
- CR-PLP-2015-00168, Metallic Vibration Probe Point on the Inboard Pump Bearing of P-52C Had Not Been Restored Following Maintenance, January 11, 2015
- CR-PLP-2015-00998, During QO-1, Safety Injection Actuation Test, the Open Position Indication Failed to Light When Placing HS-0944A to the Bypass Position with the Valve in the Closed Position, March 6, 2-015
- CR-PLP-2015-0221, T3, CCW Surge Tank, Level Has Been Rising Slowly at About 2 – 3 Percent Per Day, January 14, 2015

- CR-PLP-2015-02398, Review of Technical Specification Surveillance Procedure QO-146 for CCW Pump P-52C Identified that the Vibration Reference Values and Acceptance Criteria in Attachment 1 of the Test Procedure were Different than the Vibration Reference Values and Acceptance Criteria in QO-15, June 10, 2015
- EN-LI-102, CAP, Revision 24
- M-209, Piping & Instrument Diagram Component Cooling System, Sheet 1, Revision 68
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- Pre-Fire Plan for Cable Spreading Room/Elevation 607'-6"
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- Smear Efficiency Factors Relative to Surface Contaminated Objects Memo, October 10, 2000

#### 4OA1 Performance Indicator Verification

- EN-LI-114, PI Process, Revision 6
- NRC PI Data, EP – ANS Reliability, Fourth Quarter 2014 through First Quarter 2015

- NRC PI Data, EP – Drill/Exercise Performance, Fourth Quarter 2014 through First Quarter 2015
- NRC PI Data, EP – ERO Readiness, Fourth Quarter 2014 through First Quarter 2015
- NRC PI Technique/Data Sheet, Safety System Functional Failures (MS05), July 2014 through March 2015
- NRC PI Technique/Data Sheet, Unplanned Power Changes per 7000 Critical Hours (IE03), April 2014 through March 2015

#### 40A2 Problem Identification and Resolution

- AOP-29, PCP Abnormal Conditions, Revision 2
- ARP-5, PCP Steam Generator and Rod Drive Scheme EK-09 (C-12), Revision 101
- CR-PLP-2012-02044, Operation of PCPs with Inadequate Net Positive Suction Head, April 2, 2012
- CR-PLP-2013,00652, Entered LCO 3.7.7 Due to Indications of A CCW Leak on E-54A, February 14, 2013
- CR-PLP-2013-00085, Unit Removed From Service to Perform Repairs on MOD-26H5, Switchyard Disconnect Switch, February 27, 2013
- CR-PLP-2013-03063, Received Alarm EK-0137, Auxilliary Feedwater AFAS-FOGG Subsystem Trip Unexpectedly, July 9, 2013
- CR-PLP-2013-03590, V-24A, Diesel Generator Room Supply Fan Control Switch Was In AUTO and Fan Did Not Start Properly, August 15, 2013
- CR-PLP-2013-03769, Some WO Packages for Important Systems Contain Inaccurate or Insufficient Details That Are Being Revised, Causing Delays In The Start of Execution Week Activities, August 26, 2013
- CR-PLP-2014-02171, Plant Process Computer Meteorological Calculation for Atmospheric Stability Class Had Ann Error, Potential Resulting In The Display of Inaccurate Stability Class Level, March 9, 2014
- CR-PLP-2014-02461, E-22A, Diesel Generator 1-1 Jacket Water Cooler ET Inspection identified Tubes for Plugging, March 17, 2014
- CR-PLP-2014-03615, TI-0122CD, Primary System Temperature Protective Channel D-Cold Leg Was Reading Erratic, July 6, 2014
- CR-PLP-2014-05199, Control Power Fuse Blew During Installation of New Breaker Bucket 52-1606, July 6, 2014
- CR-PLP-2014-5054, PCP P-50C Upper Stage Pressure Has a Degrading Trend, October 23, 2014
- CR-PLP-2014-5096, Trend in Lower Oil Level for PCP P-50A Motor, October 22, 2014
- CR-PLP-2015-00005, Failure to Sufficiently Troubleshoot Equipment Failures Contributes to Repetitive Failures of High Critical Components and Inadvertent Safety System Actuations, January 1, 2015
- CR-PLP-2015-01057, NRC Question Regarding the Response to High Vibration Levels Defined in PCP Abnormal Operating Procedure AOP-29, March 11, 2015
- CR-PLP-2015-01181, Emergency Diesel Generator 1-2, K-6B Failed to Start During MO-7A-2, March 18, 2015
- CR-PLP-2015-02053, T-25B 1-2 D/G Day Tank Started to Fill During MO-7A-2 EDG 1-2 Attachment 4 Fuel Oil Transfer Pump P-18B Test Step 17.0, May 18, 2015
- CR-PLP-2015-02073, Gaps in Functional and Organizational Behaviors Are Contributing To Some ER Challenges, May 19, 2015
- CR-PLP-2015-0596, PCP P-50A Lower Oil level is Declining Below the 42 Percent Limit, February 2, 2015
- CR-PLP-2015-1501, Rising Trend in 'D' SIT, April 12, 2015

- CR-PLP-2015-1943, CV-3065, Safety Injection Tank T-82B, Vent Valve Will Not Change Indicated Position, May 12, 2015
- CR-PLP-2015-2053, P-18A, 'A' Fuel Oil Transfer Pump, Continued to Fill Day Tank When Level was High, May 18, 2015
- CR-PLP-2015-2870, Indicated Position of CV-0605 Is Approximately 120% Open, July 8, 2015
- EN-DC-147, PCP Operating Limit Evaluation for Palisades Nuclear Plant, Revision 6
- EN-DC-336, Plant Health Committee Meeting Packages, Second Quarter 2015
- EN-OP-104, Operability Evaluation Due to PCP P-50C Impeller Pieces, Revision 7
- RT-118, PCS Calorimetric Mass Flow Determination, Revision 12
- RT-118, PCS Calorimetric Mass Flow Determination, Revision 9

#### 40A3 Follow-Up of Events and Notices of Enforcement Discretion

- AOP-38, Acts of Nature, Revision 3
- AOP-38, Acts of Natures Basis Document, Revision 3
- CR-PLP-2015-01817, MV-PMU100 has Packing Leak of 60 Drops Per Minute, May 2, 2015
- CR-PLP-2015-01818, Packing Leak on MV-PMU100 During an Unusual Event, May 2, 2015
- CR-PLP-2015-01819, Better Coordination of Event Communication Needed With State of Michigan, May 2, 2015
- CR-PLP-2015-01820, Seismic Activity Felt and Confirmed, May 2, 2015
- CR-PLP-2015-01837, NOUE EAL Overclassification, May 2, 2015
- CR-PLP-2015-01852, ERO Pager Failed to Actuate, May 4, 2015
- EAL Basis, EAL Technical Bases, Revision 6
- EI-1, Emergency Classification and Actions, Revision 56
- EI-17, Compensating Measures for Out of Service EAL Equipment and Listing of Non-EAL Equipment Important for EP, Revision 5
- EN-DC-356, Post Earthquake Inspection Procedure, Revision 2
- EN-EP-202, Equipment Important to EP, Revision 1
- FSAR Chapter 2, Site and Environment, Revision 21
- FSAR Chapter 5, Design of Structures, Systems and Components, Revision 31
- GEN-38, Accessing the Seismic Monitor Readings, Revision 1
- Guidelines for Nuclear Plant Response to Earthquakes, EPRI, December 1989
- Operations Shift Logs and Control Room Plant Process Computer Data, May 2, 2015

## LIST OF ACRONYMS USED

1R23	Refueling Outage Number 23
AC	Alternating Current
ADAMS	Agencywide Documents Access Management System
ALARA	As-Low-As-Reasonably-Achievable
ANS	Alert and Notification System
CAP	Corrective Action Program
CCW	Component Cooling Water
CFR	<i>Code of Federal Regulations</i>
CR	Condition Report
DEP	Drill and Exercise Performance
EACE	Equipment Apparent Cause Evaluation
EAL	Emergency Action Level
EP	Emergency Preparedness
ERO	Emergency Response Organization
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
IST	Inservice Test
NEI	Nuclear Energy Institute
NCV	Non-Cited Violation
NOUE	Notice of Unusual Event
NRC	U.S. Nuclear Regulatory Commission
PAPR	Powered Air Purifying Respirator
PARS	Publicly Available Records System
PCP	Primary Coolant Pump
PCS	Primary Coolant System
PI	Performance Indicator
PM	Preventive Maintenance
RWP	Radiation Work Permit
SCBA	Self-Contained Breathing Apparatus
SDP	Significance Determination Process
SSC	Structures, Systems, and Components
TEDE	Total Effective Dose Equivalent
TS	Technical Specification
TSO	Transmission System Operator
UFSAR	Updated Final Safety Analysis Report
VCT	Volume Control Tank
WO	Work Order

A. Vitale

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Sincerely,

**/RA/**

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