



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
2443 WARRENVILLE RD. SUITE 210
LISLE, IL 60532-4352

May 15, 2015

Mr. Anthony Vitale
Vice President, Operations
Entergy Nuclear Operations, Inc.
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043-9530

SUBJECT: PALISADES NUCLEAR PLANT, TRIENNIAL FIRE PROTECTION INSPECTION
REPORT 05000255/2015008

Dear Mr. Vitale:

On April 16, 2015, the U.S. Nuclear Regulatory Commission (NRC) completed a triennial fire protection inspection at your Palisades Nuclear Plant. The enclosed inspection report documents the inspection results, which were discussed on April 16, 2015, with Mr. P. Russell and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations, and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

The NRC inspectors documented one finding of very-low safety significance (Green) in this report. This finding was determined to involve a violation of NRC requirements. However, because of its very-low safety significance, and because the issue was entered into your Corrective Action Program, the NRC is treating the issue as a Non-Cited Violation (NCV) in accordance with Section 2.3.2 of the NRC Enforcement Policy.

If you contest the subject or severity of the 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 copies to the Regional Administrator, Region III; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector 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* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," 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's Public Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA Jasmine Gilliam Acting for/

Robert C. Daley, Chief
Engineering Branch 3
Division of Reactor Safety

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

Enclosure:
Inspection Report 05000255/2015008
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: 05000255/2015008

Licensee: Entergy Nuclear Operations, Inc.

Location: Covert, MI

Dates: March 18 – April 16, 2015

Inspectors: A. Dahbur, Senior Reactor Inspector
D. Szwarc, Senior Reactor Inspector (Lead)
R. Winter, Reactor Inspector

Accompanying Personnel: D. Passehl, Senior Reactor Analyst

Approved by: Robert C. Daley, Chief
Engineering Branch 3
Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

Inspection Report 05000255/2015008; 03/18/2015-04/16/2015; Palisades Nuclear Plant; Routine Triennial Fire Protection Baseline Inspection.

This report covers an announced triennial fire protection baseline inspection. The inspection was conducted by Region III inspectors. One finding was identified by the inspectors. The finding was considered a Non-Cited Violation (NCV) of U.S Nuclear Regulatory Commission (NRC) regulations. The significance of most findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process (SDP)." Cross-cutting aspects were determined using IMC 0310, "Aspects Within the Cross-Cutting Areas." Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. 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.

NRC-Identified and Self-Revealed Findings

Cornerstone: Mitigating Systems

- **Green.** The inspectors identified a finding of very-low safety significance, and an associated NCV of Title 10, *Code of Federal Regulations* (CFR) 50.48(c), and National Fire Protection Association Standard 805, Section 2.4.3.3 for the licensee's failure to correctly model the as-built plant in the Fire Probabilistic Risk Assessment (PRA). Specifically, the licensee credited the suppression system located in the cable spreading room in the PRA to suppress type 2 fire scenarios, whereas the actual room contained numerous obstructions due to the stacked cable trays located near the ceiling that interfered with the water spray pattern discharged from the sprinklers. These obstructions could have prevented the suppression system from providing an adequate water density pattern to suppress a fire below the cable trays in areas which contained electrical panels. The licensee entered this issue into their Corrective Action Program, and already had compensatory measures in place in the cable spreading room, including hourly fire tours and a standing order for an immediate call out for the fire brigade for a fire alarm in the room.

The inspectors determined that the performance deficiency was more than minor because the finding, if left uncorrected, would have the potential to lead to a more significant safety concern. Specifically, the licensee's failure to correctly model/analyze the as-built condition of the suppression system located in the cable spreading room in the PRA could potentially affect the risk associated with a fire in the room, and could result in inappropriately screening out the effects of other changes associated with the fire area. Appendix M was used because the existing SDP Appendices do not adequately address the risk of performance deficiencies associated with licensees' PRAs. The Senior Reactor Analyst concluded that the finding was of very-low safety significance (Green) because while there may be a change to the plant's baseline risk as a result of this issue, there is no delta plant risk due to a deficiency in the licensee's PRA model/analysis. This finding has a cross-cutting aspect in the area of Human Performance associated with Team Work because the licensee did not communicate and coordinate activities between the PRA and the fire protection groups. (Section 1R05.3b) [H.4]

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events and Mitigating Systems

1R05 Fire Protection (71111.05XT)

The inspectors conducted the inspection in accordance with U.S. Nuclear Regulatory Commission (NRC) Inspection Procedure (IP) 71111.05XT, "Fire Protection – National Fire Protection Association (NFPA) 805 (Triennial)," issued January 31, 2013. The inspectors reviewed the licensee's Fire Protection Program against the requirements of NFPA 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2001 Edition," as incorporated by Title 10, *Code of Federal Regulation* (CFR) Part 50.48(c). The NFPA 805 standard establishes a comprehensive set of requirements for Fire Protection Programs at nuclear power plants. The standard incorporates both deterministic and risk-informed performance-based concepts. The deterministic aspects of the standard are comparable to traditional requirements.

The inspectors conducted a design-based, plant-specific, risk-informed, onsite inspection of the licensee's Fire Protection Program's defense-in-depth elements used to mitigate the consequences of a fire. The inspectors reviewed the licensee's Fire Protection Program to ensure that it met the fire protection concept of defense-in-depth for plant areas important to safety by:

- preventing fires from starting;
- rapidly detecting, controlling and extinguishing fires that do occur;
- providing protection for structures, systems, and components important to safety so that a fire that is not promptly extinguished by fire suppression activities will not prevent the safe-shutdown of the reactor plant; and
- taking reasonable actions to mitigate postulated events that could potentially cause loss of large areas of power reactor facilities due to explosions or fires.

The inspectors evaluated the licensee's Fire Protection Program by focusing on the design, installation, operational status, testing, and material condition of the Fire Protection Program, post-fire safe shutdown (SSD) systems, and B.5.b mitigating strategies. The inspectors verified that the licensee's program is sufficiently implemented and maintained to satisfy that nuclear safety and radioactive release goals, objectives, and performance criteria for all operational modes and plant configurations.

In addition, the inspectors' review and assessment focused on the licensee's post-fire SSD systems for selected risk-significant fire areas. Inspector emphasis was placed on determining that the post-fire SSD capability and the fire protection features were maintained free of fire damage to ensure that at least one post-fire SSD success path was available. The inspectors' review and assessment also focused on the licensee's B.5.b related license conditions, and the requirements of 10 CFR 50.54 (hh)(2). The inspectors' emphasis was to ensure that the licensee could maintain or restore core cooling, containment, and spent fuel pool cooling capabilities utilizing the B.5.b

mitigating strategies following a loss of large areas of power reactor facilities due to explosions or fires. Documents reviewed are listed in the Attachment to this report.

The fire areas and B.5.b mitigating strategies selected for review during this inspection are listed below and in Section 1R05.15. The fire areas selected constituted three inspection samples and the B.5.b mitigating strategies selected constituted two inspection samples, respectively, as defined in IP 71111.05XT.

| Fire Area | Description |
|-----------|----------------------------------|
| 2 | Cable Spreading Room |
| 9 | Intake Structure |
| 13A | Auxiliary Building 590' Corridor |

.1 Protection of Safe Shutdown Capabilities

a. Inspection Scope

The inspectors reviewed the licensee's fire response abnormal operating procedures (AOPs) to verify that the shutdown methodology properly identified the components and systems necessary to achieve and maintain safe and stable plant conditions. The inspectors performed a walk-through of portions of the shutdown from outside of the control room AOP-41, "Alternate SSD Procedure," Revision 1, to ensure that operators could reasonably perform the actions specified in the procedure.

b. Findings

No findings were identified.

.2 Passive Fire Protection

a. Inspection Scope

For the selected fire areas, the inspectors evaluated the adequacy of fire area barriers, penetration seals, fire doors, electrical raceway fire barrier systems, and fire rated electrical cables. The inspectors walked down accessible portions of the selected fire areas to observe material condition, construction details, and the adequacy of design of fire area boundaries (including walls, fire doors, and fire dampers) to ensure they were appropriate for the fire hazards in the area. The inspectors reviewed license documentation, such as the NRC NFPA 805 Safety Evaluation Report (SER), and NFPA standards to verify that Fire Protection Program features met license commitments. The inspectors reviewed the installation, repair, and qualification records for a sample of penetration seals to ensure the fill material was of the appropriate fire rating, and that the installation met the engineering design. In addition, the inspectors reviewed a sample of surveillance and maintenance procedures for selected fire doors, fire dampers, and fire barrier penetration seals to assure they were properly inspected and repaired.

b. Findings

No findings were identified.

.3 Active Fire Protection

a. Inspection Scope

The inspectors walked down and evaluated the adequacy of fire suppression and detection systems to determine that they were installed, tested, and maintained to adequately control and/or extinguish fires associated with the hazards of the selected fire areas. The inspectors observed the material condition, operational lineup, and design of the installed fire detection and suppression systems, including the electric motor driven, diesel motor driven, jockey fire pumps, carbon dioxide system, manual fire hose and standpipe systems, and fire extinguishers in the selected fire areas. The inspectors reviewed fire pre-plans and procedures for the selected fire areas to determine if appropriate information was provided to fire brigade members. In addition, the inspectors observed the placement of the fire hoses, fire extinguishers, fire hose nozzle types, and fire hose lengths to verify they were not blocked, and that adequate reach and coverage was provided consistent with the fire protection features and potential fire conditions described in the NFPA 805 fire safety analysis calculations.

b. Findings

Failure to Correctly Assess the Suppression System in the Cable Spreading Room in the Probabilistic Risk Assessment for NFPA 805

Introduction: The inspectors identified a finding of very-low safety significance (Green), an associated Non-Cited Violation (NCV) of 10 CFR 50.48(c), and NFPA 805, Section 2.4.3.3, for the licensee's failure to correctly model the as-built plant condition in the Fire Probabilistic Risk Assessment (PRA); also referred to as a probabilistic safety assessment (PSA) in NFPA 805. Specifically, the licensee credited the suppression system located in the cable spreading room in the PRA to suppress type 2 fire scenarios, whereas the actual room contained numerous obstructions due to the stacked cable trays located near the ceiling that interfered with the water spray pattern discharged from the sprinklers. These obstructions could have prevented the suppression system from providing an adequate water density pattern to suppress a fire below the cable trays in areas which contained electrical panels.

Description: The cable spreading room (Fire Area 2) contained electrical cabinets and cables from both safety-related divisions. The electrical cabinets located in the room consisted of transformers, inverters, battery chargers, breakers, 480 volt load centers, motor control centers, and 125 volts direct current buses. The cabling was located primarily in cable trays suspended above the electrical cabinets that were generally stacked three to four trays high. The majority of cable trays were of the ladder type construction without a solid top or bottom and were filled to capacity with electrical cables. The cable trays were typically separated by six inches to a foot of vertical clearance between stacked trays. This overall tray arrangement was generally present throughout the room.

The cable spreading room contained an automatic detection system and a wet pipe sprinkler system for automatic suppression. During the walk down in the area the inspectors noted that, due to density of cable trays, it was not possible to see the ceiling from standing on the floor in all but a few areas of the room. The inspectors also noted that all sprinkler heads were mounted near the ceiling with no sprinkler heads in the vertical clearances between cable trays and no sprinkler heads below

the cable trays. The inspectors were concerned that the sprinkler system would only be effective for extinguishing a fire in the upper cable trays.

The licensee installed the wet pipe sprinkler system in the cable spreading room in compliance with NFPA 13-1968, "Standard for Installation of Sprinkler Systems." Section 4316, "Obstructions" of NFPA 13-1968 stated, in part, that, "timbers, uprights, hangers, piping, light fixtures, ducts, etc., are likely to interfere with proper distribution of water from sprinklers. Therefore, sprinklers should be so located or spaced that any interference is held to a minimum." The licensee's Engineering Report PLP-RPT-12-00053, "NFPA Code Compliance Review," Revision 0 indicated that there were no requirements to comply with Section 4316. The licensee indicated in their response to the inspectors that the "should" statement in the NFPA standard section was only a recommendation and did not impose any requirements.

In 1995 during the Appendix R Enhancement Program, the licensee identified significant obstructions of the sprinklers in the cable spreading room by the stacked cable trays and completed an 86-10 type of evaluation EA-APR-95-033, and concluded that although there were no sprinklers located below the cable trays and the trays represented a significant obstructions to water discharge from the sprinklers located at the ceiling. The evaluation considered the configuration was acceptable since there were no significant in-situ combustibles located at the floor. The licensee's justification was based on that the hazard of concern in the room was the cables in cable trays. The in-situ combustible materials in the room consisted primarily of the large amount of cable installed in the cable trays near the ceiling. The combustibles associated with panels and load centers were completely enclosed in metal cabinets and therefore would not be expected to burn completely during a fire.

The NRC approved the licensee's transition to NFPA 805 by the SER dated February 27, 2015. The licensees' current analysis for the Fire Protection Program for NFPA 805, calculation 0247-07-0005-06, "Palisades Nuclear Plant Fire PRA Fire," Revision 1, documented the scenario development process and the individual scenario details used in the Palisades fire PRA using elements from NUREG/CR-6850, "Fire PRA Methodology for Nuclear Power Facilities." Section 9.6, "Cable Spreading Room," of calculation 0247-07-0005-06, indicated that due to the highly congested nature of the Palisades cable spreading room a modified approach to scenario development was required in order to model each scenario. The cable spreading room had a wet-pipe sprinkler system installed in a grid-like pattern. This system was credited to prevent fire propagation beyond an initial zone-of-influence for the ignition sources in the cable spreading room. Grid coordinates were assigned to all risk-relevant targets. These coordinates were used to determine the potential impacts of fire scenarios in the area.

Utilizing the distance to nearby targets and the grid coordinates; scenarios in the cable spreading room were developed with three type treatments as described below:

- Type 1 – These scenarios represented a fire that was suppressed prior to damaging the first target beyond the ignition source. Manual suppression was credited for cabinets that were not well-sealed. For sealed cabinets, credit for suppression was not required as this was the only postulated fire scenario.
- Type 2 – These scenarios represented a fire that was not suppressed prior to damaging the first target. All targets within the grid coordinate(s) associated with

the ignition source are modeled as failed. These scenarios postulated successful suppression of the fire by the wet-pipe suppression system that prevents the fire damage from extending past a sprinkler head.

- Type 3 – These scenarios represented a fire that was not suppressed prior to damaging the first target and was further not suppressed by the wet-pipe sprinkler system. Propagation to the remaining grid coordinates in the room was postulated with the associated failures.

Figure 10-1, “Scenario Suppression Event Tree,” in calculation 0247-07-0005-06, also showed that the automatic suppression was credited to prevent the formation of a hot gas layer or fire propagation beyond the zone of influence. The inspectors were concerned that the licensee’s Fire PRA analysis incorrectly postulated successful suppression of the type 2 fire scenarios by the wet-pipe sprinkler system to prevent fire propagation beyond the zone of influence below the cable trays. The Fire PRA analysis did not consider the significant obstructions by the stacked cable trays located near the ceiling that interfered with the water spray pattern discharged from the sprinklers from providing an adequate water density pattern to suppress a fire in areas below the cable trays which contain electrical panels.

The licensee entered this issue into their Corrective Action Program (CAP) as CR-PLP-2015-01593. Since the licensee was currently in the transition period to full implementation of the NFPA 805 licensing and design basis, compensatory measure were already established for the cable spreading room for other non-compliances. Compensatory measures were in place as hourly fire tours and a standing order to immediately activate the fire brigade for fire alarms coming from the cable spreading room.

Analysis: The inspectors determined that the licensee’s failure to correctly consider the plant as-built condition in the PRA model/analysis was contrary to NFPA 805, Section 2.4.3.3 and was a performance deficiency. Specifically, the licensee failed to consider the obstructions to the suppression system in the cable spreading room when crediting the suppression system in the PRA model/analysis.

The performance deficiency was determined to be more than minor because the finding, if left uncorrected, would have the potential to lead to a more significant safety concern. Specifically, the licensee’s failure to correctly model/analyze the as-built condition of the suppression system located in the cable spreading room, in the fire PRA could potentially affect the risk associated with a fire in the room and could result in inappropriately screening out the effects of other changes associated with the fire area. The inspectors concluded this finding was associated with the Mitigating Systems cornerstone attribute of Protection Against External Factors (Fire), and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage).

The Senior Reactor Analyst (SRA) evaluated the finding in accordance with Inspection Manual Chapter 0609, “Significance Determination Process (SDP),” dated April 29, 2015, and Appendix M, “SDP Using Qualitative Criteria,” dated April 12, 2012. Appendix M was used because the existing SDP Appendices do not adequately address the risk of performance deficiencies associated with licensees’ PRAs. The SRA

concluded that the finding was of very-low safety significance (Green). While there may be a change to the plant's baseline risk as a result of this issue, this is a fire modeling issue only; no physical plant fire protection feature was altered by the fire PRA model. Therefore, there was no increase in actual core damage risk to the physical plant.

The licensee's baseline fire PRA may change as Palisades has until August 27, 2015 to complete the procedure changes, process updates, and training items listed in License Amendment Request Attachment S, Table S-3, "Implementation Items." Palisades also has until the end of the second full operating cycle after issuance of the SER to implement other modifications identified in Attachment S, Table S-2, "Plant Modifications."

This finding has a cross-cutting aspect in the area of Human Performance associated with Team Work because the licensee did not communicate and coordinate activities between the PRA and the fire protection groups. Specifically, the fire protection group did not appropriately communicate to the PRA group that significant obstructions existed in the cable spreading room due to the stacked cable trays. As a result, the licensee did not consider the impact of the obstructions of the automatic suppression system in the PRA model. [H.4]

Enforcement: License condition 2.C(3) requires the licensee to implement and maintain in effect all provisions of the approved Fire Protection Program that complies with 10 CFR 50.48(a) and 10 CFR 50.48(c), "NFPA Standard NFPA 805," as approved in the SER dated February 27, 2015. Section 2.4.3.3 of NFPA 805 states, in part, that the PSA (PRA) approach, methods, and data shall be based on the as-built and as-operated and maintained plant, and reflect the operating experience at the plant.

Contrary to the above, from February 27, 2015, until April 16, 2015, the licensee failed to base the PSA (PRA) approach, methods, and data on the as-built and as-operated and maintained plant. Specifically, the licensee's PSA (PRA) model/analysis credited the suppression system located in the cable spreading room to suppress a type 2 fire scenarios, whereas the actual room contained numerous obstructions by the stacked cable trays located near the ceiling that interfered with the water spray pattern discharged from the sprinklers from providing adequate water density pattern to suppress a fire in areas below the cable trays which contained electrical panels.

This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy, because it was of very-low safety significance (Green), and was entered into the licensee's CAP as CR-PLP-2015-01593. The licensee currently has compensatory measures established in the cable spreading room including hourly fire tours, and a standing order for an immediate call out for the fire brigade for a fire alarm in the room. (NCV 05000255/2015008-01; Failure to Correctly Assess the Suppression System in the Cable Spreading Room in the PRA for NFPA 805).

.4 Protection from Damage from Fire Suppression Activities

a. Inspection Scope

The inspectors evaluated that one success path to achieve and maintain the Nuclear Safety Performance Criteria could be achieved, and would not be adversely affected due to damage from fire suppression activities or from the rupture or inadvertent operation of manual fire suppression systems. The inspectors walked down the selected fire areas to

assess in-plant conditions including adequacy and material condition of equipment spray protection, elevations of vulnerable equipment and checked that water would either be contained in the fire affected area, or be safely drained off through floor drains or to other areas. The inspectors addressed the possibility that a fire in one fire area could lead to the migration of smoke or hot gases to other plant areas.

b. Findings

No findings were identified.

.5 Shutdown from a Primary Control Station

a. Inspection Scope

The licensee was in the process of transitioning their Fire Protection Program to comply with 10 CFR 50.48(c), "National Fire Protection Association Standard NFPA 805." As a result the licensee was revising their AOPs. The inspectors' reviews focused on ensuring that the required functions for post-fire SSD, and the corresponding equipment necessary to perform those functions were included in the fire response AOPs. The review included assessing whether safe and stable plant conditions from the primary control stations outside the main control room could be implemented and that transfer of control from the main control room to the remote shutdown panel could be accomplished in accordance with procedure AOP-41, "Alternate SSD Procedure," Revision 1. The inspectors walked down the actions identified in the procedure with the licensee to verify operators were properly trained, assess human factors, and ensure the procedures could be completed as written.

b. Findings

No findings were identified

.6 Circuit Analyses

a. Inspection Scope

The inspectors verified that the licensee performed a Nuclear Safety Capability Assessment (NSCA) for the selected fire areas, and that the assessment identified the structures, systems, and components important for achieving safe and stable conditions. For each fire area, the inspectors reviewed the electrical schematics, flow diagrams, and the NSCA to identify any potential fire-induced cable damage that could directly affect post-fire SSD. The inspectors reviewed a sample of circuit diagrams to verify that all appropriate cables had been selected and incorporated into the NSCA. The inspectors then evaluated selected circuits to ensure all fire scenarios had been identified, and dispositioned for all modes of operation including shut down operations, and abnormal plant configurations.

The inspectors verified that the NSCA demonstrated that hot shorts, shorts to ground, or other failures that would result in a spurious actuation will not affect the capability to meet the performance criteria. The inspectors verified that the licensee's assessment identified circuits that may impact the Nuclear Safety Performance Criteria. The assessment demonstrated that hot shorts, shorts to ground or other failures that would not result in a spurious actuation will not affect the capability to meet the performance

criteria. The inspectors reviewed fire scenarios and cable attributes, potential undesirable consequences, and common power supply/bus concerns.

The inspectors also reviewed the licensee's response to multiple spurious operations (MSOs) as identified by Nuclear Energy Institute's (NEI's) document, NEI 00 01, and the site's Expert Panel. The review ensured that the licensee followed the approved guidance provided by NEI 00-01, evaluated all appropriate MSO scenarios, and properly addressed any discrepancies.

b. Findings

No findings were identified.

.7 Communications

a. Inspection Scope

The inspectors reviewed, on a sample basis, the adequacy of the communication system to support plant personnel in the performance of alternative SSD functions and fire brigade duties. The inspectors verified that plant telephones, page systems, sound powered phones, and radios were available for use and maintained in working order.

b. Findings

No findings were identified.

.8 Emergency Lighting

a. Inspection Scope

The inspectors performed walkdowns of the selected fire zones, and observed the placement and coverage area of the fixed battery pack emergency lights credited for SSD. As part of the walkdowns, the inspectors focused on the existence of sufficient emergency lighting for access and egress to areas, and for performing necessary equipment operations. The inspectors verified that battery power supplies had sufficient capacity to support recovery actions necessary to meet the Nuclear Safety Performance Criteria. The inspectors reviewed the operability testing and maintenance of the lightning units to ensure that they followed licensee procedures, and accepted industry practice.

b. Findings

No findings were identified.

.9 Cold Shutdown Repairs

a. Inspection Scope

The inspectors determined that the licensee does not credit cold shutdown repairs to meet the Nuclear Safety Performance Criteria. The inspectors reviewed the NSCA to verify that the licensee had evaluated the need for cold shutdown repairs. The inspectors also interviewed licensee personnel, and determined that the licensee does not require transitioning to cold shutdown to achieve a safe and stable condition.

b. Findings

No findings were identified.

.10 Compensatory Measures

a. Inspection Scope

The inspectors conducted a review to verify that compensatory measures were in place for out of service, degraded, or inoperable fire protection, and post-fire SSD equipment, systems, or features (e.g., detection and suppression systems, and equipment, passive fire barriers, pumps, valves or electrical devices providing SSD functions or capabilities). The inspectors also conducted a review of the adequacy of short term compensatory measures to compensate for a degraded function or feature until appropriate corrective actions were taken.

b. Findings

No findings were identified.

.11 Radiological Release

a. Inspection Scope

The inspectors verified that the licensee had provided reasonable assurance that a fire would not result in a radiological release that adversely affects the public, plant personnel, or the environment in accordance with NFPA 805, Section 1.3.2. The inspectors verified that the licensee had evaluated the potential for radioactive releases to any unrestricted areas resulting from fire suppression activities were as-low-as-reasonably-achievable. The inspectors verified that the licensee had analyzed radioactive release on a fire area basis in accordance with NFPA 805, Section 2.2.4. The inspectors walked down the selected fire zones, and verified that the pre-fire plan tactics and instructions were consistent with the potential radiological conditions identified in the fire hazards analysis.

b. Findings

No findings were identified.

.12 Non-Power Operations

a. Inspection Scope

The plant did not enter an outage during the inspection. However, the inspectors verified that the licensee had defined specific pinch points where one or more key safety functions could be lost during non-power operations.

b. Findings

No findings were identified.

.13 Monitoring Program

a. Inspection Scope

The inspection occurred during the licensee's 6-month implementation window for certain items listed in Table S-3, "Implementation Items," of Entergy Nuclear Operations, Inc. letter PNP 2014-097, dated November 4, 2014. The NRC approved a 6-month implementation window for items listed in that table in the SER dated February 27, 2015. During the inspection the licensee was in the process of developing and implementing the NFPA 805 monitoring program per NFPA 805 Section 2.6. The inspectors did not review the licensee's Monitoring Program because it was not complete.

b. Findings

No findings were identified.

.14 Plant Change Evaluation

a. Inspection Scope

The licensee had not completed any plant change evaluations during the time between issuance of the NFPA 805 license amendment on February 27, 2015, and the end of the inspection.

b. Findings

No findings were identified.

.15 B.5.b Inspection Activities

a. Inspection Scope

The inspectors reviewed the licensee's preparedness to handle large fires or explosions by reviewing selected mitigating strategies. This review ensured that the licensee continued to meet the requirements of their B.5.b related license conditions and 10 CFR 50.54(hh)(2) by determining that:

- Procedures were being maintained and adequate;
- Equipment was properly staged, maintained, and tested;
- Station personnel were knowledgeable and could implement the procedures; and
- Additionally, inspectors reviewed the storage, maintenance, and testing of B.5.b related equipment.

The inspectors reviewed the licensee's B.5.b related license conditions and evaluated selected mitigating strategies to ensure they remain feasible in light of operator training, maintenance/testing of necessary equipment and any plant modifications. In addition, the inspectors reviewed previous inspection reports for commitments made by the licensee to correct deficiencies identified during performance of Temporary Instruction 2515/171 or subsequent performances of these inspections.

The B.5.b mitigating strategies selected for review during this inspection are listed below. The offsite and onsite communications, notifications/emergency response organization activation, initial operational response actions and damage assessment activities identified in Table A.3 1 of NEI 06-12, "B.5.b Phase II and III Submittal Guidance," Revision 2, are evaluated each time due to the mitigation strategies' scenario selected.

| NEI 06-12, Revision 2, Section | Licensee Strategy (Table) |
|--------------------------------------|---|
| 3.3.3 | Manual Operation of Turbine Driven Auxiliary Feedwater Pump (A.4-3) |
| 3.3.5 | Makeup to the Condensate Storage Tank (A.4-5) |

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

40A2 Identification and Resolution of Problems (71152)

a. Inspection Scope

The inspectors reviewed the licensee's CAP procedures and samples of corrective action documents to verify that the licensee was identifying issues related to the Fire Protection Program at an appropriate threshold and entering them in the CAP. The inspectors reviewed selected samples of condition reports, design packages, and fire protection system non-conformance documents.

b. Findings

No findings were identified.

40A6 Management Meetings

.1 Exit Meeting Summary

On April 16, 2016, the inspectors presented the inspection results to Mr. P. Russell, 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.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

- B. Baker, Operations Manager
- A. Bono, Engineer
- J. Borah, Systems and Components Engineering Manager
- D. Campbell, Fire Marshall
- B. Dotson, Regulatory Assurance Specialist
- J. Hardy, Regulatory Assurance Manager
- J. Kneeland, Fire Protection Engineer
- J. Milliken, Code Programs Supervisor
- P. Russell, Engineering Director
- K. Simpson, Fire Marshall
- T. Swiecicki, Senior Lead Engineer
- A. Williams, General Manager, Plant Operations

U.S. Nuclear Regulatory Commission

- B. Boston, Acting Resident Inspector
- R. Daley, Branch Chief, EB3
- A. Garmoe, Senior Resident Inspector
- J. Lennartz, Acting Senior Resident Inspector
- A. Scarbeary, Senior Resident Inspector

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened and Closed

| | | |
|---------------------|-----|--|
| 05000255/2015008-01 | NCV | Failure to Correctly Assess the Suppression System in the Cable Spreading Room in the Probabilistic Risk Assessment for NFPA 805 (Section 1R05.3b) |
|---------------------|-----|--|

LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors 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.

CALCULATIONS

| <u>Number</u> | <u>Description or Title</u> | <u>Date or Revision</u> |
|----------------------|--|--------------------------------|
| 0247-07-0005-04 | Palisades Nuclear Plant Fire Probabilistic Risk Assessment Multiple Spurious Operations Report | 01 |
| EA-APR-95-008 | 10CFR50 Safe Shutdown Manual Actions Feasibility Analysis | 02 |
| EA-ELEC-EDSA-06 | Palisades AC Power System EDSA Model | 02 |
| EA-FPP-03-001 | Fire Loading Calculation | 03 |
| EA-FPP-05-002 | Evaluation of Combustibles Between Service Water Pumps and Diesel Fire Pumps P-41 | 02 |
| EA-FPP-FRE-001 | NFPA 805 Fire Risk Evaluations | 0 |

CORRECTIVE ACTION PROGRAM DOCUMENTS ISSUED DURING INSPECTION

| <u>Number</u> | <u>Description or Title</u> | <u>Date or Revision</u> |
|----------------------|--|--------------------------------|
| CR-PLP-2015-01188 | Information Not Included in the Fire Safety Analyses for Fire Areas 13 and 27 in DBD-7.10 | March 19, 2015 |
| CR-PLP-2015-01190 | Steam Generator Level Indicator Not Reading Correctly | March 19, 2015 |
| CR-PLP-2015-01191 | Fuses Located on Top of De-Energized Breaker | March 19, 2015 |
| CR-PLP-2015-01330 | Wireless Camera On the East Wall of the Component Cooling Water Room | March 31, 2015 |
| CR-PLP-2015-01376 | Procedure AOP-20 Had Incorrect Breaker Label | April 2, 2015 |
| CR-PLP-2015-01378 | Procedure Binders Located Next to Power Converter in Cable Spreading Room | April 2, 2015 |
| CR-PLP-2015-01383 | Evaluate Need for Additional Information in AOP-41 | April 2, 2015 |
| CR-PLP-2015-01524 | Editorial Correction to Drawing E-129 | April 14, 2015 |
| CR-PLP-2015-01579 | Bundle of Signal Wire Visible in the Cable Tray Above Fire Door 168 | April 16, 2015 |
| CR-PLP-2015-01580 | Paper Wedged Between Wall and EC-121 H2 Recombiner M-69B Power Cabinet in Cable Spreading Room | April 16, 2015 |
| CR-PLP-2015-01583 | Racking Tools for EB-77 in the Old Baler Room are being Stored Laying on the Side of the Transformer | April 16, 2015 |
| CR-PLP-2015-01585 | Evaluation EA-APR-98-002 Should Have been Required to be Transitioned to NFPA 805 | April 16, 2015 |
| CR-PLP-2015-01590 | Issues with Hydrogen and Nitrogen Bottles | April 16, 2015 |
| CR-PLP-2015-01593 | NRC Finding Related to Probabilistic Safety Assessment Approach Crediting Suppression | April 16, 2015 |
| CR-PLP-2015-01595 | Concern with Hydrogen Bottle in Room 233 | April 16, 2015 |

CORRECTIVE ACTION PROGRAM DOCUMENTS REVIEWED

| <u>Number</u> | <u>Description or Title</u> | <u>Date or Revision</u> |
|-------------------|---|-------------------------|
| CR-PLP-2004-08321 | Potential Fire Induced Cable Damage May Spuriously Operate MOV | December 17, 2004 |
| CR-PLP-2006-00687 | Potential to Lose PCS Inventory in Fire Area 13 | February 14, 2006 |
| CR-PLP-2007-01947 | Breaker Numbers Inconsistent Between Analyses and Procedure | May 9, 2007 |
| CR-PLP-2007-02237 | ONP-25.2 Contained Errors for a Significant Time | May 25, 2007 |
| CR-PLP-2014-04935 | Fire Door-74 Not Latching Because Of Knob Mechanism Sticking | October 11, 2015 |
| CR-PLP-2014-04941 | Fire Door-80 Has Excessive Signage | October 11, 2015 |
| CR-PLP-2014-04961 | Fire Door-256 Procedure Needed To Be Revised To Provide Inspection Method For Watertight Door | October 12, 2014 |

DRAWINGS

| <u>Number</u> | <u>Description or Title</u> | <u>Date or Revision</u> |
|------------------|--|-------------------------|
| E-139 Sheet 1A | Schematic Diagram – Diesel Generator Breaker 152-213 | 04 |
| E-242 Sheet 1 | Schematic Diagram – Control Shutdown Cooling and Pressure Relief Motor Operated Valves | 23 |
| E-253 Sheet 1 | Schematic Diagram – Pressurizer Heater Transformer Feeder Breaker | 21 |
| M-207 Sheet 2 | Piping & Instrument Diagram Auxiliary Feedwater System | 39 |
| M-216 Sheet 1 | Piping & Instrument Diagram Fire Protection System | 49 |
| M-216 Sheet 4 | Fire Protection EL. 570' & 590' | 11 |
| M-216 Sheet 6 | Fire Protection EL. 607' & 611'-0" | 11 |
| VEN-M66 Sheet 21 | Fire protection Sprinkler System FA 9 | 05 |
| VEN-M66 Sheet 6 | Fire protection Sprinkler System FA 2 | 04 |

EVALUATIONS

| <u>Number</u> | <u>Description or Title</u> | <u>Date or Revision</u> |
|------------------|---|-------------------------|
| PLP-RPT-12-00053 | NFPA Code Conformance Review | 0 |
| PLP-RPT-12-00100 | Fire Suppression Activities Effect on Nuclear Safety Performance Criteria | 01 |

OTHER

| <u>Number</u> | <u>Description or Title</u> | <u>Date or Revision</u> |
|---------------|---|-------------------------|
| --- | B.5.b Phase 2 &3 Basis Document | 0 |
| 09-4005.1 | Nexus Report – Radioactive Release Review for Palisades Nuclear Plant | September 20, 2012 |
| EN-OP-112 | Night & Standing Order Log | April 2, 2015 |
| GEN-017 | Palisades Alternate Resources | 19 |

PROCEDURES

| <u>Number</u> | <u>Description or Title</u> | <u>Date or Revision</u> |
|----------------------|--|--------------------------------|
| AOP -6 | Loss of Condenser Vacuum | 01 |
| AOP -7 | Rapid Power Reduction | 01 |
| AOP-20 | EDG 1-1 Malfunctions | 01 |
| AOP-41 | Alternate Safe Shutdown Procedure | 01 |
| EN-DC-161 | Control of Combustibles | 11 |
| EN-IS-109 | Compressed Gas Cylinder Handling And Storage Combustibles | 07 |
| EN-TQ-125 | Fire Brigade Drills | 02 |
| EOP Supplement 19 | Alternate Auxiliary Feedwater Methods | 11 |
| EOP Supplement 31 | Supply AFW Pumps From Alternate Sources | 08 |
| EOP-9.0 | Functional Recovery Procedure | 22 |
| FPIP-4 | Fire Protection Systems And Fire Protection Equipment | 33 |
| FP-PE-16 | Fire Protection Check Sheet B.5.b Equipment | 02 |
| FP-PE-3 | Auxiliary Building Fire Extinguisher Inspection | April 1, 2015 |
| FPSP-RO-9 | Fire Protection Surveillance | 06 |
| FPSP-RP-11 | FPSP-RP-11 Fire Barrier Penetration Surveillance | 10 |
| PFP # 13A | Pre-Fire Plan Main Corridor North | 04 |
| PFP # 13A | Pre-Fire Plan Main Corridor South | 04 |
| PFP # 2 | Pre-Fire Plan Cable Spreading Room | 04 |
| PFP # 9 | Pre-Fire Plan Screen House/Intake Structure | 04 |
| SOP-21 | Fire Protection System | 29 |

TRAINING DOCUMENTATION

| <u>Number</u> | <u>Description or Title</u> | <u>Date or Revision</u> |
|----------------------|------------------------------------|--------------------------------|
| PL-N10044 | SOER 98-02 Breaker Training | 01 |
| PLLP-NLO-ISBD | Station Power Breakers | 03 |

VENDOR DOCUMENTS

| <u>Number</u> | <u>Description or Title</u> | <u>Date or Revision</u> |
|----------------------------|--|--------------------------------|
| Catalog Models DF-3, Df-3A | Pyrotronics Ultraviolet Flame Detector | August 1985 |
| Model DIS-5B4 | Pyr-A-Larm Ionization Detector | February 1977 |

WORK ORDERS

| <u>Number</u> | <u>Description or Title</u> | <u>Date or Revision</u> |
|----------------------|--|--------------------------------|
| 52510622 01 | FPSP-RP-11 Fire Barrier Penetration Insp | February 18, 2015 |
| 52526113 01 | FPSP-ST-1 Fire Detector Sys Outside Cont Func Test | July 27, 2014 |
| 52572433 01 | FPSP-SO-2 Safety Related Fire Door Inspection | October 22, 2014 |

LIST OF ACRONYMS USED

| | |
|-------|--|
| ADAMS | Agencywide Document Access Management System |
| AOP | Abnormal Operating Procedure |
| CAP | Corrective Action Program |
| CFR | <i>Code of Federal Regulations</i> |
| IMC | Inspection Manual Chapter |
| IP | Inspection Procedure |
| MSO | Multiple Spurious Operations |
| NCV | Non-Cited Violation |
| NEI | Nuclear Energy Institute |
| NFPA | National Fire Protection Association |
| NRC | U.S. Nuclear Regulatory Commission |
| NSCA | Nuclear Safety Capability Assessment |
| PARS | Publicly Available Records System |
| PRA | Probabilistic Risk Assessment |
| PSA | Probabilistic Safety Assessment |
| SDP | Significance Determination Process |
| SER | Safety Evaluation Report |
| SRA | Senior Reactor Analyst |
| SSD | Safe Shutdown |

A. Vitale

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Sincerely,

/RA Jasmine Gilliam Acting for/

Robert C. Daley, Chief
Engineering Branch 3
Division of Reactor Safety

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

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