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PNP 2018-007

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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: Response to NRC Design Bases Assurance Inspection (Teams)
Inspection Report 05000255/2017007

Palisades Nuclear Plant
Docket 05000255
Renewed Facility Operating License No. DPR-20

Reference 1: NRC letter to Entergy Nuclear Operations, Inc., *Palisades Nuclear Plant - NRC Design Bases Assurance Inspection (Teams) Inspection Report 05000255/2017007*, dated December 29, 2017

Dear Sir or Madam:

In Reference 1, the U.S. Nuclear Regulatory Commission (NRC) identified a finding of very low safety significance and an associated non-cited violation (NCV) during the Design Bases Assurance Inspection recently conducted at the Palisades Nuclear Plant (PNP). The NCV was associated with a PNP failure to properly conduct periodic tests of the emergency diesel generators (EDGs) to start and accelerate design basis sequenced loads.

The NRC concluded that the Institute of Electrical and Electronics Engineers (IEEE) Standard 308-1978, *IEEE Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations*, required periodic system testing to demonstrate the ability of the EDGs to recover from voltage and frequency fluctuations experienced during load testing within a specified period of time. The basis for this position was not clearly documented within the inspection report and appears to be an incorrect interpretation of the IEEE standard.

Attachment 1 provides the Entergy Nuclear Operations, Inc. (ENO) response and basis for the denial of the finding and violation issued to PNP, identified in Reference 1 as *NCV 05000255/2017007-01; Failure to Periodically Test the Emergency Diesel Generators Capacity to Start and Accelerate Design Basis Sequenced Loads*. ENO

requests that the NRC further review this matter to determine whether this item was properly dispositioned as a violation of Title 10 of the *Code of Federal Regulations* (CFR), Part 50, Appendix B, Criterion XI, *Test Control*.

This letter identifies no new commitments and no revisions to existing commitments.

If you have any questions concerning this letter, please contact Mr. Jeffery Hardy, PNP Regulatory Assurance Manager, at (269) 764-2011.

Sincerely,

A handwritten signature in black ink, appearing to read 'JAH' followed by a stylized flourish.

JAH/bed

Attachment 1: Response to NRC Design Bases Assurance Inspection (Teams)
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CC Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC
Director, Office of Enforcement, USNRC

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Attachment 1

Response to NRC Design Bases Assurance Inspection (Teams)

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Introduction

In Reference 1, the U.S. Nuclear Regulatory Commission (NRC) identified a finding of very low safety significance and an associated non-cited violation (NCV) during the Design Bases Assurance Inspection recently conducted at the Palisades Nuclear Plant (PNP). The NCV was associated with a failure to properly conduct periodic tests of the emergency diesel generators (EDGs) to start and accelerate design basis sequenced loads. The finding also documented that the site did not perform adequate post-modification testing after replacing the EDG governor controller system or voltage regulators.

By issuing the NCV, the NRC concluded that a statement taken from the PNP Updated Final Safety Analysis Report committed the station to performing periodic testing detailed in Institute of Electrical and Electronics Engineers (IEEE) Standard 308-1978, *IEEE Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations*. Entergy Nuclear Operations, Inc. (ENO) concurs with this conclusion.

However, the NRC also concluded that the IEEE Standard 308-1978 required periodic system testing to demonstrate the ability of the EDGs to recover from voltage and frequency fluctuations experienced during load testing within a specified period of time. The basis for this position was not clearly documented within the inspection report and appears to be an incorrect interpretation of the IEEE standard.

After further review and consideration, ENO respectfully disagrees that a performance deficiency exists. Specifically, ENO does not agree that the site licensing bases, design bases, or applicable regulatory requirements require such testing on a periodic basis, or that inadequate post-modification testing was performed.

Below is the ENO response and basis for the denial of the finding and violation, identified in Reference 1 as NCV 05000255/2017007-01, *Failure to Periodically Test the Emergency Diesel Generators Capacity to Start and Accelerate Design Basis Sequenced Loads*. ENO requests that the NRC further review this matter to determine whether this item was properly dispositioned as a violation of Title 10 of the Code of Federal Regulations (CFR), Part 50, Appendix B, Criterion XI, *Test Control*.

NRC Finding as Documented in the Inspection Report

The finding was documented in the NRC inspection report (Reference 1) as follows:

- (1) *Failure to Periodically Test the Emergency Diesel Generators Capacity to Start and Accelerate Design Basis Sequenced Loads*

Introduction: The team identified a finding of very-low safety significance (Green) and an associated Non-Cited Violation (NCV) of Title 10 of the Code of Federal Regulations (CFR), Part 50, Appendix B, Criterion XI, "Test Control," for the failure to periodically test the EDGs capability to start and accelerate all of the sequenced loads within the applicable design voltage and frequency transient and recovery limits. Specifically, EDG testing activities did not demonstrate that all of the EDG auto-sequenced loads started and accelerated within the applicable voltage and frequency limits during start-up and recovery. In addition, the licensee did not perform adequate post-modification testing after replacing the EDG governor controller system or voltage regulators.

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Description: The UFSAR, Section 8.1.1, "Design Basis," states in part that the engineered safeguards electrical system ... is intended to meet all the other requirements identified in IEEE 308-1978. The IEEE 308-1978, Section 7.4, "Periodic Equipment Tests," states that "Tests shall be performed at scheduled intervals to (1) Detect the deterioration of the system towards an unacceptable condition. (2) Demonstrate that standby power equipment and other components that are not exercised during normal operation of station are operable. The UFSAR, Section 8.4.1.3, "Design Basis," states that the recovery time for the EDG voltage to return to 90 percent of rated voltage after application of each load step is less than 3 seconds. The UFSAR, Sections 5.1.3.8 and 5.1.3.9, for Criterion 17 and 18, states that the onsite power system can be periodically tested to assure that they are operable and functional.

The licensee is not committed to NRC Regulatory Guide's (RG's) 1.108 and 1.9, however these RG's describe an acceptable approach to test the diesels generator. Position C.2.a.2 of RG 1.108 states that testing of diesel generator units during the Plant Preoperational Test Program and at least once every 18 months should demonstrate proper operation for design-accident-loading-sequence to design-load requirements and verify that voltage and frequency are maintained within required limits. Position C.4 of RG 1.9 stated, in part, that "...at no time during the loading sequence should the frequency and voltage decrease to less than 95 percent of nominal and 75 percent of nominal respectively." It also stated that "Frequency should be restored to within 2 percent of nominal, and voltage should be restored to within 10 percent of nominal within 60 percent of each load-sequence time interval." The licensee did not provide the team an acceptable alternative to the requirements stated in the above RG's, but rather do not evaluate or review the voltage and frequency responses obtained during the RT-8C or RT-8D surveillances. Therefore, if left uncorrected, the governor or voltage regulator control system could, due to aging, drift from the original settings and not allow the EDG to recover quick enough after large load sequencing and have the potential of loads overlapping during application to the EDG.

The team noted the following deficiencies related to the EDG periodic testing:

- *The licensee, in surveillance procedures RT-8C and RT-8D, are only evaluating the steady-state voltage and frequency at the EDG terminals after the load sequencing is complete. However, section 6.3 of the test procedure verifies that the EDG successfully supports the sequenced starting of the engineered safeguards equipment, but only refers to Attachment 5 which only verifies the measured times for the sequence timers.*
- *When the electronic governor or electronic voltage regulator are replaced or otherwise adversely affected during maintenance activities, the licensee tunes the new device using an approximate approach in an unloading condition which yield a gross setting.*

The license entered the issue into their CAP CR 2017-05265 and CR 2017-05283. The licensee identified that historic LOOP/LOCA frequency and voltage trace data was available based upon the frequency and voltage recorders continuing to run during EDG output break time testing. The licensee analyzed the last EDG LOOP/LOCA traces and

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determined that the EDGs were currently operable. At the end of the inspection, the licensee was in the process of developing the corrective action to restore compliance.

Analysis: The team determined that the failure to periodically test the EDG capacity to start and accelerate all of the sequenced loads within the applicable voltage and frequency limits was contrary to 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," and was a performance deficiency. The performance deficiency was determined to be more than minor because it was associated with the Mitigating Systems cornerstone attribute of equipment performance and affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. Specifically, the failure to test the EDGs capacity to start and accelerate all of the sequenced loads within the applicable limits periodically to identify degradation and following maintenance activities were the EDGs frequency and voltage responses could be impacted did not ensure availability, reliability, and capability of components supplied by the EDGs to perform their intended safety function.

The team determined the finding could be evaluated using the Significance Determination Process in accordance with Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," issued on June 19, 2012. Because the finding impacted the Mitigating Systems and Barrier Integrity cornerstones, the team screened the finding through IMC 0609 Appendix A, "The Significance Determination Process for Findings At-Power," issued on June 19, 2012, using Exhibit 2, "Mitigating Systems Screening Questions." The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee evaluated the most recent voltage and frequency data from the last EDG output breaker tests in which the data recorder was left running after the output breaker shut and reasonably determined that the EDGs and the affected loads were operable.

The team did not identify a cross-cutting aspect associated with this finding because the performance deficiency was not reflective of current performance due to the age of the issue. Specifically, the associated testing procedures were established more than 3 years ago.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion XI, "Test Control", requires, in part, that a test program be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. It also stated that test results shall be documented and evaluated to assure that test requirements have been satisfied.

The UFSAR, Section 8.1.1, "Design Basis," states in part that the engineered safeguards electrical system ... is intended to meet all the other requirements identified in IEEE 308-1978. The IEEE 308-1978, Section 7.4, "Periodic Equipment Tests," states that "Tests shall be performed at scheduled intervals to (1) Detect the deterioration of the system towards an unacceptable condition. (2) Demonstrate that standby power equipment and other components that are not exercised during normal operation of station are operable.

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Contrary to the above, as of November 15, 2017, the licensee failed to establish a testing program to demonstrate that the EDGs could start and accelerate their sequenced loads within the applicable voltage and frequency acceptance limits periodically as required by IEEE 308-1978 and following maintenance activities that could adversely affect EDG frequency and voltage response (e.g. governor and voltage regulator maintenance activities.) The licensee is still evaluating its planned corrective actions, however, the team determined that the continued non-compliance does not present an immediate safety concern because the licensee reasonably determined the affected systems, structures, and components remained operable.

Because this violation was of very-low safety significance and was entered into the licensee's CAP as CR-PLP-2017-05265 and CR-PLP-2017-05283, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. (NCV 05000255/2017007-01; Failure to Periodically Test the Emergency Diesel Generators Capacity to Start and Accelerate Design Basis Sequenced Loads)

ENO Response and Basis for Denial

The NRC inspection report states the following in the Description section of the finding:

The IEEE 308-1978, Section 7.4, "Periodic Equipment Tests," states that "Tests shall be performed at scheduled intervals to (1) Detect the deterioration of the system towards an unacceptable condition. (2) Demonstrate that standby power equipment and other components that are not exercised during normal operation of station are operable.

The NRC inspection report states the following In the Enforcement section of the finding:

The UFSAR, Section 8.1.1, "Design Basis," states in part that the engineered safeguards electrical system ... is intended to meet all the other requirements identified in IEEE 308-1978. The IEEE 308-1978, Section 7.4, "Periodic Equipment Tests," states that "Tests shall be performed at scheduled intervals to (1) Detect the deterioration of the system towards an unacceptable condition. (2) Demonstrate that standby power equipment and other components that are not exercised during normal operation of station are operable.

Contrary to the above, as of November 15, 2017, the licensee failed to establish a testing program to demonstrate that the EDGs could start and accelerate their sequenced loads within the applicable voltage and frequency acceptance limits periodically as required by IEEE 308-1978 and following maintenance activities that could adversely affect EDG frequency and voltage response (e.g. governor and voltage regulator maintenance activities.)

Section 7.4 of the Institute of Electrical and Electronics Engineers (IEEE) Standard 308-1978, *IEEE Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations*, indeed does describe electrical system test requirements, but the quoted text above from the inspection report is slightly paraphrased. The IEEE standard states that tests shall be performed at scheduled intervals to detect, *as well as practicable*, the deterioration of the question, as shown in the Section 7.4 text below:

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7.4 Periodic Equipment Tests

7.4.1 Tests shall be performed at scheduled intervals to:

- (1) Detect as well as practicable, the deterioration of the equipment toward an unacceptable condition
- (2) Demonstrate that standby power equipment and other components that are not exercised during normal operation of the station are operable

IEEE Standard 308-1978, Section 7.1, *Surveillance Methods*, states that the extent, selection, and application of the various surveillance methods, including periodic testing, to indicate the operational status of Class 1E power systems will depend on individual plant design requirements, and refers to the surveillance methods for Class 1E equipment outlined in Table 3, *Illustrative Surveillance Methods*. Table 3 outlines the testing described in Section 7.4 of the IEEE standard, which is to detect the deterioration of the equipment toward an unacceptable condition and to demonstrate that standby power equipment and other components that are not exercised during normal operation of the station are operable. The table does not specify that diesel generator voltage or frequency recovery be monitored at periodic intervals. Instead, it specifies periodic monitoring of diesel generator dc auxiliary systems, starting capability, loading capability, and breaker operation.

The NRC inspection report does not provide a rationale for contending that periodic testing to demonstrate that the EDGs could start and accelerate their sequenced loads within the applicable voltage and frequency acceptance limits is required by IEEE Standard 308-1978. ENO examination of the IEEE standard, as discussed above, indicates that voltage and frequency recovery testing is not required on a periodic basis.

Additionally, the NRC inspection report does not explain why PNP testing performed following maintenance activities that could adversely affect EDG frequency and voltage response is inadequate. PNP post-maintenance testing is performed in accordance with industry guidance contained in various Electric Power Research Institute (EPRI) reports, and these reports do not require that post-maintenance EDG testing include voltage and frequency recovery testing.

The NRC *Principles of Good Regulation* states the following under the *Clarity* attribute:

Regulations should be coherent, logical, and practical. There should be a clear nexus between regulations and agency goals and objectives whether explicitly or implicitly stated. Agency positions should be readily understood and easily applied.

The interpretation of EDG testing requirements in the IEEE Standard 308-1978 as described in the inspection report appears to lack clarity, contrary to the NRC *Principles of Good Regulation*. Absent explanation, it is unclear whether the agency position expressed in the inspection report is consistent with written regulations. Moreover, without additional explanation, the agency position expressed in the inspection report cannot be readily understood, nor can adequate corrective actions be taken by the licensee to address a deficiency.

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References

1. NRC letter to Entergy Nuclear Operations, Inc., "Palisades Nuclear Plant - NRC Design Bases Assurance Inspection (Teams) Inspection Report 05000255/2017007," dated December 29, 2017 (ADAMS Accession Number ML17363A435)