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10 CFR 50.90

PNP 2019-003

February 07, 2019

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

SUBJECT: Response to Request for Additional Information for License
Amendment Request to Revise Emergency Diesel Generator
Degraded Voltage Surveillance Requirement

Palisades Nuclear Plant
Docket 50-255
Renewed Facility Operating License No. DPR-20

- REFERENCES:**
1. Entergy Nuclear Operations, Inc. letter, PNP 2018-010, *License Amendment Request to Revise Emergency Diesel Generator Degraded Voltage Surveillance Requirement*, May 30, 2018 (ADAMS Package Accession Number ML18152A922)
 2. NRC email, *Request for Additional Information for Palisades License Amendment Request to Revise Emergency Diesel Generator Degraded Voltage Surveillance Requirement 3.3.5.2a*, dated January 9, 2019 (ADAMS Accession Number ML19009A539)

Dear Sir or Madam:

In accordance with Title 10 of the Code of Federal Regulations, Part 50, Section 90 (10 CFR 50.90), *Application for amendment of license, construction permit, or early site permit*, Entergy Nuclear Operations, Inc. (Entergy) requested an amendment to the Renewed Facility Operating License for the Palisades Nuclear Plant (PNP).

In Reference 2, Entergy received a request for additional information (RAI) from the NRC.

The Entergy response to the RAI is provided in the attachment.

In accordance with 10 CFR 50.91(b), *State consultation*, a copy of this RAI response is being transmitted to the designated State official. This submittal contains no proprietary information. This letter identifies no new or revised regulatory commitments. The RAI

response does not affect the no significant hazards consideration determination provided in Attachment 1 of Reference 1.

Should you have any questions concerning this letter, or require additional information, please contact Jeff Erickson at 269-764-2375.

I declare under penalty of perjury that the foregoing is true and correct. Executed on February 07, 2019.

Sincerely,

A handwritten signature in black ink that reads "Mandy K. Hatter". The signature is written in a cursive style with a large, stylized 'M' and 'H'.

MKH/jse

Attachment: Response to Request for Additional Information for License
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cc: Administrator, Region III, USNRC
 Project Manager, Palisades, USNRC
 Resident Inspector, Palisades, USNRC
 State of Michigan

PNP 2019-003

ATTACHMENT

Response to Request for Additional Information

for License Amendment Request to

Revise Emergency Diesel Generator Degraded Voltage Surveillance Requirement

Seven pages follow

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Response to Request for Additional Information for License Amendment Request to Revise Emergency Diesel Generator Degraded Voltage Surveillance Requirement

A request for additional information (RAI) regarding the Palisades Nuclear Plant (PNP) license amendment request to revise an emergency diesel generator degraded voltage surveillance requirement, dated May 30, 2018, was received from the U.S. Nuclear Regulatory Commission (NRC) by email on January 9, 2019. The RAI stated:

By letter dated May 30, 2018 (Agencywide Document Access and Management System (ADAMS) Accession No. ML18152A922), Entergy Nuclear Operations, Inc., submitted a license amendment request (LAR) to revise Technical Specification (TS) 3.3.5, "Diesel Generator Undervoltage Start," Surveillance Requirement (SR) 3.3.5.2a to add a channel calibration requirement for the combined time delay setpoints for the degraded voltage sensing relay and the degraded voltage time delay relay. Currently, this SR requires calibration of the degraded voltage sensing relay time delay setpoint only. It does not include calibration of the combined setpoints for the degraded voltage sensing relay time delay and the nominal six-second delay for the time delay relay.

The requested information and the Entergy Nuclear Operations, Inc. (Entergy) responses are provided below:

NRC Request (RAI EICB-1)

Attachments 5 and 6 to the LAR are "Second Level Undervoltage Relay Setpoint Calculation" and "Second Level Undervoltage Relays 162-153 and 162-154 Uncertainty Analysis." Both calculations use the methodology in Engineering Aid, EGAD-ELEC-08, "Instrument Loop Uncertainty and Setpoint Methodology," Revision 1, dated September 25, 2005. However, Engineering Aid EGAD-ELEC-08 was not provided as part of the LAR.

Regulatory Guide 1.105, "Setpoints for Safety-Related Instrumentation," Revision 3, and Regulatory Information Summary RIS 2006-17, "NRC Staff Position on the Requirements of 10 CFR 50.36, 'Technical Specifications,' Regarding Limit Safety System Settings During Periodic Testing and Calibration of Instrument Channels," contain guidance that is one acceptable means for performing setpoint calculations. These two guidance documents, among others, are referenced in Branch Technical Position (BTP) 7-12, "Guidance on Establishing and Maintaining Instrument Setpoints," Revision 5, which is documented in NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition." The BTP provides acceptance criteria for setpoint calculations.

In order to determine if the combined setpoint for degraded voltage sensing relay time delay and the nominal six-second delay for the time delay relay is adequate, please provide a summary of the setpoint methodology, including:

- *Description of the setpoint methodology and procedures used in determining setpoints, including information sources, scope, assumptions, and statistical methods for combining all the errors.*

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Entergy Response

The setpoint methodology used in the calculations in Attachments 5 and 6 of the LAR is described in Engineering Aid EGAD-ELEC-08, Revision 1. This Engineering Aid was used in determining the uncertainties in the calculations for the setpoints for the degraded voltage sensing relay and the time delay relay. It used Instrument Society of America Standard ISA-S67.04, Part I – 1994, "Setpoints for Nuclear Safety-Related Instrumentation Used in Nuclear Power Plants," and ISA-RP67.04, Part II - 1994, Recommended Practice, "Methodologies for the Determination of Setpoints for Nuclear Safety-Related Instrumentation," as guidance, making the standards a basis for the PNP setpoint program. Regulatory Guide 1.105, Revision 3, states that ISA-S67.04, Part I – 1994, provides a method acceptable to the NRC staff for ensuring that setpoints for safety related instrumentation are established and maintained within the technical specification limits.

More specifically, the setpoint methodology described in EGAD-ELEC-08 combines the random errors via the square-root-of-the-sum-of-the-squares method, and bias or non-random errors are either added or subtracted accordingly.

NRC Request

- *Description of assumptions should include the environmental allowances (temperature, pressure, humidity, radiation, vibration, seismic, and electrical) for the instruments.*

Entergy Response

EGAD-ELEC-08 guidance was used to address applicable instrument uncertainties (i.e., allowances) by combining random errors using the square-root-of-the-sum-of-the squares method, and including bias or non-random errors by either addition or subtraction. Specifications provided by the manufacturer were used to determine relay uncertainties. If the manufacturer did not include a specific uncertainty, then that uncertainty was considered either not applicable, insignificant with respect to the overall uncertainty analysis, or included in a vendor-provided overall accuracy for the instrument. In some cases, plant documentation such as past calibration records were also used to provide the basis for an assumption. Many of the environmental allowances are addressed by the fact that the instruments are located in mild environments and have seismic capability.

Additional details are provided in LAR Attachment 5, EA-ELEC-VOLT-033, Section 4.0, titled "Calibration Assumptions," which contains uncertainty assumptions, and corresponding discussions within the analysis refer to the assumptions and provide additional justification. Also, although LAR Attachment 6, EA-EC11464-01, Section 5.0, titled "Assumptions," lists no assumptions, Section 4.0, "Design Inputs," and Section 6.0, "Analysis," include discussions of parameters and their impact on relay uncertainty.

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NRC Request

- *Basis for acceptable as-found band and acceptable as-left band and determination of the instrument operability based on acceptable as-found band and acceptable as-left band.*

Entergy Response

In Attachment 5 of the LAR, calculation EA-ELEC-VOLT-033 addresses the internal time delay associated with the second level undervoltage relays 127-7 and 127-8. Calculation Section 6.3, paragraph C, documents the ± 0.034 second as-left tolerance, as well as the ± 0.0809 second time delay uncertainty. Section 6.3, paragraphs D and E, describe the 0.650 second setpoint and the calculated time delay uncertainty of ± 0.0809 seconds, resulting in an acceptable band of 0.5691 seconds to 0.7309 seconds. The allowable as-found band is 0.570 seconds to 0.730 seconds, which is slightly within the acceptable band. Section 6.3, paragraphs C and D, discuss the 0.650 second setpoint and the ± 0.034 second as-left tolerance, which results in an acceptable as-left band of 0.616 seconds to 0.684 seconds.

Attachment 6 of the LAR contains calculation EA-EC11464-01 for uncertainties associated with time delay relays 162-153 and 162-154. Calculation Section 6.8 documents the ± 0.1 second as-left tolerance, which has been repeatedly demonstrated by past calibrations. Calculation Section 6.9 determines the time delay uncertainty for relays 162-153 and 162-154 as $+ 0.258$ seconds and $- 0.216$ seconds. Section 7.0 discusses the nominal setpoint of 6.0 seconds and the allowable as-found band of 5.8 seconds to 6.25 seconds, which is slightly within the acceptable as-found band determined by combining the 6.0 second nominal setpoint with the total calculated time delay error, resulting in a range of 5.784 seconds to 6.258 seconds. Section 7.0 also repeats the 0.1 second as-left tolerance, which results in an acceptable as-left band of 5.9 seconds to 6.1 seconds.

The as-found and as-left bands discussed above have been incorporated into Technical Specification (TS) Surveillance Tests RE-137, "Calibration of Bus 1C Undervoltage and Time Delay Relays", and RE-138, "Calibration of Bus 1D Undervoltage and Time Delay Relays," as discussed in LAR, Attachment 1, Section 2.0, "Detailed Discussion."

If, during TS surveillance testing, the measured relay time delays are within the as-found and as-left bands, then the relays are considered to be operable because they would satisfy the proposed TS setpoint range requirement. If measured relay time delays exceed the as-found bands upon calibration, fail calibration, or do not meet as-left bands upon calibration, then the relays are considered to be nonconforming and would be documented as such in a condition report within the corrective action system. The correction action system would require that instrument operability be addressed.

In LAR Attachment 1, page 8 of 13 contains Figure 1, titled "Schematic Depiction of Time Delay Setpoints." This figure demonstrates that the combined relay setpoints, including the total time delay uncertainties, support the proposed TS Surveillance Requirement values, which support the maximum analytical values.

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NRC Request

- *Basis for documented assumptions regarding instrument uncertainties and a discussion of the method used to determine uncertainty values.*

Entergy Response

EGAD-ELEC-08 guidance was used to address applicable instrument uncertainties (i.e., allowances) by combining random errors using the square-root-of-the-sum-of-the-squares method, and including bias or non-random errors by either addition or subtraction. Specifications provided by the manufacturer were used to determine component uncertainties. If the manufacturer did not include a specific uncertainty, then that uncertainty was considered either not applicable, insignificant with respect to the overall uncertainty analysis, or included in a vendor-provided overall accuracy for the instrument. In some cases, plant documentation such as past calibration records were also used to provide the basis for an assumption. Many of the environmental allowances are addressed by the fact that the instruments are located in mild environments and have seismic capability.

Additional details are provided in LAR Attachment 5, EA-ELEC-VOLT-033, Section 4.0, titled "Calibration Assumptions," which contains uncertainty assumptions, and corresponding discussions within the analysis refer to the assumptions and provide additional justification. Also, although LAR Attachment 6, EA-EC11464-01, Section 5.0, titled "Assumptions," lists no assumptions, Section 4.0, "Design Inputs," and Section 6.0, "Analysis," include discussions of parameters and their impact on relay uncertainty.

NRC Request

- *Description of the provisions for control of measuring and test equipment used for calibration of the instrument.*

Entergy Response

Provisions for the control of measuring and test equipment used for the calibration of instruments (i.e., relays) are contained in the Entergy fleet maintenance procedure EN-MA-105, "Control of Measuring and Test Equipment (M&TE)."

PNP Administrative Procedure 5.04, "Control of Installed Plant Instrumentation (IPI)," establishes additional site requirements and responsibilities to assure that IPI is tested, calibrated, and maintained to specified requirements. This procedure requires that M&TE be of the proper range and type to ensure that IPI is properly calibrated within required accuracies.

The undervoltage relays and time delay relays are calibrated using TS Surveillance Procedures RE-137, "Calibration of Bus 1C Undervoltage and Time Delay Relays", and RE-138, "Calibration of Bus 1D Undervoltage and Time Delay Relays." Within each of these procedures, Section 3.6.1 identifies the calibrated M&TE to be used during test

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performance, and requires the use of calibrated M&TE and IPI when measuring parameters that will be compared to acceptance criteria. The associated TS Surveillance Procedure Basis Document is RE-137/138, "Calibration of Bus 1C (1D) Undervoltage and Time Delay Relays." This basis document states "An accuracy of 2 cycles (34 milliseconds) will be used for conservatism. In the event that an alternate timer is used the technician is required to document that the timer's accuracy meets the 2 cycle (34 milliseconds) requirement."

LAR Attachment 5, Section 6.3, paragraph A, states that, to allow flexibility, an error of 34 milliseconds (2 cycles) will be used for the timer accuracy, which allows for flexibility in choosing test equipment. This is consistent with the TS Surveillance Procedure Basis Document RE-137/138.

NRC Request

- *Description of the program and methodology used to monitor and manage instrument uncertainties, including drift.*

Entergy Response

Administrative Procedure 5.04 states "Calibration of IPI, shall be performed utilizing appropriate Technical Specification Tests, Permanent Maintenance Procedures, Work Instructions, Preventive Maintenance activities, and/or applicable calibration sheets developed and controlled per this procedure." The procedure describes IPI nonconformances, and states that IPI that meets any of the following criteria is considered to be nonconforming: exceeds as-found tolerance bands upon calibration, fails calibration, or will not meet final tolerance bands upon calibration. It requires that nonconforming IPI be documented in a condition report within the corrective action system. The corrective action system would require that the site take action to address the nonconformance, and to address operability of the instrument.

The undervoltage relays and time delay relays are calibrated per TS Surveillance Procedures RE-137 and RE-138. These procedures describe the methods used to calibrate the undervoltage and time delay relays. Each test states that if acceptance criteria are not met, then a condition report is required, and as-found settings outside of acceptance criteria would require a past operability evaluation. The acceptance criteria include both the acceptable as-found and as-left minimum and maximum values.

NRC Request (RAI EICB-2)

Section 6.3, paragraph B of Attachment 5 to the LAR states, in part, "As no drift data is specified for the time delay, it is assumed that drift is included in the tolerance value." Please provide the basis for this assumption. Each assumption should be supported by a reference, a technical basis, vendor catalog information, vendor confirmation email, or some other technical justification.

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Entergy Response (RAI EICB-2)

The assumption in LAR Attachment 5, EA-ELEC-VOLT-033 Section 6.3, paragraph B, concerning second level undervoltage relay drift is based on manufacturer information provided in Attachment 1 of EA-ELEC-VOLT-033. This attachment contains the manufacturer instructions for the Type 27N ABB Single Phase Voltage Relay, and page 5 of the instructions contains the relay specifications, which do not include a drift error term. Since no relay drift data is specified, it is assumed that drift is included in the time delay tolerance value.

As demonstrated by the past calibration test data from TS Surveillance Procedures RE-137 and RE-138 shown below, differences between as-found and as-left data for a given date indicate that very minor, if any, calibration adjustments have historically been performed. Differences between the as-left data from a given calibration date and the as-found data from the next calibration date would encompass any calibration changes, including any potential drift component. The calibration data has consistently remained well within the calculated as-found acceptance criteria, indicating that any potential drift uncertainty is bounded by the total uncertainty calculated for the relays.

TS Surveillance Procedure RE-137:

- Relay 127-7 as-found acceptance criteria are ≥ 0.57 and ≤ 0.73 seconds
- Relay 127-7 as-left acceptance criteria are ≥ 0.616 and ≤ 0.684 seconds

Date	9/6/2011		2/12/2013		9/9/2014		2/26/2016		9/13/2017	
Relay	As-Found (sec)	As-Left (sec)	As-Found (sec)	As-Left (sec)	As-Found (sec)	As-Left (sec)	As-Found (sec)	As-Left (sec)	As-Found (sec)	As-Left (sec)
127-7XY	0.66	0.66	0.66	0.66	0.660	0.660	0.659	0.658	0.659	0.658
127-7YZ	0.66	0.66	0.66	0.66	0.659	0.659	0.658	0.659	0.659	0.658
127-7ZX	0.66	0.66	0.66	0.66	0.662	0.662	0.661	0.662	0.654	0.653

TS Surveillance Procedure RE-138:

- Relay 127-8 as-found acceptance criteria are ≥ 0.57 and ≤ 0.73 seconds
- Relay 127-8 as-left acceptance criteria are ≥ 0.616 and ≤ 0.684 seconds

Date	8/16/2011		4/2/2013		11/12/2014		3/31/2016		12/18/2017	
Relay	As-Found (sec)	As-Left (sec)	As-Found (sec)	As-Left (sec)	As-Found (sec)	As-Left (sec)	As-Found (sec)	As-Left (sec)	As-Found (sec)	As-Left (sec)
127-8XY	0.66	0.65	0.649	0.649	0.648	0.648	0.639	0.639	0.646	0.646
127-8YZ	0.65	0.65	0.651	0.651	0.651	0.650	0.642	0.642	0.649	0.648
127-8ZX	0.66	0.64	0.651	0.651	0.644	0.643	0.644	0.643	0.644	0.644

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Note: During preparation of the response to the NRC RAI, Entergy identified two editorial discrepancies in LAR Attachment 5. In Section 4.0 of calculation EA-ELEC-VOLT-033, the calculation refers to calibration procedures RT-137 and RT-138; these calibration procedures should be RE-137 and RE-138. In calculation Section 6.3, Item C, the individual error terms 0.34, 0.65, and 0.34 should be 34, 65, and 34 milliseconds. Both discrepancies have been documented in the corrective action system.