UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 13, 2019

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

SUBJECT: PALISADES NUCLEAR PLANT - ISSUANCE OF AMENDMENT NO. 268 REGARDING REVISION TO DIESEL GENERATOR UNDERVOLTAGE START SURVEILLANCE REQUIREMENT (EPID L-2018-LLA-0153)

Dear Sir or Madam:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 268 to Renewed Facility Operating License No. DPR-20 for the Palisades Nuclear Plant. The amendment consists of changes to the technical specifications (TSs) in response to your application dated May 30, 2018, as supplemented by letters dated February 7 and April 17, 2019.

The amendment revises TS 3.3.5, "Diesel Generator (DG) - Undervoltage Start (UV Start)," Surveillance Requirement (SR) 3.3.5.2a by adding a channel calibration requirement for the combined time delay setpoints for the degraded voltage sensing relay and the degraded voltage time delay relay.

A copy of our related safety evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

Kimberly J. Green, Senior Project Manager
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-255

Enclosures:
1. Amendment No. 268 to DPR-20
2. Safety Evaluation

cc: via ListServ

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

ENTERGY NUCLEAR PALISADES, LLC

ENTERGY NUCLEAR OPERATIONS, INC.

DOCKET NO. 50-255

PALISADES NUCLEAR PLANT

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 268
Renewed License No. DPR-20

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Entergy Nuclear Operations, Inc. (the licensee), dated May 30, 2018, as supplemented by letters dated February 7 and April 17, 2019, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public; and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public;

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to the license amendment and Paragraph 2.C.(2) of Renewed Facility Operating License No. DPR-20 is hereby amended to read as follows:

> The Technical Specifications contained in Appendix A, as revised through Amendment No. 268, and the Environmental Protection Plan contained in Appendix B are hereby incorporated in the license. ENO shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of issuance and shall be implemented within 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

David J. Wrona, Chief
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Renewed Facility
Operating License No. DPR-20
And Technical Specifications

Date of Issuance: May 13, 2019

ATTACHMENT TO LICENSE AMENDMENT NO. 268

RENEWED FACILITY OPERATING LICENSE NO. DPR-20

DOCKET NO. 50-255

Replace the following pages of the Renewed Facility Operating License No. DPR-20 with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating areas of change.

REMOVE	INSERT
Page 3	Page 3

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

REMOVE	INSERT
3.3.5-2	3.3.5-2

(1) Pursuant to Section 104b of the Act, as amended, and 10 CFR Part 50, "Licensing of Production and Utilization Facilities," (a) ENP to possess and use, and (b) ENO to possess, use and operate, the facility as a utilization facility at the designated location in Van Buren County, Michigan, in accordance with the procedures and limitation set forth in this license;

(2) ENO, pursuant to the Act and 10 CFR Parts 40 and 70, to receive, possess, and use source and special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Updated Final Safety Analysis Report, as supplemented and amended;

(3) ENO, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use byproduct, source, and special nuclear material as sealed sources for reactor startup, reactor instrumentation, radiation monitoring equipment calibration, and fission detectors in amounts as required;

(4) ENO, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use in amounts as required any byproduct, source, or special nuclear material for sample analysis or instrument calibration, or associated with radioactive apparatus or components; and

(5) ENO, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operations of the facility.

C. This renewed operating license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations in 10 CFR Chapter I and is subject to all applicable provisions of the Act; to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) ENO is authorized to operate the facility at steady-state reactor core power levels not in excess of 2565.4 Megawatts thermal (100 percent rated power) in accordance with the conditions specified herein.

(2) The Technical Specifications contained in Appendix A, as revised through Amendment No. 268, and the Environmental Protection Plan contained in Appendix B are hereby incorporated in the license. ENO shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Fire Protection

ENO shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the license amendment requests dated December 12, 2012 and November 1, 2017, as supplemented by letters dated February 21, 2013, September 30, 2013, October 24, 2013, December 2, 2013, April 2, 2014, May 7,

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.5.2	Perform CHANNEL CALIBRATION on each Loss of Voltage and Degraded Voltage channel with setpoints as follows: a. Degraded Voltage Function ≥ 2187 V and ≤ 2264 V 1. Time delay (degraded voltage sensing relay): ≥ 0.5 seconds and ≤ 0.8 seconds; and 2. Time delay (degraded voltage sensing relay plus time delay relay): ≥ 6.2 seconds and ≤ 7.1 seconds. b. Loss of Voltage Function ≥ 1780 V and ≤ 1940 V Time delay: ≥ 5.45 seconds and ≤ 8.15 seconds at 1400 V.	18 months

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 268 TO

RENEWED FACILITY OPERATING LICENSE NO. DPR-20

ENTERGY NUCLEAR OPERATIONS, INC.

PALISADES NUCLEAR PLANT

DOCKET NO. 50-255

1.0 INTRODUCTION

By application dated May 30, 2018 (Agencywide Documents Access and Management System (ADAMS Accession No. ML18152A922), as supplemented by letters dated February 7 and April 17, 2019 (ADAMS Accession Nos. ML19038A047 and ML19107A261, respectively), Entergy Nuclear Operations, Inc., (ENO, the licensee), requested changes to the Technical Specifications (TSs) for Palisades Nuclear Plant (PNP). The proposed changes would revise TS 3.3.5, "Diesel Generator (DG) - Undervoltage Start (UV Start)," Surveillance Requirement (SR) 3.3.5.2a by adding 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 6-second delay for the time delay relay.

The requested change would correct a non-conservative TS SR documented in the U.S. Nuclear Regulatory Commission (NRC or the Commission) inspection report, "Palisades Nuclear Plant Component Design Bases Inspection 05000255/2014008," dated December 2, 2014 (ADAMS Accession No. ML14338A848). With regard to SR 3.3.5.2a, the inspection report stated, in part, "Specifically, the licensee failed to include in the TS SR the required time delay after the voltage relay trips before the preferred source of power is isolated and 1E electrical loads transferred to the stand-by Emergency Diesel Generators (EDGs)."

The supplemental letters dated February 7 and April 17, 2019, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on August 14, 2018 (83 FR 40347).

2.0 REGULATORY EVALUATION

2.1 Background

In Attachment 1 to the license amendment request (LAR), the licensee stated that the PNP electrical distribution system has two safety-related 2400 volt (V) buses (1C and 1D), each

equipped with two levels of undervoltage relay protection: a first level undervoltage relay (FLUR) for loss of voltage conditions, and a second level undervoltage relay (SLUR) for degraded voltage sensing with an additional time delay relay for degraded voltage conditions.

Upon sensing a sudden loss of voltage, actuation of the FLURs will trip their respective incoming bus circuit breakers, and start their respective EDG, initiate bus load shed, and transfer the safety-related buses to their respective EDG.

Upon sensing a degraded voltage condition, two time delays occur: a built-in (internal) nominal 0.65-second delay within the SLURs and a nominal 6-second delay in the (external) time delay relays. Each SLUR is set at approximately 92 percent of rated voltage, with one voltage monitoring relay for each of the three phases. These relays protect against sustained degraded voltage conditions on the corresponding bus using three-out-of-three coincidence logic.

The EDGs provide backup power to the 2400 V safety-related buses in the event of a loss of offsite power or a loss of power to the associated 2400 V bus. If a 2400 V bus experiences an undervoltage condition, the SLUR initiates start of its associated EDG after a nominal 0.65-second time delay. If the bus undervoltage continues to exist after an additional nominal 6-second time delay, the associated bus incoming circuit breakers from offsite power sources trip, and a bus load shed initiates. When an EDG comes to near running speed and its output voltage is appropriate, the safety-related bus is then transferred to its EDG, and the required load breakers are closed onto the bus in a sequential manner. Following a loss of offsite power, each EDG is capable of starting and connecting to its respective 2400 V bus within 10 seconds after receipt of an EDG start signal. Each EDG is also capable of accepting required loads within the assumed loading sequence intervals.

2.2 Licensee's Proposed Changes

In Attachment 1 to the LAR, the licensee stated that NRC inspectors identified a finding at PNP for the failure to ensure that the (external) time delay setpoint for the degraded voltage monitor relay was included in TS SR 3.3.5.2a. Currently, SR 3.3.5.2a provides the setpoint only for the time delay associated with (internal to) the degraded voltage monitor relay. However, a degraded voltage monitor channel contains both a voltage sensing relay and a nominal 6-second time delay relay which has to time out before the trip relay actuates and the offsite power supply breaker is opened.

The TS SR 3.3.5.2a requires a delay setpoint of greater than or equal to 0.5 seconds and less than or equal to 0.8 seconds for the degraded voltage sensing relays (SLURs) on each channel. However, the SR does not include the nominal 6-second delay associated with separate (external) time delay relay on each channel.

Because TS SR 3.3.5.2a does not include the 6-second time delay, it does not ensure that the relays would avoid spurious trips of offsite power sources; and ensure that the relays do not exceed the time limits of engineering safeguards actuation assumed in the safety analyses, or ensure that safety related equipment will be available following sustained degraded voltage conditions. Therefore, currently the TS SR 3.3.5.2a is considered to be non-conservative.

The TS SR 3.3.5.2a currently requires the following degraded voltage channel calibration of the setpoint values for the degraded voltage sensing relay time delay:

> *Perform CHANNEL CALIBRATION on each Loss of Voltage and Degraded Voltage channel with setpoints as follows:*
>
> *a. Degraded Voltage Function ≥ 2187 V and ≤ 2264 V*
>
> *Time delay: ≥ 0.5 seconds and ≤ 0.8 seconds; and*

In the LAR, the licensee proposed to revise TS SR 3.3.5.2a by adding a degraded voltage channel calibration for the setpoints for the combined time delays for the degraded voltage sensing relay and the time delay relay, as follows:

> *Perform CHANNEL CALIBRATION on each Loss of Voltage and Degraded Voltage channel with setpoints as follows:*
>
> *a. Degraded Voltage Function ≥ 2187 V and ≤ 2264 V*
>
> *1. Time delay (degraded voltage sensing relay): ≥ 0.5 seconds and ≤ 0.8 seconds; and*
>
> *2. Time delay (degraded voltage sensing relay plus time delay relay): ≥ 6.2 seconds and ≤ 7.1 seconds.*

The frequency of TS SR 3.3.5.2 is not affected by the proposed change. Also, the existing TS SR 3.3.5.2a would be retained as TS SR 3.3.5.2a.1 and a description of the relay would be added, but this TS SR is not otherwise affected by the proposed change. The new TS SR for the combined time delay (degraded voltage sensing relay and time delay relay) would be added as SR 3.3.5.2a.2.

2.3 Regulatory Requirements

The following explains the applicability of General Design Criteria (GDC) for PNP. The construction permit for PNP was issued by the Atomic Energy Commission (AEC) on March 14, 1967, and an Interim Provisional Operating License was issued by the AEC on March 24, 1971. The plant GDC are discussed in the Final Safety Analysis Report (FSAR) Chapter 5.1, "General Design Criteria," with more details provided in the applicable FSAR sections. The AEC published the final rule that added Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants," in the *Federal Register* on February 20, 1971 (36 FR 3255), with the rule effective on May 21, 1971. As discussed in the NRC Staff Requirements Memorandum (SRM) for SECY-92-223, dated September 18, 1992 (ADAMS Accession No. ML003763736), the Commission decided not to apply the final GDC to plants with construction permits issued prior to May 21, 1971.

The licensee has made changes to the facility over the life of the plant that may have invoked the final GDC. The extent to which the final GDC have been invoked can be found in specific sections of the FSAR and in other plant-specific design and licensing basis documentation.

The NRC staff identified the following applicable regulatory requirements during its review of the LAR.

The licensee requested a change to the Renewed Facility Operating License for PNP in accordance with 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit."

The regulation at 10 CFR 50.36, "Technical specifications," requires, in part, that TSs shall be included by applicants for a license authorizing operation of a production or utilization facility. The regulation at 10 CFR 50.36(c) requires that TSs include items in five specific categories. These categories are: (1) safety limits, limiting safety system settings, and limiting control settings, (2) limiting conditions for operation (LCOs), (3) SRs, (4) design features, and (5) administrative controls. The proposed change to the PNP TSs relates to the SR category.

The regulation at 10 CFR 50.36(c)(3) states, "Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met."

Appendix A to 10 CFR Part 50, General Design Criterion (GDC) 17, "Electric power systems," states, in part, that nuclear power plants have onsite and offsite electric power systems to permit the functioning of structures, systems, and components that are important to safety. The safety function for each system (assuming the other system is not functioning) shall be to provide sufficient capacity and capability to assure that: (1) specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents.

Appendix A to 10 CFR Part 50, GDC 18, "Inspection and testing of electric power systems," states, in part, that electric power systems important to safety shall be designed to permit appropriate periodic inspection and testing of important areas and features, and that the systems shall be designed with a capability to test periodically the operability and functional performance of the components of the systems, such as onsite power sources, relays, switches, and buses.

According to PNP FSAR Section 1.4.7, "Electrical Systems," the offsite and emergency sources of auxiliary electrical power were provided to assure safe and orderly shutdown of the plant and the ability to maintain a safe shutdown condition under all credible circumstances. FSAR Section 1.4.16.1, "Licensing Basis," states that PNP submitted an application for an operating license in 1968. At that time, the GDC was in draft form. The original FSAR contained Appendix I, which presented a comparison of plant design features with the 1967 draft GDCs.

PNP FSAR Section 8.1.1, "Design Basis," states that the plant electrical system and the 345 kV switchyard are designed to reliably function and supply power during normal, abnormal and emergency conditions. This electrical power system is required to meet 10 CFR 50, Appendix A, GDC 17, for onsite and offsite power source requirements. The system will supply and distribute the electrical power necessary to operate the systems which preserve the plant's three fission product barriers under all conditions of start-up, power generation and shutdown. The electrical system is divided into buses and subsystems to minimize the effects of any electrical fault and maximize the availability of onsite and offsite power sources.

2.4 Regulatory Guidance

Regulatory Guide (RG) 1.105, Revision 3, "Setpoints for Safety-related Instrumentation," endorses Part I of Instrument Society of America (ISA) standard S67.04-1994, "Setpoints for Nuclear Safety-Related Instrumentation."

Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, LWR [Light-Water Reactor] Edition (NUREG-0800), Branch Technical Position (BTP) 8-6, March 2007 (similar to the previous BTP PSB-1, July 1981), "Adequacy of Station Electric Distribution System Voltages," states that the TS should include LCOs, SRs, trip setpoints, and maximum and minimum allowable values for the first level of undervoltage protection (loss of offsite power) relays and the second level (degraded voltage) protection sensors and associated time delay devices.

Regulatory Issue Summary (RIS) 2011-12, "Adequacy of Station Electric Distribution System Voltages," Revision 1, provides clarifying information on voltage studies necessary for degraded voltage relay (second level undervoltage protection) setting bases and transmission network/offsite/station electric power system design bases for meeting the regulatory requirements specified in GDC 17.

NRC Administrative Letter (AL) 98-10, "Dispositioning of Technical Specifications that are Insufficient to Assure Plant Safety," reiterates the NRC staff's expectations regarding correction of facility TSs when they are found to contain nonconservative values or specify incorrect actions.

3.0 TECHNICAL EVALUATION

In its inspection report, "Palisades Nuclear Plant Component Design Bases Inspection 05000255/2014008," dated December 2, 2014 (ADAMS Accession No. ML14338A848), the NRC staff identified a finding pertaining to failure to include the degraded voltage channel time delay in TS SR 3.3.5.2a. Specifically, the licensee failed to include in the TS SR the required time delay after the voltage relay trips before the preferred source of power is isolated and 1E electrical loads transferred to the stand-by EDGs. This finding was entered into the licensee's Corrective Action Program. This LAR addresses and corrects the cited finding.

Existing TS SR 3.3.5.2a addresses only the time delay of ≥ 0.5 seconds and ≤ 0.8 seconds due to "degraded voltage sensing relay" for the degraded voltage function. This time delay is built-in (internal) to the voltage sensing relay. It does not include the time delay of the "degraded voltage sensing relay plus time delay relay." The time delay relay is an external relay and has a nominal delay of 6 seconds.

Section 2.0 of the LAR states, in part, the following:

> Since TS SR 3.3.5.2a does not include the six-second time delay relays, it does not ensure that the relays would avoid spurious trips of offsite power sources, ensure that the relays do not exceed the time limits of engineering safeguards actuation assumed in the safety analyses, or ensure that safety related equipment will be available following sustained degraded voltage conditions. Therefore, TS SR 3.3.5.2a is deemed non-conservative.

> The non-conservative TS SR 3.3.5.2a was dispositioned as a degraded or non-conforming condition within the PNP corrective action system in accordance with the provisions of NRC Administrative Letter (AL) 98-10, *Dispositioning of Technical Specifications that are Insufficient to Assure Plant Safety*, to assure that plant safety is maintained. This LAR is submitted in accordance with the guidance in AL 98-10 as a corrective action to resolve the non-conservative TS.

The licensee took an immediate action and revised the TS Surveillance Procedure RE-137, "Calibration of Bus 1C Undervoltage and Time Delay Relays," and RE-138, "Calibration of Bus 1D Undervoltage and Time Delay Relays," to add acceptance criteria to ensure that the sum total of the time delays for the degraded voltage sensing relay and delay time relays are within the proposed TS SR time delay setpoint.

The licensee proposed adding a requirement to TS SR 3.3 5.2a for degraded voltage channel calibration of the combined time delay setpoints for the SLURs and the time delay relays. The proposed minimum and maximum setpoints for the combined time delays were determined as described below.

3.1 Evaluation of the Combined Time Delay Setpoints for SLURs and Time Delay Relays

The setpoints for the SLUR time delays in the existing TS SR 3.3.5.2a are based on a nominal setpoint of 0.65 seconds. This is the built-in time delay for sensing the actuation of the actuation of degraded voltage relay. In the calculation, "Second Level Undervoltage Relay Setpoint Calculation" (Attachment 5 to the LAR), the licensee determined a SLUR time delay setpoint total error of plus or minus 0.0809 seconds. As stated in this calculation, the closure of all three undervoltage relays initiates a DG start signal, and simultaneously initiates a 6-second timer. If the voltage in at least one of the undervoltage relays does not recover above the reset point of the relay within 6-second time delay, a load shed signal is initiated, the diesel breaker closes, and loads are reinitiated onto the bus via a load sequencer.

According to the licensee in Attachment 1 to the LAR, the time delay relays are external relays (162-153 and 162-154) with nominal time delay of 6 seconds. Attachment 6 to the LAR provides the "Second Level Undervoltage Time Delay Relays 162-153 and 162-154 Uncertainty Analysis" (Calculation No. EA-EC11464-01). In this calculation, the licensee determined the uncertainty associated with the 6-second timer setpoint. The licensee considered errors associated with the fixed time delays, temperature effects, control voltage effects, repeatability, drift effect, and measurement and test equipment errors. The maximum total errors associated with these time delay relays are calculated as +0.258 seconds and -0.216 seconds.

Adding together the time delay setpoint for the SLUR, with its total errors, and the time delay relay setpoint, with its total errors, yields the following minimum and maximum setpoints:

> Minimum setpoint: (0.65 sec - 0.0809 sec) + (6 sec - 0.216 sec) = 6.3531 sec

> Maximum setpoint: (0.65 sec+ 0.0809 sec) + (6 sec+ 0.258 sec) = 6.9889 sec

In order to bound these time delay setpoints, the licensee proposed time delay setpoints for the proposed TS SR 3.3.5.2a.2 to be greater than or equal to 6.2 seconds and less than or equal to 7.1 seconds. These settings provide margin from the minimum and maximum setpoints determined above. Therefore, the NRC staff finds that the time delay setpoint values of 6.2 and 7.1 seconds are acceptable.

3.2 Evaluation of the Minimum Allowable Combined Time Delay Setpoint for SLURs and Time Delay Relays

According to the licensee, the proposed combined minimum time delay of 6.2 second setpoint is long enough to override any short term voltage disturbances, such as by the start of motors. Attachment 8 to the LAR, "LOCA [loss-of-coolant accident] with Offsite Power Available Calculation (No. EA-ELEC-EDSA-03, with markup of Engineering Changes)," provides an evaluation of load flow and dynamic motor starts.

The NRC staff reviewed the results of calculation provided in Attachment 8 of the LAR. The staff finds that, based on the analysis/results of the calculations provided in Attachment 8 and as stated in Attachment 1 of the LAR, the voltages on the safety-related 1C and 1D 2400 V buses, under various postulated accident scenarios, recover to a value above the SLUR voltage trip setpoint in 5.817 seconds or less, thus, ensuring that all safety-related load motors will start. The 6.2 second minimum setpoint provides margin with respect to the worst-case voltage recovery time. Therefore, the NRC staff finds that the proposed lower limit (minimum) for the time delay setpoint of 6.2 seconds is acceptable.

3.3 Evaluation of the Maximum Allowable Combined Time Delay Setpoint for SLURs and Time Delay Relays

When a motor is subjected to sustained degraded voltage conditions, it is possible that the terminal voltage of that motor will be low enough for the motor to stall, thereby drawing electrical currents near locked rotor values. Under these conditions, the motor may continue to draw this high current for up to the total time delay, which could cause the upstream protective device for that motor to trip. If the motor protective device trips, then the motor may be unavailable when loads are transferred to the EDG. The proposed combined delay time should be short enough to not result in failure of safety-related equipment due to operation under sustained degraded voltage conditions. The licensee has proposed a maximum allowable limit of 7.1 second for the combined time delay setpoint for SLURs and time delay relays to avoid stalling of motors under degraded voltage conditions.

The licensee provided "Palisades SLUR Time Delay Calculation," as Attachment 7 to the LAR, to determine a bounding, maximum acceptable combined time delay for the degraded voltage function, using conservative assumptions, which will allow safety-related loads to continue to run (that is, to not trip on overcurrent) and to perform their safety functions during sustained undervoltage conditions for the safety-related 2400 V buses.

The NRC staff reviewed the analysis and results of the calculation provided in Attachment 7 and finds that the maximum combined time delay setpoint of 7.1 seconds, as proposed in TS SR 3.3.5.2a.2, would allow all safety-related loads to continue to run (that is, not to stall and trip on overcurrent) and perform their safety function, except for a few loads. For a few loads where the 7.1-second setpoint was found not to be sufficient, the licensee either increased the overcurrent trip settings of the individual loads or provided an explanation for why the overcurrent settings of these loads are not of concern. The staff reviewed the actions taken or explanation provided related to these few loads and finds them to be acceptable based on engineering principles and practices.

Also, according to the licensee, the proposed maximum combined time delay 7.1 second setpoint is within the time delays assumed in the PNP FSAR accident analyses for engineered

safeguards actuation. Upon a loss of offsite power, the accident analyses assume that an EDG starts and connects to its bus in 10 seconds. The proposed maximum combined time delay setpoint of 7.1 seconds is reached before the assumed EDG starting and connection time of 10 seconds. The EDG starts after the built-in time delay of 0.65 seconds after reaching the second level (or degraded voltage) setpoint. The proposed maximum setpoint is within the time delays assumed in the accident analyses. Therefore, based on results of analysis provided in Attachment 7, and the time delay assumed in the FSAR accident analyses for engineered safeguards actuation, the staff finds that the proposed upper limit for the time delay setpoint of 7.1 seconds is acceptable.

3.4 Evaluation of the Setpoint Methodology

The licensee provided Attachments 5 and 6 to the LAR, which are a methodology for determining the setpoints for "Second Level Undervoltage Relay Setpoint Calculation," and the "Second Level Undervoltage Time Delay Relays 162-153 and 162-154 Uncertainty Analysis," respectively. Both of these calculations use the methodology in Engineering Aid, EGAD-ELEC-08, "Instrument Loop Uncertainty and Setpoint Methodology," Rev. 1, dated 9/29/05. NRC guidance for performing safety-related setpoint calculations is contained in RG 1.105, Revision 3, "Setpoints for Safety-Related Instrumentation" (ADAMS Accession No. ML993560062), and RIS 2006-17, "NRC Staff Position on the Requirements of 10 CFR 50.36, 'Technical Specifications,' Regarding Limiting Safety System Settings During Periodic Testing and Calibration of Instrument Channels" (ADAMS Accession No. ML051810077).

In the February 7, 2019, supplement (ADAMS Accession No. ML19038A047), the licensee stated that the setpoint methodology used in the calculations in 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. The licensee used ISA-S67.04, Part I - 1994, "Setpoints for Nuclear Safety-Related Instrumentation Used in Nuclear Power Plants," as guidance, making the standard a basis for the Palisades setpoint program. RG 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 TS limits.

In addition, 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. The NRC staff reviewed the method for combining the errors and determined that the methodology is consistent with RG 1.105, except for drift. The licensee assumed that that drift is included as part of the time delay tolerance; however, it had not provided a justification for its assumption. In the February 7, 2019, supplement, the licensee explained that the manufacturer's instructions contain the relay specifications but they did not include a drift error term. The licensee provided past calibration test data for relays 127-7 and 127-8, which showed that the calibration data has remained within the calculated as-found acceptance criteria. The NRC staff reviewed the licensee's justification. If the actual as-found values differed significantly from the calculated as-found values, that would suggest that the relay indicated significant drift. Because the provided data show that there's been little or no difference between the actual and calculated as-found values, the data indicate the drift is negligible and need not be accounted for as an additional error. Therefore, the staff finds the licensee's justification regarding its assumption for drift acceptable.

The licensee calculated and noted the as-found and as-left tolerances in the LAR to ensure that the instruments continue to perform within the design margins. The licensee stated that

deviations from as-found and as-left values are tracked and controlled per the plant calibration procedures. The measurement and test instrumentation is tested and controlled per the plant administrative procedures to ensure that the test and measurement equipment is calibrated within the required accuracies.

The NRC staff reviewed the setpoint methodology and determined that it meets the intent of RG 1.105, Revision 3. The revised setpoints in the calculation resolve the calculation deficiencies identified in the LAR with regard to 10 CFR 50.36(c)(3).

3.5 Technical Conclusion

Based on analyses provided in LAR Attachments 7 and 8, the NRC staff finds that the combined time delay setpoint of ≥ 6.2 seconds and ≤ 7.1 seconds, as proposed in TS SR 3.3.5.2a.2, is acceptable. Based on the proposed degraded voltage relay (SLUR) settings, safety-related loads would be able to start and run, and provide their safety-related functions under accident conditions; therefore, the licensee will continue to meet the intent of GDCs 17 and 18.

3.6 Evaluation of Proposed TS Changes

The NRC staff reviewed the proposed changes to TS SR 3.3.5.2a. As noted in the LAR, the existing TS SR 3.3.5.2a would be retained as TS SR 3.3.5.2a.1 and a description of the relay would be added in parentheses. The new TS SR for the combined time delay (degraded voltage sensing relay and time delay relay) would be added as SR 3.3.5.2a.2. As concluded above, the staff finds that the combined time delay setpoint of ≥ 6.2 seconds and ≤ 7.1 seconds for proposed SR 3.3.5.2a.2 is acceptable. The frequency of TS SR 3.3.5.2 is not affected by the proposed change. The renumbering of SR 3.3.5.2a to 3.3.5.2a.1 and addition of the parenthetical description of the relay are administrative changes needed to accommodate the addition of the SR 3.3.5.2a.2, and therefore, are acceptable. The addition of SR 3.3.5.2a.2 for the combined time delay (degraded voltage sensing relay and time delay relay) resolves a nonconservative TS in accordance with the guidance in AL 98-10. Therefore, the NRC staff finds that the addition of TS SR 3.3.5.2a.2 is acceptable. The NRC staff has determined that SR 3.3.5.2a, as revised, represents a test of the degraded voltage relay settings to assure that the necessary quality of the degraded voltage relay settings will be maintained so that facility operation will be within the safety limits and the limiting conditions for operation will be met. Therefore, revised SR 3.3.5.2a will meet 10 CFR 50.36(c)(3). As noted in AL 98-10, once any amendment correcting the TS is approved, the licensee must update the final safety analysis report, as necessary, to comply with 10 CFR 50.71(e).

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Illinois State official was notified of the proposed issuance of the amendment on February 21, 2019. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes an inspection or a surveillance requirement. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no

significant hazards consideration (83 FR 40347, dated August 14, 2018), and there has been no public comment on such finding. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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Date of issuance: May 13, 2019

SUBJECT: PALISADES NUCLEAR PLANT - ISSUANCE OF AMENDMENT NO. 268 REGARDING REVISION TO DIESEL GENERATOR UNDERVOLTAGE START SURVEILLANCE REQUIREMENT (EPID L-2018-LLA-0153) DATED MAY 13, 2019

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