



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

March 6, 2020

ANO Site Vice President  
Arkansas Nuclear One  
Entergy Operations, Inc.  
N-TSB-58  
1448 S.R. 333  
Russellville, AR 72802

SUBJECT: ARKANSAS NUCLEAR ONE, UNIT 1 – SUPPLEMENTAL INFORMATION  
NEEDED FOR ACCEPTANCE OF REQUESTED LICENSING ACTION RE:  
LICENSE AMENDMENT REQUEST TO REVISE LOSS OF VOLTAGE RELAY  
ALLOWABLE VALUES (EPID L-2020-LLA-0013)

Dear Sir or Madam:

By letter dated January 24, 2020, Entergy Operations, Inc. (Entergy, the licensee) submitted a license amendment request for Arkansas Nuclear One, Unit 1 (ANO-1). The proposed amendment would modify ANO-1 Technical Specification 3.3.8, "Diesel Generator (DG) Loss of Power Start (LOPS)," by revising the loss of voltage relay allowable values stated in Surveillance Requirement 3.3.8.2.b. The purpose of this letter is to provide the results of the U.S. Nuclear Regulatory Commission (NRC) staff's acceptance review of this amendment request. The acceptance review was performed to determine if there is sufficient technical information in scope and depth to allow the NRC staff to complete its detailed technical review. The acceptance review is also intended to identify whether the application has any readily apparent information insufficiencies in its characterization of the regulatory requirements or the licensing basis of the plant.

Consistent with Section 50.90 of Title 10 of the *Code of Federal Regulations* (10 CFR), an application for an amendment to the license (including the technical specifications) must fully describe the changes requested, and following as far as applicable, the form prescribed for original applications. Section 50.34 of 10 CFR addresses the content of technical information required. This section stipulates that the submittal address the design and operating characteristics, unusual or novel design features, and principal safety considerations.

The NRC staff has reviewed your application and concluded that the information delineated in the enclosure to this letter is necessary to enable the staff to make an independent assessment regarding the acceptability of the proposed amendment in terms of regulatory requirements and the protection of public health and safety and the environment.

In order to make the application complete, the NRC staff requests that Entergy supplement the application to address the information requested in the enclosure by March 23, 2020. This will enable the NRC staff to begin its detailed technical review. If the information responsive to the NRC staff's request is not received by the above date, the application will not be accepted for review pursuant to 10 CFR 2.101, and the NRC will cease its review activities associated with the application. If the application is subsequently accepted for review, you will be advised of

any further information needed to support the NRC staff's detailed technical review by separate correspondence.

The information requested and associated timeframe in this letter were discussed with Mr. Riley Keele of your staff on March 4, 2020.

If you have any questions, please contact me at (301) 415-4037 or by e-mail at [Thomas.Wengert@nrc.gov](mailto:Thomas.Wengert@nrc.gov).

Sincerely,

*/RA/*

Thomas J. Wengert, Senior Project Manager  
Plant Licensing Branch IV  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-313

Enclosure:  
Supplemental Information Needed

cc: Listserv

SUPPLEMENTAL INFORMATION NEEDED  
LICENSE AMENDMENT REQUEST TO  
REVISE LOSS OF VOLTAGE RELAY ALLOWABLE VALUES  
ENTERGY OPERATIONS, INC.  
ARKANSAS NUCLEAR ONE, UNIT 1  
DOCKET NO. 50-313

By letter dated January 24, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20024E639), Entergy Operations, Inc. (the licensee) submitted a license amendment request (LAR) for Arkansas Nuclear One, Unit 1 (ANO-1) to modify the loss of voltage (LOV) relay allowable values in ANO-1 Surveillance Requirement (SR) 3.3.8.2.b in Technical Specification 3.3.8, "Diesel Generator (DG) Loss of Power Start (LOPS)."

Specifically, the licensee proposed to change the CHANNEL CALIBRATION with setpoint Allowable Values for SR 3.3.8.2.b as follows (changes are italicized and in **bold print**):

From: "Loss of voltage  $\geq$  [greater than or equal to] 1600 V [volts] and  $\leq$  [less than or equal to] 3000 V with a time delay of  $\geq$  0.30 seconds and  $\leq$  0.98 seconds."

To: "Loss of voltage  $\geq$  **3251.5** V and  $\leq$  **3349.5** V with a time delay of  $\geq$  **2.0** seconds and  $\leq$  **2.6** seconds."

The U.S. Nuclear Regulatory Commission (NRC) staff performed an acceptance review of the license amendment request in accordance with Office of Nuclear Reactor Regulation Office Instruction LIC-109, Revision 2, "Acceptance Review Procedures," dated January 16, 2017 (ADAMS Accession No. ML16144A521), and determined that the application is unacceptable for review, with opportunity to supplement because it is missing sufficient information for the NRC staff to independently verify that the proposed LOV relay Allowable Values and their associated time delays are adequate to assure that the required protective actions will be initiated before the associated plant process parameter exceeds its analytical limit.

Background

In its letter dated January 24, 2020, the licensee stated that it is currently developing modifications to the site undervoltage schemes, which are designed to protect important in-plant equipment from damage during degraded voltage conditions. The licensee also stated that the modifications are intended to address, in part, information contained in Regulatory Issue Summary (RIS) 2011-12, "Adequacy of Station Electric Distribution System Voltages," Revision 1, dated December 29, 2011 (ADAMS Accession No. ML113050583). Specifically, the following statement in the "Summary of Issues" section of RIS 2011-12 concerning degraded voltage relay (DVR) calculations states, in part:

The time delay chosen should be optimized to ensure that permanently connected Class 1E loads are not damaged under sustained degraded voltage

Enclosure

conditions (such as a sustained degraded voltage below the DVR voltage setting(s) for the duration of the time delay setting).

The licensee also stated that the plant modifications will include replacement of the inverse time LOV relays installed on the ANO-1 vital 4160 V switchgear A3 and A4 with definite time LOV relays. The licensee further stated that the ANO-1 undervoltage protection scheme has been reevaluated as a whole, and that modifications are planned to include overload and overcurrent relay adjustments for some safety-related motors, replacing the existing inverse time LOV relays with definite time relays, and installing two additional DVRs on each of the vital 480 V load centers to specifically address a sustained undervoltage condition. The installation of the new LOV relays using definite time relays, rather than the inverse time LOV principle, necessitates a revision to the Allowable Value in SR 3.3.8.2.b.

### Regulatory Basis

- The regulation in Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36(c)(1)(ii)(A) states in part, "Limiting safety system settings for nuclear reactors are settings for automatic protective devices related to those variables having significant safety functions. Where a limiting safety system setting is specified for a variable on which a safety limit has been placed, the setting must be so chosen that automatic protective action will correct the abnormal situation before a safety limit is exceeded. If, during operation, it is determined that the automatic safety system does not function as required, the licensee shall take appropriate action, which may include shutting down the reactor."
- The regulation in 10 CFR 50.36(c)(3) states that, "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."
- Regulatory Guide (RG) 1.105, Revision 3, "Setpoints for Safety-Related Instrumentation," dated December 1999 (ADAMS Accession No. ML993560062), describes a method acceptable to the NRC staff for complying with the NRC's regulations for ensuring that setpoints for safety-related instrumentation are initially within and remain within the technical specification limits.
- RIS 2011-12, Revision 1, clarifies voltage studies necessary for DVR (second level undervoltage protection) setting bases and transmission network/offsite/station electric power system design bases for meeting the regulatory requirements specified in General Design Criterion 17, "Electric power systems," of Appendix A to 10 CFR Part 50. The RIS states, in part:

Licensee voltage calculations should provide the basis for their DVR settings, ensuring safety-related equipment is supplied with adequate voltage (dependent on equipment manufacturers design requirements), based on bounding conditions for the most limiting safety-related load (in terms of voltage) in the plant.
- 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,” dated August 24, 2006 (ADAMS Accession No. ML051810077), discusses issues that could occur during testing of limiting safety system settings and which, therefore, may have an adverse effect on equipment operability. The RIS also represents an approach that is acceptable to the NRC staff for addressing these issues for use in licensing actions. The RIS states, in part:

As one measure of instrument operability, the NRC staff expects licensees to verify during testing or calibration that the change in the measured TSP [trip setpoint] since the last test or calibration is within predefined limits (double-sided acceptance criteria band) and to take appropriate actions if the change is outside these limits. The acceptance criteria band should be derived from the licensee’s setpoint methodology, including use of generic or plant-specific data. ... It is NRC staff’s position that verifying that the as-found TSP is within the acceptance band limits during test or calibration is part of the determination that an instrument is functioning as required.

#### Supplemental Information Required

1. Provide a summary of the ANO-1 LOV relay setpoint uncertainty calculation to support the proposed Allowable Value in SR 3.3.8.2.b. The summary should include the relay setting design basis, such as the nominal setpoint to be used during calibration surveillances, the uncertainties associated with these settings (inclusive of the Potential Transformer ratio and the Institute of Electrical and Electronics Engineers (IEEE) Standard C57.13 Accuracy Class), the expected relay drift between surveillances, measurement and test equipment uncertainties, and the as-found and as-left tolerance acceptance values to be applied during technical specification surveillances. Alternatively, the full setpoint uncertainty calculation may be provided for convenience, but is not necessary.
2. Provide the full ABB catalog number, including options of the new definite time LOV relay, ABB Single Phase Voltage Relays Type 27N, which will provide the applicable pickup and dropout voltages, performance tolerances, and the range of time delays of this proposed device. Indicate whether a harmonic filter will be used, which could affect the repeatability versus temperature range uncertainty.
3. Provide the actual time delay setting range selected for use in the LOV relay application.

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**ADAMS Accession No. ML20065H799**

\*by e-mail

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