



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

March 12, 2001

Mr. Craig G. Anderson
Vice President, Operations ANO
Entergy Operations, Inc.
1448 S. R. 333
Russellville, AR 72801

SUBJECT: ARKANSAS NUCLEAR ONE, UNIT 1 - ISSUANCE OF AMENDMENT RE: 4160
VOLT BUS LOSS-OF-VOLTAGE SETTINGS AND 480 VOLT DEGRADED
VOLTAGE SETTINGS (TAC NO. MB0096)

Dear Mr. Anderson:

The Commission has issued the enclosed Amendment No. 211 to Facility Operating License No. DPR-51 for Arkansas Nuclear One, Unit 1 (ANO-1). The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated September 28, 2000.

The amendment changes the ANO-1 TSs to revise the safety-related 4160 Volt (V) bus loss-of-voltage and 480 V bus degraded voltage relay allowable values.

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

Sincerely,

William Reckley, Project Manager, Section 1
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-313

Enclosures: 1. Amendment No. 211 to DPR-51
2. Safety Evaluation

cc w/encls: See next page

NRR-058

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
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ENTERGY OPERATIONS INC.

DOCKET NO. 50-313

ARKANSAS NUCLEAR ONE, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 211
License No. DPR-51

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Entergy Operations, Inc. (the licensee) dated September 28, 2000, 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 license amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - 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 this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-51 is hereby amended to read as follows:

2. Technical Specifications

- The Technical Specifications contained in Appendix A, as revised through Amendment No. 211, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

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

FOR THE NUCLEAR REGULATORY COMMISSION



Robert A. Gramm, Chief, Section 1
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of Issuance: March 12, 2001

ATTACHMENT TO LICENSE AMENDMENT NO. 211

FACILITY OPERATING LICENSE NO. DPR-51

DOCKET NO. 50-313

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

42a

43b

Insert

42a

43b

- 3.5.1.7 The Decay Heat Removal System isolation valve closure setpoints shall be equal to or less than 340 psig for one valve and equal to or less than 400 psig for the second valve in the suction line. The relief valve setting for the DHR system shall be equal to or less than 450 psig.
- 3.5.1.8 The degraded voltage monitoring relay settings shall be as follows:
- a. The 4.16 KV emergency bus undervoltage relay setpoints shall be ≥ 1600 VAC but ≤ 3000 VAC with a time delay setpoint of ≥ 0.30 seconds and ≤ 0.98 seconds.
 - b. The 480 V emergency bus undervoltage relay setpoints shall be ≥ 423.2 VAC but ≤ 436.0 VAC with a time delay setpoint of 8 seconds ± 1 second.
- 3.5.1.9 The following Reactor Trip circuitry shall be operable as indicated:
1. Reactor trip upon loss of Main Feedwater shall be operable (as determined by Specification 4.1.a and item 35 of Table 4.1-1) at greater than 5% reactor power. (May be bypassed up to 10% reactor power.)
 2. Reactor trip upon Turbine Trip shall be operable (as determined by Specification 4.1.a and item 41 of Table 4.1-1) at greater than 5% reactor power. (May be bypassed up to 45% reactor power.)
 3. If the requirements of Specifications 3.5.1.9.1 or 3.5.1.9.2 cannot be met, restore the inoperable trip within 12 hours or bring the plant to a hot shutdown condition.
- 3.5.1.10 Deleted
- 3.5.1.11 For on-line testing of the Emergency Feedwater Initiation and Control (EFIC) system channels during power operation only one channel shall be locked into "maintenance bypass" at any one time. If one channel of the NI/RPS is in maintenance bypass, only the corresponding channel of EFIC may be bypassed.
- 3.5.1.12 The Containment High Range Radiation Monitoring instrumentation shall be operable with a minimum measurement range from 1 to 10^7 R/hr.

Power is normally supplied to the control rod drive mechanisms from two separate parallel 480 volt sources. Redundant trip devices are employed in each of these sources. If any one of these trip devices fails in the untripped state, on-line repairs to the failed device, when practical, will be made and the remaining trip devices will be tested. Four hours is ample time to test the remaining trip devices and, in many cases, make on-line repairs.

The 4.16 KV bus undervoltage relay settings are based on a maximum setting, which is below the lowest allowed motor terminal momentary voltage of 75% of motor voltage rating of 4000 V. The settings are further reduced to include channel uncertainties and calibration tolerances. The 480V bus undervoltage relay settings are based on long term motor voltage requirements plus the maximum feeder voltage drop allowance resulting in a nominal 92% setting of motor rated voltage of 460 V. These settings are also adjusted to include channel uncertainties and calibration tolerances.

The OPERABILITY of the accident monitoring instrumentation ensures that sufficient information is available on selected plant parameters to monitor and assess these variables during and following an accident. This capability is consistent with the recommendation of Regulatory Guide 1.97, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant Conditions During and Following an Accident," December 1975 and NUREG-0578, "TMI-2 Lessons Learned Task Force Status Report and Short-Term Recommendations."

The subcooled margin monitors (SMM), and core-exit thermocouples (CET), Reactor Vessel Level Monitoring System (RVLMS) and Hot Leg Level Measurement System (HLLMS) are a result of the Inadequate Core Cooling (ICC) instrumentation required by Item II.F.2 NUREG-0737. The function of the ICC instrumentation is to increase the ability of the plant operators to diagnose the approach to and recovery from ICC. Additionally, they aid in tracking reactor coolant inventory. These instruments are included in the Technical Specifications at the request of NRC Generic Letter 83-37 and are not required by the accident analysis, nor to bring the plant to cold shutdown conditions. The Reactor Vessel Level Monitor is provided as a means of indicating level in the reactor vessel during accident conditions. The channel operability of the RVLMS is defined as a minimum of three sensors in the upper plenum region and two sensors in the dome region operable. When Reactor Coolant Pumps are running, all except the dome sensors are interlocked to read "invalid" due to flow induced variables that may offset the sensor outputs. The channel operability of the HLLMS is defined as a minimum of one wide range and any two of the narrow range transmitters in the same channel operable. If the equipment is inaccessible due to health and industrial safety concerns (for example, high radiation area, low oxygen content of the containment atmosphere) or due to physical location of the fault (for example, probe failure in the reactor vessel), then operation may continue until the next scheduled refueling outage and a report filed.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 211 TO

FACILITY OPERATING LICENSE NO. DPR-51

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT 1

DOCKET NO. 50-313

1.0 INTRODUCTION

By letter dated September 28, 2000, Entergy Operations, Inc. (the licensee), submitted a request for changes to the Arkansas Nuclear One, Unit 1, Technical Specifications (TSs). The requested changes would increase the range of acceptable values for the 4160 Volt (V) bus loss-of-voltage and 480 V bus degraded voltage relay settings. Currently, TS 3.5.1.8 provides a range of allowable values for the 4160 V bus loss-of-voltage and 480 V bus degraded voltage relay requirements. The proposed TS change increases the existing range of allowable values by accounting for channel uncertainties and calibration tolerances in accordance with industry guidance and providing better protection against unnecessary relay actuation during system transients. The proposed change also adds an allowable value for the time delay to the 4160 V loss-of-voltage relays to ensure that they actuate within a specified time.

2.0 BACKGROUND

There are two redundant and independent 4160 V safety buses (A3 and A4), and each safety bus has two levels of undervoltage protection: loss-of-voltage and degraded voltage. The loss-of-voltage protection is provided by two inverse time undervoltage relays on each of the 4160 V safety buses that isolate the safety buses upon detection of loss-of-voltage, initiate load shedding, and start the associated emergency diesel generator (EDG). The two 4160 V loss-of-voltage relays per safety bus, as discussed above, are connected in parallel so that either relay will isolate its associated bus from its offsite power source. The loss-of-voltage relays, which are set at 3120 V (75% of nominal bus voltage), initiate load shedding and starting of the associated EDG within approximately one second of a total loss-of-voltage at the associated safety bus. The isolation of the safety buses is delayed by approximately another two seconds (for a total delay of approximately three seconds) to enable the alternate offsite power source to supply the safety loads in the event of a fast transfer from the unit auxiliary transformer to either startup transformer #1, or startup transformer #2 if available to ANO-1.

The second level of undervoltage protection is provided by two degraded undervoltage relays on each of the 480 V safety buses (B5 and B6) for degraded voltage conditions. The two degraded undervoltage relays on each bus are connected in series to give the coincidence logic required to preclude a spurious trip from the offsite power source. The degraded undervoltage

relays will isolate the safety buses from the offsite power source upon detection of a sustained degraded voltage condition after a given time delay and start the EDG.

The limiting condition for operation (LCO) of TS 3.5.1.8 specifies the allowable values for the 4160 V loss-of-voltage relay settings. The TS allowable values are > 3115 VAC but < 3177 VAC. The LCO allowable values for the 480 V degraded voltage relay setting are specified in TS 3.5.1.8.b as > 423 VAC but < 431 VAC. By letter dated September 28, 2000, the licensee requested approval of the proposed TS changes to the allowable values for the 4160 V loss-of-voltage relay and 480 volt degraded voltage relay settings. Our review and evaluation of the proposed TS changes is documented in the following evaluation.

3.0 EVALUATION

The 4160 V loss-of-voltage protection for engineered safety feature (ESF) buses A3 and A4 is provided by relays 127-A3/AB, 127-A3/BC, 127-A4/AB, and 127-A4/BC, respectively. Currently, the 4160 V loss-of-voltage relay setting allowable values for TS 3.5.1.8.a are > 3115 VAC but < 3177 VAC. The allowable values for setting 480 V bus degraded voltage relays (two each on safety related 480 V load center buses B5 and B6) are specified in TS 3.5.1.8.b as > 423 VAC but < 431 VAC. The 4160 V bus and 480 V bus allowable values for TS 3.5.1.8.a and TS 3.5.1.8.b are the same values as given in the original issuance of the ANO-1 operating license issued in 1974. Based on operating experience since the issuance of the original ANO-1 operating license, the licensee has improved relay setpoint calculational methods and gained a better understanding of the plant's response to undervoltage and loss-of-voltage events. Therefore, the licensee has proposed to change the 4160 V loss-of-voltage and 480 V degraded voltage relay setting allowable values.

Based on recently completed design calculation revisions, the licensee has found that a wider range of relay allowable values than those currently specified in TS 3.5.1.8.a will provide the necessary loss-of-voltage detection. Therefore, the licensee has proposed to change the range of allowable values for setting the loss of-voltage relays from > 3115 VAC but < 3177 VAC to ≥ 1600 VAC but ≤ 3000 VAC. The licensee has indicated that in order to include channel uncertainties and calibration tolerances, the proposed maximum allowable value for loss-of-voltage relays had to be lowered from 3177 VAC to 3000 VAC, and the range had to be increased from 3115-3177 VAC to 1600-3000 VAC. The proposed settings for the loss-of-voltage relays provides a range of acceptable values for setting of the loss-of-voltage relays. The licensee also discovered that the current loss-of-voltage relay setting provides marginal protection from unnecessary actuations during system transients. Therefore, the proposed change to a lower range of 4160 V bus relay allowable values will provide improved protection from unnecessary relay actuations during potential system transient events.

The staff agrees that the lower range of allowable values will still provide the necessary safety function for loss-of-voltage event (i.e., the protection against a complete loss of voltage is relatively insensitive to the relay settings).

Additionally, the licensee has proposed to add an allowable value of > 0.30 but < 0.98 seconds for the time delay in which these relays must actuate. The proposed time delay allowable values include channel uncertainties and calibration tolerances. The proposed relay time delay setting provides sufficient time to avoid inadvertent actuation during normal fast transfer of the associated bus to an alternate power source or during offsite power system transients. The

proposed time delay is also adequate to initiate the EDG actuation signal in approximately one second for a complete loss of offsite power.

The addition of a range of allowable values for this time delay is consistent with Revision 1 of NUREG-1430, "Standard Technical Specifications for Babcock and Wilcox Plants." The staff has determined that the proposed range of relay setting allowable values for the loss-of-voltage relay conforms to the industry guidance for setpoint uncertainty and is consistent with the applicable safety analyses for loss-of-voltage protection. The staff concludes that the proposed change enhances the loss-of-voltage protection while assuring the availability of offsite power for the grid system minimum operating condition and is, therefore, acceptable.

Based on the revised design calculations, the licensee has found that a slightly increased range of relay setting values similar to those currently specified in TS 3.5.1.8.b will provide the necessary degraded voltage protection. Therefore, the licensee has proposed to change degraded voltage relay setting allowable values from a range of > 423 VAC but < 431 VAC to a range of ≥ 423.2 VAC but ≤ 436.0 VAC. The proposed allowable values for the degraded voltage relay settings are equivalent to a nominal 92% of the rated voltage of 460 V for motors to account for channel uncertainties and calibration tolerances. The licensee claims that the new proposed allowable values for the degraded voltage relays were arrived at per the guidance of ANO-1 Design Guide 1DG-001, "Instrument Loop Error Analysis and Setpoint Methodology Manual." The proposed degraded voltage relay setpoints will provide slightly more protection for the safety equipment from the effects of degraded voltage conditions than the current degraded voltage relay settings. The licensee has indicated that, based on the results of ANO-1 calculations, the proposed degraded voltage relay settings will not jeopardize the operability of the offsite power source for the analyzed minimum normal grid voltage conditions. Based on the staff's assessment of the above, the staff has determined that the slightly increased range of allowable values for the degraded voltage relays will provide the necessary safety function for degraded voltage conditions without compromising the reliability of the offsite power source.

Based on the above, the staff concludes that an increased range of allowable values for the 4160 V loss-of-voltage relays and 480 V degraded voltage relays will continue to provide the necessary safety function for the ANO-1 4160 V and 480 V safety buses. The licensee has also proposed to add into the TS the allowable value range for the time delay for the loss-of-voltage relays to ensure that these relays actuate within a specified time. The proposed changes to the range of allowable values for the 4160 V loss-of-voltage and 480 V degraded voltage relays adopt industry guidance for setpoint uncertainty and enhance the low voltage protection for the safety equipment without compromising the reliability of the offsite power system. The proposed changes are also in conformance with the guidance of Revision 1 of NUREG-1430, "Standard Technical Specifications for Babcock and Wilcox Plants." The proposed change requested by the licensee for ANO-1 4160 V loss-of-voltage relays and 480 V degraded voltage relays is similar to that approved by the staff in the Arkansas Nuclear One, Unit No. 2 Amendment No. 200 (Safety Evaluation Report dated January 26, 1999).

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Arkansas State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The Nuclear Regulatory Commission 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, and there has been no public comment on such finding (65 FR 77918, dated December 13, 2000). 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) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Paul Gill

Date: March 12, 2001

March 12, 2001

Mr. Craig G. Anderson
Vice President, Operations ANO
Entergy Operations, Inc.
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SUBJECT: ARKANSAS NUCLEAR ONE, UNIT 1 - ISSUANCE OF AMENDMENT RE: 4160
VOLT BUS LOSS-OF-VOLTAGE SETTINGS AND 480 VOLT DEGRADED
VOLTAGE SETTINGS (TAC NO. MB0096)

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Sincerely,

/RA/

William Reckley, Project Manager, Section 1
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-313

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2. Safety Evaluation

cc w/encls: See next page

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