Mr. C. Randy Hutchinson
Vice President, Operations ANO
Entergy Operations, Inc.
1448 S. R. 333
Russellville, AR 72801

Septer 14, 1999

SUBJECT: ARKANSAS NUCLEAR ONE, UNIT NO. 1 - ISSUANCE OF AMENDMENT RE: BATTERY REQUIREMENTS REVISION (TAC NO. MA5217)

Dear Mr. Hutchinson:

The Commission has issued the enclosed Amendment No. 200 to Facility Operating License No. DPR-51 for the Arkansas Nuclear One, Unit No. 1 (ANO-1). The amendment consists of changes to the Technical Specifications in response to your application dated April 9, 1999, as supplemented on July 29, 1999.

The requested changes affected requirements for the station batteries and the switchyard distribution system non-Class 1E 125 volt direct current (DC) sources. The proposed changes (1) incorporate limiting conditions for operation with respect to the battery parameters, (2) revise the battery testing requirements, and (3) relocate the switchyard distribution system 125 volt DC sources requirements to licensee-controlled documents.

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,
/s/
Nicholas D. Hilton, 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. 200 to DPR-51
2. Safety Evaluation
cc w/encls: See next page

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

ENTERGY OPERATIONS INC.

DOCKET NO. 50-313

ARKANSAS NUCLEAR ONE, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 200
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 April 9, 1999, as supplemented July 29, 1999, 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.

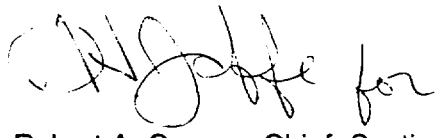
2. Accordingly, Facility Operating License No. DPR-51 is hereby amended to approve the relocation of certain Technical Specification requirements to the Technical Requirements Manual, as described in the licensee's application dated April 9, 1999, as supplemented July 29, 1999, and evaluated in the staff's Safety Evaluation attached to this amendment. This Technical Requirements Manual revision shall be reflected in the next update of the Updated Final Safety Analysis Report submitted to the NRC, pursuant to 10 CFR 50.71(e). The license is also hereby 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. 200, 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 45 days from the date of issuance (including issuance of the Technical Requirements Manual for use by licensee personnel).

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: September 14, 1999

ATTACHMENT TO LICENSE AMENDMENT NO. 200

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	Insert
56	56
57	57
57a	57a
---	57b
---	57c
100a	100a
---	100b
101	101
---	101a
---	101b
---	101c

3.7 Auxiliary Electrical Systems

Applicability

Applies to the auxiliary electrical power systems.

Objectives

To specify conditions of operation for plant station power necessary to ensure safe reactor operation and combined availability of the engineered safety features.

Specifications

3.7.1 The reactor shall not be heated or maintained above 200°F unless the following conditions are met (except as permitted by Paragraph 3.7.2):

A. Any one of the following combinations of power sources operable:

1. Startup Transformer No. 1 and Startup Transformer No. 2.

2. Startup Transformer No. 2 and Unit Auxiliary Transformer provided that the latter one is connected to the 22KV line from the switchyard rather than to the generator bus.

B. All 4160 V switchgear, 480 V load centers, 480 V motor control centers and 120 V AC distribution panels in both of the ESAS distribution systems are operable and are being powered from either one of the two startup transformers or the unit auxiliary transformer.

C. Both diesel generator sets are operable each with:

1. a separate day tank containing a minimum of 160 gallons of fuel,

2. a separate emergency storage tank containing a minimum of 138 inches (20,000 gallons) of fuel,

3. a separate fuel transfer pump, and

4. a separate starting air compressor.

D. DELETED

E. DELETED

F. The off-site power undervoltage and protective relaying interlocks associated with required startup transformer power sources shall be operable per Table 3.5.1-1.

G. The selective load-shed features associated with Startup Transformer No. 2 shall be operable if selected for auto transfer.

3.7.2

A. The specifications in 3.7.1 may be modified to allow one of the following conditions to exist after the reactor has been heated above 200F. Except as indicated in the following conditions, if any of these conditions are not met, a hot shutdown shall be initiated within 12 hours. If the condition is not cleared within 24 hours, the reactor shall be brought to cold shutdown within an additional 24 hours.

B. In the event that one of the offsite power sources specified in 3.7.1.A (1 or 2) is inoperable, reactor operation may continue for up to 24 hours if the availability of the diesel generators is immediately verified.

C. Either one of the two diesel generators may be inoperable for up to 7 days in any month provided that during such 7 days the operability of the remaining diesel generator is demonstrated immediately and daily thereafter, there are no inoperable ESF components associated with the operable diesel generator, and provided that the two sources of off-site power specified in 3.7.1.A(1) or 3.7.1.A(2) are available.

D. Any 4160V, 480V, or 120V switchgear, load center, motor control center, or distribution panel in one of the two ESF distribution systems may be inoperable for up to 8 hours, provided that the operability of the diesel generator associated with the operable ESF distribution system is demonstrated immediately and all of the components of the operable distribution system are operable. If the ESF distribution system is not returned to service at the end of the 8 hour period, Specification 3.7.2.A shall apply.

E. DELETED

F. DELETED

G. DELETED

H. If the requirements of Specification 3.7.1.G cannot be met, either:

(1) place all Startup Transformer No. 2 feeder breakers in "pull-to-lock" within 1 hour, restore the inoperable interlocks to operable status within 30 days, or submit within 30 days a Special Report pursuant to Specification 6.12.5 outlining the cause of the failure, proposed corrective action and schedule for implementation; or

(2) apply the action requirements of Table 3.5.1-1, Note 14.

3.7.3 Both 125 VDC electrical power subsystems shall be operable when the unit is above the cold shutdown condition.

A. With one 125 VDC electrical power subsystem inoperable:

1. verify that there are no inoperable safety related components associated with the operable 125 VDC electrical subsystem which are redundant to the inoperable 125 VDC electrical power subsystem,

2. verify the operability of the diesel generator associated with the operable 125 VDC electrical subsystem immediately, and

3. restore the 125 VDC electrical subsystem to operable status within 8 hours.

B. With one 125 VDC electrical power subsystem inoperable, and unable to satisfy the requirements or allowable outage times of 3.7.3.A.1, 3.7.3.A.2, or 3.7.3.A.3, the unit shall be placed in hot shutdown within 12 hours and in cold shutdown within an additional 24 hours.

3.7.4 Battery cell parameters shall be within limits when the associated 125 VDC electrical power subsystems are required to be operable.

A. With one or more batteries with one or more battery cell parameters not within Table 4.6-1 Category A or B limits:

1. Within 1 hour, verify pilot cell electrolyte level and float voltage meet Table 4.6-1 Category C limits,

2. Within 24 hours and once per 7 days thereafter, verify battery cell parameters meet Table 4.6-1 Category C limits, and

3. Within 31 days, restore battery cell parameters to Table 4.6-1 Category A and B limits.

B. With one or more batteries with one or more battery cell parameters not within Table 4.6-1 Category A or B limits and unable to satisfy the requirements or allowable outage times of 3.7.4.A.1, 3.7.4.A.2, or 3.7.4.A.3, declare the associated battery inoperable immediately and perform the required actions of 3.7.3.A.

C. With one or more batteries with electrolyte temperature of the pilot cell not within the limits of Specification 4.6.2.8, electrolyte temperature of representative cells not within the limits of Specification 4.6.2.6 or with one or more batteries with one or more battery cell parameters not within Table 4.6-1 Category C limits, declare the associated battery inoperable immediately and perform the required actions of 3.7.3.A.

Bases

The electrical system is designed to be electrically self-sufficient and provide adequate, reliable power sources for all electrical equipment during startup, normal operation, safe shutdown and handling of all emergency situations. To prevent the concurrent loss of all auxiliary power, the various sources of power are independent of and isolated from each other.

In the event that the offsite power sources specified in 3.7.1.A (1 or 2) are inoperable, the required capacity of one emergency storage tank plus one day tank (20,160 gallons) will be sufficient for not less than three and one-half days operation for one diesel generator loaded to full capacity. (ANO-1 FSAR 8.2.2.3) The underground emergency storage tanks are gravity fed from the bulk storage tank and are normally full, while the day tanks are fed from transfer pumps which are capable of being cross connected at their suction and discharges and automatically receive fuel oil when their inventory is less than 180 gallons. Thus, at least a seven day total diesel oil inventory is available onsite for emergency diesel generator operation during complete loss of electric power conditions.

Technical Specification 3.7.2 allows for the temporary modification of the specifications in 3.7.1 provided that backup system(s) are operable with safe reactor operation and combined availability of the engineered safety features ensured.

Technical Specifications 3.7.1.F and 3.7.1.G provide assurance that the Startup Transformer No. 2 loads will not contribute to a sustained degraded grid voltage situation. This will protect ESF equipment from damage caused by sustained undervoltage.

The 125 VDC electrical power system consists of two independent and redundant safety related class 1E DC electrical subsystems. Each subsystem consists of one 100% capacity 125 VDC battery, an associated battery charger, and its distribution network. Additionally, there is one spare battery charger per subsystem, which provides backup service in the event that the preferred battery charger is out of service.

If one of the required DC electrical power subsystems is inoperable (e.g., inoperable battery, no operable battery charger, or inoperable battery and no operable associated battery charger), the remaining DC electrical power subsystem has the capacity to support a safe shutdown and to mitigate an accident condition. Since a subsequent worst-case single failure would, however, result in the complete loss of the remaining 125 VDC electrical power subsystems with attendant loss of ES functions, continued power operation should not exceed 8 hours.

Battery cell parameters must remain within acceptable limits to ensure availability of the required DC power to shut down the reactor and maintain it in a safe condition after an anticipated operational event or a postulated design basis accident. Cell parameter limits are conservatively established, allowing continued DC electrical system function even with Table 4.6-1 Category A and B limits not met.

With one or more cells in one or more batteries not within limits (i.e., Table 4.6-1 Category A limits not met, or Category B limits not met, or Category A and B limits not met) but within the Table 4.6-1 Category C limits, the battery is degraded but has sufficient capacity to perform its intended function. Therefore, the battery is not required to be considered inoperable solely as a result of Category A or B limits not met, and continued operation is permitted for a limited period of time. The pilot cell electrolyte level and float voltage are required to be verified to meet the Table 4.6-1 Category C limits within 1 hour (TS 3.7.4.A.1). These checks will provide a quick representative status of the remainder of the battery cells. Verification that the Table 4.6-1 Category C limits are met (TS 3.7.4.A.2) provides assurance that during the time needed to restore the parameters to within the Category A and B limits, the battery will still be capable of performing its intended function. This verification is repeated at 7 day intervals until the parameters are restored to within Category A and B limits. This periodic verification is consistent with the increased potential to exceed these battery parameter limits during these conditions.

With one or more batteries with one or more battery cell parameters outside the Table 4.6-1 Category C limit for any connected cell, sufficient capacity to supply the maximum expected load requirement is not assured. Therefore, the battery must be immediately declared inoperable and the corresponding DC electrical power subsystem must be declared inoperable.

Additionally, other potentially extreme conditions, such as electrolyte temperature of the pilot cell falling below 60°F, average electrolyte temperature of representative cells falling below 60°F or battery terminal voltage below the limit are also cause for immediately declaring the associated DC electrical power subsystem inoperable.

e. Diesel fuel from the emergency storage tank shall be sampled and found to be within acceptable limits specified in Table 1 of ASTM D975-68 when checked for viscosity, water, and sediment.

5. Once every 31 days the pressure in the required starting air receiver tanks shall be verified to be ≥ 175 psig.

Once every 18 months, the capacity of each diesel oil transfer pump shall be verified to be at least 10 gpm.

4.6.2 DC Sources and Battery Cell Parameters

1. Verify battery terminal voltage is ≥ 124.7 V on float charge once each 7 days.

2. Verify battery capacity is adequate to supply, and maintain in operable status, the required emergency loads for the design duty cycle when subjected to either a battery service test or a modified performance discharge test once every 18 months.

3. Verify battery capacity is ≥ 80% of the manufacturers rating when subjected to a performance discharge test or a modified performance discharge test once every 60 months, once every 24 months when battery has reached 85% of the service life with capacity ≥ 100% of the manufacturers rating and showing no degradation, and once every 12 months when battery shows degradation or has reached 85% of the service life and capacity is < 100% of the manufacturer's rating.

4. Any battery charger which has not been loaded while connected to its 125V d-c distribution system for at least 30 minutes during every quarter shall be tested and loaded while connected to its bus for 30 minutes.

5. Verify battery pilot cell parameters meet Table 4.6-1 Category A limits once per 7 days.

6. Verify average electrolyte temperature of representative cells is ≥ 60°F once per 92 days.

7. Verify battery cell parameters meet Table 4.6-1 Category B limits once per 92 days and once within 24 hours after a battery discharge to < 110 V and once within 24 hours after a battery overcharge to > 145 V.

8. Verify electrolyte temperature of pilot cell is ≥ 60°F once per 31 days.

4.6.3 Emergency Lighting

The correct functioning of the emergency lighting system shall be verified once every 18 months.

Table 4.6-1 (page 1 of 1)
Battery Cell Surveillance Requirements

PARAMETER	CATEGORY A: LIMITS FOR EACH DESIGNATED PILOT CELL	CATEGORY B: LIMITS FOR EACH CONNECTED CELL	CATEGORY C: ALLOWABLE LIMITS FOR EACH CONNECTED CELL
Electrolyte Level	> Minimum level indication mark, and ≤ 1/4 inch above maximum level indication mark[a]	> Minimum level indication mark, and ≤ 1/4 inch above maximum level indication mark[a]	Above top of plates, and not overflowing
Float Voltage	≥ 2.13 V	≥ 2.13 V	> 2.07 V
Specific Gravity[b][c]	≥ 1.195	≥ 1.190 AND Average of all connected cells > 1.195	Not more than 0.020 below average connected cells AND Average of all connected cells ≥ 1.190

(a) It is acceptable for the electrolyte level to temporarily increase above the specified maximum during equalizing charges provided it is not overflowing.

(b) Corrected for electrolyte temperature.

(c) A battery charging current of < 2 amps when on float charge is acceptable for meeting specific gravity limits following a battery recharge, for a maximum of 7 days. When charging current is used to satisfy specific gravity requirements, specific gravity of each connected cell shall be measured prior to expiration of the 7 day allowance.

Bases

The emergency power system provides power requirements for the engineered safety features in the event of a DBA. Each of the two diesel generators is capable of supplying minimum required engineered safety features from independent buses. This redundancy is a factor in establishing testing intervals. The monthly tests specified above will demonstrate operability and load capacity of the diesel generator. The fuel supply and diesel starter motor air pressure are continuously monitored and alarmed for abnormal conditions. Starting on complete loss of off-site power will be verified by simulated loss-of-power tests once every 18 months.

The SR 4.6.2.1 verification of battery terminal voltage while on float charge helps to ensure the effectiveness of the charging system and the ability of the batteries to perform their intended function. Float charge is the condition in which the battery charger is supplying the continuous charge required to overcome the internal losses of a battery and maintain the battery in a fully charged state. The voltage requirements are based on the nominal design voltage of the battery (2.15 V per cell average) and are consistent with the battery vendor allowable minimum volts per cell limits. The inability to meet this requirement constitutes an inoperable battery.

The SR 4.6.2.2 battery service test is a special test of the battery capability, as found, to satisfy the design requirements (battery duty cycle) of the DC electrical power system. The discharge rate and test length should correspond to the design duty cycle requirements. A modified performance discharge test may be performed in lieu of a service test. The inability to meet this requirement constitutes an inoperable battery.

The modified performance discharge test is a simulated duty cycle consisting of just two rates; the one minute rate published for the battery or the largest current load of the duty cycle, followed by the test rate employed for the performance test, both of which envelope the duty cycle of the battery. Since the ampere-hours removed by a rated one minute discharge represents a very small portion of the battery capacity, the test rate can be changed to that for the performance test without compromising the results of the performance discharge test. The battery terminal voltage for the modified performance discharge test should remain above the minimum battery voltage specified in the battery service test for the duration of time equal to that of the service test.

A modified performance discharge test is a test of the battery capacity and its ability to provide a high rate, short duration load (usually the highest rate of the duty cycle). This will often confirm the battery's ability to meet the critical period of the load duty cycle, in addition to determining its percentage of rated capacity. Initial conditions for the modified performance discharge test should be identical to those specified for a service test and the test discharge rate must envelope the duty cycle of the service test if the modified performance discharge test is performed in lieu of a service test.

The SR 4.6.2.3 battery performance discharge test is a test of constant current capacity of a battery after having been in service, to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage. The inability to meet this requirement constitutes an inoperable battery.

Either the battery performance discharge test or the modified performance discharge test, described above, is acceptable for satisfying SR 4.6.2.3; however, only the modified performance discharge test may be used to satisfy SR 4.6.2.3 while satisfying the requirements of SR 4.6.2.2 at the same time.

The acceptance criteria for this surveillance are consistent with IEEE-450. This reference recommends that the battery be replaced if its capacity is below 80% of the manufacturer's rating. A capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements.

The frequency for this test is normally 60 months. If the battery shows signs of degradation, or if the battery has reached 85% of its service life and capacity is < 100% of the manufacturer's rating, the frequency is reduced to 12 months. However, if the battery shows no degradation but has reached 85% of its service life, the frequency is only reduced to 24 months for batteries that retain ≥ 100% of the manufacturer's ratings. Degradation is indicated, according to IEEE-450, when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is ≥ 10% below the manufacturer's rating.

SR 4.6.2.4 requires that each required battery charger be capable of supplying the connected loads while maintaining the battery fully charged. This is based on the assumption that the batteries are fully charged at the beginning of a design basis accident, and on the safety function of providing adequate power for the design basis accident loads.

SR 4.6.2.5 verifies that the Table 4.6-1 Category A battery cell parameters are consistent with vendor recommendations and IEEE-450, which recommend regular battery inspections (at least once per month) including voltage, specific gravity, and electrolyte level of pilot cells.

The SR 4.6.2.6 verification that the average temperature of representative cells is ≥ 60°F is consistent with a recommendation of IEEE-450, which states that the temperature of electrolytes in representative cells (~10% of all connected cells) should be determined on a quarterly basis. Lower than normal temperatures act to inhibit or reduce battery capacity. This surveillance ensures that the operating temperatures remain within an acceptable operating range. This limit is based on manufacturer recommendations.

SR 4.6.2.7 verifies that the Table 4.6-1 Category B battery cell parameters are consistent with vendor recommendations and IEEE-450, which recommend regular battery inspections (at least once per quarter) including voltage, specific gravity, and electrolyte level of each connected cell. In addition, within 24 hours after a battery discharge to < 110 V or a battery overcharge to > 145 V, the battery must be demonstrated to meet Category B limits. Transients, such as motor starting transients, which may momentarily cause battery voltage to drop to ≤ 110 V, do not constitute a battery discharge provided battery terminal voltage and float current return to pre-transient values. This inspection is also consistent with IEEE-450, which recommends special inspections following a severe discharge or overcharge, to ensure that no significant degradation of the battery occurs as a consequence of such discharge or overcharge.

The SR 4.6.2.8 verification that the temperature of the pilot cell is ≥ 60°F is consistent with a recommendation of IEEE-450, which states that the temperature of electrolytes in pilot cells should be determined on a monthly basis. Lower than normal temperatures act to inhibit or reduce battery capacity. This surveillance ensures that the operating temperatures remain within an acceptable operating range. This limit is based on manufacturer recommendations.

Table 4.6-1 delineates the limits on electrolyte level, cell float voltage, and specific gravity for three different categories. The meaning of each category is discussed below.

Category A defines the normal parameter limit for each designated pilot cell in each battery. The cells selected as pilot cells are those whose temperature, voltage and electrolyte specific gravity approximate the state of charge of the entire battery.

The Category A limits specified for electrolyte level are based on manufacturer recommendations and are consistent with the guidance in IEEE-450, with the extra 1/4 inch allowance above the high water level indication for operating margin to account for temperatures and charge effects. In addition to this allowance, footnote (a) to Table 4.6-1 permits the electrolyte level to be above the specified maximum level during equalizing charge, provided it is not overflowing. These limits ensure that the plates suffer no physical damage and that adequate electron transfer capability is maintained in the event of transient conditions. IEEE-450 recommends that electrolyte level readings should be made only after the battery has been at float charge for at least 72 hours.

The Category A limit specified for float voltage is $\geq$ 2.13 V per cell. This value is based on the battery vendor allowable minimum cell voltage and on a recommendation of IEEE-450, which states that prolonged operation of cells < 2.13 V can reduce the life expectancy of cells.

The Category A limit specified for specific gravity for each pilot cell is $\geq$ 1.195. This value is characteristic of a charged cell with adequate capacity. According to IEEE-450, the specific gravity readings are based on a temperature of 77°F (25°C).

The specific gravity readings are corrected for actual electrolyte temperature. For each 3°F (1.67°C) above 77°F (25°C), 1 point (0.001) is added to the reading; 1 point is subtracted for each 3°F below 77°F. The specific gravity of the electrolyte in a cell increases with a loss of water due to electrolysis or evaporation.

Category B defines the normal parameter limits for each connected cell. The term "connected cell" excludes any battery cell that is jumpered out.

The Category B limits specified for electrolyte level and float voltage are the same as those specified for Category A and have been discussed above. The Category B limit specified for specific gravity for each connected cell is $\geq$ 1.190 with the average of all connected cells > 1.195. These values are based on manufacturer's recommendations. The minimum specific gravity value required for each cell ensures that the effects of a highly charged or newly installed cell will not mask overall degradation of the battery.

Category C defines the limits for each connected cell. These values, although reduced, provide assurance that sufficient capacity exists to perform the intended function and maintain a margin of safety. When any battery parameter is outside the Category C limits, the assurance of sufficient capacity described above no longer exists and the battery must be declared inoperable.

The Category C limits specified for electrolyte level (above the top of the plates and not overflowing) ensure that the plates suffer no physical damage and maintain adequate electron transfer capability. The Category C limit for float voltage is consistent with IEEE-450, which states that a cell voltage of 2.07 V or below, under float conditions and not caused by elevated temperature of the cell, indicates internal cell problems and may require cell replacement.

The Category C limit of average specific gravity $\geq$ 1.190 is based on manufacturer recommendations. In addition to that limit, it is required that the specific gravity for each connected cell must be no less than 0.020 below the average of all connected cells. This limit ensures that the effect of a highly charged or new cell does not mask overall degradation of the battery.

Footnotes (b) and (c) to Table 4.6-1 are applicable to Category A, B, and C specific gravity. Footnote (b) to Table 4.6-1 requires the above mentioned correction for electrolyte temperature. The value of 2 amps used in footnote (c) is the nominal value for float current established by the battery vendor as representing a fully charged battery with an allowance for overall battery condition. This current provides, in general, an indication of overall battery condition.

Because of specific gravity gradients that are produced during the recharging process, delays of several days may occur while waiting for the specific gravity to stabilize. A stabilized charger current is an acceptable alternative to specific gravity measurement for determining the state of charge. This phenomenon is discussed in IEEE-450. Footnote (c) to Table 4.6-1 allows the float charge current to be used as an alternate to specific gravity for up to 7 days following a battery recharge. Within 7 days each connected cell's specific gravity must be measured to confirm the state of charge. Following a minor battery recharge (such as equalizing charge that does not follow a deep discharge) specific gravity gradients are not significant, and confirming measurements may be made in less than 7 days.

The SR 4.6.3 testing of the emergency lighting is scheduled every 18 months and is subject to review and modification if experience demonstrates a more effective test schedule.

REFERENCE

FSAR, Section 8

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 200 TO

FACILITY OPERATING LICENSE NO. DPR-51

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT NO. 1

DOCKET NO. 50-313

1.0 INTRODUCTION

By letter dated April 9, 1999, as supplemented July 29, 1999, Entergy Operations, Inc. (Entergy, the licensee), requested a technical specification (TS) amendment for Arkansas Nuclear One, Unit 1 (ANO-1). The amendment request is related to the ANO-1 station batteries and the switchyard distribution system 125 volt direct current (DC) sources. The staff identified several changes that were required to the proposed TSs and identified the necessary changes to the licensee. The July 29, 1999, letter revised the proposed actions associated with inoperable 125 volt DC electrical power subsystems, added a monthly surveillance requirement for pilot cell electrolyte temperature, and revised several statements in the TS Bases, and did not change the initial proposed no significant hazards consideration determination.

2.0 BACKGROUND

The Class 1E 125 volt DC electrical system at ANO-1 consists of two independent, physically and electrically separated 125 volt batteries. Each 125 volt DC bus is supplied by a battery charger with the associated battery floating on the bus. A second battery charger on each bus serves as a standby charger. These four chargers are supplied from separate 480 volt, Class 1E motor control centers. Each battery charger is rated at 400 amperes (A) and is capable of restoring the battery capacity from the design minimum charge to full charge within 24 hours while supplying the normal steady state loads. In case of battery charger failure, the battery will supply power to the loads without interruption. Each battery is sized to carry the continuous emergency DC and vital alternating current (AC) loads for a minimum of 2 hours in addition to supplying power for the operation of momentary loads during the 2-hour period. The battery capacity at 80 percent of nameplate rating will correspond to the warranted capacity at the end of the life cycle and full design demand.

The non-Class 1E DC control power for the 500 kilovolt (kV) and 161 kV switchyard breakers at the ANO-1 switchyard can be supplied from three different sources: (1) a 125 volt DC battery located in the switchyard control building; (2) the battery charger located in the switchyard control building; and (3) the ANO-1 DC bus "D41," a non-1E power supply. Currently, the requirements for the switchyard DC sources are a part of the TSs.

3.0 EVALUATION

3.1 Relocation of Switchyard DC Sources

The licensee proposed to relocate the present requirements, TS 3.7.1.E, and actions, TS 3.7.2.G, associated with inoperable DC sources to the 125 volt DC switchyard distribution system to a document under licensee control, specifically, the Technical Requirements Manual (TRM). The licensee also proposes to revise the title of TS 4.6.2, "Station Batteries and Switchyard Batteries," to "DC Sources and Battery Cell Parameters." Since the TRM is incorporated by reference into the Updated Final Safety Analysis Report (UFSAR) and maintained under the process described in Section 50.59 of Title 10 of the *Code of Federal Regulations* (10 CFR), and the relocated surveillance requirements do not satisfy any of the four criteria of 10 CFR 50.36 for inclusion in the TSs, the proposed relocation is acceptable.

3.2 Revision to Class 1E DC Sources

The licensee proposed to combine the requirements of TS 3.7.1.D (Requirements for Batteries Operability), TS 3.7.2.E (Inoperable Battery Chargers), and TS 3.7.2.F (Inoperability of the Station Batteries) into a new requirement, TS 3.7.3.

The existing TS 3.7.2.F states:

> One of the two station batteries and the associated distribution system may be inoperable for 8 hours provided that there are no inoperable safety related components associated with the remaining station battery which are redundant to the inoperable station battery and the operability of the diesel generator is verified immediately. If the battery is not returned to service at the end of the 8 hour period, Specification 3.7.2.A shall apply.

This provision was omitted in the licensee's proposal dated April 9, 1999. The licensee, in its letter dated July 29, 1999, stated that "ANO proposes to retain the current TS 3.7.2.F required actions associated with an inoperable station battery or distribution system." Therefore, the existing requirements are retained to compensate for the extended allowed outage time (AOT) of 8 hours.

Proposed TS 3.7.3 incorporates the requirements for operability of the DC electrical power subsystem and TS 3.7.3.A provides the required actions in the event the requirements of TS 3.7.3 are not met. The combination of TS 3.7.1.D, TS 3.7.2.E, and TS 3.7.2.F into TS 3.7.3 is editorial in nature, and, therefore, acceptable to the staff.

The licensee proposed the addition of TS 3.7.3.B, which would provide the required action if the requirements or AOTs of TS 3.7.3.A could not be met. The proposed requirements are consistent with existing action statements except that an allowance to remain in hot shutdown for 24 hours has been removed. The staff concluded that TS 3.7.3.B is more restrictive than the existing requirements, consistent with the intent of NUREG-1430, "Standard Technical Specifications - Babcock and Wilcox Plants," and, therefore, acceptable.

The licensee proposes to add a new TS 3.7.4 (Battery Cell Parameters) to the TSs. The specification requires the battery parameters to be within limits when the DC electrical subsystem is required to be operable. TSs 3.7.4.A, 3.7.4.B, and 3.7.4.C provide the required actions and AOTs in the event the battery cell parameters are not within Table 4.6-1 (Battery Cell Surveillance Requirements). The table includes the requirements for electrolyte level, float voltage, and specific gravity for the designated pilot cell and each connected cell. The values of the requirements are consistent with NUREG-1430, IEEE-450, "Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications" (1995), and are modified to reflect the vendor recommendations. Therefore, the staff considers the values used in Table 4.6-1 acceptable.

Proposed TS 3.7.4.A provides the required actions and AOTs in the event battery cell parameters are not within the Table 4.6-1 Category A or B limits.

Proposed TS 3.7.4.B provides the required actions to be taken if the required actions and AOTs of TS 3.7.4.A.1, 3.7.4.A.2, or 3.7.4.A.3 are not met (immediately declare the battery inoperable).

Proposed TS 3.7.4.C provides the required actions for one or more batteries with average electrolyte temperature of representative cells not within the limits ($\geq$60 °F) or one or more battery cell parameters not within Table 4.6-1 Category C limits (declare the battery inoperable).

The staff found the addition of TS 3.7.4 more restrictive than ANO-1's existing requirements and at least as conservative as described in NUREG-1430. Therefore, the staff finds the addition of TS 3.7.4 acceptable.

ANO-1 proposed to change the title of TS 4.6.2 from "Station Batteries and Switchyard Batteries" to "DC Sources and Battery Cell Paramaters," to reflect the change in scope of the TS. The licensee also proposes to make the following modifications:

(a) TS 4.6.2.1 is revised to verify the battery terminal voltage to be greater than or equal to 124.7 volts on float charge once each 7 days. The voltage requirements are based on nominal design voltage of the battery (2.15 volts per cell average) and recommendation of the battery manufacturer. This verification ensures the effectiveness of the charging system and the ability of the battery to perform its intended function. Accordingly, this change is acceptable.

(b) The present ANO-1 TS does not require a service test of the battery. The licensee is revising TS 4.6.2.2 to perform a service test or a modified performance test every 18 months, which will confirm that the battery has the capability, as found, to perform the design requirements of the DC systems. This is consistent with IEEE-450 (1995) and is acceptable.

(c) TS 4.6.2.3 requires conducting a performance discharge test every 18 months to determine the battery capacity. ANO-1 proposes to revise TS 4.6.2.3 to require a performance test or modified performance test every 60 months; once every 24 months when the battery has reached 85 percent of its service life with a capacity of greater than or equal to 100 percent; and once every 12 months when the battery shows degradation or has reached 85 percent of the service life and the capacity is less than

100 percent of the manufacturer's rating. The requested change is consistent with industry practice and the recommendation of IEEE-450 (1995) and is acceptable.

(d) ANO-1 added TS 4.6.2.5 to require the verification of pilot cell limits (Category A of Table 4.6-1) every 7 days. These limits are consistent with NUREG-1430, manufacturer recommendations, and IEEE-450 (1995), and, therefore, are acceptable.

(e) TS 4.6.2.6 has been added to verify, every 92 days, the average electrolyte temperature of representative cells is greater than or equal to 60 °F. This is based on the recommendation of IEEE-450 and is, therefore, acceptable.

(f) TS 4.6.2.7 has been added to require the verification of the limits for each connected cell (Category B of Table 4.6-1). These are consistent with the recommendations of the manufacturer and IEEE-450, and are, therefore, acceptable.

(g) The licensee added TS 4.6.2.8: "Verify electrolyte temperature of pilot cell is ≥ 60 °F once per 31 days." This is consistent with the recommendation of IEEE-450 and is, therefore, acceptable.

The licensee added or revised the present TS Bases associated with the revised limiting conditions for operation's required actions and surveillance requirements. These proposed additions and revisions clarify the proposed requirements and are, therefore, acceptable.

3.3 Evaluation Conclusion

Based on the discussion included in paragraphs 3.1 and 3.2, the staff finds Entergy's amendment request acceptable.

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 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, and there has been no public comment on such finding (64 FR 27321 dated May 19, 1999). 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.

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