



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

March 12, 2001

Mr. David A. Christian
Senior Vice President - Nuclear
Virginia Electric and Power Company
5000 Dominion Blvd.
Glen Allen, Virginia 23060

SUBJECT: SURRY UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS RE: DEGRADED
VOLTAGE AND LOSS OF VOLTAGE SETTING LIMITS (TAC NOS. MA8520
AND MA8521)

Dear Mr. Christian:

The Commission has issued the enclosed Amendment No. 224 to Facility Operating License No. DPR-32 and Amendment No. 224 to Facility Operating License No. DPR-37 for the Surry Power Station, Unit Nos. 1 and 2, respectively. The amendments change the Technical Specifications (TS) in response to your application dated December 19, 2000.

These amendments revise Table 3.7-4, item 7, and TS 3.6.B. The changes revise the range of allowable values in Table 3.7-4 for the 4160-volt bus loss-of-voltage and degraded voltage relay settings. When a loss of offsite power occurs, these settings determine when the emergency diesel generators start and when the emergency buses transfer from the offsite power source to the emergency diesel generators. Also, an editorial change is made in TS 3.6.B to correct a typographical error made in 1990. At that time, reactor coolant conditions were erroneously stated as "350°F or 450 psig," instead of "350°F and 450 psig," in VEPCO's proposed TS change that was approved by the NRC on August 2, 1990, as Amendments 143 and 140.

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

Sincerely,

Gordon E. Edison, Senior Project Manager, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-280 and 50-281

Enclosures:

1. Amendment No. 224 to DPR-32
2. Amendment No. 224 to DPR-37
3. Safety Evaluation

cc w/encls: See next page

NRR-058

Mr. David A. Christian
Senior Vice President - Nuclear
Virginia Electric and Power Company
5000 Dominion Blvd.
Glen Allen, Virginia 23060

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/RA/

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DATED: March 12, 2001

AMENDMENT NO. 224 TO FACILITY OPERATING LICENSE NO. DPR-32 - SURRY UNIT 1
AMENDMENT NO. 224 TO FACILITY OPERATING LICENSE NO. DPR-37 - SURRY UNIT 2

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

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-280

SURRY POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 224
License No. DPR-32

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Virginia Electric and Power Company (the licensee) dated December 19, 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 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.

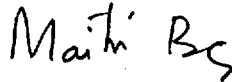
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Facility Operating License No. DPR-32 is hereby amended to read as follows:

(B) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 224 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented by the end of the Fall 2001 refueling outage.

FOR THE NUCLEAR REGULATORY COMMISSION



Maitri Banerjee, Acting Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 12, 2001



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

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-281

SURRY POWER STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 224
License No. DPR-37

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Virginia Electric and Power Company (the licensee) dated December 19, 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 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 3.B of Facility Operating License No. DPR-37 is hereby amended to read as follows:

(B) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 224 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented by the end of the Spring 2002 refueling outage.

FOR THE NUCLEAR REGULATORY COMMISSION

Maitri Banerjee

Maitri Banerjee, Acting Chief, Section 1
Project Directorate II
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. 224 TO FACILITY OPERATING LICENSE NO. DPR-32

LICENSE AMENDMENT NO. 224 TO FACILITY OPERATING LICENSE NO. DPR-37

DOCKET NOS. 50-280 AND 50-281

Remove Page

TS 3.6-1

TS 3.7-26

Insert Page

TS 3.6-1

TS 3.7-26

3.6 TURBINE CYCLE

Applicability

Applies to the operating status of the Main Steam and Auxiliary Feed Systems.

Objectives

To define the conditions required in the Main Steam System and Auxiliary Feed System for protection of the steam generator and to assure the capability to remove residual heat from the core during a loss of station power/or accident situations.

Specification

- A. A unit's Reactor Coolant System temperature or pressure shall not exceed 350°F or 450 psig, respectively, or the reactor shall not be critical unless the five main steam line code safety valves associated with each steam generator in unisolated reactor coolant loops are OPERABLE with lift settings as specified in Table 3.6-1A and 3.6-1B.
- B. To assure residual heat removal capabilities, the following conditions shall be met prior to the commencement of any unit operation that would establish reactor coolant system conditions of 350°F and 450 psig which would preclude operation of the Residual Heat Removal System. The following shall apply:
 1. Two motor driven auxiliary feedwater pumps shall be OPERABLE.
 2. A minimum of 96,000 gallons of water shall be available in the protected condensate storage tank to supply emergency water to the auxiliary feedwater pump suctions.
 3. All main steam line code safety valves, associated with steam generators in unisolated reactor coolant loops, shall be OPERABLE with lift settings as specified in Table 3.6-1A and 3.6-1B.

TABLE 3.7-4
ENGINEERED SAFETY FEATURE SYSTEM INITIATION LIMITS INSTRUMENT SETTING

<u>No.</u>	<u>Functional Unit</u>	<u>Channel Action</u>	<u>Setting Limit</u>
6	AUXILIARY FEEDWATER		
	a. Steam Generator Water Level Low-Low	Aux. Feedwater Initiation S/G Blowdown Isolation	$\geq 14.5\%$ narrow range
	b. RCP Undervoltage	Aux. Feedwater Initiation	$\geq 70\%$ nominal
	c. Safety Injection	Aux. Feedwater Initiation	All S.I. setpoints
	d. Station Blackout	Aux. Feedwater Initiation	$\geq 46.7\%$ nominal
	e. Main Feedwater Pump Trip	Aux. Feedwater Initiation	N.A.
7	LOSS OF POWER		
	a. 4.16 KV Emergency Bus Undervoltage (Loss of Voltage)	Emergency Bus Separation and Diesel start	≥ 2975 volts and ≤ 3265 volts with a 2 (+5, -0.1) second time delay
	b. 4.16 KV Emergency Bus Undervoltage (Degraded Voltage)	Emergency Bus Separation and Diesel start	≥ 3830 volts and ≤ 3881 volts with a 60 (± 3.0) second time delay (Non CLS, Non SI) 7 (± 0.35) second time delay (CLS or SI Conditions)
8	NON-ESSENTIAL SERVICE WATER ISOLATION		
	a. Low Intake Canal Level	Isolation of Service Water flow to non-essential loads	23 feet-6 inches
9	RECIRCULATION MODE TRANSFER		
	a. RWST Level-Low	Initiation of Recirculation Mode Transfer System	$\geq 11.25\%$ $\leq 15.75\%$
10.	TURBINE TRIP AND FEEDWATER ISOLATION		
	a. Steam Generator Water Level High-High	Turbine Trip Feedwater Isolation	$\leq 80\%$ narrow range

Amendment Nos. 224 and 224

TS 3.7-26



UNITED STATES
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WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 224 TO FACILITY OPERATING LICENSE NO. DPR-32
AND AMENDMENT NO. 224 TO FACILITY OPERATING LICENSE NO. DPR-37

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION, UNIT NOS. 1 AND 2

DOCKET NOS. 50-280 AND 50-281

1.0 INTRODUCTION

By letter dated March 17, 2000, Virginia Electric and Power (Dominion) Company (the licensee) requested revisions to the Surry Power Station Unit 1 and Unit 2, Technical Specifications (TS) to change the setting limits for the degraded voltage and loss-of-voltage relay setpoints and to make a minor editorial correction. During a conference call on September 29, 2000, the staff commented on the change and asked the licensee to add upper limits for the degraded voltage and loss-of-voltage relay setpoints in the TS change request to comply with guidance of the Technical Specification Task Force (TSTF)-365 Standard Technical Specification Change Traveler to NUREG-1431, "Add Upper Limits to the Voltage and Time Delay Setpoints of the Loss of Voltage Relays." By letter dated December 19, 2000, the licensee submitted the revised TS change request, which supersedes the entire March 17, 2000, request for the setting limits for the degraded voltage and loss-of-voltage relay setpoints and to make a minor editorial correction.

The staff has reviewed the proposed changes and finds them acceptable as discussed in the following evaluation.

2.0 BACKGROUND

2.1 General

To provide a reliable source of power for the engineered safety features (ESF) systems, nuclear power plants have redundant offsite (preferred) and onsite (standby emergency diesel generators (EDGs)) power sources. The power sources for the ESF systems are classified as Class 1E safety-related power sources. The EDGs provide an alternate source of power to the ESF systems if the preferred power source is lost (i.e., loss-of-voltage condition) or is insufficiently stable (i.e., degraded grid voltage condition). Each Class 1E bus is equipped with undervoltage relays to permit automatic transfer to the alternate preferred power source, and to start EDGs. The undervoltage relay logic includes intentional definite time delay settings to ensure that adequate voltage is available on the Class 1E bus during post-accident ESF load

Enclosure

sequencing, and that the permanently connected Class 1E loads are not damaged as a result of a degraded voltage condition.

The undervoltage relay trip setpoints are based on design limits determined by various design basis accident conditions (described in the Updated Final Safety Analysis Report (UFSAR)). The analytical trip setpoints are conservatively adjusted as "allowable setpoints," taking into account calibration tolerances, instrumentation uncertainties, and drift. The allowable trip setpoints ensure that ESF systems will function as designed and within the time limits assumed in the accident analysis, and that the consequences of accident conditions will be minimized.

2.2 Surry Design

At Surry, two independent 4.16 kV Class 1E emergency buses provide power, normally from offsite power sources, to the ESF systems in each unit. Undervoltage relay protection for the Surry Unit 1 and Unit 2 Class 1E 4.16 kV buses is described in UFSAR Section 8.5. The emergency buses are protected from a degraded voltage or loss-of-voltage condition. The voltage of each bus is monitored on each phase with separate single-phase loss-of-voltage relays and two parallel three-phase degraded voltage relays. Each set of relays provides the input to a coincident two-out-of-three logic scheme.

On a loss-of-voltage condition, the separate loss-of-voltage relays trip (nominally below 75 percent of rated voltage), and after a time delay initiate an automatic transfer of the class 1E emergency buses from the offsite source to the EDGs. The time delay for the loss-of-voltage relays is nominally 2 seconds. Under a degraded voltage condition (nominally below 90 percent of rated voltage), the degraded voltage relays (two-out-of-three logic scheme) will initiate an alarm in the control room at 10 seconds, start the EDGs at 50 seconds, and initiate the transfer of the Class 1E buses from the offsite source to the EDGs at 60 seconds. The setpoints for the loss-of-voltage and degraded voltage relays were chosen to protect safety-related equipment from potentially damaging undervoltage conditions, and to coordinate the interactions between the offsite and onsite emergency power systems. The setpoints selected preclude inadvertent load shedding during the transient undervoltage conditions that can occur when large loads are started or during worst-case switchyard voltage conditions.

Item 7 in Surry TS Table 3.7-4 lists the requirements for engineered safeguards instrumentation, interlocks, and setpoints associated with detecting and responding to an undervoltage condition on the 4.16 kV safety buses. In a systematic review of instrument channel uncertainties and the standard calculational methodology for computing the total channel statistical allowance (CSA) associated with loss-of-voltage and degraded voltage relay setpoints, the licensee found that the existing setting limits for these relays need revision. The revision is necessary to enhance the long-term operation of safety-related equipment powered from the emergency buses and to better reflect the capabilities of the relays. The licensee also determined that the setting limit for degraded voltage relays should be raised to provide an increased margin to the safety analysis limit when accounting for channel uncertainties and analysis assumptions. Therefore, the licensee has requested revisions to item 7 in TS Table 3.7-4 to ensure that voltage setpoints for the loss-of-voltage and degraded voltage are adequate for the required design basis functions.

3.0 EVALUATION

3.1 4.16 kV Emergency Bus Undervoltage (Loss Of Voltage)

The loss-of-voltage relays initiate the automatic transfer of the 4.16 kV Class IE emergency buses from the offsite power source to the EDGs upon receipt of a loss-of-voltage signal after a specific time delay. The existing TS setting for the loss-of-voltage relay is 75 percent (± 1) percent of 4.16 kV (3120 ± 41.6 volts). The licensee has found that although the loss-of-voltage relay can be calibrated to the ± 1 percent tolerance, the capability of the relay is such that it cannot be maintained over the surveillance period. Therefore, the licensee proposes to keep the existing relay setpoint and expand the loss-of-voltage relay tolerances. The licensee states that the proposed setting limit (range of relay setpoint allowable values) has been determined by using the CSA calculation, which has previously not been used to calculate the relay tolerances. The licensee also proposes to change the format for the setting limit to be consistent with the approved Allowable Value format discussed in TSTF-365, industry/TSTF Standard Technical Specification Change Traveler to NUREG-1431. The proposed setting limits are ≥ 2975 volts and ≤ 3265 volts. The proposed setting limits correspond to ≥ 71.5 percent and ≤ 78.5 percent. The proposed change in the relay tolerance is expanded from the current ± 1 percent to ± 3.5 percent as determined by the CSA calculation. The staff has determined that the expanded range of allowable values will still provide the necessary safety function for loss-of-voltage event. The staff agrees 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 preserves the existing loss-of-voltage protection and allows flexibility in maintaining the relay during the surveillance interval.

3.2 4.16 kV Emergency Bus Undervoltage (Degraded Voltage)

The degraded voltage relays initiate the automatic transfer of the 4.16 kV safety buses from the offsite power source to the EDGs upon receipt of a degraded voltage signal after a specific time delay. The degraded voltage relays are currently set at 90 percent (± 1 percent) of 4.16 kV (3744 ± 41.6 volts). The original analysis conducted by the licensee for the degraded voltage setpoint qualitatively concluded that a setpoint of 90 percent (± 1 percent) of 4.16 kV would ensure that at least 90 percent of rated terminal voltage would be available for the 4000-volt and 460-volt motors. The licensee did not include the CSA in the original calculation for the degraded voltage relay setpoint. The licensee performed a more recent load-flow analysis assuming plant voltages at the degraded voltage relay safety limit, which showed that the actual terminal voltage for 460-volt motors could approach values as low as 85 percent of rated voltage. As a result of this new analysis and using CSA calculations to evaluate the adequacy of the degraded voltage setpoint, the licensee has concluded that the existing TS setting limit of 90 percent should be increased to 92.7 percent. Therefore, the licensee has proposed a new degraded voltage setpoint value of 92.7 percent for the 4.16 kV buses to improve the 460-volt motor terminal voltage in the event of a sustained degraded voltage condition. The proposed degraded voltage relay setting of 92.7 percent of 4.16 kV will permit continued operation of 460-volt motors with motor terminal voltage as low as 88 percent of motor-rated voltage. The licensee contends that although the voltage at the 460-volt motor terminal with the proposed setting limits is less than the ideal voltage of 90 percent of the motor-rated voltage, the motors can adequately perform their intended safety functions. This is because the 460-volt motors

purchased at the Surry Power Station have a 1.15 service factor, and the loads imposed on the motors are below their nominal rated horsepower. As a result, the 460-volt motors have adequate torque at 88 percent of rated voltage to drive their intended loads. The licensee has performed calculations for the pump flows for the worst-case 460-volt motor at the proposed degraded voltage setpoint limits and has found that the motor terminal voltage of 88 percent is adequate for required design basis functions. The staff discussed this matter with the licensee in an unrelated conference call on November 20, 2000, on an unresolved item associated with the degraded voltage setting limits from a previous safety system design inspection. The licensee provided sufficient justification (above) during this conference call to satisfy the staff's insistence that the safety-related pump motors be capable of adequately performing their required functions at the proposed degraded voltage setting limits.

The licensee also proposes to change the format for the setting limit of the degraded voltage relays to be consistent with the approved Allowable Value format discussed in TSTF-365, Industry/TSTF Standard Technical Specification Change Traveler to NUREG-1431. The proposed setting limits for the degraded voltage relay are ≥ 3830 volts and ≤ 3881 volts. These limits correspond to ≥ 92.1 percent and ≤ 93.3 percent with the relay setpoint at 92.7 percent. The proposed change in the relay tolerance is reduced from the current ± 1 percent to approximately ± 0.6 percent to take into account instrument and process uncertainties and analysis assumptions. The staff has determined that the proposed range of allowable values will protect Class 1E equipment and allow it to perform the required safety function for a degraded voltage event.

The staff agrees that the proposed range of relay setting allowable values for the degraded voltage relay conforms to the industry guidance for setpoint uncertainty and is consistent with the applicable safety analyses for degraded voltage protection. The staff has evaluated the licensee's basis for increasing the degraded voltage relay setting limit and the assertion that the 460-volt motors will perform adequately at 88 percent of rated voltage. The staff concludes that the motors will perform their intended design basis functions with the proposed setting limits. The staff also agrees with the licensee that it is not advisable to raise the degraded voltage relay setpoint above 92.7 percent to achieve ideal voltage of 90 percent at the terminals of all 460-volt motors for all conditions because of the increased potential for spurious actuations due to offsite grid voltage fluctuations.

3.3 Editorial Correction

The required reactor coolant system conditions specified in TS 3.6.B are erroneously stated as "350°F or 450 psig," rather than "350°F and 450 psig," which are the correct requirements. The conjunction was inadvertently changed in an earlier TS revision associated with Auxiliary Feedwater cross-connect requirements. The proposed editorial change corrects the typographical error. The proposed change to TS 3.6.B is acceptable.

Based on the above, the staff concludes that the proposed range of allowable values for the 4160 V loss-of-voltage and degraded voltage relays will continue to provide the necessary safety function for 4160 V safety buses at the Surry Power Station Units 1 and 2. The proposed changes to the range of allowable values for the 4160 V loss-of-voltage and degraded relays adopt CSA calculation 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 approved Allowable

Value format discussed in TSTF-365, Industry/TSTF Standard Technical Specification Change Traveler to NUREG-1431. Therefore, this proposed change is acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Virginia State official was notified of the proposed issuance of the amendments. The State official had no comment.

5.0 ENVIRONMENTAL CONSIDERATION

These amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve 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 these amendments involve no significant hazards consideration and there has been no public comment on such finding (66 FR 2025). Accordingly, these amendments meet 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 these amendments.

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 these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: P. Gill

Date: March 12, 2001