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. 206
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 July 20, 1995, 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. 206, 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 within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Bart C. Buckley for

David B. Matthews, Director
Project Directorate II-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: December 28, 1995

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. 206 TO FACILITY OPERATING LICENSE NO. DPR-32

AMENDMENT NO. 206 TO FACILITY OPERATING LICENSE NO. DPR-37

DOCKET NOS. 50-280 AND 50-281

Revise Appendix A as follows:

Remove Pages	Insert Pages
TS 2.3-3	TS 2.3-3
TS 2.3-4	TS 2.3-4
TS 2.3-8	TS 2.3-8
TS 3.7-6	TS 3.7-6
TS 3.7-25	TS 3.7-25
TS 3.7-26	TS 3.7-26

where

ΔT_o = Indicated ΔT at rated thermal power, °F

T = Average coolant temperature, °F

T' = Average coolant temperature measured at nominal conditions and rated power, °F

K_4 = A constant = 1.089

K_5 = 0 for decreasing average temperature

A constant, for increasing average temperature 0.02/°F

K_6 = 0 for $T \leq T'$

= 0.001086 for $T > T'$

$f(\Delta I)$ as defined in (d) above,

τ_3 = 10 seconds

(f) Low reactor coolant loop flow = ≥ 90% of normal indicated loop flow as measured at elbow taps in each loop

(g) Low reactor coolant pump motor frequency - ≥ 57.5 Hz

(h) Reactor coolant pump under voltage - ≥ 70% of normal voltage

3. Other reactor trip settings

(a) High pressurizer water level - ≤ 92% of span

(b) Low-low steam generator water level - ≥ 14.5% of narrow range instrument span

(c) Low steam generator water level - ≥ 15% of narrow range instrument span in coincidence with steam/feedwater mismatch flow - ≤ 1.0×10^6 lbs/hr

(d) Turbine trip

(e) Safety injection - Trip settings for Safety Injection are detailed in TS Section 3.7.

B. Protective instrumentation settings for reactor trip interlocks shall be as follows:

1. The reactor trip on low pressurizer pressure, high pressurizer level, turbine trip, and low reactor coolant flow for two or more loops shall be unblocked when power ≥ 10% of rated power.

2. The single loop loss of flow reactor trip shall be unblocked when the power range nuclear flux ≥ 50% of rated power.

3. The power range high flux, low setpoint trip and the intermediate range high flux, high setpoint trip shall be unblocked when power ≤ 10% of rated power.

4. The source range high flux, high setpoint trip shall be unblocked when the intermediate range nuclear flux is ≤ 5×10^{-11} amperes.

Basis

The power range reactor trip low setpoint provides protection in the power range for a power excursion beginning from low power. This trip value was used in the safety analysis.(1) The Source Range High Flux Trip provides reactor core protection during shutdown (COLD SHUTDOWN, INTERMEDIATE SHUTDOWN, and HOT SHUTDOWN) when the reactor trip breakers are closed and reactor power is below the permissive P-6. The Source and Intermediate Range trips in addition to the Power Range trips provide core protection during

will prevent the minimum value of the DNBR from going below the applicable design as a result of the decrease in Reactor Coolant System flow associated with the loss of a single reactor coolant pump.

Although not necessary for core protection, other reactor trips provide additional protection. The steam/feedwater flow mismatch which is coincident with a low steam generator water level is designed for and provides protection from a sudden loss of the reactor's heat sink. Upon the actuation of the safety injection circuitry, the reactor is tripped to decrease the severity of the accident condition. Upon turbine trip, at greater than 10% power, the reactor is tripped to reduce the severity of the ensuing transient.

References

(1) FSAR Section 14.2.1
(2) FSAR Section 14.2
(3) FSAR Section 14.5
(4) FSAR Section 7.2
(5) FSAR Section 3.2.2
(6) FSAR Section 14.2.9
(7) FSAR Section 7.2

reduces the consequences of a steam line break inside the containment by stopping the entry of feedwater.

Auxiliary Feedwater System Actuation

The automatic initiation of auxiliary feedwater flow to the steam generators by instruments identified in Table 3.7-2 ensures that the Reactor Coolant System decay heat can be removed following loss of main feedwater flow. This is consistent with the requirements of the "TMI-2 Lessons Learned Task Force Status Report," NUREG-0578, item 2.1.7.b.

Setting Limits

1. The high containment pressure limit is set at about 10% of design containment pressure. Initiation of safety injection protects against loss of coolant(2) or steam line break(3) accidents as discussed in the safety analysis.
2. The high-high containment pressure limit is set at about 23% of design containment pressure. Initiation of containment spray and steam line isolation protects against large loss-of-coolant(2) or steam line break accidents(3) as discussed in the safety analysis.
3. The pressurizer low pressure setpoint for safety injection actuation is set substantially below system operating pressure limits. However, it is sufficiently high to protect against a loss-of-coolant accident as shown in the safety analysis.(2) The setting limit (in units of psig) is based on nominal atmospheric pressure.
4. The steam line high differential pressure limit is set well below the differential pressure expected in the event of a large steam line break accident as shown in the safety analysis.(3)
5. The high steam line flow differential pressure setpoint is constant at 40% full flow between no load and 20% load and increasing linearly to 110% of full flow at full load in order to protect against large steam line break accidents. The coincident low T_{avg} setting limit for SIS and steam line isolation initiation is set below its HOT SHUTDOWN value. The coincident

TABLE 3.7-4

ENGINEERED SAFETY FEATURE SYSTEM INITIATION LIMITS INSTRUMENT SETTING

No.	Functional Unit	Channel Action	Setting Limit
1	High Containment Pressure (High Containment Pressure Signal)	a) Safety Injection b) Containment Vacuum Pump Trip c) High Press. Containment Isolation d) Safety Injection Containment Isolation e) F.W. Line Isolation	≤ 19 psia
2	High-High Containment Pressure (High-High Containment Pressure Signals)	a) Containment Spray b) Recirculation Spray c) Steam Line Isolation d) High-High Press. Containment Isolation	≤ 25 psia
3	Pressurizer Low-Low Pressure	a) Safety Injection b) Safety Injection Containment Isolation c) F.W. Line Isolation	≥ 1,760 psig
4	High Differential Pressure Between Steam Line and the Steam Line Header	a) Safety Injection b) Safety Injection Containment Isolation c) F.W. Line Isolation	≤ 150 psig
5	High Steam Flow in 2/3 Steam Lines	a) Safety Injection	≤ 40% (at zero load) of full steam flow ≤ 40% (at 20% load) of full steam flow ≤ 110% (at full load) of full steam flow
		b) Steam Line Isolation c) Safety Injection Containment Isolation d) F.W. Line Isolation	
	Coincident with Low T_{avg} or		≥ 541°F T_{avg}
	Low Steam Line Pressure		≥ 500 psig steam line pressure

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TABLE 3.7-4

ENGINEERED SAFETY FEATURE SYSTEM INITIATION LIMITS INSTRUMENT SETTING

No.	Functional Unit	Channel Action	Setting Limit
6	AUXILIARY FEEDWATER		
	a. Steam Generator Water Level Low-Low	Aux. Feedwater Initiation S/G Blowdown Isolation	≥ 14.5% narrow range
	b. RCP Undervoltage	Aux. Feedwater Initiation	≥ 70% nominal
	c. Safety Injection	Aux. Feedwater Initiation	All S.I. setpoints
	d. Station Blackout	Aux. Feedwater Initiation	≥ 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	75 (± 1.0)% 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	90 (± 1)% volts with a 60 (± 3.0) second time delay (Non CLS, Non SI) 7 (± .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	≥ 11.25% ≤ 15.75%
10	TURBINE TRIP AND FEEDWATER ISOLATION		
	a. Steam Generator Water Level High-High	Turbine Trip Feedwater Isolation	≤ 80% narrow range

Amendment Nos. 206 and 206

UNITED STATES
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 206 TO FACILITY OPERATING LICENSE NO. DPR-32

AND AMENDMENT NO. 206 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 July 20, 1995, the Virginia Electric and Power Company proposed an amendment to the operating license of the Surry Power Station Units 1 and 2 to revise the plant Technical Specifications (TS). The proposed changes are to establish a new setpoint limit for steam generator high-high level and to provide more restrictive setting limits for certain Reactor Protection System/Engineered Safety Features Actuation System (RPS/ESFAS) setpoints. Administrative changes are also proposed.

2.0 BACKGROUND

Virginia Electric Power and Company performed a systematic review of the instrument channel uncertainties for the RPS/ESFAS instrumentation actuation setpoints. The licensee referenced revision 1 of plant procedure STD-EEN-0304, "Calculating Instrumentation Uncertainties by the Square Root Sum of the Squares Method," for a standard calculation methodology for computing the total channel statistical allowance (CSA) for actuation or trip setpoints. The licensee stated that this procedure is based on Westinghouse methodology and ISA 67.04, "Setpoints for Nuclear Safety-Related Instrumentation used in Nuclear Power Plants."

In this review, the licensee addressed sources of error that were not originally recognized or well understood in initial plant design or licensing. Consequently, the licensee reevaluated several analyses and is proposing changes to three RPS/ESFAS setpoints to ensure that they are conservative with respect to accident analyses' assumptions and the more recently considered sources of setpoint error. In addition, the review revealed that the TS did not specify a setpoint limit for high-high steam generator level. Therefore, the licensee is proposing a setpoint limit for this instrumentation for completeness of the TS.

The licensee is also proposing minor editorial changes to the TS. These include changes in measurement units to provide consistency and the removal of references to two-loop operation.

3.0 EVALUATION

A review of the licensee's calculation methodology for computing the total CSA for actuation or trip setpoints revealed some minor deviations from standard practice. First, the breakdown of the CSA error terms indicated that the error associated with Rack Measuring and Test Equipment (RMTE) was included in the calculation of the TS setpoint value, but not accounted for in the rack allowances (Rack Comparator Setting Accuracy (RCSA), Rack Calibration Accuracy (RCA), and Rack Drift (RD)). However, by including the RMTE term where the licensee does, the resulting allowable value appears biased in the conservative direction.

The other deviations concern differences in the terminology used in the methodology, as well as, how the calculated values from the methodology are used in the Surry TS. For instance, for a decreasing trip function, the licensee obtains what they refer to as the Minimum Trip Setpoint by adding the total calculated CSA to the Safety Analysis Limit (SAL). The Minimum Specifiable TS Limit, which corresponds to an Allowable Value in standard terminology, is obtained by subtracting the rack components error terms from the Minimum Trip Setpoint. A margin is then added to obtain a TS Limit, which is the value specified in the TS. Finally, additional margin is added to the Minimum Trip Setpoint to obtain an actual trip setpoint for the instrumentation, with an associated error band (calibration limits and surveillance limits). In standard practice, the calibration limits and surveillance limits include the calibration accuracy uncertainty terms and rack drift components.

The TS Limit is the value used as the Setting Limit in TS Table 3.7-4, "Engineered Safety Feature System Initiation Limits Instrument Setting." Although not explicitly defined in the TS, the licensee stated that reportability is based on the Setting Limit in the TS. Contrary to standard practice, the Setting Limit does not represent a formal Allowable Value or a Trip Setpoint. However, the setpoint is controlled through maintenance of the calibration and surveillance limits and the TS setting limits appear to be conservative to the calculated minimum specified TS Limit, as stated by the licensee.

The specific changes proposed by the licensee are as follows:

Steam Generator Water Level High-High

The licensee proposed to add a new narrow range setpoint limit of $\leq$80% of the narrow range span for steam generator water level high-high. This protective function is provided to limit the cooldown associated with a feedwater malfunction event and to prevent steam generator overfill.

Steam generator water-level high-high is listed in TS Table 3.7-3, "Instrument Operating Conditions for Isolation Functions," as an instrument for the Turbine Trip and Feedwater Isolation function. However, this instrument is not currently listed with an associated setting limit in TS Table 3.7-4,

"Engineered Safety Feature System Initiation Limits Instrument Setting." To incorporate the new setpoint limit into the TS, the licensee proposed to add an Item No. 10, "Turbine Trip and Feedwater Isolation," to TS Table 3.7-4 with a Functional Unit 10a, "Steam Generator Water Level High-High." The associated Channel Action of "Turbine Trip, Feedwater Isolation" and Setting Limit of "$\leq$80% narrow range" will also be added to complete item 10a.

The licensee stated that this setpoint is being added now for TS completeness. The proposed setpoint limit has been conservatively based on maintaining water level within the narrow range level span and includes allowances for normal instrument uncertainties and process measurement errors. Prior to this TS change request, the setpoint of $\leq$80% of narrow range was already in use. Based on the above, the staff finds that the setpoint addition of $\leq$80% is acceptable.

Pressurizer Low-Low Pressure

The licensee proposed to change the setpoint limit for pressurizer low-low pressure from $\geq$1700 psig to $\geq$1760 psig of the narrow range span. This setpoint limit ensures ESF actuation for loss of primary or secondary cooling events in accordance with accident analysis assumptions.

The original accident analysis assumed that a safety injection signal is generated when the Reactor Coolant System pressure reaches 1700.3 psig, which is the SAL. Upon review of the calculation, the licensee discovered instrument uncertainties that were not accounted for in the original analysis, such as those introduced by a harsh environment due to a small steam line break in containment. The new calculation revealed a total CSA of 61.1 psig, of which, 45.92 psig was attributed to harsh environment. The total CSA minus rack component uncertainties was added to the SAL to obtain a Minimum Specifiable TS Limit of 1752.5 psig, which is the lowest possible value that could be represented in the TS. A margin of 7.5 psig was added to this limit to suggest an updated TS Limit of $\geq$1760 psig. This change will be reflected in the Setting Limit column for Item Number 3, "Pressurizer Low-Low Pressure," in TS Table 3.7-4.

The proposed setpoint limit of $\geq$1760 psig is based on a more accurate consideration of uncertainties than the original calculation. Therefore, the change is acceptable.

The licensee also proposed to add a clarifying statement to the Bases in TS Section 3.7 for the pressurizer low-low pressure setting limit that indicates that the limit is based on nominal atmospheric pressure. This change is editorial in nature and, therefore, acceptable.

Steam Generator Water Level Low-Low

The licensee proposed to change the narrow range setpoint limit for steam generator water level low-low from ≥5% to ≥14.5% of the narrow range span. This protective function is provided to limit the effects of the loss of normal feedwater or the loss of offsite power to the station auxiliaries.

The original accident analyses assumed a steam generator low-low level trip setpoint of 0% (SAL). The licensee discovered that the original Surry licensing basis did not include all of the necessary instrument uncertainties, such as those introduced by a feedline break event in containment. This event creates the potential for an abnormal containment environment, which would necessitate the inclusion of harsh environmental effects in the accident analyses. The new calculation revealed a total CSA of 15.13% of narrow range span, of which, 4.17% was attributable to harsh environment. The total CSA minus rack component uncertainties was added to the SAL to obtain a Minimum Specifiable TS Limit of 14.01% of narrow range span. A margin of 0.49% was added to this to suggest an updated TS Limit of ≥14.5% of narrow range. This change will be reflected in the Setting Limit column for Item Number 6a, "Steam Generator Water Level Low-Low," in TS Table 3.7-4. The setpoint change is also reflected in a statement in TS Section 2.3.A.3(b).

The proposed setpoint limit of ≥14.5% is based on a more accurate consideration of uncertainties than the original calculation. Therefore, the change is acceptable.

High Containment Pressure

The licensee proposed to change the setpoint limit for high containment pressure from ≤5 psig to ≤19 psia. This setpoint limit ensures primary ESF actuation for high energy line breaks inside containment in accordance with accident analyses assumptions.

The accident analysis assumes an ESF signal is generated when containment pressure reaches 19.7 psia, which is equivalent to 5 psig. To ensure this assumption remains valid, the licensee proposed a more conservative setpoint limit of ≤19 psia to account for normal environmental errors experienced by instrumentation outside containment. The units of the proposed setpoint limit are expressed in "psia" rather that "psig" for consistency with control room instrumentation faceplate indication. This change will be reflected in the Setting Limit column for Item Number 1, "High Containment Pressure," in TS Table 3.7-4.

The proposed new setpoint limit of ≤19 psia is more conservative than the originally calculated setpoint and provides consistency with control room indication. Therefore, the change is acceptable.

High-High Containment Pressure

The licensee proposed to change the setpoint limit for high-high containment

pressure from ≤10.3 psig to ≤25 psia. This setpoint limit ensures ESF actuation for high energy line breaks inside containment in accordance with accident analyses assumptions.

The existing setpoint limit is not being changed, however the units of the proposed setpoint limit will be expressed in "psia" rather than "psig" for consistency with control room instrumentation faceplate indication. This change will be reflected in the Setting Limit column for Item Number 2, "High-High Containment Pressure," in TS Table 3.7-4.

The proposed TS change only affects the units representation and not the actual setpoint limit. The change is editorial in nature and therefore, acceptable.

References to Two-loop Operation

The licensee proposes to remove all references to two-loop operation from the TS, since the Surry power plant is not licensed for operation in this manner. The proposed changes affect the Basis section of TS Section 2.3, "Limiting Safety System Setting, Protective Instrumentation" and TS Section 2.3.B.2, "Limited Safety Settings, Protective Instrumentation." Both sections are revised to delete references to two-loop operation in discussions regarding operation of the P-8 Permissive interlock.

Removing the references to two-loop operation does not affect the current TS setpoint for the P-8 Permissive interlock. The proposed changes are editorial in nature and are, therefore, acceptable.

4.0 SUMMARY

The licensee proposed changes to establish a new setpoint limit for steam generator water level high-high and to provide more restrictive setting limits for pressurizer low-low pressure, steam generator water level low-low, and high containment pressure. These changes provide added assurance that the effects of instrument channel uncertainties during accident conditions are adequately addressed, and will also ensure that the relationship between actual plant settings for the RPS/ESFAS and the accident analyses' assumptions is properly maintained. Based on our review as noted above, the proposed setpoint changes are based on a more accurate consideration of uncertainties than the original calculation and are, therefore, acceptable.

The remaining proposed changes included the revision of measurement units and the removal of references to two-loop operation. As stated in the above review, these changes are editorial in nature and are, therefore, acceptable.

5.0 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.

6.0 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 (60 FR 45190). 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.

7.0 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: S. Wittenberg

Date: December 28, 1995