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.

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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	≥ 18.93% ≤ 19.43%
10	TURBINE TRIP AND FEEDWATER ISOLATION		
	a. Steam Generator Water Level High-High	Turbine Trip Feedwater Isolation	≤ 80% narrow range

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ATTACHMENT 3

SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

10 CFR 50.92 EVALUATION - BASIS FOR NO SIGNIFICANT HAZARDS DETERMINATION

Virginia Electric and Power Company is proposing revisions to Sections 2.3, "Limiting Safety System Settings, Protective Instrumentation," and 3.7, "Instrumentation Systems." We have reviewed the proposed change against the criteria of 10 CFR 50.92 and have concluded that the change does not pose a significant safety hazards consideration as defined therein. Consistent with the examples of amendments not likely to involve a significant hazards consideration noted in the Federal Register (Vol. 50, No. 44) dated March 6, 1986, the proposed changes to 1) revise the units of the high-high containment pressure setpoint limit and 2) delete certain references to two-loop operation, since the plant is not licensed to operate in that manner, are purely administrative in nature and therefore are not a significant hazards consideration. Likewise, the remaining proposed changes constitute additional restrictions not presently included in Technical Specifications and therefore are not a significant hazards consideration. Specifically, operation of Surry Power Station with the proposed change will not:

1. Involve a significant increase in either the probability of occurrence or consequences of any accident or equipment malfunction scenario which is important to safety and which has been previously evaluated in the Updated Safety Analysis Report (UFSAR). The effect of the proposed change is to ensure that actual plant setpoints remain conservative consistent with respect to accident analysis assumptions. The proposed change requires safety system actuation limits that are more conservative than those currently in Technical Specifications. The change does not invalidate currently implemented station setpoints or currently applicable accident analysis assumptions regarding these setpoints. Consequently, the results and conclusions of the current UFSAR accident analyses are not affected by these changes. The proposed Technical Specifications change revises setpoints used to mitigate accidents and therefore has no bearing on the probability of an accident. Further, the change ensures that the setpoints used to mitigate an accident bound the setpoints used in the accident analyses. Therefore, the probability of an accident or consequences of an accident is not adversely affected as a result of this change.

2. Create the possibility of a new or different type of accident than those previously evaluated in the UFSAR. Implementing the proposed Technical Specifications setpoint limits cannot create the possibility of an accident of a different type than was previously evaluated in the UFSAR. Since actual plant setpoints are not being affected, new accident precursors will not be introduced. Furthermore, spurious challenges to safety systems are also not expected to increase in frequency as a result of these changes since actual setpoints installed in the plant are not being changed. Consequently, no new accident precursors are created as a result of the new Technical Specifications setpoint limits.

3. Involve a significant reduction in a margin of safety. Since the results of the existing UFSAR accident analyses remain bounding, safety margins are not impacted. The proposed Technical Specifications setpoint limits ensure plant setpoints remain conservative and consistent with design base accident analysis assumptions including appropriate instrument channel uncertainties due to harsh environmental conditions. Therefore, the margin of safety as defined in the Technical Specifications bases is unaffected.