

# LIMITING SAFETY SYSTEM SETTINGS

## BASES

### REACTOR PROTECTION SYSTEM INSTRUMENTATION SETPOINTS (Continued)

#### 8. Drywell Pressure-High

High pressure in the drywell could indicate a break in the primary pressure boundary systems. The reactor is tripped in order to minimize the possibility of fuel damage and reduce the amount of energy being added to the coolant and to the primary containment. The trip setting was selected as low as possible without causing spurious trips.

#### 9. Scram Discharge Volume Water Level-High

The scram discharge volume receives the water displaced by the motion of the control rod drive pistons during a reactor scram. Should this volume fill up to a point where there is insufficient volume to accept the displaced water at pressures below 65 psig, control rod insertion would be hindered. The reactor is therefore tripped when the water level has reached a point high enough to indicate that it is indeed filling up, but the volume is still great enough to accommodate the water from the movement of the rods at pressures below 65 psig when they are tripped. The trip setpoint for each scram discharge volume is equivalent to a contained volume of approximately 24 gallons of water.

#### 10. Turbine Stop Valve-Closure

The turbine stop valve closure trip anticipates the pressure, neutron flux, and heat flux increases that would result from closure of the stop valves. With a trip setting of 5% of valve closure from full open, the resultant increase in heat flux is such that adequate thermal margins are maintained during the worst case transient. As indicated in Table 3.3.1-1, this function is automatically bypassed below the turbine first stage pressure value equivalent to thermal power less than 40% of RATED THERMAL POWER.

The automatic bypass setpoint is feedwater temperature dependent due to the subcooling changes that affect the turbine first stage pressure - reactor power relationship. For RATED THERMAL POWER operation with feedwater temperature greater than or equal to 420°F, an allowable ~~setpoint of <26.5% of control valve wide open turbine first stage pressure~~ value of 218 psig is provided for the bypass function. This setpoint is also applicable to operation at less than RATED THERMAL POWER with the correspondingly lower feedwater temperature. The allowable ~~setpoint is~~ value ~~reduced to <22.5%, <19.5%, and <16.5% of control valve wide open turbine first stage pressure~~ for RATED THERMAL POWER operation with a feedwater temperature between 370°F and 420°F; 370°F and 320°F, and 320°F and 250°F, respectively. Similarly, the reduced setpoint is applicable to operation at less than RATED THERMAL POWER with the correspondingly lower feedwater temperature.

as defined  
in Table  
3.3.1-1

#### 11. Turbine Control Valve Fast Closure, Trip Oil Pressure-Low

The turbine control valve fast closure trip anticipates the pressure, neutron flux, and heat flux increase that could result from fast closure of the

## LIMITING SAFETY SYSTEM SETTING

### BASES

#### REACTOR PROTECTION SYSTEM INSTRUMENTATION SETPOINTS (Continued)

turbine control valves due to load rejection with or without coincident failure of the turbine bypass valves. The Reactor Protection System initiates a trip when fast closure of the control valves is initiated by the fast acting solenoid valves and in less than 20 milliseconds after the start of control valve fast closure. This is achieved by the action of the fast acting solenoid valves in rapidly reducing hydraulic trip oil pressure at the main turbine control valve actuator disc dump valves. This loss of pressure is sensed by pressure switches whose contacts form the one-out-of-two twice logic input to the Reactor Protection System. This trip setting, a slower closure time, and a different valve characteristic from that of the turbine stop valve, combine to produce transients which are very similar to that for the stop valve. Relevant transient analyses are discussed in Section 15.2.2 of the Final Safety Analysis Report. As with the Turbine Stop Valve-Closure, this function is also bypassed below 40% of RATED THERMAL POWER. The basis for the setpoint is identical to that described for the Turbine Stop Valve-Closure.

bypass

and reduction of the setpoint due to reduced feedwater temperatures

#### 12. Reactor Mode Switch Shutdown Position

The reactor mode switch Shutdown position provides additional manual reactor trip capability.

#### 13. Manual Scram

The Manual Scram provides manual reactor trip capability. The manual scram function is composed of four push button switches in a one-out-of-two taken twice logic.

TABLE 3.3.1-1 (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION

TABLE NOTATIONS

- (a) A channel may be placed in an inoperable status for up to 2 hours for required surveillance without placing the trip system in the tripped condition provided at least one OPERABLE channel in the same trip system is monitoring that parameter.
- (b) Unless adequate shutdown margin has been demonstrated per Specification 3.1.1 and the "one-rod-out" Refuel position interlock has been demonstrated OPERABLE per Specification 3.9.1, the shorting links shall be removed from the RPS circuitry prior to and during the time any control rod is withdrawn.\*
- (c) An APRM channel is inoperable if there are less than 2 LPRM inputs per level or less than 14 LPRM inputs to an APRM channel.
- (d) This function is not required to be OPERABLE when the reactor pressure vessel head is removed per Specification 3.10.1.
- (e) This function shall be automatically bypassed when the reactor mode switch is not in the Run position.
- (f) This function is not required to be OPERABLE when DRYWELL INTEGRITY is not required.
- (g) With any control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.
- (h) This function is automatically bypassed when turbine first stage pressure is less than the value of turbine first stage pressure corresponding to 40%\*\* of RATED THERMAL POWER.

\*Not required for control rods removed per Specification 3.9.10.1 or 3.9.10.2.

\*\*~~The initial setpoint shall be  $\leq 25.4\%$  of the calibrated span on increasing turbine first stage pressure for  $\Delta T$  (see 3/4.2.2 for definition) =  $0^\circ F$ ;  $\leq 21\%$  for  $0^\circ F < \Delta T < 50^\circ F$ ;  $\leq 18\%$  for  $50^\circ F < \Delta T < 100^\circ F$  and  $\leq 15\%$  for  $100^\circ F < \Delta T < 170^\circ F$ . The allowable value shall be  $\leq 26.9\%$ ,  $\leq 22.5\%$ ,  $\leq 19.5\%$ , and  $\leq 16.5\%$  respectively.~~

Replace with Insert 1.

\*\* The Turbine First Stage Pressure Bypass Setpoints and corresponding Allowable Values are adjusted based on Feedwater temperatures (see 3/4.2.2 for definition of  $\Delta T$ ). The Setpoints and Allowable Values for various  $\Delta T$ s are as follows:

<u>T(°F)</u>	<u>Setpoint (psig)</u>	<u>Allowable Value (psig)</u>
0 = T	< 212	< 218
0 < $\Delta T$ < 50	$\bar{\sim}$ 190	$\bar{\sim}$ 196
50 < $\Delta T$ < 100	$\bar{\sim}$ 168	$\bar{\sim}$ 174
100 < $\Delta T$ < 170	$\bar{\sim}$ 146	$\bar{\sim}$ 152

TABLE 3.3.4.2-1

END-OF-CYCLE RECIRCULATION PUMP TRIP SYSTEM INSTRUMENTATION

<u>TRIP FUNCTION</u>	<u>MINIMUM OPERABLE CHANNELS PER TRIP SYSTEM<sup>(a)</sup></u>
1. Turbine Stop Valve - Closure	2 <sup>(b)</sup>
2. Turbine Control Valve - Fast Closure	2 <sup>(b)</sup>

(a) A trip system may be placed in an inoperable status for up to 2 hours for required surveillance provided that the other trip system is OPERABLE.

(b) This function is automatically bypassed when turbine first stage pressure is less than the value of turbine first stage pressure corresponding to 40%\* of RATED THERMAL POWER.

~~\*The initial setpoint shall be  $\leq 25.4\%$  of the calibrated span on increasing turbine first stage pressure for  $\Delta T$  (see 3/4.2.2 for definition)  $\leq 0^\circ F$ ,  $\leq 21\%$  for  $0^\circ F < \Delta T < 50^\circ F$ ,  $\leq 18\%$  for  $50^\circ F < \Delta T < 100^\circ F$  and  $15\%$  for  $100^\circ F < \Delta T < 170^\circ F$ . The allowable value shall be  $\leq 26.9\%$ ,  $\leq 22.5\%$ ,  $\leq 19.5\%$ , and  $\leq 16.5\%$  respectively.~~

\* The Turbine First Stage Pressure Bypass Setpoints and corresponding Allowable Values are adjusted based on Feedwater temperatures (see 3/4.2.2 for definition of  $\Delta T$ ). The Setpoints and Allowable Values for various  $\Delta T$ s are as follows:

<u>T(<math>^\circ F</math>)</u>	<u>Setpoint (psig)</u>	<u>Allowable Value (psig)</u>
0 = T	$\leq 212$	$\leq 218$
$0 < \Delta T \leq 50$	$\leq 190$	$\leq 196$
$50 < \Delta T \leq 100$	$\leq 168$	$\leq 174$
$100 < \Delta T \leq 170$	$\leq 146$	$\leq 152$