

# LIMITING SAFETY SYSTEM SETTINGS

## BASES

### REACTOR PROTECTION SYSTEM INSTRUMENTATION SETPOINTS (Continued)

#### Average Power Range Monitor (Continued)

The APRM trip system is calibrated using heat balance data taken during steady state conditions. Fission chambers provide the basic input to the system and therefore the monitors respond directly and quickly to changes due to transient operation for the case of the Neutron Flux-High setpoint; i.e., for a power increase, the THERMAL POWER of the fuel will be less than that indicated by the neutron flux due to the time constants of the heat transfer associated with the fuel. For the Flow Biased Simulated Thermal Power-High setpoint, a time constant is introduced into the flow biased APRM in order to simulate the fuel thermal transient characteristics. A more conservative maximum value is used for the flow biased setpoint as shown in Table 2.2.1-1.

The APRM setpoints were selected to provide adequate margin for the Safety Limits and yet allow operating margin that reduces the possibility of unnecessary shutdown. The flow referenced trip setpoint must be adjusted by the specified formula in Specification 3.2.2 in order to maintain these margins when CMFLPD is  $\geq$  to FRTP.

#### 3. Reactor Vessel Steam Dome Pressure-High

High pressure in the nuclear system could cause a rupture to the nuclear system process barrier resulting in the release of fission products. A pressure increase while operating will also tend to increase the power of the reactor by compressing voids thus adding reactivity. The trip will quickly reduce the neutron flux, counteracting the pressure increase. The trip setting is slightly higher than the operating pressure to permit normal operation without spurious trips. The setting provides for a wide margin to the maximum allowable design pressure and takes into account the location of the pressure measurement compared to the highest pressure that occurs in the system during a transient. This trip setpoint is effective at low power/flow conditions when the turbine control valve fast closure and turbine stop valve closure trips are bypassed. For a load rejection or turbine trip under these conditions, the transient analysis indicated an adequate margin to the thermal hydraulic limit.

#### 4. Reactor Vessel Water Level-Low

The reactor vessel water level trip setpoint has been used in transient analyses dealing with coolant inventory decrease. The scram setting was chosen far enough below the normal operating level to avoid spurious trips but high enough above the fuel to assure that there is adequate protection for the fuel and pressure limits.

## POWER DISTRIBUTION LIMITS

### 3/4.2.2 APRM SETPOINTS

#### LIMITING CONDITION FOR OPERATION

3.2.2 The APRM flow biased simulated thermal power-high scram trip setpoint (S) and flow biased neutron flux-upscale control rod block trip setpoint ( $S_{RB}$ ) shall be established according to the following relationships:

a. Two Recirculation Loop Operation

<u>Trip Setpoint</u>	<u>Allowable Value</u>
$S \leq (0.66W + 48\%)T$	$S \leq (0.66W + 51\%)T$
$S_{RB} \leq (0.66W + 42\%)T$	$S_{RB} \leq (0.66W + 45\%)T$

b. Single Recirculation Loop Operation

<u>Trip Setpoint</u>	<u>Allowable Value</u>
$S \leq (0.66W + 42.7\%)T$	$S \leq (0.66W + 45.7\%)T$
$S_{RB} \leq (0.66W + 36.7\%)T$	$S_{RB} \leq (0.66W + 39.7\%)T$

where: S and  $S_{RB}$  are in percent of RATED THERMAL POWER,  
W = Loop recirculation flow as a percentage of the loop recirculation flow which produces a rated core flow of 84.5 million lbs/hr.  
T = The ratio of FRACTION OF RATED THERMAL POWER (FRTP) divided by the CORE MAXIMUM FRACTION OF LIMITING POWER DENSITY (CMFLPD). T is applied only if less than or equal to 1.0.

APPLICABILITY: OPERATIONAL CONDITION 1, when THERMAL POWER is greater than or equal to 25% of RATED THERMAL POWER.

#### ACTION:

With the APRM flow biased simulated thermal power-high scram trip setpoint and/or the flow biased neutron flux-upscale control rod block trip setpoint less conservative than the value shown in the Allowable Value column for S or  $S_{RB}$ , as above determined, initiate corrective action within 15 minutes and adjust S and/or  $S_{RB}$  to be consistent with the Trip Setpoint value \* within 6 hours or reduce THERMAL POWER to less than 25% of RATED THERMAL POWER within the next 4 hours.

\*With CMFLPD greater than the FRTP, rather than adjusting the APRM setpoints, the APRM gain may be adjusted such that the APRM readings are greater than or equal to 100% times CMFLPD, provided that the adjusted APRM reading does not exceed 100% of RATED THERMAL POWER, and a notice of the adjustment is posted on the reactor control panel.

result in a calculated  $T \geq 1.0$   
when the APRM reading is substituted  
RIVER BEND - UNIT 1 for FRTP, 3/4 2-7

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NOV 30 1988  
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Amendment No. 31

# INSERT A

$$T = \frac{3 \times \text{FRTP} + 1}{4 \times \text{CMFLPD}} \text{ provided } \text{CMFLPD} \leq 0.6 \times \text{FRTP} + 0.4, \text{ otherwise}$$

$$T = \frac{\text{FRTP}}{\text{CMFLPD}}$$

T is applied only if less than or equal to 1.0.

FRTP is the FRACTION OF RATED THERMAL POWER.

CMFLPD is the CORE MAXIMUM FRACTION OF LIMITING POWER DENSITY.

## POWER DISTRIBUTION LIMITS

### SURVEILLANCE REQUIREMENTS

4.2.2 The F RTP and CMFLPD shall be determined, the value of T calculated, and the most recent actual APRM flow biased simulated thermal power-high scram and flow biased neutron flux-upscale control rod block trip setpoints verified to be within the above limits or adjusted, as required:

- a. At least once per 24 hours,
- b. Within 12 hours after completion of a THERMAL POWER increase of at least 15% of RATED THERMAL POWER, and
- c. Initially and at least once per 12 hours when the reactor is operating with ~~CMFLPD greater than or equal to F RTP~~  $T \leq 1.0$ .
- d. The provisions of Specification 4.0.4 are not applicable.

