Table 3.3.1-1 (page 1 of 8)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT
1.	Manual Reactor Trip	1,2	2	B	SR 3.3.1.12	NA	NA
		3 (a), 4 (a), 5 (a)	2	C	SR 3.3.1.12	NA	NA
2.	Power Range Neutron Flux						
	a. High	1,2	4	D	SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.14	≤ 109.4% RTP	≤ 109% RTP
	b. Low	1 (b), 2	4	E	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.10 SR 3.3.1.14	≤ 25.4% RTP	≤ 25% RTP
3.	Power Range Neutron Flux High Positive Rate	1,2	4	D	SR 3.3.1.7 SR 3.3.1.10	≤ 5.4% RTP with time constant ≥ 2 sec	≤ 5% RTP with time constant ≥ 2 sec
4.	Intermediate Range Neutron Flux	1 (b), 2 (c)	2	F,G	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.10	≤ 40% RTP	≤ 35% RTP
		2 (d)	2	H	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.10	≤ 40% RTP	≤ 35% RTP

(a) With Reactor Trip Breakers (RTBs) closed and Rod Control System capable of rod withdrawal.
(b) Below the P-10 (Power Range Neutron Flux) interlocks.
(c) Above the P-6 (Intermediate Range Neutron Flux) interlocks.
(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

b. Power Range Neutron Flux—Low

The LCO requirement for the Power Range Neutron Flux—Low trip Function ensures that protection is provided against a positive reactivity excursion from low power or subcritical conditions.

The LCO requires all four of the Power Range Neutron Flux—Low channels to be OPERABLE. The channels are combined in a 2-out-of-4 trip Logic.

In MODE 1, below the Power Range Neutron Flux (P-10 setpoint), and in MODE 2, the Power Range Neutron Flux—Low trip must be OPERABLE. This Function may be manually blocked by the operator when two out of four power range channels are greater than approximately 10% RTP (P-10 setpoint). This Function is automatically unblocked when three out of four power range channels are below the P-10 setpoint. Above the P-10 setpoint, positive reactivity additions are mitigated by the Power Range Neutron Flux—High trip Function.

In MODE 3, 4, 5, or 6, the Power Range Neutron Flux—Low trip Function does not have to be OPERABLE because the reactor is shut down. Other RTS trip Functions and administrative controls provide protection against positive reactivity additions or power excursions in MODE 3, 4, 5, or 6.

3. Power Range Neutron Flux - High Positive Rate

The Power Range Neutron Flux - High Positive Rate trip uses the same NIS detectors as discussed for Function 2 above.

The Power Range Neutron Flux—High Positive Rate trip Function ensures that protection is provided against rapid increases in neutron flux that are characteristic of an RCCA drive rod housing rupture and the accompanying ejection of the RCCA. In certain cases, this Function compliments the Power Range Neutron

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

3. Power Range Neutron Flux—High Positive Rate (continued)

Flux — High and Low Setpoint trip Functions to ensure that the criteria are met for a rod ejection event.

The LCO requires all four of the Power Range Neutron Flux — High Positive Rate channels to be OPERABLE. The channels are combined in a 2-out-of-4 trip Logic.

In MODE 1 or 2, when there is a potential to add a large amount of positive reactivity from a rod ejection accident (REA), the Power Range Neutron Flux — High Positive Rate trip must be OPERABLE. In MODE 3, 4, 5, or 6, the Power Range Neutron Flux — High Positive Rate trip Function does not have to be OPERABLE because other RTS trip Functions and administrative controls will provide protection against positive reactivity additions. Also, since only the shutdown banks may be withdrawn in MODE 3, 4, or 5, the remaining complement of control bank worth ensures a sufficient degree of SDM in the event of an REA. In MODE 6, no rods are withdrawn and the SDM is increased during refueling operations. The reactor vessel head is also removed or the closure bolts are detensioned preventing any pressure buildup.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

4. Intermediate Range Neutron Flux

The Intermediate Range Neutron Flux trip Function ensures that protection is provided against an uncontrolled RCCA bank rod withdrawal accident from a subcritical condition during startup. This trip Function provides diverse protection to the Power Range Neutron Flux—Low Setpoint trip Function. The NIS intermediate range detectors are located external to the reactor vessel and measure neutrons leaking from the core. The NIS intermediate range channels also provide a control interlock signal to prevent automatic and manual rod withdrawal prior to initiating a reactor trip. Limiting further rod withdrawal may terminate the transient and eliminate the need to trip the reactor. No credit is taken in the safety analyses for this trip function.

The LCO requires two channels of Intermediate Range Neutron Flux to be OPERABLE. Two OPERABLE channels are sufficient to ensure no single random failure will disable this trip Function. The trip function is accomplished by a 1-out-of-2 trip Logic.

Because this trip Function is important only during startup, there is generally no need to disable channels for on-line testing while the Function is required to be OPERABLE. Therefore, a third channel is unnecessary.

In MODE 1 below the P-10 setpoint, and in MODE 2, when there is a potential for an uncontrolled RCCA bank rod withdrawal accident during reactor startup, the Intermediate Range Neutron Flux trip must be OPERABLE. Above the P-10 setpoint, the Power Range Neutron Flux—High Setpoint trip and the Power Range Neutron Flux—High Positive Rate trip provide core protection for a rod

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

within the allowed 48 hour Completion Time, the unit must be placed in a MODE in which the requirement does not apply. To achieve this status, the RTBs must be opened within the next hour. The additional hour provides sufficient time to accomplish the action in an orderly manner. With the RTBs open, these Functions are no longer required.

The Completion Time is reasonable considering that in this Condition, the remaining OPERABLE train is adequate to perform the safety function, and given the low probability of an event occurring during this interval.

D.1.1, D.1.2, D.2.1, D.2.2, and D.3

Condition D applies to the Power Range Neutron Flux — High and Power Range Neutron Flux - High Positive Rate Functions.

The NI44 power range detector provides input to the CRD System therefore, the NIS has a two-out-of-four trip logic. A known inoperable channel must be placed in the tripped condition. This results in a partial trip condition requiring only one-out-of-three logic for actuation. The 6 hours allowed to place the inoperable channel in the tripped condition is justified in WCAP-10271-P-A (Ref. 7).

In addition to placing the inoperable channel in the tripped condition, THERMAL POWER must be reduced to $\leq$ 75% RTP within 12 hours. Reducing the power level prevents operation of the core with radial power distributions beyond the design limits. With one of the NIS power range detectors inoperable, 1/4 of the radial power distribution monitoring capability is lost.

As an alternative to the above actions, the inoperable channel can be placed in the tripped condition within 6 hours and the QPTR monitored once every 12 hours as per SR 3.2.4.2, QPTR verification. Calculating QPTR every 12 hours compensates for the lost monitoring capability due to the inoperable NIS power range channel and allows continued unit operation at power levels $\geq$ 75% RTP. The 6 hour Completion Time and the 12 hour Frequency are consistent with LCO 3.2.4, "QUADRANT POWER TILT RATIO (QPTR)."

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