

Attachment 3

9409140028 940902
PDR ADDCK 05000219
P PDR

The scram discharge volume has two separate instrument volumes utilized to detect water accumulation. The high water level is based on the design that the water in the SDIV's, as detected by either set of level instruments, shall not be allowed to exceed 29.0 gallons; thereby, permitting 137 control rods to scram. To provide further margin, an accumulation of not more than 14.0 gallons of water, as detected by either instrument volume, will result in a rod block and an alarm. The accumulation of not more than 7.0 gallons of water, as detected in either instrument volume will result in an alarm.

Detailed analyses of transients have shown that sufficient protection is provided by other scrams below 45% power to permit bypassing of the turbine trip and generator load rejection scrams. However, for operational convenience, 40% of rated power has been chosen as the setpoint below which these trips are bypassed. This setpoint is coincident with bypass valve capacity.

A low condenser vacuum scram trip of 20 inches Hg has been provided to protect the main condenser in the event that vacuum is lost. A loss of condenser vacuum would cause the turbine stop valves to close, resulting in a turbine trip transient.

The low condenser vacuum trip provides a reliable backup to the turbine trip. Thus, if there is a failure of the turbine trip on low vacuum, the reactor would automatically scram at 20 inches Hg. The condenser is capable of receiving bypass steam until 7 inches Hg vacuum thereby mitigating the transient and providing a margin.

The settings to isolate the isolation condenser in the event of a break in the steam or condensate lines are based on the predicted maximum flows that these systems would experience during operation, thus permitting operation while affording protection in the event of a break. The settings correspond to a flow rate of less than three times the normal flow rate of 3.2×10^5 lb/hr. Upon initiation of the alternate shutdown panel, this function is bypassed to prevent spurious isolation due to fire induced circuit faults.

The setting of ten times the stack release limit for isolation of the air-ejector offgas line is to permit the operator to perform normal, immediate remedial action if the stack limit is exceeded. The time necessary for this action would be extremely short when considering the annual averaging which is allowed under 10 CFR 20.106, and, therefore, would produce insignificant effects on doses to the public.

Four radiation monitors are provided which initiate isolation of the reactor building and operation of the standby gas treatment system. Two monitors are located in the ventilation ducts, one is located in the area of the refueling pool and one is located in the reactor vessel head storage area. The trip logic is basically a 1 out of 4 system. Any upscale trip will cause the desired action. Trip settings of 17 mr/hr in the duct and 100 mr/hr on the refueling floor are based upon initiating standby gas treatment system so as not to exceed allowed dose rates of 10 CFR 20 at the nearest site boundary.

The SRM upscale of 5×10^5 CPS initiates a rod block so that the chamber can be relocated to a lower flux area to maintain SRM capability as power is increased to the IRM range. Full scale reading is 1×10^6 CPS. This rod block is bypassed in IRM Ranges 8 and higher since a level of 5×10^5 CPS is reached and the SRM chamber is at its fully withdrawn position.

The SRM downscale rod block of 100 CPS prevents the instrument chamber from being withdrawn too far from the core during the period that it is required to monitor the neutron flux. This downscale rod block is also bypassed in IRM Ranges 8 and higher. It is not required at this power level since good indication exists in the Intermediate Range and the SRM will be reading approximately 5×10^5 CPS when using IRM Ranges 8 and higher.

The IRM downscale rod block in conjunction with the chamber full-in position and range switch setting, provides a rod block to assure that the IRM is in its most sensitive condition before startup. If the two latter conditions are satisfied, control rod withdrawal may commence even if the IRM is not reading at least 5%. However, after a substantial neutron flux is obtained, the rod block setting prevents the chamber from being withdrawn to an insensitive area of the core.

The APRM downscale setting of $\geq 2/150$ full scale is provided in the RUN MODE to prevent control rod withdrawal without adequate neutron monitoring.

High flow in the main steamline is set at 120% of rated flow. At this setting the isolation valves close and in the event of a steam line break limit the loss of inventory so that fuel clad perforation does not occur. The 120% flow would correspond to the thermal power so this would either indicate a line break or too high a power.

Temperature sensors are provided in the steam line tunnel to provide for closure of the main steamline isolation valves should a break or leak occur in this area of the plant. The trip is set at 50°F above ambient temperature at rated power. This setting will cause isolation to occur for main steamline breaks which result in a flow of a few pounds per minute or greater. Isolation occurs soon enough to meet the criterion of no clad perforation.

TABLE 3.1.1 PROTECTIVE INSTRUMENTATION REQUIREMENTS

Function	Trip Setting	Reactor Modes in which Function Must Be OPERABLE				Min. No. of OPERABLE or OPERATING [tripped] Trip Systems	Min. No. of Instrument Channels Per OPERABLE Trip System	Action Required*
		Shutdown	Refuel	Startup	Run			
A. Scram								
1. Manual Scram		X	X	X	X	2	1	Insert control rods
2. High Reactor Pressure	**		X(s)	X(l)	X	2	2(nn)	
3. High Drywell Pressure	≤ 3.5 psig		X(u)	X(u)	X	2	2(nn)	
4. Low Reactor Water Level	**		X	X	X	2	2(nn)	
5. a. High Water Level in Scram Discharge Volume North Side	≤ 29 gal.		X(a)	X(z)	X(z)	2	2(nn)	
b. High Water Level in Scram Discharge Volume South Side	≤ 29 gal.		X(a)	X(z)	X(z)	2	2(nn)	
6. Low Condenser Vacuum	≥ 20 in. hg.			X(b)	X	1	3(mm)(nn)	
7. DELETED								
8. Average Power Range Monitor (APRM)	**		X(c,s)	X(c)	X(c)	2	3(nn)	
9. Intermediate Range Monitor (IRM)	**		X(d)	X(d)		2	3(nn)	
10. Main Steamline Isolation Valve Closure	**		X(b,s)	X(b)	X	2	4(nn)	
11. Turbine Trip Scram	**				X(j)	2	4(nn)	
12. Generator Load Rejection Scram	**				X(j)	2	2(nn)	

TABLE 3.1.1 PROTECTIVE INSTRUMENTATION REQUIREMENTS

Function	Trip Setting	Reactor Modes in which Function Must Be OPERABLE				Min. No. of OPERABLE or OPERATING [tripped] Trip Systems	Min. No. of Instrument Channels Per OPERABLE Trip System	Action Required*
		Shutdown	Refuel	Startup	Run			
B. <u>Reactor Isolation</u>								Close main steam isolation valves and close isolation condenser vent valves, or PLACE IN COLD SHUT-DOWN CONDITION
1. Low-Low Reactor Water Level	**	X	X	X	X	2	2(oo)	
2. High Flow in Main Steam-line A	≤120% rated	X(s)	X(s)	X	X	2	2(oo)	
3. High Flow in Main Steam-line B	≤120% rated	X(s)	X(s)	X	X	2	2(oo)	
4. High Temperature in Main Steam-line Tunnel	≤Ambient at Power + 50°F	X(s)	X(s)	X	X	2	2(oo)	
5. Low Pressure in Main Steam-line	**			X(cc)	X	2	2(oo)	
6. DELETED								
C. <u>Isolation Condenser Initiation</u>								PLACE IN COLD SHUT-DOWN CONDITION
1. High Reactor Pressure	**	X(s)	X(s)	X(ll)	X	2	2(pp)	
2. Low-Low Reactor Water Level	≥72" above TOP OF ACTIVE FUEL	X(s)	X(s)	X	X	2	2(pp)	

TABLE 3.1.1 PROTECTIVE INSTRUMENTATION REQUIREMENTS

Function	Trip Setting	Reactor Modes in which Function Must Be OPERABLE				Min. No. of OPERABLE or OPERATING [tripped] Trip Systems	Min. No. of Instrument Channels Per OPERABLE Trip System	Action Required*
		Shutdown	Refuel	Startup	Run			
K. <u>Rod Block</u>								
1. SRM Upscale	$\leq 5 \times 10^5$ cps		X	X(l)		1	2	No control rod withdrawals permitted
2. SRM Downscale	≥ 100 cps(f)		X	X(l)		1	2	
3. IRM Downscale	$\geq 5/125$ fullscale (g)		X	X		2	3	
4. APRM Upscale	**		X(s)	X	X	2	3(c)	
5. APRM Downscale	$\geq 2/150$ fullscale				X	2	3(c)	
6. IRM Upscale	$\leq 108/125$ fullscale		X	X		2	3	
7. a) water level high scram discharge volume North	≤ 14 gallons		X(z)	X(z)	X(z)	1	1 per instrument volume	
b) water level high scram discharge volume South	≤ 14 gallons		X(z)	X(z)	X(z)	1	1 per instrument volume	

L. Condenser Vacuum Pump Isolation

DELETED

TABLE 4.1.1 (cont'd)

<u>Instrument Channel</u>	<u>Check</u>	<u>Calibrate</u>	<u>Test</u>	<u>Remarks (Applies to Test and Calibration)</u>
13. DELETED				
14. High Radiation in Reactor Building				
Operating Floor	1/s	1/3 mo	1/3 mo	Using gamma source for calibration
Ventilation Exhaust	1/s	1/3 mo	1/3 mo	
15. High Radiation on Air Ejector Off-Gas		1/3 mo	1/3 mo	Using built-in calibration equipment Channel Check Source check Calibration according to established station calibration procedures Note a
	1/s			
	1/mo	1/24 mo	1/24 mo	
16. IRM Level	N/A	Each startup	N/A	
IRM Scram	*	*	*	Using built-in calibration equipment
17. IRM Blocks	N/A	Prior to startup and shutdown	Prior to startup and shutdown	Upscale and downscale
18. Condenser Low Vacuum	N/A	1/20 mo	1/20 mo	
19. Manual Scram Buttons	N/A	N/A	1/3 mo	
20. High Temperature Main Steamline Tunnel	N/A	1/20 mo	Each refueling outage	Using heat source box