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3.5.5 ACCIDENT MONITORING INSTRUMENTATION

Applicability

Applies to the operability requirements for the instruments identified in Table 3.5-2 and Table 3.5-3 during STARTUP, POWER OPERATION and HOT STANDBY.

Objectives

To assure operability of key instrumentation useful in diagnosing situations which could represent or lead to inadequate core cooling or evaluate and predict the course of accidents beyond the design basis.

Specification

3.5.5.1 The minimum number of channels identified for the instruments in Table 3.5-2, shall be OPERABLE. With the number of instrumentation channels less than the minimum required, restore the inoperable channel(s) to OPERABLE status within seven (7) days (48 hours for pressurizer level) or be in at least HOT SHUTDOWN within the next six (6) hours and in COLD SHUTDOWN within an additional 30 hours. Prior to startup following a COLD SHUTDOWN, the minimum number of channels shown in Table 3.5-2 shall be operable.

3.5.5.2 The channels identified for the instruments specified in Table 3.5-3 shall be OPERABLE. With the number of instrumentation channels less than required, restore the inoperable channel(s) to OPERABLE in accordance with the action specified in Table 3.5-3.

Bases

The Saturation Margin Monitor provides a quick and reliable means for determination of saturation temperature margins. Hand calculation of saturation pressure and saturation temperature margins can be easily and quickly performed as an alternate indication for the Saturation Margin Monitors.

Discharge flow from the two (2) pressurizer code safety valves and the PORV is measured by differential pressure transmitters connected across elbow taps downstream of each valve. A delta-pressure indication from each pressure transmitter is available in the control room to indicate code safety or relief valve line flow. An alarm is also provided in the control room to indicate that discharge from a pressurizer code safety or relief valve is occurring. In addition, an acoustic monitor is provided to detect flow in the PORV discharge line. An alarm is provided in the control room for the acoustic monitor.

The Emergency Feedwater System is provided with two channels of flow instrumentation on each of the two discharge lines. Local flow indication is also available for the emergency feedwater system.

Although the pressurizer has multiple level indications, the separate indications are selectable via a switch for display on a single display. Pressurizer level, however, can also be determined via the patch panel and the computer log. In addition, a second channel of pressurizer level indication is available independent of the NNI.

Although the instruments identified in Table 3.5-2 are significant in diagnosing situations which could lead to inadequate core cooling, loss of any one of the instruments in Table 3.5-2 would not prevent continued, safe, reactor operation. Therefore, operation is justified for up to 7 days (48 hours for pressurizer level). Alternate indications are available for Saturation Margin Monitors using hand calculations, the PORV/Safety Valve position monitors using discharge line thermocouple and Reactor Coolant Drain Tank indications, and for EFW flow using Steam Generator level and EFW pump discharge pressure. Pressurizer level has two channels, one channel from NNI (3 D/P instrument strings through a single indicator) and one channel independent of the NNI. Operation with the above pressurizer level channels out of service is permitted for up to 48 hours. Alternate indication would be available through the plant computer.

Monitors for containment pressure, containment water level, containment hydrogen level and various high range radiation monitors are useful to evaluate and predict the course of accidents which go beyond the plant design basis (See Table 3.5-3). These instruments should be maintained for that purpose.

TABLE 3.5-3

Post Accident Monitoring Instrumentation

FUNCTION	INSTRUMENTS	REQUIRED NUMBER OF CHANNELS	MINIMUM NUMBER OF CHANNELS	ACTION
1.	High Range Noble Gas Effluent			
	a. Condenser Vacuum Pump Exhaust (RM-A5-Hi)	1	1	A
	b. Condenser Vacuum Pump Exhaust (RM-G25)	1	1	A
	c. Auxiliary and Fuel Handling Building Exhaust (RM-A8-Hi)	1	1	A
	d. Reactor Building Purge Exhaust (RM-A9-Hi)	1	1	A
	e. Reactor Building Purge Exhaust (RM-G24)	1	1	A
	f. Main Steam Lines Radiation (RM-G26/RM-G27)	1 each OTSG	1 each OTSG	A
2.	Containment High Range Radiation (RM-G22/23)	2	2	A
3.	Containment Pressure	2	1	B
4.	Containment Water Level	2	1	B
5.	Containment Hydrogen	2	1	B

TABLE 3.5-3 (Continued)

ACTIONS

A. With the number of OPERABLE Channels less than required by the Minimum channels OPERABLE requirements:

1. either restore the inoperable Channel(s) to OPERABLE status within 7 days of the event, or

2. prepare and submit a Special Report within 30 days following the event outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the system to OPERABLE status.

B. 1. With the number of OPERABLE accident monitoring instrumentation channels less than the required CHANNELS OPERABLE requirements restore the inoperable channel(s) to OPERABLE status within 30 days or be in at least HOT SHUTDOWN within the next 12 hours.

2. With the number of OPERABLE accident monitoring instrumentation channels less than the MINIMUM CHANNELS OPERABLE requirements, restore the inoperable channel(s) to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours.

4. SURVEILLANCE STANDARDS

Specified intervals may be adjusted plus or minus 25 percent to accommodate normal test schedules.

4.1 OPERATIONAL SAFETY REVIEW

Applicability

Applies to items directly related to safety limits and limiting conditions for operation.

Objective

To specify the minimum frequency and type of surveillance to be applied to unit equipment and conditions.

Specification

4.1.1 The minimum frequency and type of surveillance required for reactor protection system and engineered safety feature protection system instrumentation when the reactor is critical shall be as stated in Table 4.1-1.

4.1.2 Equipment and sampling test shall be performed as detailed in Tables 4.1-2 and 4.1-2.

4.1.3 Each post accident monitoring intrumentation channel shall be demonstrated OPERABLE by the performance of the check, test and calibration at the frequencies shown in Table 4.1-4.

Bases

Check

Failures such as blown instrument fuses, defective indicators, or faulted amplifiers which result in "upscale" or "downscale" indication can be easily recognized by simple observation of the functioning of an Instrument or system. Furthermore, such failures are, in many cases, revealed by alarm or annuciator action. Comparison of output and/or state of independent channels measuring the same variable supplements this type of built-in surveillance. Based on experience in operation of both conventional and nuclear systems, when the unit is in operation, the minimum checking frequency stated is deemed adequate for reactor system instrumentation.

Calibration

Calibration shall be performed to assure the presentation and acquisition of accurate information. The nuclear flux (power range) channels amplifiers shall be checked and calibrated if necessary, every shift against a heat balance standard. The frequency of heat balance checks will assure that the difference between the out-of-core instrumentation and the heat balance remains less than 4%.

TABLE 4.1-1 (Continued)

	CHANNEL DESCRIPTION	CHECK	TEST	CALIBRATE	REMARKS
28.	Radiation Monitoring Systems*	W(1)(3)	M(3)	Q(2)	(1) Using the installed check source when background is less than twice the expected increase in cpm which would result from the check source alone. Background readings greater than this value are sufficient in themselves to show that the monitor is functioning. (2) Except area gamma radiation monitors RM-G6, RM-G7, and RM-G8, which are located in high radiation areas of the Reactor Building. These monitors will be calibrated quarterly or at the next scheduled reactor shutdown following the quarter in which calibration would normally be due, if a shutdown during the quarter does not occur. (3) Surveillances are required to be performed only when containment integrity is required. This applies to monitors which initiate containment isolation only.
29.	High and Low Pressure Injection Systems: Flow Channels.	NA	NA	R	

* Does not include the monitors covered under specification 3.5.5.2 and 4.1.3

TABLE 4.1-4

POST ACCIDENT MONITORING INSTRUMENTATION

FUNCTION	INSTRUMENTS	CHECK	TEST	CALIBRATE	REMARKS
1.	Noble Gas Effluent				
	a. Condenser Vacuum Pump Exhaust (RM-A5-Hi)	W	M	R	(1) Using the installed check source when background is less than twice the expected increase in cpm which would result from the check source alone. Background readings greater than this value are sufficient in themselves to show that this monitor is functioning.
	b. Condenser Vacuum Pump Exhaust (RM-G25)	W(1)	M	R	
	c. Aux. & Fuel Handling Building Exhaust (RM-A8-Hi)	W	M	R	
	d. Reactor Building Purge Exhaust (RM-A9-Hi)	W	M	R	
	e. Reactor Building Purge Exhaust (RM-G24)	W(1)	M	R	
	f. Main Steam Lines Radiation (RM-G26/ RM-G27)	W(1)	M	R	
2.	Containment High Range Radiation (RM-G 22/23)	W	M	R	
3.	Containment Pressure	W	N/A	R	
4.	Containment Water Level	W	N/A	R	
5.	Containment Hydrogen	W	M	R	