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March 26, 1986
ST-HL-AE-1630
File No.: G9.17

Mr. Vincent S. Noonan, Project Director
PWR Project Directorate #5
U. S. Nuclear Regulatory Commission
Washington, DC 20555

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498, STN 50-499
Responses to NRC Request for
Additional Information Regarding RG 1.97

Reference: Letter - N.. P. Kadambi to J. H.Goldberg, dated February 24, 1986; South Texas Project Emergency Response Capability - Conformance to R.G. 1.97, Rev. 2

Dear Mr. Noonan:

As indicated in FSAR Appendix 7B, the STP implementation of Regulatory Guide 1.97 requirements was performed in an integrated fashion with the Control Room Design Review, using the WOG Emergency Response Guidelines and the guidance of appropriate NUREG documents. This integrated approach was presented to NRC in December 1983 (meeting notes ST-AE-HL-90317, NRC letter dated February 16, 1984) and discussed during several subsequent meetings with the staff. Review of STP with consideration given to this integrated approach will show conformance to NUREG-0737, NUREG-0737 Supplement 1 and RG 1.97.

The attachments enclosed provide STP's response to the referenced letter. We feel that this supplemental information is adequate to permit your review of STP conformance to RG 1.97 to be completed. In order to facilitate your completed review of RG 1.97 conformance, we suggest that a meeting be held during the month of April, 1986 to answer any remaining questions. We suggest that the appropriate members of the INEL review team also be present at this meeting, so that conformance to RG 1.97 can be established to the agreement of all parties involved. Members of our Licensing staff will be contacting the NRC Project Manager to arrange the subject meeting.

A003

Ll/NRC/dd

If you should have any questions on this matter, please contact Mr. M. E. Powell at (713) 993-1328.

Very truly yours,

M. R. Wisenburg
Manager, Nuclear Licensing

THC/yd

Attachment A: Item-by-item responses to each of the exceptions identified in the INEL report sent by the referenced letter.

Attachment B: FSAR Table 7.5-1 (Amendment 53, in process), marked up to show changes required, particularly in response to INEL report exceptions.

Attachment C: Description of reasons for changes in Amendment 53 FSAR Table 7.5-1 (i.e., changes from current pages of Table 7.5-1 to Amendment 53 revision); letter references for recent FSAR updates pertinent to this submittal; change in FSAR Section 7A.II.F.1 regarding containment water level sensors.

L1/NRC/dd

cc:

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Revised 12/2/85

L1/NRC/dd

Attachment A

This attachment provides item-by-item responses to each of the exceptions identified in Section 4 of the INEL report attached to NRC letter dated February 24, 1986. Where exceptions are closely related, they have been grouped and responses provided for that group.

INEL Report Exception:

1. Range requirement deviation--the applicant should provide the range monitored for the twelve variables listed and justify any deviation from the regulatory guide (Section 3.3.1).

Response:

The ranges for the identified variables are provided below:

	Title	Range
1.	SG Water Level (Wide Range) Top Tap - 604" above tube sheet 4" above top of primary separator Bottom Tap - 12" above tube sheet Top of tube sheet to top of SG - 769"	Total Range - 592"
2.	SG Water Level (Narrow Range) Bottom Tap - 425" above tube sheet	Total Range - 179"
3.	Pressurizer Water Level: Volume Span	Low Level Tap 147.7 ft^3 Upper Level Tap 2002.3 ft^3 Total Volume 2100 ft^3
4.	Refueling Water Storage Tank Water Level: Bottom Tap - 11-3/8" above tank bottom Centerline of Supply Nozzle - 2'-11-3/8" above tank bottom Centerline of Overflow - 32' 4-11/16" above tank bottom	Total Range - 384"
5.	Auxiliary Feedwater Storage Tank Water Level: Bottom Tap - 6" above tank bottom, at centerline of pump suction Upper Range - centerline of tank overflow	Total Range - 514"
6.	Auxiliary Feedwater Flow:	*0 - 700 gpm per SG
7.	Volume Control Tank Water Level: Volume Span	Low Level Tap 72 ft^3 Upper Level Tap 528 ft^3 Total Volume 600 ft^3
8.	Main Feedwater Flow:	*0 - 5.0 x 10^6 lbm/hr

9. Containment Spray Flow:	*0 - 3000 gpm
10. Component Cooling Water Flow to ESF Components:	*Pump Discharge 0 - 20,000 gpm *RCFC 0 - 2500 gpm *RHR HX 0 - 7000 gpm
11. Residual Heat Removal System Flow:	*0 - 4000 gpm
12. Unit Vent Flow:	*37,000 - 290,500 cfm

*Table 7.5-1 has been revised to reflect this information (see attached annotated pages) and will be incorporated in a future FSAR amendment.

INEL Report Exception:

2. RCS soluble boron concentration--the applicant should provide the information required by Section 6.2 of Supplement No. 1 to NUREG-0737 for this variable, identify any deviation and justify those deviations identified (Section 3.3.2).

Response:

The South Texas Project Post-Accident Sampling System provides the RCS soluble boron concentration measurement; this measurement meets the Regulatory Guide 1.97, Rev. 2 Category 3 requirements. The PASS is described in FSAR Section 9.3.2.

Table 7.5-1 has been revised to reflect this information (see attached annotated pages).

INEL Report Exception:

3. Containment isolation valve position--the applicant should provide Category 1 instrumentation for this variable or identify and justify any specific deviation (Section 3.3.6).

Response:

The appurtenances and power supplies for the containment isolation valves, as noted in Table 7.5-1, meet the intent of Regulatory Guide 1.97 Category 1 instrumentation. For isolation valves in series, a single indication on each valve is sufficient to satisfy the requirements of Regulatory Guide 1.97 when those indications are powered from different trains.

Containment isolation valve status conforms to Regulatory Guide 1.97 Category 1 instrumentation criteria, except for valve indication. There are no other deviations from the Category 1 instrumentation.

Table 7.5-1 has been revised to reflect the above information (see attached annotated pages).

INEL Report Exception:

4. Analysis of primary coolant (gamma spectrum)--the applicant should provide the information required by Section 6.2 of Supplement No. 1 to NUREG-0737 for this variable, identify any deviation and justify those deviations identified (Section 3.3.8).

Response:

The South Texas Project Post-Accident Sampling System is used to provide an RCS sample for analysis of primary coolant (gamma spectrum); on-site laboratory instrumentation is used for the analysis and meets the Regulatory Guide 1.97, Rev. 2 Category 3 requirements.

Table 7.5-1 has been revised to reflect this information (see attached annotated pages).

INEL Report Exception:

5. Accumulator tank level and pressure--the applicant should justify the deviation in the pressure range; the applicant should install accumulator tank level instrumentation that meets the recommendations of Regulatory Guide 1.97 (Section 3.3.12).

Response:

Accumulator Tank Pressure

The range of the accumulator tank pressure indicator is adequate to monitor any expected pressure within the accumulators. The maximum pressure allowed by the plant Technical Specifications is between 586 and 679 psig (Technical Specification 3.5.1). Furthermore, the accumulator discharge isolation valves are locked open during operation. Hence, any malfunction of the two series check valves would be immediately indicated to the operator in the control room. Finally, the accumulator is protected by a spring loaded safety valve with a setting of 700 psig. Thus, the range of the existing accumulator pressure transmitter is adequate to monitor any expected pressure within the accumulator.

Accumulator Tank Level

The South Texas Project has installed Category 3 accumulator level instrumentation to monitor the status of the accumulator level primarily for technical specification surveillance. The span of the installed instrument is approximately 14 inches, from 59 to 64 percent of the tank volume. Technical Specification 3.5.1 requires that the accumulator volume is maintained between 11598 and 12023 ft^3 during normal operation. The two series check valves in each accumulator discharge line prevent fluid addition during operation. Any malfunction of the two series check valves would be immediately indicated to the operator in the control room.

Accumulator isolation valve position, accumulator vent valve position, and accumulator pressure (all of which are Category 2 instrumentation) provide the operator adequate information to monitor the status of the accumulators.

Table 7.5-1 has been revised to reflect this information (see attached annotated pages).

INEL Report Exception:

6. Accumulator isolation valve position--the applicant should provide the information required by Section 6.2 of Supplement No. 1 to NUREG-0737 for this variable, identify any deviation and justify those deviations identified (Section 3.3.13).

Response:

The South Texas Project accumulator isolation valve position meets the Regulatory Guide 1.97, Rev. 2 Category 2 requirements. Table 7.5-1 has been revised to reflect this information (see attached annotated pages).

INEL Report Exception:

7. Reactor coolant pump status--the applicant should install the motor current instrumentation in accordance with Regulatory Guide 1.97 (Section 3.3.15).

Response:

The Emergency Operating Procedures do not use the RCP motor current to assess the operational status of the reactor coolant pumps; the reactor coolant pump breaker positions are used. Therefore the reactor coolant pump breaker position has been classified as a Type D, Category 2 variable in Table 7.5-1.

Reactor coolant pump motor current is available in the control room via meters, one per pump. This current instrumentation conforms to Regulatory Guide 1.97, Rev. 2 requirements for Category 3 instrumentation.

Table 7.5-1 has been revised to reflect this information (see attached annotated pages).

INEL Report Exception:

8. Pressurizer heater status--the applicant should provide the recommended instrumentation (Section 3.3.16).

Response:

The South Texas Project has 2 banks of pressurizer heaters normally loaded on the Class 1E emergency buses. Hence, the requirements stated in NUREG-0737, Section II.E.3.1 are met without requiring any operator action.

The above information together with pressurizer breaker position status indication (see Table 7.5-1) is adequate to determine proper heater energization.

Table 7.5-1 has been revised to reflect this information (see attached annotated pages).

INEL Report Exception:

9. Quench tank level--the applicant should provide the information required by Section 6.2 of Supplement No. 1 to NUREG-0737 for this variable, identify any deviation and justify those deviations identified (Section 3.3.17).

10. Quench tank temperature--the applicant should provide the information required by Section 6.2 of Supplement No. 1 to NUREG-0737 for this variable, identify any deviation and justify those deviations identified (Section 3.3.17).

11. Quench tank pressure--the applicant should provide the information required by Section 6.2 of Supplement No. 1 to NUREG-0737 for this variable, identify any deviation and justify those deviations identified (Section 3.3.17).

Response:

Table 7.5-1 has been revised to reflect the requested information (see attached annotated pages).

The pressurizer relief tank (quench tank) temperature range (50 to 350°F) is adequate to monitor any expected conditions in the tank. For the design basis pressurizer steam discharge, the pressure relief tank (PRT) water temperature is maintained below 200°F. The Emergency Operating Procedures direct the operator to check if the PRT pressure and temperature are increasing to determine if there is an ongoing loss of RCS inventory via leakage to the PRT. If a discharge results in a pressure that exceeds the rupture disc design pressure, the disc would rupture and pass the discharge through the tank to the containment. The rupture disc release pressure is 91 psig (corresponding saturation temperature is approximately 320°F). Following breach of the disc, the temperature of the tank will not exceed the saturation temperature associated with the existing containment pressure. The pressurizer relief tank pressure range is 0 to 100 psig.

The PRT is a 2100 cubic feet tank, lying horizontally with a length of 375.75 inches. The inside diameter of the PRT is 114 inches with the low level tap 7 inches up from the bottom and the high level tap 7 inches below the top of the tank.

INEL Report Exception:

12. Containment atmosphere temperature--the applicant should provide the information required by Supplement No. 1 to Section 6.2 of NUREG-0737 for this variable (Section 3.3.18).

Response:

Containment atmosphere temperature is not a key South Texas Project variable. The key variables for monitoring the accomplishment of containment cooling are containment spray flow (D2), containment water level (wide range) (A1, B1, B2, C2, and D2), containment water level (narrow range) (A1, B2, C2, and D2), containment pressure (A1, B2, C1, C2, D2), containment spray system valve status (D2), containment spray pumps status (D2), and the RCB fan cooler differential pressure/status (D2). Immediately after containment spray is initiated, the containment atmosphere is saturated and the temperature is calculated from the containment pressure. Since the operator does not utilize this parameter to verify containment cooling, containment atmospheric temperature has been classified as a Category 3 parameter.

Table 7.5-1 has been revised to reflect this information (see attached annotated pages).

INEL Report Exception:

13. Containment sump water temperature--the applicant should provide the recommended instrumentation for this variable or identify other instrumentation that provides the same information (Section 3.3.19).

Response:

Containment sump water temperature is not required for emergency core cooling system operation or assurance that minimum NPSH requirements are met. NPSH calculations conservatively assume saturated water is present (see FSAR Section 6.2.2.3.5). Containment water level measurements indicate that a source of water is available and, as described in Note i of Table 7.5-1, containment cooling is verified by other plant parameters. This variable designation is therefore Type D, Category 3. Should an indication of sump water temperature be desirable, the RHR heat exchanger inlet temperature should be used.

Table 7.5-1 has been revised to reflect this information (see attached annotated pages).

INEL Report Exception:

14. High-level radioactive liquid tank level--the applicant should provide the information required by Section 6.2 of Supplement No. 1 to NUREG-0737 for this variable, identify any deviation and justify those deviations identified (Section 3.3.20).

Response:

The liquid radwaste system is not required following an event. Level instrumentation has been provided for the various tanks in the Liquid Waste Processing System (as discussed in FSAR Section 11.2). Indication and alarm are provided in the radwaste control room, which is located in the Mechanical Auxiliary Building, except for the Reactor Coolant Drain Tank. Indication and alarm for the RCDT are provided in the control room.

Table 7.5-1 has been revised to reflect the requested information (see attached annotated pages).

INEL Report Exception:

15. Radioactive gas holdup tank pressure--the applicant should provide the information required by Section 6.2 of Supplement No. 1 to NUREG-0737 for this variable, identify any deviation and justify those deviations identified. (Section 3.3.20).

Response:

The South Texas Project Gaseous Waste Processing System does not utilize gas holdup tanks. The GWPS design description has been provided in FSAR Section 11.3. This parameter is not applicable to the STP design.

Table 7.5-1 has been revised to reflect this information (see attached annotated pages).

INEL Report Exception:

16. Emergency ventilation damper position--the applicant should provide position indication for these dampers in accordance with the recommendations of Regulatory Guide 1.97 (Section 3.3.21).

Response:

Ventilation dampers which are required to perform a safety function are provided with position indication instrumentation which meets the requirements of Regulatory Guide 1.97, Rev. 2 Category 2.

Table 7.5-1 has been revised to reflect this information (see attached annotated pages).

INEL Report Exception:

17. Vent from steam generator safety relief valves or atmospheric dump valves--the applicant should provide the information required by Section 6.2 of Supplement No. 1 to NUREG-0737 for this variable, identify any deviation and justify those deviations identified (Section 3.3.22).

Response:

As indicated in NUREG-0737, Item II.F.1, offline monitors are not required for PWR secondary side main steam safety valve and dump valve discharge lines. For this application, the externally mounted main steam line radiation monitors are provided, as indicated in FSAR Section 7A.II.F.1.

Table 7.5-1 has been revised to clarify how STP has met this requirement (see attached annotated pages).

INEL Report Exception:

18. Plant and environs radiation--the applicant should provide the range of the instrumentation provided for this variable, identify any deviation and justify those deviations identified (Section 3.3.24).

Response:

Table 7.5-1 has been revised to provide the range of this instrumentation (see attached annotated pages).

INEL Report Exception:

19. Plant and environs radioactivity--the applicant should provide the information required by Section 6.2 of Supplement No. 1 to NUREG-0737 for this variable, identify any deviation and justify those deviations identified (Section 3.3.25).

Response:

Table 7.5-1 has been revised to provide the information requested for this instrumentation (see attached annotated pages).

INEL Report Exception:

20. Wind direction--the applicant should provide the information required by Supplement No. 1 to NUREG-0737 for this variable, identify any deviation and justify those deviations identified (Section 3.3.26).

21. Wind speed--the applicant should provide the information required by Supplement No. 1 to NUREG-0737 for this variable, identify any deviation and justify those deviations identified (Section 3.3.26).

22. Estimation of atmospheric stability--the applicant should provide the information required by Supplement No. 1 to NUREG-0737 for this variable, identify any deviation and justify those deviation identified (Section 3.3.26).

Response:

Table 7.5-1 has been revised to provide the information requested for this instrumentation (see attached annotated pages).

Attachment B

This attachment provides the Amendment 53 Table 7.5-1 (amendment in process) marked up with further changes required to respond to NRC letter dated February 24, 1986 and its attached INEL report.

These revisions to Table 7.5-1 will be incorporated in a future amendment of the FSAR. That amendment will also incorporate revisions required in Appendix 7B to correspond with Table 7.5-1.

TABLE 7.5-1

POST-ACCIDENT MONITORING INSTRUMENTATION

Variable	Range/Status	Type/ Category	Sensor Qualification Environmental	Sensor Qualification Seismic	Number of Channels	Control Room Indication	Implementation Date	Sensor Power Supply	EOC Indication	TSC Indication	Conformance to RG 1.97, Rev. 2
RCS Pressure (Wide Range)	0-3000 psig	A1,B1,B2, C1,C2,D2	Yes	Yes	1	QDPS 1 recorded	Core Load	1E	Yes	Yes	Note b
RCS Wide Range T_{Hot}	0-700°F	A1,B1,B2	Yes	Yes	1 per loop	QDPS 4 recorded	Core Load	1E	Yes	Yes	Conforms
RCS Wide Range T_{Cold}	0-700°F	A1,B1,B2	Yes	Yes	1 per loop	QDPS 4 recorded	Core Load	1E	Yes	Yes	Conforms
Wide Range Steam Generator Water Level	0-100% of span	A1,B1,B2, D2	Yes	Yes	1 per steam generator	QDPS 4 recorded	Core Load	1E	Yes	Yes	Conforms
Narrow Range Steam Generator Water Level	0-100% of span	A1,B1,B2, D2	Yes	Yes	4 per steam generator	QDPS 1 per SG recorded	Core Load	1E	Yes	Yes	Conforms
Pressurizer Water Level	0-100% of span	A1,B1,D2	Yes	Yes	4	QDPS 1 recorded	Core Load	1E	Yes	Yes	Conforms
Containment Pressure	-5 to 65 psig	A1,B1,B2 C1,C2,D2	Yes	Yes	4	QDPS 2 recorded	Core Load	1E	Yes	Yes	Conforms
Steamline Pressure	0-1400 psig	A1,B1,D2	Yes	Yes	3 per loop	QDPS 1 per loop recorded	Core Load	1E	Yes	Yes	Conforms
Refueling Water Storage Tank (RWST) Water Level	0-100% of span	A1,B1,D2	Yes	Yes	3	QDPS 2 meters 2 recorded	Core Load	1E	Yes	Yes	Conforms

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TABLE 7.5-1

POST-ACCIDENT MONITORING INSTRUMENTATION (Continued)

Variable	Range/Status	Type/ Category	Sensor Qualification Environmental	Sensor Qualification Seismic	Number of Channels	Control Room Indication	Implementation Date	Sensor Power Supply	EOC Indication	TSC Indication	Conformance to RG 1.97, Rev. 2
Containment Water Level (Wide Range)	~~0-609,000 gal~~ ~~(0-(6) ft.)~~ El. -10'5" to El. -4'0"	A1,B1,B2 C2,D2	Yes	Yes	3	QDPS 1 recorded	Core Load	1E	Yes	Yes	Conforms See also Note aa
Containment Water Level (Narrow Range)	~~Bottom of Sump to Top of Sump~~ El. -16'3" to El. -10'9"	A1,B2,C2 D2	Yes	Yes	2	QDPS 2 recorded	Core Load	1E	Yes	Yes	Conforms See also Note aa
Auxiliary Feedwater Storage Tank (AFST) Water Level	0-100% of span	A1,B1,D2	Yes	Yes	3	QDPS 1 recorded	Core Load	1E	Yes	Yes	Conforms
Auxiliary Feedwater Flow	0-700 gal/min	A1,B1,D2	Yes	Yes	1 per loop	QDPS 4 meters 4 recorded	Core Load	1E	Yes	Yes	Note o
High Range Containment Radiation Level	1R/hr to 10^8 R/hr Gamma	A1,B1,B2, C2,E2	Yes	Yes	2	QDPS 2 meters 2 recorded	Core Load	1E	Yes	Yes	Note s
Steam Generator Blowdown Radiation Level	10^{-2} to 10^6 μCi/cc	A1,B2,C2	Yes	Yes	1 per blowdown line	QDPS 4 meters 4 recorded	Core Load	1E	Yes	Yes	Conforms
Steamline Radiation Level (Radioactivity Level - Vent from SG Safety Relief Valves/PORVs)	10^{-2} to 10^6 μCi/cc	A1,B2,C2, E2	Yes	Yes	1 per steam line	QDPS 4 meters 4 recorded	Core Load	1E	Yes	Yes	Conforms (see also Note ag)

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TABLE 7.5-1

POST-ACCIDENT MONITORING INSTRUMENTATION (Continued)

Variable	Range/Status	Type/ Category	Sensor Qualification Environmental	Sensor Qualification Seismic	Number of Channels	Control Room Indication	Implementation Date	Sensor Power Supply	EOC Indication	TSC Indication	Conformance to RG 1.97, Rev. 2
Core Exit Temperature	100-2200°F	A1,B1,C1	Yes	Yes	2 trains of 25 thermocouples each, equally distributed across core (in quadrants)	QDPS hottest thermocouple and average of hottest quadrant recorded	Core Load	1E	Yes	Yes	Conforms
RCS Subcooling	200°F subcooling to 50°F superheat	A1,B1	Yes	Yes	2	QDPS 2 recorded	Core Load	1E	Yes	Yes	Conforms
Neutron Flux (Extended Range)	10^{-8} to 200% Full Power	B1,D2	Yes	Yes	2	QDPS 2 recorded	Core Load	1E	Yes	Yes	Note r
Neutron Flux Startup Rate	-0.5 to +5.0 dpm	B1,D2	Yes	Yes	2	QDPS recorded as neutron flux	Core Load	1E	Yes	Yes	Note r
Reactor Vessel Water Level	Upper Core Support Plate to top of vessel	B1,C2,D2	Yes	Yes	2	QDPS 1 recorded	Core Load	1E	Yes	Yes	Conforms
Containment Isolation Valve Status	Open/Closed	C2,D2	Yes	Yes	1 per valve	1 pair of lights per valve	Core Load	1E	Yes	Yes	Note c

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TABLE 7.5-1

POST-ACCIDENT MONITORING INSTRUMENTATION (Continued)

Variable	Range/Status	Type/ Category	Sensor Qualification: Environmental	Sensor Qualification: Seismic	Number of Channels	Control Room Indication	Implementation Date	Sensor Power Supply	EOC Indication	TSC Indication	Conformance to RG 1.97, Rev. 2	
Containment Hydrogen Concentration	0-10% Concentration	B1,C1	Yes	Yes	2	QDPS 1 recorded	Core Load	1E	Yes	Yes	Conforms	53
Control Rod Position Indication	Rods on Bottom	D3	No	No	1 per rod	LED	Core Load	N-1E	No	No	Conforms (Note x)	40
Containment Pressure (Extended Range)	0-180 psig	C1,C2	Yes	Yes	2	QDPS	Core Load	1E 1 recorded	Yes	Yes	Conforms	
RCS Pressure (Extended Range)	0-3500 psig	A1,B1,C1	Yes	Yes	2	QDPS 2 recorded	Core Load	1E	Yes	Yes	Note b	
Primary Coolant Activity and Sampling	~~N/A~~ Note d	C3,E3	No	No	1 post accident sampling system	CRT (ERFDADS)	Core Load	~~N/A~~ N-1E	Yes	Yes	Notes d, h	53
Unit Vent Radiation Level	(Note a)	C2,E2	Yes	No	1	CRT (RMS)	Core Load	N-1E	Yes	Yes	Conforms (Note a, w)	
Fuel Handling Bldg. Exhaust Radiation Level	10^{-6} to 10^{-1} μCi/cc	C2,E2	Yes	Yes	2	QDPS 2 meters 2 recorded	Core Load	1E	Yes	Yes	Conforms	
RCS Soluble Boron Concentration	0-6000 ppm	B3,E3	No	No	1	CRT (ERFDADS)	Core Load	N-1E	Yes	Yes	Conforms (Note d)	

TABLE 7.5-1

POST-ACCIDENT MONITORING INSTRUMENTATION (Continued)

Variable	Range/Status	Type/ Category	Sensor Qualification: Environmental	Sensor Qualification: Seismic	Number of Channels	Control Room Indication	Implementation Date	Sensor Power Supply	EOC Indication	TSC Indication	Conformance to RG 1.97, Rev. 2	
Adjacent Building Area Radiation Level	10^{-1} to 10^{4} mR/hr	C3	No	No	5	CRT (RMS)	Core Load	N-1E	Yes	Yes	Note l	53
Site Environmental Radiation Level (Portable Monitoring)	~~N/A~~ 10^{-3} to 5×10^{3} R/hr; 10^{-2} to 5×10^{4} R/hr	C3,E3	No	No	N/A	Portable Sampling	Core Load	N-1E	No	No	Conforms Note a,c	
Pressurizer PORV Status	Open/Closed	B2,D2	Yes	Yes	1 per valve	1 pair of lights per valve	Core Load	1E	Yes	Yes	Conforms	
Pressurizer PORV Block Valve Status	Open/Closed	D2	Yes	Yes	1 per valve	1 pair of lights per valve	Core Load	1E	Yes	Yes	Conforms	40
Pressurizer Safety Valve Status	Open/Closed	B2,D2	Yes	Yes	1 per valve	1 Alarm CRT (ERFDADS)	Core Load	N-1E	Yes	Yes	Conforms	
Pressurizer Heater Breaker Position	Open/Closed	D2	Yes	Yes	1 per bank	1 pair of lights per bank	Core Load	1E	Yes	Yes	Note e	
Pressurizer Pressure	1700-2500 psig	D2	Yes	Yes	4	QDPS 1 recorded	Core Load	1E	Yes	Yes	Conforms	53
Site Environmental Radioactivity Level (Portable Monitoring)	Note ad	C3,E3	No	No	N/A	Portable Sampling	Core Load	N-1E	No	No	Conforms Note ad	

TABLE 7.5-1

POST-ACCIDENT MONITORING INSTRUMENTATION (Continued)

Variable	Range/Status	Type/ Category	Sensor Qualification: Environmental	Sensor Qualification: Seismic	Number of Channels	Control Room Indication	Implementation Date	Sensor Power Supply	EOC Indication	TSC Indication	Conformance to RG 1.97, Rev. 2
RCP Status Breaker Position	~~On/Off~~ Open/Closed	D2 ~~4~~ 1 set	No	No	1 per pump	~~1 pair of lights~~ 1 set per pump	Core Load	N-1E	Yes	Yes	Conforms
Motor Current	0-600amps	D3	No	No	1 per pump	1 meter per pump	Complete	N-1E	No	No	
Pressurizer Spray Valve Status	Open/Closed	D2	No	No	1 per valve	1 light per valve	Core Load	N-1E	Yes	Yes	Conforms
Charging Flow	0-500 gal/min	D2	Yes	Yes	1	QDPS	Core Load	1E	Yes	Yes	Conforms
Letdown Flow	0-500 gal/min	D2	Yes	Yes	1	1 meter	Core Load	N-1E	Yes	Yes	Conforms
Volume Control Tank (VCT) Water Level	0-100% of span	D2	Yes	Yes	2	1 meter	Core Load	1E	Yes	Yes	Conforms
CVCS Valve Status	Open/Closed	D2	Yes	Isolation Valves Only	1 per valve	1 pair of lights per valve	Core Load	1E/N-1E	Yes	Yes	Conforms (Note f)
Charging Pump Status	On/Off	D2	Yes	Yes	1 per pump	1 pair of lights per pump	Core Load	1E	Yes	Yes	Conforms (Note f)
Boric Acid Transfer (BAT) Pump Status	On/Off	D2	Yes	Yes	1 per pump	1 pair of lights per pump	Core Load	1E	Yes	Yes	Conforms (Note f)
RCP Seal Injection Flow	0-20 gal/min	D2	Yes	Yes	1 per loop	QDPS 4 recorded	Core Load	1E	Yes	Yes	Conforms (Note f)

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TABLE 7.5-1

POST-ACCIDENT MONITORING INSTRUMENTATION (Continued)

Variable	Range/Status	Type/ Category	Sensor Qualification: Environmental	Sensor Qualification: Seismic	Number of Channels	Control Room Indication	Implementation Date	Sensor Power Supply	EOC Indication	TSC Indication	Conformance to RG 1.97, Rev. 2
SG Atmospheric PORV Status	0-100% Open	D2,E2	Yes	Yes	1 per valve	QDPS 1 meter per valve	Core Load	1E	Yes	Yes	Conforms
Main Steamline Isolation Valve Status	Open/Closed	B2,D2	Yes	Yes	1 per valve	1 pair of lights per valve	Core Load	1E	Yes	Yes	Conforms (Note f)
Main Steamline Bypass Valve Status	Open/Closed	B2,D2	Yes	Yes	1 per valve	1 pair of lights per valve	Core Load	1E	Yes	Yes	Conforms (Note f)
SG Safety Valve Status	Open/Closed	D2,E2	Yes	Yes	1 per valve	Alarm CRT (ERFDADS)	Core Load	N-1E	Yes	Yes	Conforms
Main Feedwater Control Valve Status	Open/Closed	D2	Yes	Yes	1 per valve	CRT (ERFDADS)	Core Load	1E	Yes	Yes	Conforms (Note f)
Main Feedwater Control Bypass Valve Status	Open/Closed	D2	Yes	Yes	1 per valve	CRT (ERFDADS)	Core Load	1E	Yes	Yes	Conforms (Note f)
Main Feedwater Isolation Valve Status	Open/Closed	D2	Yes	Yes	1 per valve	1 pair of lights per valve	Complete	1E	Yes	Yes	Conforms (Note f)

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TABLE 7.5-1

POST-ACCIDENT MONITORING INSTRUMENTATION (Continued)

Variable	Range/Status	Type/ Category	Sensor Qualification Environmental	Sensor Qualification Seismic	Number of Channels	Control Room Indication	Implementation Date	Sensor Power Supply	EOC Indication	TSC Indication	Conformance to RG 1.97, Rev. 2	
Main Feedwater Isolation Bypass Valve Status	Open/Closed	D2	Yes	Yes	1 per valve	1 pair of lights per valve	Complete	1E	Yes	Yes	Conforms (Note f)	
Main Feedwater Flow	0-5.0 x 10^6 lbs/hr	D2	Yes	Yes	3 per loop	QDPS 1 per loop recorded	Core Load	1E	Yes	Yes	Conforms	53
SG Blowdown Isolation Valve Status	Open/Closed	D2	Yes	Yes	1 per valve	1 pair of lights per valve	Complete	1E	Yes	Yes	Conforms (Note f)	
SG Blowdown Sample Isolation Valve Status	Open/Closed	D2	Yes	Yes	1 per valve	1 pair of lights per valve	Complete	1E	Yes	Yes	Conforms (Note f)	40
HHSI Flow	0-2000 gal/min	D2	Yes	Yes	2 per SI pump (hot leg, cold leg)	6 meters	Core Load	N-1E	Yes	Yes	Conforms	
LHSI Flow	0-3500 gal/min (hot leg) 0-5000 gal/min (cold leg)	D2	Yes	Yes	2 per SI pump (hot leg, cold leg)	6 meters	Core Load	N-1E	Yes	Yes	Conforms	53

TABLE 7.5-1

POST-ACCIDENT MONITORING INSTRUMENTATION (Continued)

Variable	Range/Status	Type/ Category	Sensor Qualification: Environmental	Sensor Qualification: Seismic	Number of Channels	Control Room Indication	Implementation Date	Sensor Power Supply	EOC Indication	TSC Indication	Conformance to RG 1.97, Rev. 2	
ECCS Accumulator Pressure	0-700 psig	D2	Yes	Yes	2 per tank	3 ~~1~~ meters, one per tank, sharing 2 channels	Core Load	N-1E	Yes	Yes	Note a,b ~~Conforms~~	
Auxiliary Feedwater Valve Status	Open/Closed	D2	Yes	Yes	1 per valve	1 pair of lights per valve	Core Load	1E	Yes	Yes	Conforms (Note f)	
Containment Spray Flow	0-~~100% of span~~ 3000 gal/min	D2	Yes	Yes	1 per train	3 meters	Complete	N-1E	Yes	Yes	Conforms	40
Containment Spray System Valve Status	Open/Closed	D2	Yes	Yes	1 per valve	1 pair of lights per valve	Complete	1E	Yes	Yes	Conforms (Note f)	
Containment Spray Pump Status	On/Off	D2	Yes	Yes	1 per pump	1 pair of lights per pump	Complete	1E	Yes	Yes	Conforms (Note f)	
Reactor Containment Fan Cooler Differential Pressure/ Status	3-4 in. water gage, On/Off	D2	Yes	Yes	1 per fan	1 alarm per fan	Core Load	1E/N-1E	Yes	Yes	Note m	53
CCW Pump Discharge Pressure	0-150 psig	D2	Yes	Yes	1 per train	QDPS	Core Load	[illegible]	Yes	Yes	Conforms (Note f)	
Containment Ventilation Valve Status	Open/Closed	D2	Yes	Yes	1 per valve	1 pair of lights per valve	Core Load	1E	Yes	Yes	Conforms	
ECCS Accumulator Isolation Valve Status	Open/Closed	D2	Yes	Yes	1 per valve	1 pair of lights per valve	Core Load	1E	Yes	Yes	Conforms	

move ECCS accumulator tank level entries to here (from p. 7.5-27)

TABLE 7.5-1

POST-ACCIDENT MONITORING INSTRUMENTATION (Continued)

Variable	Range/Status	Type/ Category	Sensor Qualification: Environmental	Sensor Qualification: Seismic	Number of Channels	Control Room Indication	Implementation Date	Sensor Power Supply	EOC Indication	TSC Indication	Conformance to RG 1.97, Rev. 2
CCW Header Temperature	50-250°F	D2	Yes	Yes	1 per train	QDPS	Core Load	1E	Yes	Yes	Conforms
CCW Surge Tank Water Level	0-100% of span	D2	Yes	Yes	1 per tank compartment	QDPS	Core Load	1E	Yes	Yes	Conforms (Note f)
CCW Flow to ESF Components	0-appropriate gal/min for component/header	D2	Yes	Yes	1 per ~~ESF~~ CCW pump discharge component	QDPS	Core Load	1E	Yes	Yes	Conforms
Pump Discharge	← 0-20,000 gal/min										
RCFC	0-2500 gal/min				1 per ~~ESF~~ component header						
RHR HX	0-7000 gal/min										
CCW Valve Status	Open/Closed	D2	Yes	Yes	1 per valve	1 pair of lights per valve	Core Load	1E	Yes	Yes	Conforms (Note f)
ECW Flow to ESF Components	0-appropriate gal/min component/header	D2	Yes	Yes	1 per major ESF component	QDPS	Core Load	1E	Yes	Yes	Conforms (Note f)
ECW Valve Status	Open/Closed	D2	Yes	Yes	1 per valve	1 pair of lights per valve or meter	Complete	1E/N-1E	Yes	Yes	Conforms (Note f)
ESF Environment Temperature	Temperature above setpoint	D2	Yes	Yes	1 per ESF component/ cubicle	? alarm	Core Load	N-1E	Yes	Yes	Conforms (Note f)
CCW Pump Cooler	0-50 gal/min										
CCW HX	0-20,000 gal/min										
Standby DG	0-1900 gal/min										
Essential Chillers	0-600 gal/min										
	0-1100 gal/min										

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TABLE 7.5-1

POST-ACCIDENT MONITORING INSTRUMENTATION (Continued)

Variable	Range/Status	Type/ Category	Sensor Qualification: Environmental	Sensor Qualification: Seismic	Number of Channels	Control Room Indication	Implementation Date	Sensor Power Supply	EOC Indication	TSC Indication	Conformance to RG 1.97, Rev. 2	
ESF Cubicle Fan/Cooler Status	Fan Stopped/ Running	D2	Yes	Yes	1 per ~~ESF component/cubicle~~ fan/cooler	1 pair of lights per item	Core Load	1E	Yes	Yes	Conforms (Note f)	53
Standby Power and Emergency Power Source Status	Bus Specific	D2	Yes	Yes	1 per bus	1 meter or alarm for each power source	Core Load	1E/N-1E	Yes	Yes	Conforms	40
Other Safety-Related Energy Sources	Component Specific	D2	Yes	Yes	1 per source	1 meter or alarm for each power source	Core Load	1E/N-1E	Yes	Yes	Conforms (Note y)	
RHR Heat Exchanger Discharge Temperature	50-400° F	D2	Yes	Yes	1 per heat exchanger	QDPS 3 recorded	Core Load	1E	Yes	Yes	Conforms	
RHR Flow	0-4000 gal/min ~~open~~	D2	Yes	Yes	1 per train	QDPS 3 meters	Core Load	1E	Yes	Yes	Conforms	53
RHR Valve Status	Open/Closed	D2	Yes	Yes	1 per valve	1 pair of lights per valve	Core Load	1E	Yes	Yes	Conforms (Note f)	
Reactor Trip Breaker Position	Open/Closed	D2	Yes	Yes	1 per breaker	QDPS, 1 pair of lights per breaker	Complete	1E	Yes	Yes	Conforms (Note f)	40

TABLE 7.5-1

POST-ACCIDENT MONITORING INSTRUMENTATION (Continued)

Variable	Range/Status	Type/ Category	Sensor Qualification: Environmental	Sensor Qualification: Seismic	Number of Channels	Control Room Indication	Implementation Date	Sensor Power Supply	EOC Indication	TSC Indication	Conformance to RG 1.97, Rev. 2	
Turbine Governor Valve Position	Open/Closed	D2	Yes	No	1 per valve	1 pair of lights per valve	Complete	N-1E	Yes	Yes	Conforms (Notes f,z)	
Turbine Stop Valve Position	Open/Closed	D2	Yes	No	1 per valve	1 pair of lights per valve	Complete	N-1E	Yes	Yes	Conforms (Notes f,z)	40
Motor-Driven Auxiliary Feedwater Pump Status	On/Off	D2	Yes	Yes	1 per pump	1 pair of lights per pump	Core Load	1E	Yes	Yes	Conforms (Note f)	
Auxiliary Feedwater Turbine Pump Status	0-2000 psig, Open/Closed	D2	Yes	Yes	1 pump discharge pressure indicator, 1 per steam inlet valve	QDPS, 1 meter, 1 pair of lights per valve	Core Load	1E	Yes	Yes	Conforms (Note f)	53
SI Pump Status	On/Off	D2	Yes	Yes	1 per pump	1 pair of lights per pump	Complete	1E	Yes	Yes	Conforms (Note f)	
SI Valve Status	Open/Closed	D2	Yes	Yes	1 per valve	1 pair of lights per valve	Complete	1E	Yes	Yes	Conforms (Note f)	40

put emergency vent. damper info here (from p. 7.5-28)

TABLE 7.5-1

POST-ACCIDENT MONITORING INSTRUMENTATION (Continued)

Variable	Range/Status	Type/ Category	Sensor Qualification Environmental	Sensor Qualification Seismic	Number of Channels	Control Room Indication	Implementation Date	Sensor Power Supply	EOC Indication	TSC Indication	Conformance to RG 1.97, Rev. 2
Essential Cooling Water Pump Status	On/Off	D2	Yes	Yes	1 per pump	1 pair of lights per pump	Complete	1E	Yes	Yes	Conforms (Note f)
CCW Pump Status	On/Off	D2	Yes	Yes	1 per pump	1 pair of lights per pump	Complete	1E	Yes	Yes	Conforms (Note f)
RHR Pump Status	On/Off	D2	Yes	Yes	1 per pump	1 pair of lights per pump	Complete	1E	Yes	Yes	Conforms (Note f)
SI Actuation Status	On/Off	D2	Yes	Yes	1 per actuation train	1 Alarm	Core Load	1E	Yes	Yes	Conforms
Containment Isolation Actuation Status	On/Off	D2	Yes	Yes	1 per actuation train	1 Alarm	Core Load	1E	Yes	Yes	Conforms
Control Room Radiation Level	10^{-1} to 10^{4} mR/hr (area)	E3	No	No	1	CRT (RMS)	Core Load	N-1E	Yes	Yes	Note l
	10^{-6} to 10^{-1} μCi/cc (intake air)	E2	Yes	Yes	2	QPDS 2 meters 2 recorded	Core Load	1E	Yes	Yes	Conforms

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TABLE 7.5-1

POST-ACCIDENT MONITORING INSTRUMENTATION (Continued)

Variable	Range/Status	Type/ Category	Sensor Qualification: Environmental	Sensor Qualification: Seismic	Number of Channels	Control Room Indication	Implementation Date	Sensor Power Supply	EOC Indication	TSC Indication	Conformance to RG 1.97, Rev. 2	
Access Area Radiation	10^{-1} to 10^{4} R/hr	E3	Yes	No	1 per designated area	CRT (RMS)	Core Load	N-1E	Yes	Yes	Note l	40
Condenser Vacuum Pump Radiation Level	10^{-6} to 10^{5} μCi/cc	E3	Yes	No	1	CRT (RMS)	Core Load	N-1E	Yes	Yes	Note n	
Concentration from Liquid Pathways												
Liquid Radwaste	10^{-6} to 10^{-1} μCi/cc	E2	Yes	No	1 per plant	CRT (RMS)	Core Load	N-1E	Yes	Yes	Note t	53
Effluent Path Flow Rate/Status												
Liquid Radwaste Flow	0-100% of span	E3	No	No	1	CRT (RMS)	Core Load	N-1E	Yes	Yes	Note q	
Valve Status	Open/Closed	E2	Yes	No	1 per valve	1 pair of lights per valve	Core Load	N-1E	Yes	Yes	Notes q, w	
~~Unit Vent~~ Flow	~~0-100% of span~~ 37,000 - 290,500 cfm	E2	Yes	No	1	CRT (ERFDADS)	Core Load	N-1E	Yes	Yes	Note w	

Wind Direction 0-540°
Wind Speed 0-50 mph (10m)
0-100 mph (60m)
Atmospheric Stability
ΔT -6 to 6°F
Sigma Theta 0-60°

TABLE 7.5-1

POST-ACCIDENT MONITORING INSTRUMENTATION (Continued)

Variable	Range/Status	Sensor Qualification: Type/ Category	Sensor Qualification: Environmental	Sensor Qualification: Seismic	Number of Channels	Control Room Indication	Implementation Date	Sensor Power Supply	EOC Indication	TSC Indication	Conformance to RG 1.97, Rev. 2
~~Condenser Vacuum Pump Flow~~ Condenser Vacuum Pump	~~0-100% of span~~ 10,000 scfm	E3	No	No	1	~~CRT (Plant GRT (RMS)~~ CRT (Plant computer)	Core Load	N-1E	~~Yes~~ No	~~Yes~~ No	Note v
Pump Status	On/Off	E2	Yes	No	1 per pump	CRT (ERFDADS)	Core Load	N-1E	Yes	Yes	Notes v, w
Meteorological Parameters	~~(see Table 2.3-23)~~	E3	No	No	15	CRT (ERFDADS)	Core Load	N-1E	Yes	Yes	Note u, l
Containment Sump and Atmospheric Sampling	N/A	E3	No	No	1 post accident sampling system	CRT (ERFDADS)	Core Load	N-1E	Yes	Yes	Notes d, h
Boric Acid Tank Charging Flow	----	----	----	----	----	----	----	----	----	----	Note g
Containment Atmospheric Temperature	50-200°F	D3	No	No	1	1 meter	Complete	N-1E	No	No	Note i
ECCS Accumulator Tank Level (move to place shown on p. 7.5-21)	0-100% of span	D3	No	No	2 per tank	3 meters, one per tank, showing 2 channels	Complete	N-1E	Yes	Yes	Note j
Containment Sump Water Temperature	50-400°F	D3	No	No	1 per RHR HX inlet	CRT (ERFDADS)	Complete	N-1E	Yes	Yes	Note k
Quench Tank Temperature	50-350°F	D3	No	No	1	1 meter	Complete	N-1E	No	No	Conforms (Note ae)
Quench Tank Pressure	0-100psig	D3	No	No	1	1 meter	Complete	N-1E	No	No	Conforms (Note ae)
Quench Tank Water Level	0-100% of span	D3	No	No	1	1 meter	Complete	N-1E	No	No	Conforms (Note ae)

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TABLE 7.5-1

POST-ACCIDENT MONITORING INSTRUMENTATION (Continued)

Variable	Range/Status	Type/ Category	Sensor Qualification: Environmental	Sensor Qualification: Seismic	Number of Channels	Control Room Indication	Implementation Date	Sensor Power Supply	EOC Indication	TSC Indication	Conformance to RG 1.97, Rev. 2
Heat Removal by the Containment Fan Heat Removal System	----	----	----	----	----	----	----	----	----	----	Note m
move to 7.5-29 Emergency Ventilation Damper Position	Open/Closed	D2	Yes	Yes	1 per damper	1 pair of lights per damper	Complete	1E	Yes	Yes	Note p Conforms (Note f)
Radioactive Liquid Tank Level	0-100% of span	D3	No	No	1 per tank	None (Note ah)	Complete	N-1E	No	No	Note ah
Radioactive Gas Holdup Tank Pressure	----	----	----	----	----	----	----	----	----	----	Note af

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regroup so that if entries are in 1st and last columns only, those items are at end of table. That is, Boric Acid Tank Charging Flow, Heat Removal by Cont. Fan ...., Radioactive Gas Holdup Tank Pressure and Radioactivity Level - Vent... Valves will be the last entries on this table.

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TABLE 7.5-1 (Continued)

NOTES

a. Noble Gas: 10^{-6} to 10^{5} μCi/cc, Particulate: 10^{-11} to 10^{2} μCi/cc, Halogens: 10^{-11} to 10^{2} μCi/cc.

To cover the required range of particulates and halogens, a combination of on-line detection and grab sample capability with onsite analysis is employed. These monitors are environmentally qualified, but not seismically qualified, since they are attached to a non-seismic system. 40

b. RCS Pressure - one qualified channel of wide range RCS pressure and two qualified channels of extended range RCS pressure are used to monitor RCS pressure for STP.

c. Containment Isolation Valve Status - STP has identified instrumentation that is necessary to assess the process of accomplishing or maintaining critical safety functions. The critical safety functions defined are equivalent to those utilized in the Westinghouse Owners Group Emergency Response Guidelines, i.e., Subcriticality, RCS Integrity, Reactor Coolant Inventory, Reactor Core Cooling, Heat Sink Maintenance, and Containment Environment. Containment isolation valve status is not a critical safety function. However, the containment isolation valve positions were designated variables for monitoring the actual gross breach of the containment and are therefore ~~qualified to~~ designated as Category 2. ~~criteria.~~ 53

Add insert A →

d. The STP Post-Accident Sampling System is sufficient for obtaining samples to perform detailed analysis of RCS coolant, containment sump, and containment atmospheric activity. Offline measurement systems are considered Category 3 variables. The PASS is described in Section 9.3.2. 40

Add insert G →

e. Pressurizer Heater Status - RG 1.97, Rev. 2 specified that heater current was the preferred parameter for determining heater status. For STP, heater breaker position was selected for determining pressurizer heater status due to hardware considerations. Breaker position provides adequate indication to the operator to ensure that the two pressurizer heater banks powered from the Class 1E busses are operable.

replace with Insert C →

f. The study performed on STP indicated that these parameters were needed in the minimum set of parameters necessary to monitor the performance of: 53

1. Plant safety systems employed for mitigating the consequences of an accident and subsequent plant recovery to attain a safe shutdown condition, including verification of the automatic actuation of safety systems.

2. Systems normally employed for attaining a cold shutdown condition. 40

g. Boric Acid Tank Charging Flow - For monitoring the performance of the Emergency Core Cooling System (ECCS), STP has designated Refueling Water Storage Tank (RWST) Level, High Head Safety Injection (HHSI) Flow,

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TABLE 7.5-1 (Continued)

NOTES

Low Head Safety (LHSI) Injection Flow, Containment Water Level, and ECCS Valve Status. Since the ECCS does not take suction from the Boric Acid Tank (BAT), the Boric Acid Charging Flow was not designated a key variable. If the operator uses the BAT for boration following an accident, normal charging flow and RCS sampling is used to demonstrate that the RCS is being borated. 40

h. Data entry is via manual keyboard.

i. Containment Atmospheric Temperature - The WOG Emergency Response Guidelines (ERG) do not require the operator to take an action that would result in adverse consequences if the Containment temperature indication was providing an erroneous value. As such, the Containment temperature indication is considered a D3 parameter and is not specifically identified on this listing. 53

replace by INSERT E

j. Accumulator pressure indication and valve position indication for the accumulator discharge isolation valves and accumulator vent valves provide adequate status of the accumulators.

replace by INSERT D

k. Containment sump water temperature indication is not utilized by the operator to take corrective action. Other parameters were designated as STP type D variables to demonstrate that the Safety Injection System (SIS) is operating properly when taking suction from the Containment sump.

replace by INSERT F

l. Conforms to RG 1.97, Rev. 3. 40

m. Heat removal by the Containment Heat Removal System (CHRS) - Other parameters were designated as STP type D variables to demonstrate that the containment heat removal systems are operating properly. These include the following:

- Containment Spray Flow
- Containment Spray System (CSS) valve status
- Containment Pressure
- Containment Water Level
- Containment Spray Pump Status
- Reactor Containment Fan Cooler (RCFC) Differential Pressure
- RCFC Status

n. Condenser Vacuum Pump Radiation Monitor - This parameter is considered to be a backup variable for the measurement of secondary side radiation.

TABLE 7.5-1 (Continued)

NOTES

Main steamline radiation monitors are adequate to provide primary indication of this information. The condenser vacuum pump radiation monitor is environmentally qualified, but not seismically qualified, since it is attached to a non-seismic system. 40

o. The STP design utilizes four physically separate auxiliary feedwater lines. The four Class 1E transmitters provide the redundancy required. The requirement is to ensure flow to at least one intact steam generator post-accident. The required redundancy with a four loop plant is provided by one channel per loop. SG Water Level Wide Range provides a diverse backup. Total AFW flow (0-2800 gpm) is also displayed via the QDPS. 53

p. Deleted. 40 53

Emergency Ventilation Damper Position - As an alternate to monitoring ventilation damper position, STP monitors radiogas, radioparticulate, and/or radioiodine concentrations at various locations in the plant which provide information concerning the status of the ventilation system. These parameters include:

- Area radiation in locations which contain, or could contain, significant quantities of radioactive material
- Unit vent radiogas concentration
- Radiogas concentration discharged from non-headered vents
- Environs radiation
- Fuel handling building vent radiation 40
- Effluent path flow rate

q. Effluent Path Flow Rate/Status - Variables which provide the operator with information to estimate the magnitude of release of radioactive materials through identified pathways. Valve status is the primary variable and flow rate is a backup variable.

r. Neutron Flux - No diverse variable is required since the failure of one channel will not cause the operator to violate the required safety function.

s. Two Containment high range monitors meet the requirements of a Type A variable. These monitors are Class 1E, redundant and fully qualified to Category 1 requirements. Six area monitors are located throughout Containment with the range of 0.1 to 10,000 mR/hr that provide additional monitoring over this range. In addition, the off-scale high readings of the low range monitors provide some information to resolve ambiguity above this range. These two qualified high range radiation monitors also satisfy the requirements of NUREG-0737.

TABLE 7.5-1 (Continued)

NOTES

t. The study performed on STP indicated that these parameters were included in the minimum set of parameters necessary to monitor for release of radioactivity via liquid effluent pathways. These monitors are environmentally qualified, but not seismically qualified since they are attached to non-seismically qualified systems.

u. Meets requirements of RG 1.23. Refer to Table 2.3-23 for additional information.

v. For the purpose of radiological release calculations, the conservative assumption of maximum flow will be utilized. Actual flow indication serves as a backup parameter and is designated Category 3.

w. These Category 2 sensors are environmentally, but not seismically qualified, since they are attached to a non-seismic system.

x. Rod position indication is provided in the CR via the digital rod position indication system light emitting diode (LED) display.

y. Instrument loops on Class 1E systems are qualified up to and including channel isolation devices.

z. These Category 2 sensors are environmentally and seismically qualified; however, they are installed in a non-seismic system and are therefore not listed as seismically qualified instruments. They are installed using mountings similar to those used for comparable seismically qualified equipment.

aa. A description of the containment water level measurement design is provided in Appendix 7A, item II.F.1.

add insert B

ab.

ac. Refer to Table 12.5-1 for additional information.

ad. A portable Canberra multichannel analyzer is provided.

ae. Digital inputs to the ERFDADS for the quench tank (PRT) are the following: high/low water level, high pressure, and high temperature. These digital points are available at the EOC and TSC using ERFDADS.

af. The STP Gaseous Waste Processing System does not utilize gas holdup tanks. The GWPS design description is provided in Section 11.3. This variable is not applicable to the STP design.

ag. As indicated in NUREG-0737, Item II.F.1, offline monitors are not required for PWR secondary side safety valve and dump valve discharge lines. Main steam line radiation monitors have been provided, as indicated in this table (A1, B2, C2, E2 type and category).

add Insert H

ah.

Insert A: The appurtenances and power supplies for the containment isolation valves meet the intent of Regulatory Guide 1.97 Category 1 instrumentation. For isolation valves in series, a single indication on each valve is sufficient to satisfy the requirements when those indications are powered from different trains.

Insert B: The maximum pressure allowed by the Technical Specifications is between 586 and 679 psig. The two series check valves in each accumulator discharge line prevent fluid addition to the tank during operation. The accumulator discharge valves are also locked open during operation. Hence, any malfunction of the two check valves would be immediately indicated in the control room. The accumulator is also protected by a spring loaded safety valve with a setting of 10 psig.

Insert C: The South Texas Project has 2 banks of pressurizer heaters normally loaded on the Class 1E emergency buses. Hence, the requirements stated in NUREG-0737, Section II.E.3.1 are met without necessitating operator action. Since the heater banks are normally loaded on emergency buses, heater breaker position was selected for determining pressurizer heater status.

Insert D: The span of the installed instrument is approximately 14 inches from 39 to 64 percent of the tank volume. The two series check valves in each accumulator discharge line prevent fluid addition during operation. Accumulator isolation valve position, vent valve position and pressure (all of which are Category 2 instrumentation) provide the operator adequate information to monitor the status of the accumulators.

Insert E: The key South Texas Project variables for monitoring the accomplishment of containment cooling are containment spray flow, containment water level (wide range), containment water level (narrow range), containment pressure, containment spray system valve status, containment spray pumps status and RCB fan cooler differential pressure/status. Immediately after containment spray is initiated, the containment atmosphere is saturated and the temperature is calculated from the containment pressure.

Insert F: Containment sump water temperature is not required for emergency core cooling system operation or assurance that minimum NPSH requirements are met. NPSH calculations conservatively assume saturated water is present (see Section 6.2.2.3.5). Containment water level measurements indicate that a source of water is available and as described in Note i, containment cooling is verified by other plant parameters. Therefore this variable designation is Type D, Category 3. Should an indication of sump water temperature be desirable, the RHR heat exchanger inlet temperature should be used.

Insert G: The offline measurements available and the corresponding ranges are as shown below:

Boron	0-6000 ppm
pH	0-14
Specific Conductivity	0-1000 μmhos/cm
Dissolved Oxygen	0-20 ppm
Chloride	0-20 ppm
Dissolved Hydrogen	0-2000 cc/kg
Gross Activity	10 μCi/ml - 10 Ci/ml
Gamma Spectrum	0-2000 mR/sec (uncorrected) (determined by Ortek gamma spectroscopy system)

Refer to Appendix 7A, item II.B.3 for additional information.

Insert H: Indication and alarm for LWPS tank levels are provided in the radwaste control room, which is located in the Mechanical Auxiliary Building, except for the Reactor Coolant Drain Tank. Level indication and alarms for the RCDT are provided in the control room. For further information, refer to Section 11.2 and Table 11.2-5A.

Attachment C

Amendment 53 revisions of Table 7.5-1 were made to address the latest design relative to:

1. Range clarification/verification
2. Number of channels verification
3. Displays verification
4. Reflection of plant effluent points
5. Wording clarification

Letters sent to NRC providing information pertinent to this submittal include the following:

ST-HL-AE-1526, dated 11/22/85	Table 12.5.1
ST-HL-AE-1388, dated 10/14/85	Section 7A.II.B.3

Attached is a markup change in FSAR Section 7A.II.F.1 to show the revised sensor locations for the containment water level narrow range and wide range sensors. This information is referenced in Note aa to Table 7.5-1.

II.F.1 (Continued)

The plant effluent sampling system and analysis capability are further discussed in Section 11.5. ~~(later).~~ 40

(3) Containment High Range Radiation Monitor

Redundant Class 1E, monitors are provided in the Containment Building, 180° apart on the operating deck (elevation 68°). The range of the monitors is 1R/hr to 10^8 R/hr gamma. 44

(4) Containment Pressure

Redundant Class 1E containment pressure and extended range containment pressure monitoring channels provide continuous monitoring and recording of containment pressure. These monitors cover a range of -5 to 180 psig; accuracy of these monitors is approximately ±3 percent. 40 49

(5) Containment Water Level

The STP design includes above redundant, Class 1E, wide range level monitors. These monitors are located ~~on~~ the containment floor ~~at~~ (elevation -11'3") as shown in Figure 7A.II.F.1-1. ~~The wide range monitoring channels provide indication ranging from the containment floor to an elevation corresponding to a water volume of 609,000 gallons.~~ In addition, Class 1E narrow range monitors are provided in the normal and secondary sumps. ~~The narrow range monitoring channels provide indication from the bottom to the top of the normal and secondary sumps.~~ 40

These level monitors detect the presence of water at discrete predetermined levels. The accuracy of detection at each point is approximately ±1/4 inch.

The wide range monitors position the detection lowest measurement point points more closely at the bottom than at the top. In addition, the detection points of the three monitors are chosen to provide overlap. Above the ~~Floor~~ at El. ~~-11'3"~~ -10'5", for the first foot, detection points are one inch apart (i.e., four points per monitor, 3 inches apart). For the next two feet, detection points are three inches apart. For the next 3 1/2 feet, detection points are six inches apart. 49

The narrow range monitors provided in the normal sump (bottom at El. -17'3") and the secondary sump (bottom at El. -12'3") use a detection point spacing of six inches. The normal sump monitor provides level detection between El. -17'0" and -11'6"; the secondary sump monitor provides level detection at El. ~~-11'9"~~ -12'0" and ~~-11'3"~~ -11'0".

and twelve inches respectively.

-16'3" and -10'9"

These monitoring channels provide continuous monitoring and recording of the containment water level for use in diagnosis of a Loss-of-Coolant Accident, providing indication ranging from levels indicative of a small break LOCA, with levels in the normal and secondary sumps and just above floor elevation, through elevation -4'0", which provides level indication above the maximum flood elevation of -4'9".