

CHAPTER 7  
INSTRUMENTATION AND CONTROLS

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**CHAPTER 7****INSTRUMENTATION AND CONTROLS**

## 7.1 INTRODUCTION

This **section** of the referenced DCD is incorporated by reference with the following departures and/or supplements.

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## 7.1.6.1 Setpoint Calculations for Protective Functions

STD COL 7.1-1 The Setpoint Program described in Technical Specifications Section 5.5 provides the appropriate controls for update of the instrumentation setpoints following completion of the calculation of setpoints for protective functions and the reconciliation of the setpoints against the final design.

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## 7.2 REACTOR TRIP

This **section** of the referenced DCD is incorporated by reference with no departures or supplements.

### 7.3 ENGINEERED SAFETY FEATURES

This **section** of the referenced DCD is incorporated by reference with the following departures and/or supplements.

#### 7.3.1.2.14 Boron Dilution Block

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Revise the fourth paragraph of DCD Subsection 7.3.1.2.14 to read:

WLS DEP 7.3-1 Condition 1 is an average of the source range count rate, sampled at least N times over the most recent time period T1, compared to a similar average taken at time period T2 earlier. If the ratio of the current average count rate to the earlier average count rate is greater than a preset value, a partial trip is generated in the division. On a coincidence of excessively increasing source range neutron flux in two of the four divisions, boron dilution is blocked. The Flux Doubling function is also delayed from actuating each time the source range detector's high voltage power is energized to prevent a spurious dilution block due to the short term instability of the processed source range values. This source range flux doubling signal may be manually blocked to permit plant startup and normal power operation when reactor coolant average temperature is above the P-8 setpoint. It is automatically reinstated when reactor power is decreased below the P-6 power level during shutdown or reactor coolant average temperature decreases below the P-8 setpoint.

The Flux Doubling function can also be manually blocked during shutdown conditions when below the P-8 reactor coolant average temperature. When blocked during shutdown conditions, the CVS demineralized water system isolation valves are automatically closed to prevent inadvertent boron dilution.

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TABLE 7.3-201 (Sheet 1 of 3)  
ENGINEERED SAFETY FEATURES ACTUATION SIGNALS

Actuation Signal	No. of Divisions/ Controls	Actuation Logic	Permissives and Interlocks
12. Passive Residual Heat Removal (Figure 7.2-1, Sheet 8)			
a. Manual initiation	2 controls	1/2 controls	None
b. Low narrow range steam generator water level coincident with	4/steam generator	2/4-BYP <sup>1</sup> in either steam generator	None
Low startup feedwater flow	2/feedwater line	1/2 in either feedwater line	None
c. Low steam generator wide range water level	4/steam generator	2/4-BYP <sup>1</sup> in either steam generator	None
d. Core makeup tank injection	(See Items 6a through 6e)		
e. Automatic reactor coolant system depressurization (first stage)	(See items 3a through 3c)		
f. High-3 pressurizer level	4	2/4-BYP <sup>1</sup>	Manual block permitted below P-19 Automatically unblocked above P-19
13. Block of Boron Dilution (Figure 7.2-1, Sheets 3 and 15)			
WLS DEP 7.3-1 a. Flux doubling calculation	4	2/4-BYP <sup>1</sup>	Manual block permitted above P-8 Automatically unblocked (momentary) below P-6 or below P-8 Demineralized water system isolation valves closed if blocked below P-8
b. Undervoltage to Class 1E battery chargers <sup>(8)</sup>	2/charger	2/2 per charger and 2/4 chargers <sup>5</sup>	None
c. Reactor trip (P-4)	1/division	2/4	None

TABLE 7.3-201 (Sheet 2 of 3)  
ENGINEERED SAFETY FEATURES ACTUATION SIGNALS

Actuation Signal	No. of Divisions/ Controls	Actuation Logic	Permissives and Interlocks
14. Chemical Volume Control System Isolation (Figure 7.2-1, Sheets 6 and 11)			
a. High-2 pressurizer water level	4	2/4-BYP <sup>1</sup>	Automatically unblocked above P-19 Manual block permitted below P-19
b. High-2 steam generator narrow range level	4/steam generator	2/4-BYP <sup>1</sup> in either steam generator	None
c. Automatic or manual safeguards actuation signal coincident with	(See items 1a through 1e)		
High-1 pressurizer water level	4	2/4-BYP <sup>1</sup>	None
d. High-2 containment radioactivity	4	2/4-BYP <sup>1</sup>	None
e. Manual initiation	2 controls	1/2 controls	None
f. Flux doubling calculation	4	2/4-BYP <sup>1</sup>	Manual block permitted above P-8 Automatically unblocked (momentary) below P-6 or below P-8 Demineralized water system isolation valves closed if blocked below P-8
g. High steam generator narrow range level coincident with	4/steam generator	2/4-BYP <sup>1</sup> in either steam generator	None
Reactor trip (P-4)	1/division	2/4	None
15. Steam Dump Block (Figure 7.2-1, Sheet 10) <sup>(8)</sup>			
a. Low reactor coolant temperature (Low-2 T <sub>avg</sub> )	2/loop	2/4-BYP <sup>1</sup>	None
b. Mode control	2 controls	1/division	None

WLS DEP 7.3-1



TABLE 7.3-201 (Sheet 3 of 3)  
ENGINEERED SAFETY FEATURES ACTUATION SIGNALS

Actuation Signal	No. of Divisions/ Controls	Actuation Logic	Permissives and Interlocks
c. Manual stage 1 cooldown control	2 controls	1/division	None
d. Manual stage 2 cooldown control	2 controls	1/division	None
16. Main Control Room Isolation and Air Supply Initiation (Figure 7.2-1, Sheet 13)			
a. High-2 control room supply air radiation	2	1/2	None
b. Undervoltage to Class 1E battery chargers <sup>(8)</sup>	2/charger	2/2 per charger and 2/4 chargers <sup>5</sup>	None
c. Manual initiation <sup>(8)</sup>	2 controls	1/2 controls	None
17. Auxiliary Spray and Purification Line Isolation (Figure 7.2-1, Sheet 12)			
a. Low-1 pressurizer level	4	2/4-BYP <sup>1</sup>	Manual block permitted below P-12 Automatically unblocked above P-12
b. Manual initiation of chemical and volume control system isolation	(See item 14e)		

TABLE 7.3-202  
INTERLOCKS FOR ENGINEERED SAFETY FEATURES ACTUATION SYSTEM

Designation	Derivation	Function	
P-3	Reactor trip breaker open	Permits manual reset of safeguards actuation signal to block automatic safeguards actuation	
P-3	Reactor trip breakers closed	Automatically resets the manual block of automatic safeguards actuation	
P-4	Reactor trip initiated or reactor trip breakers open	(a) Isolates main feedwater if coincident with low reactor coolant temperature (b) Trips turbine (c) Blocks boron dilution	
P-4	No reactor trip initiated and reactor trip breakers closed	Removes demand for isolation of main feedwater, turbine trip and boron dilution block	
P-6	Intermediate range neutron flux channels above setpoint	None	
P-6	Intermediate range neutron flux channels below setpoint	Automatically resets the manual block of flux doubling actuation of the boron dilution block	
WLS DEP 7.3-1	P-8	Reactor coolant average temperature above setpoint	Permits manual block of flux doubling actuation of the boron dilution block
WLS DEP 7.3-1	P-8	Reactor coolant average temperature below setpoint	(a) Automatically resets (momentary) the manual block of flux doubling actuation of the boron dilution block (b) Closes demineralized water system isolation valves if flux doubling actuation of the boron dilution block is blocked below P-8
	P-11	Pressurizer pressure below setpoint	(a) Permits manual block of safeguards actuation on low pressurizer pressure, low compensated steam line pressure, or low reactor coolant inlet temperature (b) Permits manual block of steam line isolation on low reactor coolant inlet temperature (c) Permits manual block of steam line isolation and steam generator power-operated relief valve block valve closure on low compensated steam line pressure (d) Coincident with manual actions of (b) or (c), automatically unblocks steam line isolation on high negative steam line pressure rate (e) Permits manual block of main feedwater isolation on low reactor coolant temperature

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## 7.4 SYSTEMS REQUIRED FOR SAFE SHUTDOWN

This **section** of the referenced DCD is incorporated by reference with the following departures and/or supplements.

### 7.4.1.1 Safe Shutdown Using Safety-Related Systems

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Revise the second sentence of the sixth paragraph of DCD Subsection 7.4.1.1 as follows:

- WLS DEP 6.3-1 This prevents loss of water inventory from containment and permits extended operation of the passive residual heat removal heat exchanger and the in-containment refueling water storage tank.
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Revise the last sentence of the eighth paragraph of DCD Subsection 7.4.1.1 as follows:

- WLS DEP 3.2-1 The system provides core decay heat removal in this configuration with a limited  
WLS DEP 6.3-1 increase in the containment water level.
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Revise the ninth paragraph of DCD Subsection 7.4.1.1 as follows:

- WLS DEP 3.2-1 Once the reactor coolant system and the safety systems are in this configuration, the plant is in a stable shutdown condition. The reactor coolant system temperatures and pressures continue to slowly decrease. The passive residual heat removal heat exchanger has the capacity to maintain a safe, stable reactor coolant system condition during a design basis event for at least 72 hours in a closed-loop mode of operation. A non-bounding, conservative analysis of extended operation in this mode shows the passive residual heat removal heat exchanger cools the reactor coolant system to 420°F in 36 hours.
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Revise the last three sentences of the eleventh paragraph of DCD Subsection 7.4.1.1 as follows:

- WLS DEP 3.2-1 The operator assessment includes consideration for a visible refueling water storage tank level, full core makeup tanks, a high and stable pressurizer level, and decreasing or stable reactor coolant system temperature. If automatic depressurization is not needed, the operator is directed to de-energize all loads on the Class 1E dc batteries. This action preserves the capability for the operator to initiate automatic depressurization at a later time based on assessment of the same parameters.
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## 7.5 SAFETY-RELATED DISPLAY INFORMATION

This **section** of the referenced DCD is incorporated by reference with the following departures and/or supplements.

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7.5.2 VARIABLE CLASSIFICATIONS AND REQUIREMENTS

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Add the following paragraph at the end of DCD Subsection 7.5.2.

STD COL 7.5-1 FSAR **Table 7.5-201** supplements **DCD Table 7.5-1** and provides variable data shown in the DCD table as “site specific.”

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7.5.3.5 Type E Variables

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Add the following paragraph at the end of DCD Subsection 7.5.3.5.

STD COL 7.5-1 FSAR **Table 7.5-201** supplements **DCD Table 7.5-8** and provides variable data shown in the DCD table as “site specific.”

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7.5.5 COMBINED LICENSE INFORMATION

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STD COL 7.5-1 This COL item is addressed in **Subsection 7.5.2** and **Table 7.5-201**, and in  
WLS COL 7.5-1 **Subsection 7.5.3.5**.

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TABLE 7.5-201  
POST-ACCIDENT MONITORING SYSTEMS<sup>(a)</sup>

WLS COL 7.5-1

Variable	Range/ Status	Number of Instruments Required	Remarks
Boundary environs radiation <ul style="list-style-type: none"> <li>• Airborne Radiohalogens and Particulates (portable sampling with onsite analysis capability)</li> <li>• Radiation (portable instrumentation)</li> <li>• Radioactivity (portable instrumentation)</li> </ul>	$10^{-9}$ to $10^{-3}$ $\mu\text{Ci/cc}$  $10^{-3}$ to $10^4$ R/hr, photons $10^{-3}$ to $10^4$ rads/hr, beta radiations and low energy photons  Isotopic Analysis	NA	Conforms to RG 1.97 <sup>(b)</sup>
Meteorological parameters <ul style="list-style-type: none"> <li>• Wind Speed</li> <li>• Wind Direction</li> <li>• Differential Temperature</li> </ul>	See Remarks	NA	Conforms to RG 1.97 <sup>(b)</sup> and RG 1.23; see <b>FSAR Subsection 2.3.3</b> and <b>Table 2.3-281</b>

a) This table supplements **DCD Tables 7.5-1** and **7.5-8** and provides the site specific information noted in the “Remarks” column of **DCD Table 7.5-1** and in the “Variable” column of **DCD Table 7.5-8**.

b) Conformance to Regulatory Guide 1.97 is described in **Appendix 1AA**. Variables and ranges are defined consistent with Regulatory Guide 1.97, Revision 3.

TABLE 7.5-202  
Deleted

7.6 INTERLOCK SYSTEMS IMPORTANT TO SAFETY

This **section** of the referenced DCD is incorporated by reference with no departures or supplements.

## 7.7 CONTROL AND INSTRUMENTATION SYSTEMS

This **section** of the referenced DCD is incorporated by reference with no departures or supplements.