

REACTIVITY CONTROL SYSTEMS

3/4.1.5 STANDBY LIQUID CONTROL SYSTEM

LIMITING CONDITION FOR OPERATION

3.1.5 The standby liquid control system consists of two redundant subsystems and shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITIONS 1 and 2

ACTION:

- a. In OPERATIONAL CONDITION 1 or 2:
 - 1. With one system subsystem inoperable, restore the subsystem to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours.
 - 2. With both system subsystems inoperable, restore at least one subsystem to OPERABLE status within 8 hours or be in at least HOT SHUTDOWN within the next 12 hours.

SURVEILLANCE REQUIREMENTS

4.1.5 The standby liquid control system shall be demonstrated OPERABLE:

- a. At least once per 24 hours by verifying that:
 - 1. The temperature of the sodium pentaborate solution in the storage tank is greater than or equal to 70°F.
 - 2. The available volume of sodium pentaborate solution is within the limits of Figure 3.1.5-1.
 - 3. The heat tracing circuit is OPERABLE by determining the temperature of the pump suction piping to be greater than or equal to 70°F.

TABLE 3.3.2-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION

<u>TRIP FUNCTION</u>	<u>VALVE ACTUA- TION GROUPS OPERATED BY SIGNAL^(d)</u>	<u>MINIMUM OPERABLE CHANNELS PER TRIP SYSTEM^(a)</u>	<u>APPLICABLE OPERATIONAL CONDITION</u>	<u>ACTION</u>
<u>3. MAIN STEAM LINE ISOLATION</u>				
a. Reactor Vessel Water Level - Low Low Low, Level 1	1	2	1, 2, 3	21
b. Main Steam Line Radiation - High, High	2 ^(b)	2	1, 2, 3##	28
c. Main Steam Line Pressure - Low	1	2	1	22
d. Main Steam Line Flow - High	1	2/line	1, 2, 3	20
e. Condenser Vacuum - Low	1	2	1, 2**, 3**	21
f. Main Steam Line Tunnel Temperature - High	1	2/line	1, 2, 3	21
g. Manual Initiation	1, 2, 17	2	1, 2, 3	25
<u>4. REACTOR WATER CLEANUP SYSTEM ISOLATION</u>				
a. RWCU Δ Flow - High	7	1/Valve ^(e)	1, 2, 3	23
b. RWCU Δ Flow - High, Timer	7	1/Valve ^(e)	1, 2, 3	23
c. RWCU Area Temperature - High	7	6/Valve ^(e)	1, 2, 3	23
d. RWCU Area Ventilation Δ Temperature-High	7	6/Valve ^(e)	1, 2, 3	23
e. SLCS Initiation	7 ^(f)	1/Valve ^(e)	1, 2	23
f. Reactor Vessel Water Level - Low Low, Level 2	7	2/Valve ^(e)	1, 2, 3	23
g. Manual Initiation	7	1/Valve ^(e)	1, 2, 3	25

TABLE 3.3.2-1 (Continued)

NOTES

- * When handling recently irradiated fuel in the secondary containment and during operations with a potential for draining the reactor vessel.
- ** When any turbine stop valve is greater than 90% open and/or when the key-locked bypass switch is in the Norm position.
- ## The hydrogen water chemistry (HWC) system shall not be placed in service until reactor power reaches 20% of RATED THERMAL POWER. After reaching 20% of RATED THERMAL POWER, and prior to operating the HWC system, the normal full power background radiation level and associated trip setpoints may be increased to levels previously measured during full power operation with hydrogen injection. Prior to decreasing below 20% of RATED THERMAL POWER and after the HWC system has been shutoff, the background level and associated setpoint shall be returned to the normal full power values. If a power reduction event occurs so that the reactor power is below 20% of RATED THERMAL POWER without the required setpoint change, control rod motion shall be suspended (except for scram or other emergency actions) until the necessary setpoint adjustment is made.
- (a) A channel may be placed in an inoperable status for up to 6 hours for required surveillance without placing the trip system in the tripped condition provided at least one other OPERABLE channel in the same trip system is monitoring that parameter.
- (b) Also trips and isolates the mechanical vacuum pumps.
- (c) Also starts the Filtration, Recirculation and Ventilation System (FRVS).
- (d) Refer to Table 3.3.2-1 table notation for the listing of which valves in an actuation group are closed by a particular isolation signal. Refer to Tables 3.6.3-1 and 3.6.5.2-1 for the listings of all valves within an actuation group.
- (e) Sensors arranged per valve group, not per trip system.
- (f) Closes only RWCU system isolation valve(s) HV-F001 and HV-F004.
- (g) Requires system steam supply pressure-low coincident with drywell pressure-high to close turbine exhaust vacuum breaker valves.
- (h) Manual isolation closes HV-F008 only, and only following manual or automatic initiation of the RCIC system.
- (i) Manual isolation closes HV-F003 and HV-F042 only, and only following manual or automatic initiation of the HPCI system.
- (j) Trip functions common to RPS instrumentation.

TABLE 4.3.2.1-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>TRIP FUNCTION</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>CHANNEL CALIBRATION</u>	<u>OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED</u>
<u>MAIN STEAM LINE ISOLATION (Continued)</u>				
e. Condenser Vacuum - Low	S	Q	R	1, 2**, 3**
f. Main Steam Line Tunnel Temperature - High	NA	Q	R	1, 2, 3
g. Manual Initiation	NA	Q(a)	NA	1, 2, 3
4. <u>REACTOR WATER CLEANUP SYSTEM ISOLATION</u>				
a. RWCU Δ Flow - High	S	Q	R	1, 2, 3
b. RWCU Δ Flow - High, Timer	NA	Q	R	1, 2, 3
c. RWCU Area Temperature - High	NA	Q	R	1, 2, 3
d. RWCU Area Ventilation Δ Temperature - High	NA	Q	R	1, 2, 3
e. SLCS Initiation	NA	Q(b)	NA	1, 2
f. Reactor Vessel Water Level - Low Low, Level 2	S	Q	R	1, 2, 3
g. Manual Initiation	NA	Q(a)	NA	1, 2, 3
5. <u>REACTOR CORE ISOLATION COOLING SYSTEM ISOLATION</u>				
a. RCIC Steam Line Δ Pressure (Flow) - High	NA	Q	R	1, 2, 3
b. RCIC Steam Line Δ Pressure (Flow) - High, Timer	NA	Q	R	1, 2, 3
c. RCIC Steam Supply Pressure - Low	NA	Q	R	1, 2, 3
d. RCIC Turbine Exhaust Diaphragm Pressure - High	NA	Q	R	1, 2, 3

TABLE 4.3.2.1-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>TRIP FUNCTION</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>CHANNEL CALIBRATION</u>	<u>OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED</u>
<u>HIGH PRESSURE COOLANT INJECTION SYSTEM ISOLATION (Continued)</u>				
h. HPCI Torus Compartment Temperature - High	NA	Q	R	1, 2, 3
i. Drywell Pressure - High	NA	Q	R	1, 2, 3
j. Manual Initiation	NA	R	NA	1, 2, 3
7. <u>RHR SYSTEM SHUTDOWN COOLING MODE ISOLATION</u>				
a. Reactor Vessel Water Level - Low, Level 3	S	Q	R	1, 2, 3
b. Reactor Vessel (RHR Cut-in Permissive) Pressure - High	NA	Q	R	1, 2, 3
c. Manual Initiation	NA	Q(a)	NA	1, 2, 3

* When handling recently irradiated fuel in the secondary containment and during operations with a potential for draining the reactor vessel.

** When any turbine stop valve is greater than 90% open and/or when the key-locked bypass switch is in the Norm position.

(a) Manual initiation switches shall be tested at least once per 18 months. All other circuitry associated with manual initiation shall receive a CHANNEL FUNCTIONAL TEST at least once per 92 days as part of circuitry required to be tested for automatic system isolation.

(b) Each train or logic channel shall be tested at least every other 92 days.

INSTRUMENTATION

BASES

3/4.3.2 ISOLATION ACTUATION INSTRUMENTATION

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The valve groups actuated by this Function are listed in Table 3.3.2-1.

4.c, 4.d. RWCU Area Temperature and Area Ventilation Differential Temperature - High

RWCU area temperatures and area ventilation differential temperatures are provided to detect a leak from the RWCU System. The isolation occurs even when very small leaks have occurred and is diverse to the high differential flow instrumentation for the hot portions of the RWCU System. If the small leak continues without isolation, offsite dose limits may be reached. Credit for these instruments is not taken in any transient or accident analysis in the UFSAR, since bounding analyses are performed for large breaks such as recirculation or MSL breaks.

Area temperature and area ventilation differential temperature signals are initiated from temperature elements that are located in the room that is being monitored. Twelve ambient temperature sensor/monitors provide input to the RWCU Area Temperature - High Function. Twelve channels are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

Twelve differential temperature sensor/monitors provide input to the RWCU Area Ventilation Differential Temperature - High Function. Twelve channels are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The valve groups actuated by this Function are listed in Table 3.3.2-1.

4.e. SLC System Initiation

The isolation of the RWCU System is required when the SLC System has been initiated to prevent dilution and removal of the boron solution by the RWCU System. SLC System initiation signals are initiated from the two SLC pump start signals.

Two channels (one from each pump) of the SLC System Initiation Function are available and are required to be OPERABLE only in OPERATIONAL CONDITIONS 1 and 2 (when the SLC system is required to be OPERABLE), since these OPERATIONAL CONDITIONS are consistent with the Applicability for the SLC System (TS 3.1.5).

4.f. Reactor Vessel Water Level - Low Low, Level 2

Low RPV water level indicates that the capability to cool the fuel may be threatened. Should RPV water level decrease too far, fuel damage could result. Therefore, isolation of some interfaces with the reactor vessel occurs to isolate the potential sources of a break. The isolation of the RWCU System on Level 2 supports actions to ensure that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46. The Reactor Vessel Water Level - Low Low, Level 2 Function associated with RWCU isolation is not