UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

NEBRASKA PUBLIC POWER DISTRICT

DOCKET NO. 50-298

COOPER NUCLEAR STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 152
License No. DPR-46

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Nebraska Public Power District (the licensee) dated September 30, 1991, as supplemented by letter dated January 20, 1992, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this license amendment will not be inimical t. the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and Paragraph 2.C.(2) of Facility Operating License No. DPR-46 is hereby amended to read as follows:

   2. Technical Specifications

      The Technical Specifications contained in Appendix A, as revised through Amendment No. 152 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. The license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

John T. Larkins

John T. Larkins, Director
Project Directorate IV-1
Division of Reactor Projects - III/IV/V
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
  Specifications

Date of Issuance: March 11, 1992

ATTACHMENT TO LICENSE AMENDMENT NO. 152

FACILITY OPERATING LICENSE NO. DPR-46

DOCKET NO. 50-298

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change.

REMOVE PAGES	INSERT PAGES
ii-iii	ii-iii
21	21
52-52a	52-52a
83	83
107-108	107-108
110	110
114-122	114-122
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165-166	165-166
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209a-209b	209a-209b
215b-215e	215b-215e
216b2	216b2

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2.1 Bases: (Cont'd)

5. Main Steam Line Isolation Valve Closure on Low Pressure

The low pressure isolation of the main steam lines (Specification 2.1.A.6) was provided to protect against rapid reactor depressurization.

B. Reactor Water Level Trip Settings Which Initiate Core Standby Cooling Systems (CSCS)

The core standby cooling systems are designed to provide sufficient cooling to the core to dissipate the energy associated with the loss-of-coolant accident and to limit fuel clad temperature, to assure that core geometry remains intact and to limit any clad metal-water reaction to less than 1%. To accomplish their intended function, the capacity of each Core Standby Cooling System component was established based on the reactor low water level scram set point. To lower the set point of the low water level scram would increase the capacity requirement for each of the CSCS components. Thus, the reactor vessel low water level scram was set low enough to permit margin for operation, yet will not be set lower because of CSCS capacity requirements.

The design for the CSCS components to meet the above guidelines was dependent upon three previously set parameters: The maximum break size, low water level scram set point and the CSCS initiation set point. To lower the set point for initiation of the CSCS may lead to a decrease in effective core cooling. To raise the CSCS initiation set point would be in a safe direction, but it would reduce the margin established to prevent actuation of the CSCS during normal operation or during normally expected transients.

Transient and accident analyses reported in Section 14 of the Safety Analyses Report demonstrate that these conditions result in adequate safety margins for the fuel.

C. References for 2.1 Bases

1. "Generic Reload Fuel Application," NEDE-24011-P, (most current approved submittal).

2. "Cooper Nuclear Station Single-Loop Operation," NEDO-24258, May 1980.

3. "Supplemental Reload Licensing Submittal for Cooper Nuclear Station Unit 1," (applicable reload document).

4. Safety Analysis Report (Section XIV).

NOTES FOR TABLE 3.2.A

1. Whenever Primary Containment integrity is required there shall be two operable or tripped trip systems for each function.

2. If the minimum number of operable instrument channels per trip system requirement cannot be met by a trip system, that trip system shall be tripped. If the requirements cannot be met by both trip systems, the appropriate action listed below shall be taken.

   A. Initiate an orderly shutdown and have the reactor in a cold shutdown condition in 24 hours.

   B. Initiate an orderly load reduction and have the Main Steam Isolation Valves shut within 8 hours.

   C. Isolate the Reactor Water Cleanup System.

   D. Isolate the Shutdown Cooling mode of the RHR System.

3. Two required for each steam line.

4. These signals also start the Standby Gas Treatment System and initiate Secondary Containment isolation.

5. Not required in the refuel, shutdown, and startup/hot standby modes (interlocked with the mode switch).

6. Requires one channel from each physical location for each trip system.

7. Low vacuum isolation is bypassed when the turbine stop is not full open, manual bypass switches are in bypass and mode switch is not in RUN.

8. The instruments on this table produce primary containment and system isolations. The following listing groups the system signals and the system isolated.

   <u>Group 1</u>

   Isolation Signals:

   1. Reactor Low Low Low Water Level ($\geq$-145.5 in.)
   2. Main Steam Line High Radiation (3 times full power background)
   3. Main Steam Line Low Pressure ($\geq$825 psig in the RUN mode)
   4. Main Steam Line Leak Detection ($\leq$200°F)
   5. Condenser Low Vacuum ($\geq$7" Hg vacuum)
   6. Main Steam Line High Flow ($\leq$150% of rated flow)

   Isolations:

   1. MSIV's
   2. Main Steam Line Drains

NOTES FOR TABLE 3.2.A (cont'd.)

Group 2

Isolation Signals:

1. Reactor Low Water Level (≥4.5 inches)
2. High Dry Well Pressure (≤ 2 psig)

Isolations:

1. RHR Shutdown Cooling mode of the RHR system.
2. Drywell floor and equipment drain sump discharge lines.
3. TIP ball valves
4. Group 6 isolation relays

Group 3

Isolation Signals:

1. Reactor Low Water Level (≥4.5 inches)
2. Reactor Water Cleanup System High Flow (≤200% of system flow)
3. Reactor Water Cleanup System High Area Temperature (≤ 200°F)

Isolations:

1. Reactor Water Cleanup System

Group 4

Isolation Signals:

Provided by instruments on Table 3.2.B (HPCI)

Isolations:

Isolates the HPCI steam line

Group 5

Isolation Signals:

Provided by instruments on Table 3.2.B (RCIC)

Isolations:

Isolates the RCIC steam line.

Group 6

Isolation Signals:

1. Group 2 Isolation Signal
2. Reactor Building H&V Exhaust Plenum High Radiation ((100 mr/hr)

3.2 BASES

In addition to reactor protection instrumentation which initiates a reactor scram, protective instrumentation has been provided which initiates action to mitigate the consequences of accidents which are beyond the operator's ability to control, or terminates operator errors before they result in serious consequences. This set of specifications provides the limiting conditions of operation for the primary system isolation function, initiation of the core cooling systems, control rod block and Standby Gas Treatment System. The objectives of the specifications are (1) to assure the effectiveness of the protective instrumentation when required even during periods when portions of such systems are out of service for maintenance, and (2) to prescribe the trip settings required to assure adequate performance. When necessary, one channel may be made inoperable for brief intervals to conduct required functional tests and calibrations.

Some of the settings on the instrumentation that initiate or control core and containment cooling have tolerances explicitly stated where the high and low values are both critical and may have a substantial effect on safety. The set points of other instrumentation, where only the high or low end of the setting has a direct bearing on safety, are chosen at a level away from the normal operating range to prevent inadvertent actuation of the safety system involved and exposure to abnormal situations.

A. Primary Containment Isolation Functions

Actuation of primary containment valves is initiated by protective instrumentation shown in Table 3.2.A which senses the conditions for which isolation is required. Such instrumentation must be available whenever primary containment integrity is required.

The instrumentation which initiates primary system isolation is connected in a dual bus arrangement.

The low water level instrumentation, set to trip at 168.5 inches (+4.5 inches) above the top of the active fuel, closes all isolation valves except those in Groups 1, 4, 5, and 7. Details of valve grouping and required closing times are given in Specification 3.7. For valves which isolate at this level this trip setting is adequate to prevent core uncovery in the case of a break in the largest line assuming a 60 second valve closing time. Required closing times are less than this.

The low low low reactor water level instrumentation is set to trip when the water level is 19 inches (-145.5 inches) above the top of the active fuel. This trip closes Groups 1 and 7 Isolation Valves (Reference 1), activates the remainder of the CSCS subsystems, and starts the emergency diesel generators. These trip level settings were chosen to be high enough to prevent spurious actuation but low enough to initiate CSCS operation and primary system isolation so that post accident cooling can be accomplished.

LIMITING CONDITIONS FOR OPERATION

3.4 STANDBY LIQUID CONTROL SYSTEM

Applicability:

Applies to the operating status of the Standby Liquid Control System.

Objective:

To assure the availability of a system with the capability to shutdown the reactor and maintain the shutdown condition without the use of control rods.

Specification:

A. Normal System Availability

During periods when fuel is in the reactor and prior to startup from a Cold Condition, the Standby Liquid Control System shall be operable, except as specified in 3.4.B below. This system need not be operable when the reactor is in the Cold Condition and all control rods are fully inserted and Specification 3.3.A is met.

SURVEILLANCE REQUIREMENTS

4.4 STANDBY LIQUID CONTROL SYSTEM

Applicability:

Applies to the surveillance requirements of the Standby Liquid Control System.

Objective:

To verify the operability of the Standby Liquid Control System.

Specification:

A. Normal System Availability

The operability of the Standby Liquid Control System shall be shown by the performance of the following tests:

1. At least once per month each subsystem shall be tested for operability by recirculating demineralized water to the test tank.

2. At least once during each operating cycle:

a. Check that the settings of the subsystem relief valves are $1450 < P < 1680$ psig and the valves will reset at $P \geq 1300$ psig.

b. Manually initiate the system, except explosive valves, and pump boron solution from the Standby Liquid Control Storage Tank through the recirculation path. Minimum pump flow rate of 38.2 gpm against a system head of 1300 psig shall be verified. After pumping boron solution the system will be flushed with demineralized water.

c. Manually initiate one of the Standby Liquid Control System Pumps and

LIMITING CONDITIONS FOR OPERATION

3.4

B. Operation with Inoperable Components:

1. From and after the date that one subsystem is made or found to be inoperable, Specification 3.4.A.1 shall be considered fulfilled and continued operation permitted provided that the operable subsystem remains operable and the inoperable subsystem is returned to an operable condition within seven days.

C. Sodium Pentaborate Solution

At all times when the Standby Liquid Control System is required to be operable the following conditions shall be met:

1. The net volume versus concentration of the Liquid Control Solution in the liquid control tank shall be maintained as required in Figure 3.4.1.

2. The temperature of the liquid control solution shall be maintained above the curve shown in Figure 3.4.2.

SURVEILLANCE REQUIREMENTS

4.4.A.2.c (Cont'd.)

pump demineralized water into the reactor vessel from the test tank.

These tests check the actuation of the explosive charge of the tested loop, proper operation of the valves, and pump operability. The replacement charges to be installed will be selected from the same manufactured batch as a previously tested charge.

d. Both subsystems, including both explosive valves, shall be tested in the course of two operating cycles.

B. Surveillance with Inoperable Components:

1. When a subsystem is found to be inoperable, the operable subsystem shall be verified to be operable immediately and daily thereafter until the inoperable subsystem is returned to an operable condition.

C. Sodium Pentaborate Solution

The following tests shall be performed to verify the availability of the Liquid Control Solution:

1. Volume: Check and record at least once per day.

2. Temperature: Check and record at least once per day.

3. Concentration: Check and record at least once per month. Also check concentration anytime water or boron is

3.4 BASES

STANDBY LIQUID CONTROL SYSTEM

A. The Standby Liquid Control System consists of two, distinct subsystems, each containing one positive displacement pump and independent suction from the liquid control tank, and discharge to a common injection header through parallel squibb valves. The purpose of the Standby Liquid Control System is to provide the capability of bringing the reactor from full power to a cold, xenon-free shutdown condition assuming that none of the withdrawn control rods can be inserted. To meet this objective, the system is designed to inject a quantity of boron that produces a concentration of 600 ppm of boron in the reactor core in less than 125 minutes. The 600 ppm concentration in the reactor core is required to bring the reactor from full power to a 3.0 percent Δk subcritical condition, considering the hot to cold reactivity difference, xenon poisoning, etc. The time requirement for inserting the boron solution was selected to override the rate of reactivity insertion caused by cooldown of the reactor following the xenon poison peak.

The conditions under which the Standby Liquid Control System must provide shutdown capability are identified via the Plant Nuclear Safety Operational Analysis (Appendix G). If no more than one operable control rod is withdrawn, the basic shutdown reactivity requirement for the core is satisfied and the Standby Liquid Control System is not required. Thus, the basic reactivity requirement for the core is the primary determinant of when the Standby Liquid Control System is required.

The minimum limitation on the relief valve setting is intended to prevent the recycling of liquid control solution via the lifting of a relief valve at too low a pressure. The upper limit on the relief valve setting provides system protection from overpressure.

B. Only one of the two Standby Liquid Control subsystems is needed for operating the system. One inoperable subsystem does not immediately threaten shutdown capability, and reactor operation can continue while the inoperable subsystem is being repaired. Assurance that the remaining subsystem will perform its intended function and that the long term average availability of the system is not reduced is obtained for a one out of two system by an allowable equipment out of service time of one third of the normal surveillance frequency. This method determines an equipment out of service time of ten days. Additional conservatism is introduced by reducing the allowable out of service time to seven days.

C. Level indication and alarm indicate whether the solution volume has changed, which might indicate a possible solution concentration change. The test interval has been established in consideration of these factors. Temperature and liquid level alarms for the system are annunciated in the control room.

The solution is kept at least 10°F above the saturation temperature to guard against boron precipitation. The margin is included in Figure 3.4.2.

LIMITING CONDITIONS FOR OPERATION

3.5 CORE AND CONTAINMENT COOLING SYSTEMS

Applicability:

Applies to the operational status of the core and containment cooling systems.

Objective:

To assure the operability of the core and containment cooling systems under all conditions for which this cooling capability is an essential response to station abnormalities.

Specification:

A. Core Spray and LPCI Systems

1. Both Core Spray subsystems shall be operable:

   (1) prior to reactor startup from a Cold Shutdown, or

   (2) when there is irradiated fuel in the vessel and when the reactor vessel pressure is greater than atmospheric pressure, except as specified in 3.5.A.2 and 3.5.F.3 below.

SURVEILLANCE REQUIREMENT

4.5 CORE AND CONTAINMENT COOLING SYSTEMS

Applicability:

Applies to the Surveillance Requirements of the core and containment cooling systems which are required when the corresponding Limiting Condition for Operation is in effect.

Objective:

To verify the operability of the core and containment cooling systems under all conditions for which this cooling capability is an essential response to station abnormalities.

Specification:

A. Core Spray and LPCI Systems

1. Core Spray Subsystem Testing.

	Item	Frequency
a.	Simulated Automatic Actuation Test.	Once/Operating Cycle
b.	Pump Operability	Once/month
c.	Motor Operated Valve Operability	Once/Month
d.	Pump flow rate. Both loops shall deliver at least 4720 gpm against a system head corresponding to a differential pressure of ≥ 113 psi between the reactor vessel and the primary containment.	Once/3 months
e.	Core Spray Header ΔP Instrumentation	
	Check	Once/day
	Calibrate	Once/3 months

LIMITING CONDITIONS FOR OPERATION

3.5.A (cont'd.)

2. From and after the date that one of the Core Spray subsystems is made or found to be inoperable for any reason, continued reactor operation is permissible during the succeeding seven days provided that during such seven days all active components that affect operability of the operable Core Spray subsystem and all active components that affect operability of both LPCI subsystems and the diesel generators are operable.

3. Both LPCI subsystems shall be operable:

   (1) prior to reactor startup from a Cold Condition, except as specified in 3.22.B.1, or

   (2) when there is irradiated fuel in the vessel and when the reactor vessel pressure is greater than atmospheric pressure, except as specified in 3.5.A.4 and 3.5.A.5 below.

4. From and after the date that one of the RHR (LPCI) pumps is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding thirty days provided that during such thirty days the remaining active components that affect operability of the LPCI subsystem containing the inoperable pump and all active components that affect operability of the operable LPCI subsystem both Core Spray subsystems and both diesel generators are operable.

SURVEILLANCE REQUIREMENTS

4.5.A (cont'd.)

2. When it is determined that one Core Spray subsystem is inoperable, the operable Core Spray subsystem and both LPCI subsystems shall be verified to be operable immediately. The operable Core Spray subsystem shall be verified to be operable daily thereafter.

3. LPCI subsystem testing shall be as follows:

	Item	Frequency
a.	Simulated Automatic Actuation Test	Once/Operating Cycle
b.	Pump Operability	Once/month
c.	Motor Operated Valve Operability	Once/month
d.	Pump Flow Rate	Once/3 months

During single pump LPCI, each RHR pump shall deliver at least 7700 GPM but no more than 8400 GPM against a system head equivalent to a reactor vessel pressure of 20 psid above drywell pressure with water level below the jet pumps. At the same conditions, two pump LPCI flow shall be at least 15,000 GPM.

e. Recirculation pump discharge valves shall be tested each refueling outage to verify full open to full closed in t ≤ 26 seconds.

f. An airtest shall be performed on the drywell and torus headers and nozzles once/5 years.

4. When it is determined that one of the RHR (LPCI) pumps is inoperable at a time when it is required to be operable the remaining active components that affect operability of the LPCI subsystem containing the inoperable pump, all active components that affect operability of the operable LPCI subsystem, and both Core Spray subsystems shall be verified to be operable immediately and the operable LPCI pumps daily thereafter.

LIMITING CONDITIONS FOR OPERATION

3.5.A (Cont'd.)

5. From and after the date that one LPCI subsystem is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding 7 days, unless it is sooner made operable, provided that during such 7 days all active components that affect operability of the operable LPCI subsystem, both Core Spray subsystems, the RHR Service Water subsystem associated with the operable LPCI subsystem and both diesel generators shall be operable.

6. All recirculation pump discharge valves shall be operable prior to reactor startup (or closed if permitted elsewhere in these specifications).

7. The reactor shall not be started up with the RHR system supplying cooling to the fuel pool.

8. If the requirements of 3.5.A 1,2,3,4,5,6 or 7 cannot be met, an orderly shutdown of the reactor shall be initiated and the reactor shall be in the cold shutdown condition within 24 hours.

B. Residual Heat Removal (RHR) Service Water System

1. Except as specified in 3.5.B.2, 3.5.B.3, and 3.5.F.3 below, both RHR Service Water subsystems shall be operable whenever irradiated fuel is in the reactor vessel and reactor coolant temperature is greater than 212°F, and prior to reactor startup from a Cold Condition.

SURVEILLANCE REQUIREMENTS

4.5.A. (Cont'd.)

5. When it is determined that LPCI subsystem is inoperable, the operable LPCI subsystem, both Core Spray subsystems and the RHR Service Water subsystem associated with the operable LPCI subsystem, shall be verified to be operable immediately and daily thereafter.

6. All recirculation pump discharge valves shall be tested for operability during any period of Reactor cold shutdown exceeding 48 hours, if operability tests have not been performed during the preceding 31 days.

B. Residual Heat Removal (RHR) Service Water System

1. RHR Service Water System testing shall be as follows:

	Item	Frequency
a.	Pump & Valve Operability	Once/3 months
b.	Pump Capacity Test. Each RHR service water booster pump shall deliver 4000 gpm.	After pump maintenance and every 3 months

LIMITING CONDITIONS FOR OPERATION

3.5.B (Cont'd.)

2. From and after the date that any RHR Service Water booster pump is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding thirty days, unless such pump is sooner made operable provided that during such thirty days the remaining active components that affect operability of the RHR Service Water subsystem containing the inoperable pump, and all active components that affect operability of the operable RHR Service Water subsystem are operable.

3. From and after the date that one RHR Service Water subsystem is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding seven days unless such subsystem is sooner made operable, provided that all active components that affect operability of the operable RHR Service Water subsystem, its associated LPCI subsystem, and its associated diesel generator, are operable.

4. If the requirements of 3.5.B.1, 3.5.B.2 or 3.5.B.3 cannot be met, an orderly shutdown shall be initiated and the reactor shall be in a cold shutdown condition within 24 hours.

C. HPCI System

1. The HPCI System shall be operable whenever there is irradiated fuel in the reactor vessel, reactor pressure is greater than 113 psig, and prior to reactor startup from a Cold Condition, except as specified in 3.5.C.2 and 3.5.C.3 below.

SURVEILLANCE REQUIREMENTS

4.5.B (Cont'd.)

2. When it is determined that any RHR Service Water booster pump is inoperable, the remaining active components that affect operability of the RHR Service Water subsystem containing the inoperable pump and all active components that affect operability of the operable RHR Service Water subsystem shall be verified to be operable immediately and weekly thereafter.

3. When one RHR Service Water subsystem becomes inoperable, the operable RHR Service Water subsystem and its associated LPCI subsystem shall be verified to be operable immediately and daily thereafter.

C. HPCI System

1. HPCI System testing shall be performed as follows:

	Item	Frequency
a.	Simulated Automatic Actuation Test	Once/operating Cycle
b.	Pump Operability	Once/month
c.	Motor Operated Valve Operability	Once/month

LIMITING CONDITIONS FOR OPERATION

3.5.C HPCI System (cont'd.)

2. From and after the date that the HPCI System is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding seven days unless such system is sooner made operable, providing that during such seven days all active components that affect operability of the ADS, the IC System, both LPCI subsystems and both Core Spray subsystems are operable.

3. With the surveillance requirements of 4.5.C not performed at the required intervals due to reactor shutdown, a reactor startup may be conducted provided the appropriate surveillance is performed within 48 hours of achieving 150 psig reactor steam pressure.

4. If the requirements of 3.5.C.1 cannot be met, an orderly shutdown shall be initiated and the reactor pressure shall be reduced to 113 psig or less within 24 hours.

SURVEILLANCE REQUIREMENT

4.5.C. HPCI System (cont'd.)

	Item	Frequency
d.	Flow Rate at approximately 1000 psig Steam Press.	Once/3 months
e.	Flow Rate at approximately 150 psig Steam Press.	Once/operating cycle

The HPCI pump shall be demonstrated to be capable of delivering at least 4250 gpm for a system head corresponding to a reactor pressure of 1000 to 150 psig

2. When it is determined that the HPCI System is inoperable, the RCIC System, both LPCI subsystems, and both Core Spray subsystems shall be verified to be operable immediately. The RCIC System shall be verified to be operable daily thereafter. In addition, the ADS logic shall be demonstrated to be operable immediately and daily thereafter.

D. Reactor Core Isolation Cooling (RCIC) System

1. The RCIC System shall be operable whenever there is irradiated fuel in the reactor vessel, the reactor pressure is greater than 113 psig, and prior to reactor startup from a Cold Condition, except as specified in 3.5.D.2 and 3.5.D.3 below.

D. Reactor Core Isolation Cooling (RCIC) System

1. RCIC System testing shall be performed as follows:

	Item	Frequency
a.	Simulated Automatic Actuation Test	Once/operating cycle

LIMITING CONDITIONS FOR OPERATION

3.5.D (cont'd.)

2. From and after the date that the RCIC System is made or found to be inoperable for any reason, continued reactor power operation is permissible only during the succeeding seven days provided that during such seven days the HPCI System is operable.

3. With the surveillance requirements of 4.5.D not performed at the required intervals due to reactor shutdown, a reactor startup may be conducted provided the appropriate surveillance is performed within 48 hours of achieving 150 psig reactor steam pressure.

4. If the requirements of 3.5.D 1 & 2 cannot be met, an orderly shutdown shall be initiated and the reactor pressure shall be reduced to 113 psig or less within 24 hours.

E. Automatic Depressurization System (ADS)

1. The Automatic Depressurization System shall be operable whenever there is irradiated fuel in the reactor vessel and the reactor pressure is greater than 113 psig and prior to a startup from a Cold Condition, except as specified in 3.5.E.2 and 3.5.E.3 below.

SURVEILLANCE REQUIREMENT

4.5.D (cont'd.)

	Item	Frequency
b.	Pump Operability	Once/month
c.	Motor Operated Valve Operability	Once/month
d.	Flow Rate at approximately 1000 psig Steam Pressure	Once/3 months
e.	Flow Rate at approximately 150 psig Steam Pressure	Once/operating cycle

The RCIC pump shall be demonstrated to be capable of delivering at least 400 gpm for a system head corresponding to a reactor pressure of 1000 to 150 psig.

2. When it is determined that the RCIC System is inoperable, the HPCI System shall be verified to be operable immediately.

E. Automatic Depressurization System (ADS)

1. During each operating cycle the following tests shall be performed on the ADS:

A simulated automatic actuation test shall be performed prior to startup after each refueling outage.

LIMITING CONDITIONS FOR OPERATION

3.5.E (cont'd)

2. From and after the date that one valve in the Automatic Depressurization System is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding seven days unless such valve is sooner made operable, provided that during such seven days the HPCI System is operable.

3. With the surveillance requirements of 4.6.D.5 not performed at the required intervals due to reactor shutdown, a reactor startup may be conducted provided the appropriate surveillance is performed within 12 hours of achieving 113 psig reactor steam pressure.

4. If the requirements of 3.5.E.1 or 3.5.E.2 cannot be met, an orderly shutdown shall be initiated and the reactor pressure shall be reduced to at least 113 psig within 24 hours.

F. Minimum Low Pressure Cooling and Diesel Generator Availability

1. During any period when one diesel generator is inoperable, continued reactor operation is permissible only during the succeeding seven days unless such diesel generator is sooner made operable, provided that the operable diesel generator and its associated LPCI, Core Spray, and RHR Service Water subsystems are operable and the requirements of 3.9.A.1 are met. If this requirement cannot be met, the requirements of 3.5.F.2 shall be met.

SURVEILLANCE REQUIREMENTS

4.5.E (cont'd)

2. When it is determined that one valve of the ADS is inoperable, the ADS actuation logic for the other ADS valves shall be demonstrated to be operable immediately. In addition, the HPCI System shall be verified to be operable immediately.

F. Minimum Low Pressure Cooling and Diesel Generator Availability

1. When it is determined that one diesel generator is inoperable, the LPCI, Core Spray, and RHR Service Water subsystems associated with the operable diesel generator shall be verified to be operable immediately and daily thereafter. In addition, the operable diesel generator shall be demonstrated to be operable immediately and every three days thereafter.

LIMITING CONDITIONS FOR OPERATION

3.5.F (cont'd.)

2. During any period when both diesel generators are inoperable, continued reactor operation is permissible only during the succeeding 24 hours unless one diesel generator is sooner made operable, provided that both LPCI subsystems, both Core Spray subsystems, and both RHR Service Water subsystems are operable and the reactor power level is reduced to 25% of rated power and the requirements of 3.9.A.1 are met. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor placed in the cold shutdown condition within 24 hours.

3. Any combination of inoperable components in the LPCI, RHR Service Water, and Core Spray systems shall not defeat the capability of the remaining operable components to fulfill the cooling functions.

4. When irradiated fuel is in the reactor vessel and the reactor is in the Cold Shutdown Condition, both core spray subsystems, both LPCI subsystems, and both RHR Service Water subsystems may be inoperable, provided no work is being done which has the potential for draining the reactor vessel. Refueling requirements are as specified in Specification 3.10.F.

5. With irradiated fuel in the reactor vessel, one control rod drive housing may be open while the suppression chamber is completely drained provided that:

    a. The reactor vessel head is removed.

    b. The spent fuel pool gates are open and the fuel pool water level is maintained at a level ≥ 33 feet.

    c. The condensate transfer system is operable and a minimum of 230,000 gallons of water is in the condensate storage tank.

SURVEILLANCE REQUIREMENTS

4.5.F (cont'd.)

3.5.F (cont'd)

d. The automatic mode of the drywell sump pump is disabled.

e. No maintenance is being conducted which will prevent filling the suppression chamber to a level above the Core Spray and LPCI suctions.

f. With the exception of the suppression chamber water supply, both Core Spray subsystems and both LPCI subsystems are operable.

g. The control rod is withdrawn to the backseat.

h. A special flange, capable of sealing a leaking control rod housing, is available for immediate use.

i. The control rod housing is covered with the special flange following the removal of the control rod drive.

j. No work is being performed in the vessel while the housing is open.

G. Maintenance of Filled Discharge Pipe

Whenever the Core Spray subsystems, LPCI subsystems, HPCI System, or RCIC System are required to be operable, the discharge piping from the pump discharge of these systems to the last block valve shall be filled.

4.5.F (cont'd)

G. Maintenance of Filled Discharge Pipe

The following surveillance requirements shall be adhered to, to assure that the discharge piping of the Core Spray subsystems, LPCI subsystems, HPCI System and RCIC System are filled:

1. Whenever a Core Spray subsystem, LPCI subsystem, the HPCI System, or RCIC System is made operable, the discharge piping shall be vented from the high point of the system and water flow observed initially and on a monthly basis.

2. The pressure switches which monitor the LPCI, Core Spray, HPCI and RCIC System lines to ensure they are full shall be functionally tested and calibrated every three months.

3.5 BASES

A. Core Spray and LPCI Subsystems

This specification assures that adequate emergency cooling capability is available whenever irradiated fuel is in the reactor vessel.

The limiting conditions of operation in Specifications 3.5.A.1 through 3.5.A.8 specify the combinations of operable subsystems to assure the availability of the minimum required cooling systems. During reactor shutdown when the residual heat removal system is realigned from LPCI to the shutdown cooling mode, the LPCI subsystems are considered operable.

The Core Spray System is a low pressure coolant system which is comprised of two, distinct subsystems and is designed to provide emergency cooling to the core by spraying in the event of a loss-of-coolant accident. This system functions in combination with the LPCI System to prevent excessive fuel clad temperature.

The LPCI System is an operating mode of the RHR System and is comprised of two, distinct subsystems. The LPCI System is designed to provide emergency cooling to the core by flooding in the event of a loss-of-coolant accident. This system functions in combination with the Core Spray System to prevent excessive fuel clad temperature. The LPCI and the Core Spray systems provide adequate cooling for break areas of approximately 0.2 square feet up to and including the double-ended recirculation line break without assistance from the high pressure emergency core cooling subsystems.

The allowable repair times are established so that the average risk rate for repair would be no greater than the basic risk rate. The method and concept are described in reference (1). Using the results developed in this reference, the repair period is found to be slightly greater than 1/2 the test interval. This assumes that the

(1) Jacobs, I.M., "Guidelines for Determining Safe Test Intervals and Repair Times for Engineered Safeguards", General Electric Co. A.P.E.D., April, 1969 (APED 5736).

Core Spray subsystems and LPCI subsystems constitute a 1 out of 4 system; however, the combined effect of the two systems to limit excessive clad temperatures must also be considered. The test interval specified in Specification 4.5 is 1 month.

Should one Core Spray subsystem become inoperable, the remaining Core Spray subsystem and the LPCI subsystems are available should the need for core cooling arise. To assure that the remaining Core Spray and LPCI subsystems are available, they are verified to be operable immediately.

Should the loss of one LPCI pump occur, a nearly full complement of core cooling equipment is available. Three LPCI pumps in conjunction with the Core Spray subsystems will perform the core cooling function. Because of the availability of the majority of the core cooling equipment, which will be verified to be operable, a thirty day repair period is justified. If one LPCI subsystem is not available, at least 1 LPCI pump must be available to fulfill the containment cooling function. The 7 day repair period is set on this basis.

B. RHR Service Water System

The RHR Service Water System consists of two, distinct subsystems designed to provide heat removal for the containment cooling function. Each RHR Service Water subsystem contains two RHR Service Water booster pumps serving one side of one of two RHR Heat Exchangers, while two RHR (LPCI) pumps serve the other side. The RHR Service Water System operates in conjunction with the RHR System to provide the containment cooling function.

The design of the RHR Service Water System is predicated upon the use of one RHR Service Water booster pump and one RHR heat exchanger for heat removal after a design basis accident. Thus, there are ample spares for margin above design conditions. Loss of margin should be avoided and the equipment maintained in a state of operation. So a 30 day out-of-service time is chosen for this equipment. If one loop is out-of-service reactor operation is permissible for seven days. The requirements for availability of the RHR System for support of the containment cooling function are reflected in the associated action statements for the LPCI System.

With components or subsystems out-of-service, overall core and containment cooling reliability is maintained by verifying the operability of the remaining cooling equipment. For routine out-of-service periods caused by preventive maintenance, etc., the operability of other systems and components will be verified as given in the Technical Specifications. However, if a failure, design deficiency, etc., caused the out-of-service period, then a demonstration of operability may be needed to assure that a similar problem does not exist on the remaining components. For example, if an out-of-service period were caused by failure of a pump to deliver rated capacity, the other pumps of this type might be subjected to a capacity test.

The pump capacity test is a comparison of measured pump performance parameters to shop performance tests. Tests during normal operation will be performed by measuring the flow and/or the pump discharge pressure. These parameters and its power requirement will be used to establish flow at that pressure.

C. HPCI System

The limiting conditions for operating the HPCI System are derived from the Station Nuclear Safety Operational Analysis (Appendix G) and a detailed functional analysis of the HPCI System (Section VI.).

The HPCI System is provided to assure that the reactor core is adequately cooled to limit fuel clad temperature in the event of a small break in the nuclear system and loss-of-coolant which does not result in rapid depressurization of the reactor vessel. The HPCI System permits the reactor to be shut down while maintaining sufficient reactor vessel water level inventory until the vessel is depressurized. The HPCI System continues to operate until reactor vessel pressure is below the pressure at which LPCI operation or Core Spray System operation maintains core cooling.

The capacity of the system is selected to provide this required core cooling. The HPCI pump is designed to pump 4250 gpm at reactor pressures between 1120 and 150 psig. Two sources of water are available. Initially, demineralized water from the emergency condensate storage tank is used instead of injecting water from the suppression pool into the reactor.

When the HPCI System begins operation, the reactor depressurizes more rapidly than would occur if HPCI was not initiated due to the condensation of steam by the cold fluid pumped into the reactor vessel by the HPCI System. As the reactor vessel pressure continues to decrease, the HPCI flow momentarily reaches equilibrium with the flow through the break. Continued depressurization causes the break flow to decrease below the HPCI flow and the liquid inventory begins to rise. This type of response is typical of the small breaks. The core never uncovers and is continuously cooled throughout the transient so that no core damage of any kind occurs for breaks that lie within the capacity range of the HPCI System.

The analysis in the FSAR, Appendix G, shows that the ADS provides a single failure proof path for depressurization for postulated transients and accidents. The RCIC System serves as an alternate to the HPCI System only for decay heat removal when feed water is lost. Considering the HPCI System and the ADS plus the RCIC System as redundant paths, reference (1) methods would give an estimated allowable repair time of 15 days based on the one month testing frequency. However, a maximum allowable repair time of 7 days is selected for conservatism. The HPCI and RCIC Systems as well as all other Core Standby Cooling Systems must be operable when starting up from a Cold Condition. It is realized that the HPCI System is not designed to operate until reactor pressure exceeds 150 psig and is automatically isolated before the reactor pressure decreases below 100 psig. It is the intent of this specification to assure that when the reactor is being started up from a Cold Condition, the HPCI System is not known to be inoperable.

D. RCIC System

The RCIC System is designed to provide makeup to the nuclear system as part of the planned operation for periods when the main condenser is unavailable. The nuclear safety analysis, FSAR Appendix C, shows that the RCIC System provides water to cool the fuel when feed water is lost. In all other postulated accidents and transients, the ADS provides redundancy for the HPCI System. Based on this and judgements on the reliability of the HPCI System, an allowable repair time of 7 days is specified. Immediate verifications of HPCI System operability during RCIC System outage is considered adequate based on judgement and practicality.

E. Automatic Depressurization System (ADS)

The limiting conditions for operating the ADS are derived from the Station Nuclear Operational Analysis (Appendix G) and a detailed functional analysis of the ADS (Section VI.).

This specification ensures the operability of the ADS under all conditions for which the automatic or manual depressurization of the nuclear system is an essential response to station abnormalities.

The nuclear system pressure relief system provides automatic nuclear system depressurization for small breaks in the nuclear system so that the LPCI and Core Spray Systems can operate to protect the fuel barrier.

Because the Automatic Depressurization System does not provide makeup to the reactor primary vessel, no credit is taken for the steam cooling of the core caused by the system actuation to provide further conservatism to the CSCS. Performance analysis of the Automatic Depressurization System is considered only with respect to its depressurizing effect in conjunction with the LPCI or Core Spray Systems. There are six valves provided and each has a capacity of 800,000 lb/hr at a set pressure of 1080 psig.

The allowable out of service time for one ADS valve is determined as seven days because of the redundancy and because the HPCI System is verified to be operable during this period. Therefore, redundant protection for the core with a small break in the nuclear system is still available.

The ADS test circuit permits continued surveillance on the operable relief valves to assure that they will be available if required.

F. Minimum Low Pressure Cooling and Diesel Generator Availability

The purpose of Specification F is to assure that adequate core cooling equipment is available at all times. It is during refueling outages that major maintenance is performed and during such time that all low pressure core cooling systems may be out of service. Specification 3.5.F.4 provides that should this occur, no work will be performed on the primary system which could lead to draining the vessel. This work would include work on certain control rod drive components and recirculation system. Thus, the specification precludes the events which could require core cooling. Specification 3.5.F.5 recognizes that, concurrent with control rod drive maintenance during the refueling outage, it may be necessary to drain the suppression chamber for maintenance or for the inspection required by Specification 4.7.A.2.h. In this case, if excessive control rod housing leakage occurred, three levels of protection against loss of core cooling would exist. First, a special flange would be used to stop the leak. Second, sufficient inventory of water is maintained to provide, under worst case leak conditions, approximately 60 minutes of core cooling while attempts to secure the leak are made. This inventory includes water in the reactor well, spent fuel pool, and condensate storage tank. If a leak should occur, manually operated valves in the condensate transfer system can be opened to supply either the Core Spray System or the spent fuel pool. Third, sufficient inventory of water is maintained to permit the water which has drained from the vessel to fill the torus to a level above the Core Spray and LPCI suction strainers. These systems could then recycle the water to the vessel. Since the system cannot be pressurized during refueling, the potential need for core flooding only exists and the specified combination of the Core Spray or the LPCI subsystems can provide this. This specification also provides for the highly unlikely case that both diesel generators are found to be inoperable. The reduction of rated power to 25% will provide a very stable operating condition. The allowable repair time of 24 hours will provide an opportunity to repair the diesel and thereby prevent the necessity of taking the plant down through the less stable shutdown condition. If the necessary repairs cannot be made in the allowed 24 hours, the plant will be shutdown in an orderly fashion. This will be accomplished while the two off-site sources of power required by Specification 3.9.A.1 are available.

G. Maintenance of Filled Discharge Pipe

If the discharge piping of the Core Spray, LPCI, HPCI, and RCIC systems are not filled, a water hammer can develop in this piping when the pump and/or pumps are started. If a water hammer were to occur at the time at which the system were required, the system would still perform its design functions. However, to minimize damage to the discharge piping and to ensure added margin in the operation of these systems, this Technical Specification requires the discharge lines to be filled whenever the system is in an operable condition.

H. Engineered Safeguards Compartments Cooling

The unit cooler in each pump compartment is capable of providing adequate ventilation flow and cooling. Engineering analyses indicate that the temperature rise in safeguards compartments without adequate ventilation flow or cooling is such that continued operation of the safeguards equipment or associated auxiliary equipment cannot be assured.

4.5 BASES

Core and Containment Cooling Systems Surveillance Frequencies

The testing intervals for the core and containment cooling systems are based on industry practice, quantitative reliability analysis, judgement and practicality. The core cooling systems have not been designed to be fully testable during operation. For example, in the case of the HPCI System, automatic initiation during power operation would result in pumping cold water into the reactor vessel, which is not desirable. Complete ADS testing during power operation causes an undesirable loss-of-coolant inventory. To increase the availability of the core and containment cooling systems, the components which make up the system; i.e., instrumentation, pumps, valves, etc., are tested frequently. The pumps and motor operated injection valves are also tested each month to assure their operability. A simulated automatic actuation test once each cycle combined with frequent tests of the pumps and injection valves is deemed to be adequate testing of these systems.

When components and subsystems are out-of-service, overall core and containment cooling reliability is maintained by verifying the operability of the remaining equipment. For routine out-of-service periods caused by preventative maintenance, etc., the operability of other systems and components will be verified as given in the Technical Specifications. However, if a failure or design deficiency caused by outage, then a demonstration of operability may be needed to assure that a generic problem does not exist. For example, if an out-of-service period were caused by failure of a pump to deliver rated capacity due to a design deficiency, the other pumps of this type might be subjected to a flow rate test.

LIMITING CONDITION FOR OPERATION

3.7.A (cont'd.)

6. Low-Low Set Relief Function

a. The low-low set function of the safety-relief valves shall be operable when there is irradiated fuel in the reactor vessel and the reactor coolant temperature is ≥ 212°F, except as specified in 3.7.A.6.a.1 and 2 below.

1. With the low-low function of one safety/relief valve (S/RV) inoperable, restore the inoperable LLS S/RV to OPERABLE within 14 days or be in the HOT STANDBY mode within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. With the low-low set function of both S/RVs inoperable, be in at least HOT STANDBY within 12 hours and in COLD SHUTDOWN within the next 24 hours.

b. The pressure switches which control the low-low set safety/relief valves shall have the following settings.

NBI-PS-51A Open Low Valve
1015 ± 20 psig (Increasing)

NBI-PS-51B Close Low Valve
875 ± 20 psig (Decreasing)

NBI-PS-51C Open High Valve
1025 ± 20 psig (Increasing)

NBI-PS-51D Close High Valve
875 ± 20 psig (Decreasing)

B. Standby Gas Treatment System

1. Except as specified in 3.7.B.3 below, both Standby Gas Treatment subsystems shall be operable at all times when secondary containment integrity is required.

2.a. The results of the in-place cold DOP leak tests on the HEPA filters shall show ≥99% DOP removal. The results of the halogenated hydrocarbon leak tests on the charcoal adsorbers shall show ≥99% halogenated hydrocarbon removal. The DOP and halogenated hydrocarbon tests shall be performed at a Standby Gas Treatment flowrate of ≤1780 CFM and at a Reactor Building pressure of ≤-.25" Wg.

SURVEILLANCE REQUIREMENT

4.7.A (cont'd.)

6. Low-Low Set Relief Function

a. The low-low set safety/relief valves shall be tested and calibrated as specified in Table 4.2.B.

B. Standby Gas Treatment System

1. At least once per operating cycle the following conditions shall be demonstrated.

a. Pressure drop across the combined HEPA filters and charcoal adsorber banks is less than 6 inches of water at the system design flow rate.

b. Inlet heater input is capable of reducing R.H. from 100 to 70% R.H.

2.a. The tests and sample analysis of Specification 3.7.B.2 shall be performed at least once every 18 months for standby service or after every 720 hours of system operation and following significant painting, fire or chemical release in any ventilation zone communicating with the system.

LIMITING CONDITION FOR OPERATION

3.7.B (cont'd)

b. The results of laboratory carbon sample analysis shall show ≥99% radioactive methyl iodide removal with inlet conditions of: velocity ≥27 FPM, ≥1.75 mg/m^3 inlet methyl iodide concentration, ≥70% R.H. and ≤30°C.

c. Each fan shall be shown to provide 1780 CMF ±10%.

3. From and after the date that one Standby Gas Treatment subsystem is made or found to be inoperable for any reason, reactor operation is permissible only during the succeeding seven days unless such subsystem is sooner made operable, provided that during such seven days all active components that affect operability of the operable Standby Gas Treatment subsystem, and its associated diesel generator, shall be operable.

Fuel handling requirements are specified in Specification 3.10.E.

4. If these conditions cannot be met, procedures shall be initiated immediately to establish reactor conditions for which the Standby Gas Treatment System is not required.

C. Secondary Containment

1. Secondary containment integrity shall be maintained during all modes of plant operation except when all of the following conditions are met.

SURVEILLANCE REQUIREMENT

4.7.B (cont'd)

b. Cold DOP testing shall be performed after each complete or partial replacement of the HEPA filter bank or after any structural maintenance on the system housing.

c. Halogenated hydrocarbon testing shall be performed after each complete or partial replacement of the charcoal adsorber bank or after any structural maintenance on the system housing.

d. Each subsystem shall be operated with the heaters on at least 10 hours every month.

e. Test sealing of gaskets for housing doors downstream of the HEPA filters and charcoal adsorbers shall be performed at, and in conformance with, each test performed for compliance with Specification 4.7.B.2.a and Specification 3.7.B.2.a.

3. System drains where present shall be inspected quarterly for adequate water level in loop-seals.

4.a. At least once per operating cycle automatic initiation of each Standby Gas Treatment subsystem shall be demonstrated.

b. At least once per operating cycle manual operability of the bypass valve for filter cooling shall be demonstrated.

c. When one Standby Gas Treatment subsystem becomes inoperable, the operable Standby Gas Treatment subsystem shall be verified to be operable immediately and daily thereafter. A demonstration of diesel generator operability is not required by this specification.

C. Secondary Containment

1. Secondary containment surveillance shall be performed as indicated below:

LIMITING CONDITIONS FOR OPERATION

3.7.C (cont'd.)

a. The reactor is subcritical and Specification 3.3.A is met.

b. The reactor water temperature is below 212°F and the reactor coolant system is vented.

c. No activity is being performed which can reduce the shutdown margin below that specified in Specification 3.3.A.

d. No irradiated fuel is being handled in the secondary containment and no loads which could potentially damage irradiated fuel are being moved in the secondary containment.

e. If secondary containment integrity cannot be maintained, restore secondary containment integrity within 4 hours or;

   a. Be in at least Hot Shutdown within the next 12 hours and in cold shutdown within the following 24 hours.

   b. Suspend irradiated fuel handling operations in the secondary containment, movement of loads which could potentially damage irradiated fuel in the secondary containment, and all core alterations and activities which could reduce the shutdown margin. The provisions of Specification 1.0.J are not applicable.

D. Primary Containment Isolation Valves

1. During reactor power operating conditions, all isolation valves listed in Table 3.7.1 and all instrument line flow check valves shall be operable except as specified in 3.7.D.2.

SURVEILLANCE REQUIREMENTS

4.7.C (cont'd.)

a. A preoperational secondary containment capability test shall be conducted after isolating the reactor building and placing either Standby Gas Treatment subsystem filter train in operation. Such tests shall demonstrate the capability to maintain 1/4 inch of water vacuum under calm wind ($2<\bar{\mu}<5$ mph) conditions with a filter train flow rate of not more than 100% of building volume per day. ($\bar{\mu}$ = wind speed)

b. Additional tests shall be performed during the first operating cycle under an adequate number of different environmental wind conditions to enable valid extrapolation of the test results.

c. Secondary containment capability to maintain 1/4 inch of water vacuum under calm wind ($2<\bar{\mu}<5$ mph) conditions with a filter train flow rate of not more than 100% of building volume per day, shall be demonstrated at each refueling outage prior to refueling.

d. After a secondary containment violation is determined, the Standby Gas Treatment System will be operated immediately after the affected zones are isolated from the remainder of the secondary containment to confirm its ability to maintain the remainder of the secondary containment at 1/4 inch of water negative pressure under calm wind conditions.

D. Primary Containment Isolation Valves

1. The primary containment isolation valves surveillance shall be performed as follows:

a. At least once per operating cycle the operable isolation valves that are power operated and automatically initiated shall be tested for simulated automatic initiation and closure times.

The primary containment is normally slightly pressurized during periods of reactor operation. Nitrogen used for inerting could leak out of the containment but air could not leak in to increase oxygen concentration. Once the containment is filled with nitrogen to the required concentration, no monitoring of oxygen concentration is necessary. However, at least twice a week the oxygen concentration will be determined as added assurance.

The 500 gallon conservative limit on the nitrogen storage tank assures that adequate time is available to get the tank refilled assuming normal plant operation. The estimated maximum makeup rate is 1500 SCFD which would require about 160 gallons for a 10 day makeup requirement. The normal leak rate should be about 200 SCFD.

3.7.A.6 & 4.7.A.6 LOW-LOW SET RELIEF FUNCTION

The low-low set relief logic is an automatic safety relief valve (SRV) control system designed to mitigate the postulated thrust load concern of subsequent actuations of SRV's during certain transients (such as inadvertant MSIV closure) and small and intermediate break loss-of-coolant accident (LOCA) events. The setpoints used in Section 3.7.A.6.b are based upon a minimum blowdown range to provide adequate time between valve actuations to allow the SRV discharge line high water leg to clear, coupled with consideration of instrument inaccuracy and the main steam isolation valve isolation setpoint.

The as-found setpoint for NBI-PS-51A, the pressure switch controlling the opening of RV-71D, must be ≤ 1040 psig. The as-found closing setpoint for NBI-PS-51B must be at least 90 psig less than 51A, and must be ≥ 850 psig. The as-found setpoint for NBI-PS-51C, pressure switch controlling the opening of RV-71F must be ≤ 1050 psig. The as-found closing setpoint for NBI-PS-51D must be at least 90 psig below 51C, and must be ≥ 850 psig. This ensures that the analytical upper limit for the opening setpoint (1050 psig), the analytical lower limit on the closing setpoint (850 psig) and the analytical limit on the blowdown range (≥ 90 psig) for the Low-Low Set Relief Function are not exceeded. Although the specified instrument setpoint tolerance is ± 20 psig, an instrument drift of ± 25 psig was used in the analysis to ensure adequate margin in determining the valve opening and closing setpoints. The opening setpoint is set such that, if both the lowest set non-LLS S/RV and the highest set of the two LLS S/RVs drift 25 psig in the worst case directions, the LLS S/RVs will still control subsequent S/RV actuations. Likewise, the closing setpoint is set to ensure the LLS S/RV closing setpoint remains above the MSIV low pressure trip. The 90 psig blowdown provides adequate energy release from the vessel to ensure time for the water leg to clear between subsequent S/RV actuations.

3.7.B & 3.7.C STANDBY GAS TREATMENT SYSTEM AND SECONDARY CONTAINMENT

The secondary containment is designed to minimize any ground level release of radioactive materials which might result from a serious accident. The reactor building provides secondary containment during reactor operation when the drywell is sealed and in service. The reactor building provides primary containment when the reactor is shut down and the drywell is open, as during refueling. Because the secondary containment is an integral part of the complete containment system, secondary containment is required at all times that primary containment is required as well as during refueling, and during movement of loads which could potentially damage irradiated fuel in the secondary containment. Secondary containment may be broken for short periods of time to allow access to the reactor building roof to perform necessary inspections and maintenance.

The Standby Gas Treatment System consists of two, distinct subsystems, each containing one exhaust fan and associated filter train, which is designed to filter and exhaust the reactor building atmosphere to the stack during secondary containment isolation conditions. Both Standby Gas Treatment System fans are designed to automatically start upon containment isolation and to maintain the reactor building pressure to the design negative pressure so that all leakage should be in-leakage. Should one subsystem fail to start, the redundant subsystem is designed to start automatically. Each of the two fans has 100 percent capacity.

3.7.B & 3.7.C BASES (cont'd)

High efficiency particulate absolute (HEPA) filters are installed before and after the charcoal adsorbers to minimize potential release of particulates to the environment and to prevent clogging of the iodine adsorbers. The charcoal adsorbers are installed to reduce the potential release of radioiodine to the environment. The in-place test results should indicate a system leak tightness of less than 1 percent bypass leakage for the charcoal adsorbers and HEPA filters. The laboratory carbon sample test results should indicate a radioactive methyl iodide removal efficiency of at least 99 percent for expected accident conditions. If the performance of the HEPA filters and charcoal adsorbers are as specified, the resulting doses will be less than the 10 CFR 100 guidelines for the accidents analyzed.

Only one of the two Standby Gas Treatment subsystems is needed to cleanup the reactor building atmosphere upon containment isolation. If one subsystem is found to be inoperable, there is no immediate threat to the containment system performance and reactor operation or refueling operation may continue while repairs are being made. If both subsystems are inoperable, the plant is brought to a condition where the Standby Gas Treatment System is not required.

4.7.B & 4.7.C BASES

Standby Gas Treatment System and Secondary Containment

Initiating reactor building isolation and operation of the Standby Gas Treatment System to maintain at least a 1/4 inch of water vacuum within the secondary containment provides an adequate test of the operation of the reactor building isolation valves, leak tightness of the reactor building and performance of the Standby Gas Treatment System. Functionally testing the initiating sensors and associated trip channels demonstrates the capability for automatic actuation. Periodic testing gives sufficient confidence of reactor building integrity and Standby Gas Treatment System performance capability.

Pressure drop across the combined HEPA filters and charcoal adsorbers of less than 6 inches of water at the system design flow rate will indicate that the filters and adsorbers are not clogged by excessive amounts of foreign matter. A 7.8 kw heater is capable of maintaining relative humidity below 70%. Heater capacity and pressure drop should be determined at least once per operating cycle to show system performance capability.

The frequency of tests and sample analysis are necessary to show that the HEPA filters and charcoal adsorbers can perform as evaluated. Tests of the charcoal adsorbers with halogenated hydrocarbon refrigerant shall be performed in accordance with ANSI N510-1980. The test canisters that are installed with the adsorber trays should be used for the charcoal adsorber efficiency test. Each sample should be at least two inches in diameter and a length equal to the thickness of the bed. If test results are unacceptable, all adsorbent in the system shall be replaced with an adsorbent qualified according to

4.7.B & 4.7.C BASES

Table 5.1 of ANSI N509-1980. The replacement tray for the adsorber tray removed for the test should meet the same adsorbent quality. Tests of the HEPA filters with DOP aerosol shall be performed in accordance to ANSI N510-1980. Any filters found defective shall be replaced with filters qualified pursuant to Regulatory Position C.3.d. of Regulatory Guide 1.52, Revision 2, March, 1978.

All elements of the heater should be demonstrated to be functional and operable during the test of heater capacity. Operation of the heaters will prevent moisture buildup in the filters and adsorber system.

With doors closed and fan in operation, DOP aerosol shall be sprayed externally along the full linear periphery of each respective door to check the gasket seal. Any detection of DOP in the fan exhaust shall be considered an unac ·able test result and the gaskets repaired and test repeated.

If system drains are present in the filter/adsorber ba. loop-seals must be used with ade uate water level to prevent by-pass leakage from the banks.

If significant painting, fire or chemical release occurs such that the HEPA filter or charcoal adsorber could become contaminated from the fumes, chemicals or foreign material, the same tests and sample analysis shall be performed as required for operational use. The determination of significance shall be made by the operator on duty at the time of the incident. Knowledgeable staff members should be consulted prior to making this determination.

Demonstration of the automatic initiation capability and operability of filter cooling is necessary to assure system performance capability. If one Standby Gas Treatment subsystem is inoperable, the operable subsystem's operability is verified daily. This substantiates the availability of the operable subsystem and thus reactor operation or refueling operation can continue for a limited period of time.

3.7.D & 4.7.D BASES

Primary Containment Isolation Valves

Double isolation valves are provided on lines penetrating the primary containment and open to the free space of the containment. Closure of one of the valves in each line would be sufficient to maintain the integrity of the pressure suppression system. Automatic initiation is required to minimize the potential leakage paths from the containment in the event of a loss-of-coolant accident.

The maximum closure times for the automatic isolation valves of the primary containment and reactor vessel isolation control system have been selected in consideration of the design intent to prevent core uncovering following pipe breaks outside the primary containment and the need to contain released fission products following pipe breaks inside the primary containment.

These valves are highly reliable, have a low service requirement, and most are normally closed. The initiating sensors and associated trip channels are also checked to demonstrate the capability for automatic isolation. The test interval of once per operating cycle for automatic initiation

LIMITING CONDITIONS FOR OPERATION

3.10.B (Cont'd)

4. During spiral reload, SRM operability will be verified by using a portable external source every 12 hours until the required amount of fuel is loaded to maintain 3 cps. As an alternative to the above, two fuel assemblies will be loaded in different cells containing control blades around each SRM to obtain the required 3 cps. Until these two assemblies have been loaded, the 3 cps requirement is not necessary.

C. Spent Fuel Pool Water Level

Whenever irradiated fuel is stored in the spent fuel pool, the pool water level shall be maintained at or above 8½' above the top of the fuel.

D. Time Limitation

Irradiated fuel shall not be handled in or above the reactor prior to 24 hours after reactor shutdown.

E. Standby Gas Treatment System

From and after the date that one Standby Gas Treatment subsystem is made or found to be inoperable for any reason, handling of irradiated fuel, and movement of loads which could potentially damage irradiated fuel in the secondary containment is permissible only during the succeeding seven days unless such subsystem is sooner made operable, provided that during such seven days all active components that affect operability of the operable Standby Gas Treatment subsystem, and its associated diesel generator, shall be operable.

At least one diesel generator shall be operable during fuel handling operations. This one diesel shall be capable of supplying power to an operable Standby Gas Treatment subsystem.

F. Core Standby Cooling Systems

During a refueling outage, refueling operation with fuel in the vessel may continue with one Core Spray and one LPCI subsystem inoperable, or with both Core Spray subsystems inoperable. Refueling is permitted with the suppression chamber drained provided an operable Core Spray or LPCI subsystem of RHR is aligned to take a suction on the condensate storage tank containing at least 150,000 gallons (≥14 ft. indicated level).

SURVEILLANCE REQUIREMENTS

4.10 (Cont'd)

C. Spent Fuel Pool Water Level

When irradiated fuel is stored in the spent fuel pool, the water level shall be recorded daily.

E. Standby Gas Treatment System

When one Standby Gas Treatment subsystem becomes inoperable, the operable Standby Gas Treatment subsystem shall be verified to be operable immediately and daily thereafter. A demonstration of diesel generator operability is not required by this specification.

3.10 BASES (Cont'd)

D. Time Limitation

The radiological consequences of a fuel handling accident are based upon the accident occurring at least 24 hours after reactor shutdown.

E. Standby Gas Treatment System

Only one of the two Standby Gas Treatment subsystems is needed to clean up the reactor building atmosphere upon containment isolation. If one subsystem is found to be inoperable, there is no immediate threat to the containment system performance and refueling operation may continue while repairs are being made. If both subsystems are inoperable, the plant is brought to a condition where the Standby Gas Treatment System is not required.

F. Core Standby Cooling Systems

During refueling the system cannot be pressurized, so only the potential need for core flooding exists and the specified combination of the Core Spray or LPCI subsystems can provide this. A more detailed discussion is contained in the bases for 3.5.F.

G. Control Room Air Treatment

If the system is found to be inoperable, there is no immediate threat to the control room and refueling operation may continue for a limited period of time while repairs are being made. If the system cannot be repaired within seven days, refueling operations will be terminated.

H. Spent Fuel Cask Handling

The operation of the redundant crane in the Restricted Mode during fuel cask handling operations assures that the cask remains within the controlled area once it has been removed from its transport vehicle (i.e., once it is above the 931' elevation). Handling of the cask on the Refueling Floor in the Unrestricted Mode is allowed only in the case of equipment failures or emergency conditions when the cask is already suspended. The Unrestricted Mode of operation is allowed only to the extent necessary to get the cask to a suitable stationary position so the required repairs can be made. Operation with a failed controlled area microswitch will be allowed for a 48-hour period providing an Operator is on the floor in addition to the crane operator to assure that the cask handling is limited to the controlled area as marked on the floor. This will allow adequate time to make repairs but still will not restrict cask handling operations unduly.

4.10 BASES

A. Refueling Interlocks

Complete functional testing of all refueling interlocks before any refueling outage will provide positive indication that the interlocks operate in the situations for which they were designed. By loading each hoist with a weight equal to the fuel assembly, positioning the refueling platform and withdrawing control rods, the interlocks can be subjected to valid operational tests. Where redundancy is provided in the logic circuitry, tests can be performed to assure that each redundant logic element can independently perform its functions.

B. Core Monitoring

Requiring the SRM's to be functionally tested prior to any core alteration assures that the SRM's will be operable at the start of that alteration. The daily response check (or 12-hour check for spiral reload) of the SRM's ensures their continued operability.

E. Standby Gas Treatment System

Only one of the two Standby Gas Treatment subsystems is needed to clean up the reactor building atmosphere upon containment isolation. If one subsystem is found to be inoperable, there is no immediate threat to the containment system performance and refueling operations may continue while repairs are being made. If both subsystems are inoperable, the plant is brought to a condition where the Standby Gas Treatment System is not required.

H. Spent Fuel Cask Handling

The Surveillance Requirements specified assure that the redundant crane is adequately inspected in accordance with the accepted ANSI Standard (B.30.2.0) and manufacturer's recommendations to determine that the equipment is in satisfactory condition. The testing of the controlled area limit switches assures that the crane operation will be limited to the designated area in the Restricted Mode of operation. The test of the "two-block" limit switch assures the power to the hoisting motor will be interrupted before an actual "two-blocking" incident can occur. The test of the inching hoist assures that this mode of load control is available when required.

Requiring the lifting and holding of the cask for 5 minutes during the initial lift of each series of cask handling operations puts a load test on the entire crane lifting mechanism as well as the braking system.

Performing this test when the cask is being lifted initially from the cask car assures that the system is operable prior to lifting the load to an excessive height.

CONDITIONS FOR OPERATION

3.12 (cont'd)

B. Reactor Equipment Cooling (REC) System

1. Both Reactor Equipment Cooling subsystems and their associated pumps shall be operable whenever irradiated fuel is in the vessel or the spent fuel pool, except as specified in 3.12.B.2 and 3.12.B.3 below.

2. From and after the date that any component that affects operability in one REC subsystem becomes inoperable, continued reactor operation is permissible during the succeeding thirty days provided that during such thirty days all the active components that affect operability of the operable REC subsystem, the active components that affect operability of the engineered safeguards compartment cooling systems, the diesel generator associated with the operable subsystem are operable.

The allowable repair time does not apply when the reactor is in the shutdown mode and reactor pressure is less than 75 psig.

3. Both REC subsystems with one pump per subsystem shall be operable as stated in 3.12.B.1 and 3.12.B.2 above during reactor head-off operations requiring LPCI or Core Spray system availability or Service Water cooling shall be available.

4. If the requirements of 3.12.B.1 through 3.12.B.3 cannot be met, the reactor shall be shutdown in an orderly manner and in the Cold Shutdown condition within 24 hours or operations requiring LPCI or Core Spray system availability shall be halted.

SURVEILLANCE REQUIREMENTS

4.12 (cont'd)

B. Reactor Equipment Cooling (REC) System

1. REC System Testing

	Item	Frequency
a.	Pump Operability	Once/Month
b.	Motor operated Valve Operability	Once/Month
c.	Pump flow rate Each pump shall deliver 1175 gpm at 65 psid.	Once/3 months and after pump maintenance
d.	System head tank level shall be monitored.	Daily

2. When it is determined that any active component that affects operability of an REC subsystem is inoperable, all active components that affect operability of the operable REC subsystem shall be verified operable immediately and weekly thereafter.

LIMITING CONDITIONS FOR OPERATION

3.12 (cont'd)

C. Service Water System

1. Both Service Water subsystems with both pumps in each subsystem shall be operable whenever irradiated fuel is in the vessel or spent fuel pool and prior to reactor startup except as specified in 3.12.C.2 below.

2. From and after the date that any active component that affects operability of one Service Water subsystem is made or found to be inoperable for any reason, continued reactor operation is permissible during the succeeding thirty days provided that during such thirty days all active components that affect operability of the operable Service Water subsystem and its associated diesel generator are operable.

3. If the requirement of 3.12.C.1 and 3.12.C.2 cannot be met, an orderly shutdown of the reactor shall be initiated and the reactor shall be in the Cold Shutdown Condition within 24 hours.

D. Battery Room Ventilation

1. Battery room ventilation shall be operable on a continuous basis whenever specification 3.9.A is required to be satisfied.

2. From and after the date that either of the two battery room vent fans is made or found to be inoperable for any reason, continued reactor operation is permissible during the succeeding 7 days.

3. If the requirements of 3.12.D.1 & 2 cannot be met, an orderly shutdown of the reactor shall be initiated and the reactor shall be in Cold Shutdown within 24 hours.

SURVEILLANCE REQUIREMENTS

4.12 (cont'd)

C. Service Water System

1. Service Water System Testing

	Item	Functional
a.	Pump Operability	Once/Month
b.	Motor Operated Valve Operability	Once/Month
c.	Pump discharge head tests	Once/3 months

2. When it is determined that any required Service Water System component is inoperable, all active components that affect operability of the operable Service Water subsystem components shall be verified to be operable immediately and weekly thereafter.

D. Battery Room Ventilation

1. The spare battery room ventilation fan shall be checked for operability once/week.

3.12 BASES

A. Main Control Room Ventilation System

The control room ventilation system is designed to filter the control room atmosphere for intake air and/or for recirculation during control room isolation conditions. The system is designed to automatically start upon control room isolation and to maintain the control room pressure to the design positive pressure so that all leakage should be out leakage.

High efficiency particulate absolute (HEPA) filters are installed before the charcoal adsorbers to prevent clogging of the iodine adsorbers. The charcoal adsorbers are installed to reduce the potential intake of radioiodine to the control room. The in-place test results should indicate a system leak tightness of less than 1 percent bypass leakage for the charcoal adsorbers and HEPA filters. The laboratory carbon sample test results should indicate a radioactive methyl iodide removal efficiency of at least 99 percent for expected accident conditions. If the performance of the HEPA filters and charcoal adsorbers are as specified, the resulting doses will be less than the allowable levels stated in criterion 19 of the General Design Criteria for Nuclear Power Plants, Appendix A to 10 CFR Part 50.

If the system is found to be inoperable, there is no immediate threat to the control room and reactor operation may continue for a limited period of time while repairs are being made. If the system cannot be repaired within seven days, the reactor is shutdown and brought to cold shutdown within 24 hours.

B. Reactor Equipment Cooling (REC) System

The Reactor Equipment Cooling System consists of two, distinct subsystems, each containing two pumps and one heat exchanger. Each subsystem is capable of supplying the cooling requirements of the essential services following design accident conditions with only one pump in either subsystem.

The REC System has additional flexibility provided by the capability of interconnection of the two subsystems and the backup water supply to the critical cooling loop by the Service Water System. This flexibility and the need for only one pump in one critical cooling loop to meet the design accident requirements justifies the 30 day repair time during normal operation and the reduced requirements during head-off operations requiring the availability of the LPCI or Core Spray systems.

C. Service Water System

The Service Water System consists of two, distinct subsystems, each containing two vertical Service Water pumps located in the intake structure, and associated strainers, piping, valving and instrumentation. The pumps discharge to a common header from which independent piping supplies two Seismic Class I cooling water loops and one turbine building loop. Automatic valving is provided to shutoff all supply to the turbine building loop on drop in header pressure thus assuring supply to the Seismic Class I loops each of which feeds one diesel generator, two RHR Service Water booster pumps, one control room basement fan coil unit and one REC heat exchanger. Valves are included in the common discharge header to permit the Seismic Class I Service Water System to be operated as two independent subsystems. The heat exchangers are valved such that they can be individually backwashed without interrupting system operation.

During normal operation two or three pumps will be required. Three pumps are used for a normal shutdown.

The loss of all a-c power will trip all operating Service Water pumps. The automatic emergency diesel generator start system and emergency equipment starting sequence will then start one selected Service Water pump in 30-40 seconds. In the meantime, the drop in Service Water header pressure will close the turbine building cooling water isolation valve guaranteeing supply to the reactor building, the control room basement, and the diesel generators from the one Service Water pump.

Due to the redundance of pumps and the requirement of only one to meet the accident requirements, the 30 day repair time is justified.

D. Battery Room Ventilation

The temperature rise and hydrogen buildup in the battery rooms without adequate ventilation is such that continuous safe operation of equipment in these rooms cannot be assured.

4.12 BASES

A. Main Control Room Ventilation System

Pressure drop across the combined HEPA filters and charcoal adsorbers of less than 6 inches of water at the system design flow rate will indicate that the filters and adsorbers are not clogged by excessive amounts of foreign matter. Pressure drop should be determined at least once per operating cycle to show system performance capability.

Tests of the charcoal adsorbers with halogenated hydrocarbon refrigerant should be performed in accordance with ANSI N510-1980.

The frequency of tests and sample analysis are necessary to show that the HEPA filters and charcoal adsorbers can perform as evaluated. The test canisters that are installed with the adsorber trays should be used for the charcoal adsorber efficiency test. Each sample should be at least two inches in diameter and a length equal to the thickness of the bed. If test results are unacceptable, all adsorbent in the system shall be replaced with an adsorbent qualified according to Table 5.1 of ANSI N509-1980. The replacement tray for the absorber tray removed for the test should meet the same adsorbent quality. Tests of the HEPA filters with DOP aerosol shall be performed in accordance to ANSI N510-1980. Any HEPA filters found defective shall be replaced with filters qualified pursuant to Regulatory Position C.3.d of Regulatory Guide 1.52.

Operation of the system for 10 hours every month will demonstrate operability of the filters and adsorber system and remove excessive moisture built up on the adsorber.

3.22 SPECIAL TESTS/EXCEPTIONS (CONT'D)

2. Rod Sequence Control System (RSCS)

The sequence constraints imposed on control rod groups by the RSCS may be suspended by means of the individual rod position bypass switches or jumpers, provided that the rod worth minimizer is OPERABLE, for this and the following special tests.

a. Control rod scram timing.

b. Control rod friction measurements.

c. Startup test program with thermal power less than 20% of rated thermal power.

If the above requirement is not satisfied, the RSCS shall be operable.

3. RHR System

The RHR system may be aligned in the shutdown cooling mode with at least one shutdown cooling mode loop OPERABLE while performing the Shutdown Margin Demonstration.

4. Containment Systems

Primary containment is not required while performing the Shutdown Margin Demonstration when reactor water temperature is equal to or less than 212°F.

B. Training Startup

1. LPCI System

The LPCI System is required to be operable with the exception that the RHR system may be aligned in the shutdown cooling mode while performing training startups at atmospheric pressure at power levels less than 1% of rated thermal power.

4.22 SPECIAL TESTS/EXCEPTIONS (CONT'D)

2. When the constraints imposed on control rod groups by the RSCS are bypassed, verify:

a. That the RWM is OPERABLE.

b. Conformance with this specification and procedures by a second licensed operator or other qualified employee.

B. Training Startup

The reactor vessel shall be verified to be unpressurized and the thermal power verified to be less than 1% of rated thermal power at least once per hour during training startups.