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(5) Pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by operation of the facility.

3. This renewed license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter 1: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Section 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

A. Maximum Power Level

Omaha Public Power District is authorized to operate the Fort Calhoun Station, Unit 1, at steady state reactor core power levels not in excess of 1500 megawatts thermal (rated power).

B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 239*, are hereby incorporated in the license. Omaha Public Power District shall operate the facility in accordance with the Technical Specifications.

C. Security and Safeguards Contingency Plans

The Omaha Public Power District shall fully implement and maintain in effect all provisions of the Commission-approved physical security, training and qualification, and safeguards contingency plans including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822) and to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The plans, which contain Safeguards Information protected under 10 CFR 73.21, are entitled: "Fort Calhoun Station Security Plan, Training and Qualification Plan, Safeguards Contingency Plan," submitted by letter dated October 18, 2004.

*Tech Spec 238 will be issued at a later date.

OMAHA PUBLIC POWER DISTRICT
FORT CALHOUN STATION UNIT NO. 1
OPERATING LICENSE NO. DPR-40

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2.0 LIMITING CONDITIONS FOR OPERATION
2.8 Refueling
2.8.1 Refueling Shutdown

2.8.1(1) Boron Concentration

Applicability

Applies to Reactor Coolant System boron concentration when fuel is in the reactor and one or more reactor vessel head closure bolts are less than fully tensioned.

Objective

The limit on the boron concentration of the Reactor Coolant System ensures that the reactor remains subcritical when the plant is in REFUELING SHUTDOWN (MODE 5).

Specification

Boron concentration of the Reactor Coolant System shall be greater than or equal to REFUELING BORON CONCENTRATION.

Required Actions

(1) With the boron concentration not within limit, suspend CORE ALTERATIONS immediately, and

(2) Suspend positive reactivity additions immediately, and

(3) Initiate actions to restore boron concentration to within limits immediately.

2.0 LIMITING CONDITIONS FOR OPERATION
2.8 Refueling
2.8.1 Refueling Shutdown

2.8.1(2) Nuclear Instrumentation

Applicability

Applies to the source range neutron monitors in MODE 5 with fuel in the reactor and with one or more reactor vessel head closure bolts less than fully tensioned.

Objective

To monitor the core reactivity condition and to alert the operator to unexpected changes in core reactivity when the plant is in REFUELING SHUTDOWN (MODE 5).

Specification

Two source range neutron monitors shall be OPERABLE.

Required Actions

(1) With only one source range neutron monitor OPERABLE, suspend CORE ALTERATIONS and positive reactivity additions immediately.

(2) With no source range neutron monitors OPERABLE, suspend CORE ALTERATIONS and positive reactivity additions immediately, and initiate actions to restore one source range neutron monitor to OPERABLE status immediately, and verify RCS boron concentration is greater than or equal to REFUELING BORON CONCENTRATION within 4 hours and once per 12 hours thereafter.

2.0 LIMITING CONDITIONS FOR OPERATION
2.8 Refueling
2.8.1 Refueling Shutdown

2.8.1(3) Shutdown Cooling System - High Water Level

Applicability
Applies to shutdown cooling requirements in MODE 5 with fuel in the reactor and with one or more reactor vessel head closure bolts less than fully tensioned, and the refueling cavity water level ≥ 23 ft. above the top of the core.

Objective
To minimize the possibility of a loss of shutdown cooling accident occurring inside containment that could affect public health and safety.

Specification
One OPERABLE Shutdown Cooling loop shall be IN OPERATION except as noted below:

1. The required Shutdown Cooling loop may be removed from operation for ≤ one hour per 8 hour period, provided no operations are permitted that would cause dilution of the RCS boron concentration.

2. The required Shutdown Cooling loop may be inoperable for up to eight hours provided (1) no operations are permitted that would cause dilution of the RCS boron concentration, (2) no CORE ALTERATIONS or REFUELING OPERATIONS are taking place, (3) all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere are closed within 4 hours, and (4) at least one loop is available under administrative controls.

Required Actions

(1) With no Shutdown Cooling loop IN OPERATION (except as allowed by notes 1 or 2 above),

   a. Suspend operations involving a reduction in reactor coolant boron concentration immediately, and

   b. Suspend loading of irradiated fuel assemblies into the reactor core immediately, and

   c. Initiate actions to restore system to operation immediately, and

   d. Close all containment penetrations providing direct access from containment atmosphere to outside atmosphere within 4 hours.

2.0 LIMITING CONDITIONS FOR OPERATION
2.8 Refueling
2.8.1 Refueling Shutdown

2.8.1(4) Shutdown Cooling System - Low Water Level

Applicability

Applies to shutdown cooling requirements in MODE 5 with fuel in the reactor and with one or more reactor vessel head closure bolts less than fully tensioned, and the refueling cavity water level < 23 ft. above the top of the core.

Objective

To minimize the possibility of a loss of shutdown cooling accident occurring inside of containment that could affect public health and safety.

Specification

Two Shutdown Cooling loops shall be OPERABLE, and one Shutdown Cooling loop shall be IN OPERATION.

Required Actions

(1) With one Shutdown Cooling loop inoperable either,

a. Restore the inoperable Shutdown Cooling loop to OPERABLE status immediately, or

b. Initiate actions to establish at least 23 ft. of water above the top of the core immediately.

(2) With both Shutdown Cooling loops inoperable or one Shutdown Cooling loop not IN OPERATION,

a. Suspend operations involving a reduction in RCS boron concentration immediately, and

b. Initiate actions to restore at least one Shutdown Cooling loop to operation immediately, and

c. Close all containment penetrations providing direct access from containment atmosphere to outside atmosphere within 4 hours.

2.0 LIMITING CONDITIONS FOR OPERATION
2.8 Refueling
2.8.2 Refueling Operations - Containment

2.8.2(1) Containment Penetrations

Applicability

Applies to containment penetrations in MODE 5 during CORE ALTERATIONS and REFUELING OPERATIONS inside containment.

Objective

To minimize the consequences of an accident occurring during CORE ALTERATIONS and REFUELING OPERATIONS inside containment that could affect public health and safety.

Specification

The containment penetrations shall be in the following status:

a. The Equipment Hatch Enclosure (Room 66) doors or the equipment hatch shall be capable of being closed;

b. One door in the Personnel Air Lock shall be capable of being closed; and

c. Each penetration providing direct access from the containment atmosphere to the outside atmosphere either:

   1. closed by a manual or automatic isolation valve, blind flange, or equivalent, or

   2. capable of being closed.

Note - Penetration flow path(s) providing direct access from the containment atmosphere to the outside atmosphere may be unisolated under administrative controls.

Required Actions

(1) With one or more containment penetrations not in required status, suspend CORE ALTERATIONS and REFUELING OPERATIONS within containment immediately.

2.0 LIMITING CONDITIONS FOR OPERATION
2.8 Refueling
2.8.2 Refueling Operations - Containment

2.8.2(2) Refueling Water Level

Applicability

Applies to the refueling water level during CORE ALTERATIONS, and during REFUELING OPERATIONS inside of containment

Objective

To minimize the consequences of a fuel handling accident during CORE ALTERATIONS and REFUELING OPERATIONS inside of the containment that could affect public health and safety.

Specification

The refueling water level shall be ≥ 23 ft. above the top of the reactor vessel flange.

Required Actions

(1) With the refueling water level not within limits, suspend CORE ALTERATIONS immediately, and

(2) Suspend REFUELING OPERATIONS inside of containment immediately, and

(3) Initiate actions to restore refueling water level to within limits immediately.

2.0 LIMITING CONDITIONS FOR OPERATION
2.8 Refueling
2.8.2 Refueling Operations - Containment

2.8.2(3) Ventilation Isolation Actuation Signal (VIAS)

Applicability

Applies to operation of the Ventilation Isolation Actuation Signal (VIAS) during CORE ALTERATIONS and REFUELING OPERATIONS inside containment.

Objective

To minimize the consequences of an accident occurring during CORE ALTERATIONS or REFUELING OPERATIONS that could affect public health and safety.

Specification

VIAS, including manual actuation capability, shall be OPERABLE with one gaseous radiation monitor OPERABLE.

Required Actions

(1) Without one radiation monitor OPERABLE, or VIAS manual actuation capability inoperable, immediately suspend CORE ALTERATIONS and REFUELING OPERATIONS.

2.8.2(4) Control Room Ventilation System

Applicability

Applies to operation of the control room ventilation system during CORE ALTERATIONS and REFUELING OPERATIONS inside containment.

Objective

To minimize the consequences of a fuel handling accident to the control room staff.

Specification

The control room ventilation system shall be IN OPERATION and in the Filtered Air mode.

Required Actions

(1) If the control room ventilation system is not IN OPERATION or not in the Filtered Air mode, immediately suspend CORE ALTERATIONS and REFUELING OPERATIONS.

2.0 LIMITING CONDITIONS FOR OPERATION
2.8 Refueling
2.8.3 Refueling Operations - Spent Fuel Pool

2.8.3(1) Spent Fuel Assembly Storage

Applicability

Applies to storage of spent fuel assemblies whenever any irradiated fuel assembly is stored in Region 2 (including peripheral cells) of the spent fuel pool. The provisions of Specification 2.0.1 for Limiting Conditions for Operation are not applicable.

Objective

To minimize the possibility of an accident occurring during REFUELING OPERATIONS that could affect public health and safety.

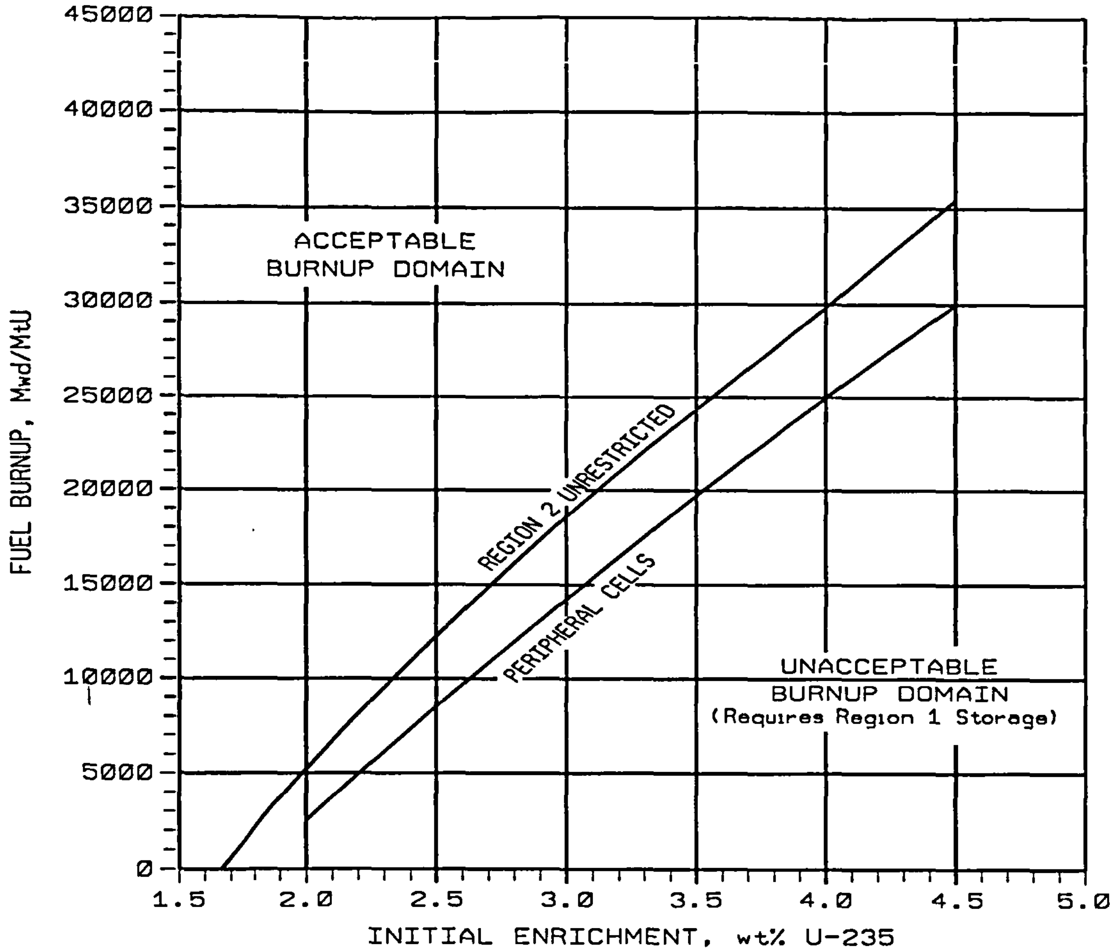
Specification

The combination of initial enrichment and burnup of each spent fuel assembly stored in Region 2 (including peripheral cells) of the spent fuel pool shall be within the acceptable burnup domain of Figure 2-10.

Required Actions

(1) With the requirements of the LCO not met, initiate action to move the noncomplying fuel assembly immediately.

FIGURE 2-10



LIMITING BURNUP CRITERIA FOR
ACCEPTABLE STORAGE IN REGION 2

NOTES:

1. Any fuel assembly ($\leq$ 4.5% average U-235 enrichment) mechanically coupled with a full length CEA may be located anywhere in Region 2.

2. Peripheral cells are those adjacent to the Spent Fuel Pool wall or the cask laydown area.

2.0 LIMITING CONDITIONS FOR OPERATION
2.8 Refueling
2.8.3 Refueling Operations - Spent Fuel Pool

2.8.3(2) Spent Fuel Pool Water Level

Applicability

Applies to the water level of the spent fuel pool during REFUELING OPERATIONS in the spent fuel pool. The provisions of Specification 2.0.1 for Limiting Conditions for Operation are not applicable.

Objective

To minimize the consequences of a fuel handling accident during REFUELING OPERATIONS in the spent fuel pool that could affect public health and safety.

Specification

The spent fuel pool water level shall be ≥ 23 ft. above the top of irradiated fuel assemblies seated in the storage racks.

Required Actions

(1) With the spent fuel pool water level not within limits, suspend REFUELING OPERATIONS in the spent fuel pool immediately.

2.0 LIMITING CONDITIONS FOR OPERATION
2.8 Refueling
2.8.3 Refueling Operations - Spent Fuel Pool

2.8.3(3) Spent Fuel Pool Boron Concentration

Applicability

Applies to the boron concentration of the spent fuel pool when unirradiated fuel assemblies are stored in the spent fuel pool. The provisions of Specification 2.0.1 for Limiting Conditions for Operations are not applicable.

Objective

To minimize the possibility of an accident that could affect public health and safety from occurring when unirradiated fuel assemblies are stored in the spent fuel pool.

Specification

The spent fuel pool boron concentration shall be ≥ 500 ppm.

Required Actions

(1) With the spent fuel pool boron concentration < 500 ppm, suspend REFUELING OPERATIONS in the spent fuel pool immediately, and

(2) Restore spent fuel pool boron concentration to ≥ 500 ppm immediately.

2.0 LIMITING CONDITIONS FOR OPERATION
2.8 Refueling
2.8.3 Refueling Operations - Spent Fuel Pool

2.8.3(4) Spent Fuel Pool Area Ventilation

Applicability

Applies to operation of the ventilation system in the spent fuel pool area during REFUELING OPERATIONS in the spent fuel pool. The provisions of Specification 2.0.1 for Limiting Condition for Operations are not applicable.

Objective

To minimize the consequences of an accident occurring during REFUELING OPERATIONS in the spent fuel pool that could affect public health and safety.

Specification

The spent fuel pool area ventilation system shall be IN OPERATION.

Required Actions

(1) With the spent fuel pool area ventilation system not IN OPERATION, suspend REFUELING OPERATIONS in the spent fuel pool immediately.

2.0 LIMITING CONDITIONS FOR OPERATION
2.8 Refueling
2.8.3 Refueling Operations - Spent Fuel Pool

2.8.3(5) Control Room Ventilation System

Applicability

Applies to operation of the control room ventilation system during REFUELING OPERATIONS in the spent fuel pool area. The provisions of Specification 2.0.1 for Limiting Conditions for Operation are not applicable.

Objective

To minimize the consequences of a fuel handling accident to the control room staff.

Specification

(1) The control room ventilation system shall be IN OPERATION and in the Filtered Air mode.

(2) A spent fuel pool area radiation monitor shall be IN OPERATION.

Required Actions

(1) If the control room ventilation system is not IN OPERATION or not in Filtered Air mode, immediately suspend REFUELING OPERATIONS.

(2) If a spent fuel pool area radiation monitor is not IN OPERATION, immediately suspend REFUELING OPERATIONS.

2.0 LIMITING CONDITIONS FOR OPERATION
2.8 Refueling
2.8.3 Refueling Operations - Spent Fuel Pool

2.8.3(6) Spent Fuel Cask Loading

Applicability

Applies to storage of spent fuel assemblies whenever any fuel assembly is located in a spent fuel cask in the spent fuel pool. The provisions of Specification 2.0.1 for Limiting Conditions for Operation are not applicable.

Objective

To minimize the possibility of an accident occurring during REFUELING OPERATIONS that could affect public health and safety.

Specification

(1) The spent fuel pool boron concentration shall be ≥ 800 ppm, and

(2) The combination of initial enrichment and burnup of each spent fuel assembly located in a spent fuel storage cask in the spent fuel pool shall be within the acceptable burnup domain of Figure 2-11.

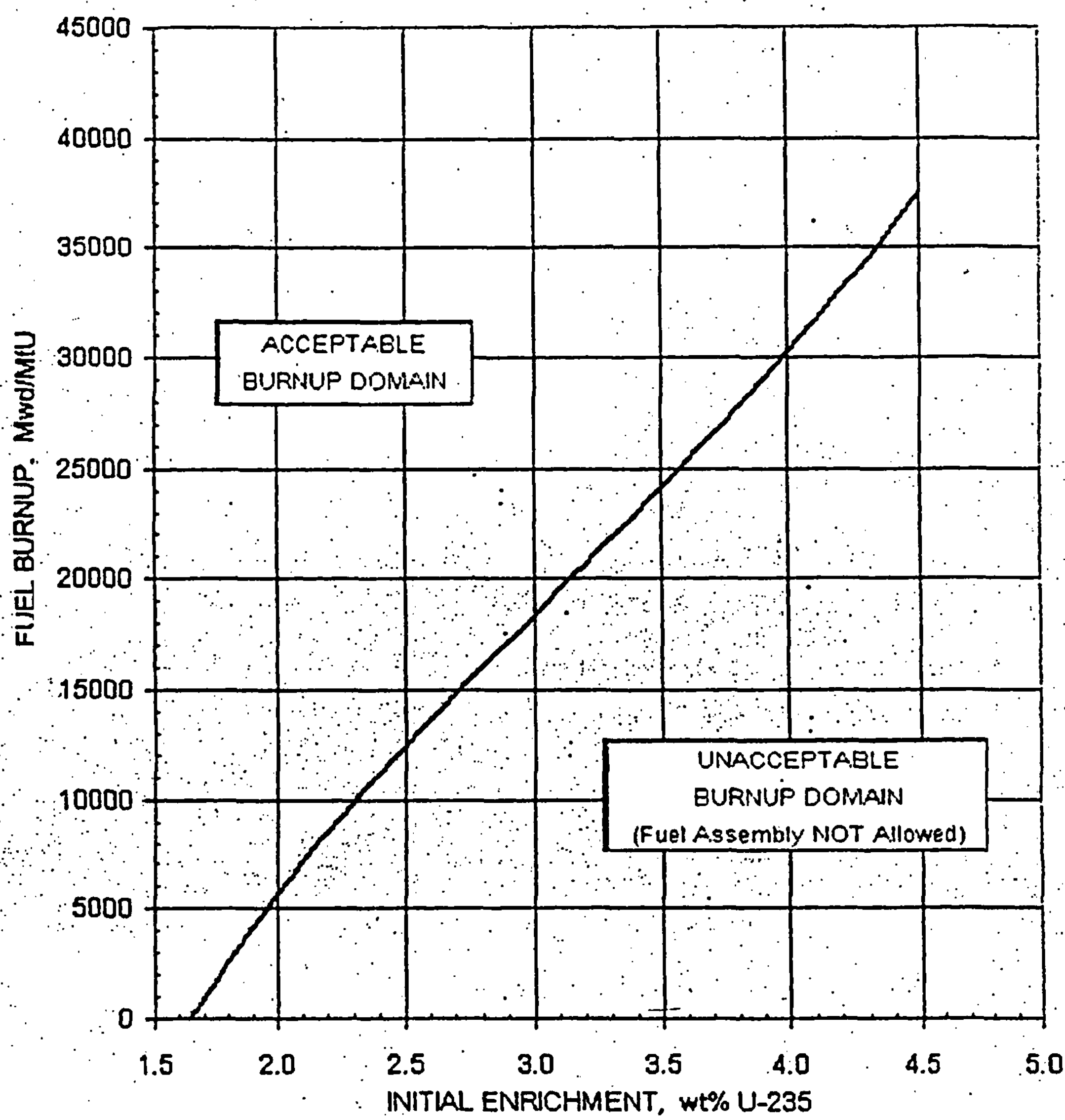
Required Actions

(1) With the spent fuel pool boron concentration <800 ppm, suspend REFUELING OPERATIONS involving spent fuel cask loading immediately, and

(2) Restore spent fuel pool boron concentration to ≥ 800 ppm immediately.

(3) With the requirements of the LCO 2.8.3(6)(2) not met, initiate action to remove the noncomplying fuel assembly from the spent fuel cask immediately.

Figure 2-11



LIMITING BURNUP CRITERIA
FOR
ACCEPTABLE STORAGE IN
SPENT FUEL CASK

2.0 LIMITING CONDITIONS FOR OPERATION
2.8 Refueling

Bases

2.8.1 Refueling Shutdown

2.8.1(1) Boron Concentration

The boron concentration of the water filling the reactor refueling cavity (of at least the REFUELING BORON CONCENTRATION) is sufficient to maintain the reactor subcritical by more than 5%, including allowance for uncertainties, in the cold condition with all rods withdrawn. The REFUELING BORON CONCENTRATION is specified in the COLR. Periodic checks of the refueling water boron concentration ensure the proper shutdown margin.

When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner. Suspension of CORE ALTERATIONS shall not preclude completion of movement of a component to a safe, conservative position.

2.8.1(2) Nuclear Instrumentation

Two OPERABLE source (wide) range neutron monitors are required to provide a signal to ensure that redundant monitoring capability is available to detect changes in core reactivity. With only one source range neutron monitor OPERABLE, redundancy has been lost. Since these instruments are the only direct means of monitoring core reactivity conditions, CORE ALTERATIONS and positive reactivity additions must be suspended immediately. When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner.

With no source range neutron monitor OPERABLE, there is no means of detecting changes in core reactivity. However, since CORE ALTERATIONS and positive reactivity additions are not being made, the core reactivity condition is stabilized until the monitors are returned to OPERABLE status. This stabilized condition is determined by verifying that the required boron concentration exists. The completion time of 4 hours is sufficient to obtain and analyze a reactor coolant sample for boron concentration. The frequency of once per 12 hours ensures that unplanned changes in boron concentration would be identified. The 12 hour frequency is reasonable, considering the low probability of a change in core reactivity during this period.

2.0 LIMITING CONDITIONS FOR OPERATION
2.8 Refueling

Bases (Continued)

2.8.1(3) Shutdown Cooling System - High Water Level

The purposes of the SDC system in MODE 5 with fuel in the reactor and with one or more reactor vessel head closure bolt less than fully tensioned, are to remove decay heat and sensible heat from the RCS, provide mixing of borated coolant, to provide sufficient coolant circulation to minimize the effects of a boron dilution accident, and to prevent boron stratification.

Inadequate cooling of the reactor coolant could result in boiling of the reactor coolant which could lead to a reduction in boron concentration in the coolant due to the boron plating out on components near the areas of boiling activity, and because of the possible addition of water to the reactor vessel with a lower boron concentration than is required to keep the reactor subcritical. The loss of reactor coolant and the reduction of boron concentration in the reactor coolant would eventually challenge the integrity of the fuel cladding, which is a fission product barrier.

An OPERABLE SDC loop consists of a SDC pump, a heat exchanger, valves, piping, instruments and controls to ensure an OPERABLE flowpath and to determine the low end temperature. The flowpath starts in one of the RCS hot legs and is returned to the RCS cold legs. The containment spray pumps can be considered as available shutdown cooling pumps only if the RCS temperature is less than 120°F and the RCS is vented with a vent area greater than or equal to 47 in^2. This restrictions ensure that the SI/CS pumps' suction header piping is not subjected to an unanalyzed condition in this mode. Analysis has determined that the minimum required RCS vent area is 47 in^2. This requirement may be met by removal of the pressurizer manway which has a cross-sectional area greater than 47 in^2.

Specification 2.8.1(3) is modified by an exception that allows the required operating SDC loop to be removed from service for up to 1 hour in each 8 hour period, provided no operations are permitted that would cause a reduction of the RCS boron concentration. This permits operations such as core mapping or alterations in the vicinity of the reactor vessel hot leg nozzles, and RCS to SDC isolation valve testing. During this 1 hour period, decay heat is removed by natural convection to the large mass of water in the refueling cavity. Boron concentration reduction is prohibited because uniform concentration distribution cannot be assured without forced circulation.

Bases (Continued)

2.8.1(3) Shutdown Cooling System - High Water Level (Continued)

Specification 2.8.1(3) is modified by an exception to allow both trains of SDC out of service for up to eight hours provided, in part, that at least one SDC train is available under administrative controls. This allows evolutions such as Engineered Safety Feature testing to be completed when the SDC system is not fully OPERABLE but is considered available since only minor operator actions are required to restore the SDC system to OPERABLE status and place it IN OPERATION. A SDC loop is considered available under administrative controls if there are: (1) approved procedures, (2) a dedicated operator stationed at the controls if they are outside of the control room, and (3) direct communication between the dedicated operator and the control room. Similarly, the SDC system is considered available under administrative controls when an operator is not at the location of the controls provided: (1) procedural guidance is consulted prior to removing SDC from service to determine the time-to-boil, and (2) there is sufficient time for the operator to travel to the local controls and perform the required actions.

With the water level ≥ 23 feet above the top of the core, only one SDC loop is required for decay heat removal. Only one is required because the volume of water above the top of the core provides backup decay heat removal capability. The 23 ft level was selected because it ensures that adequate time is available to initiate emergency procedures to cool the core. For example, assuming the amount of decay heat generated one day after shutdown with an initial reactor coolant temperature of 200°F, this level provides approximately 25 minutes before the reactor coolant would boil. More time is available under conditions more representative of when this specification applies (i.e., when the reactor vessel closure head is removed). For example, five days after shutdown with the initial reactor coolant temperature of 130°F provides more than four hours before the reactor coolant would boil.

If the SDC loop requirements are not met, there will be no forced circulation to provide mixing to establish uniform boron concentrations. Therefore, actions that reduce boron concentration are required to be suspended immediately. Additionally, suspending any operation that would increase the decay heat load, such as loading a fuel assembly, is a prudent action under this condition. Closing the containment penetrations that provide direct access to the outside environment prevents fission products, if released from a loss of decay heat removal event, from escaping the containment. A completion time of 4 hours is reasonable because most SDC problems can be repaired within 4 hours and because there is a low probability of the cooling boiling in that time.

When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner.

2.0 LIMITING CONDITIONS FOR OPERATION
2.8 Refueling

Bases (Continued)

2.8.1(4) Shutdown Cooling System - Low Water Level

With the water level < 23 feet above the top of the core, two OPERABLE SDC loops are required since the volume of water above the top of the core will not provide sufficient backup decay heat removal capability.

With one SDC loop inoperable, actions shall be immediately initiated and continued until the SDC loop is restored to OPERABLE status, or until ≥ 23 feet of water is established above the top of the core. With the water level ≥ 23 feet above the top of the core, this Specification is no longer applicable, and Specification 2.8.1(3) is applicable.

An OPERABLE SDC loop consists of a SDC pump, a heat exchanger, valves, piping, instruments and controls to ensure an OPERABLE flowpath and to determine the low end temperature. The flowpath starts in one of the RCS hot legs and is returned to the RCS cold legs. The containment spray pumps can be considered as available shutdown cooling pumps only if the RCS temperature is less than 120°F and the RCS is vented with a vent area greater than or equal to 47 in^2.

With both SDC loops inoperable, there will be no forced circulation to provide mixing to establish uniform boron concentrations. Therefore, actions that reduce boron concentration are required to be suspended immediately. Closing the containment penetrations that provide direct access to the outside environment prevents fission products, if released from a loss of decay heat removal event, from escaping the containment. A completion time of 4 hours is reasonable because most SDC problems can be repaired within 4 hours and because there is a low probability of the coolant boiling in that time.

When "immediately" is used in a completion time, the required action should be pursued without delay and in a controlled manner.

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.8 Refueling

Bases (Continued)

2.8.2(1) Containment Penetrations

During CORE ALTERATIONS or REFUELING OPERATIONS inside containment, a release of fission product radioactivity within the containment will be minimized from escaping to the environment when the LCO requirements are met. In MODE 5, the potential for containment pressurization as a result of an accident is not likely; therefore, requirements to isolate the containment from the outside atmosphere are less stringent than when the reactor is at power. The LCO does not require CONTAINMENT INTEGRITY. Since there is no potential for containment pressurization as a result of a fuel handling accident, the Appendix J leakage criteria and tests are not required.

For a fuel handling accident in containment, the very conservative assumption that all the rods in a single assembly fail with no credit for containment isolation or atmosphere filtration yields worst 2-hour doses at the exclusion area boundary (EAB) and low population zone (LPZ) that remain well within the limits of 10 CFR 50.67.

During CORE ALTERATIONS or REFUELING OPERATIONS inside of containment, the Equipment Hatch Enclosure (Room 66) doors or the equipment hatch shall be capable of being closed within one hour after a fuel handling accident per administrative controls. Placing administrative controls (closure requirements) on the Equipment Hatch Enclosure (Room 66) doors or the equipment hatch ensures that the release of fission products is minimized (defense in depth).

The Personnel Air Lock (PAL), which is also part of the containment pressure boundary, provides a means for personnel access into containment. The doors are normally interlocked to prevent simultaneously opening when CONTAINMENT INTEGRITY is required. During periods of shutdown when containment closure is not required, the interlock may be disabled and both PAL doors allowed to remain open for extended periods when frequent containment entry is necessary. During CORE ALTERATIONS or REFUELING OPERATIONS inside containment, CONTAINMENT INTEGRITY is not required, therefore the door interlock mechanism may remain disabled, but one PAL door shall always remain capable of being closed.

The other containment penetrations that provide direct access from containment atmosphere to outside atmosphere shall be capable of being closed within one hour, per administrative controls, on at least one side. The specification is met when one of the two automatic isolation valves per penetration is OPERABLE, or by closure of a manual isolation valve, blind flange, or equivalent. Equivalent isolation methods must be approved (through 10 CFR 50.59 safety evaluation process) and may include use of a material that can provide a temporary, atmospheric pressure ventilation barrier for the other containment penetrations during fuel movements.

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.8 Refueling

Bases (Continued)

2.8.2(1) Containment Penetrations (Continued)

The administrative controls to ensure closure of the Equipment Hatch Enclosure (Room 66) doors or equipment hatch, one PAL door, and other penetrations within one hour of a FHA will be implemented in plant procedures. These administrative controls are as follows:

a. the Equipment Hatch Enclosure (Room 66) doors or the equipment hatch and one door in the PAL shall be capable of being closed in less than one hour of a FHA,

b. the Equipment Hatch Enclosure (Room 66) doors or the equipment hatch and one door in the PAL shall not be obstructed unless capability for rapid removal of obstructions is provided (such as quick disconnects for hoses),

c. penetrations providing direct access from the containment atmosphere to the outside atmosphere shall be capable of being closed on one side in less than one hour of a FHA,

d. an individual or individuals shall be designated and available during CORE ALTERATIONS and REFUELING OPERATIONS, capable of closing the Equipment Hatch Enclosure (Room 66) doors or equipment hatch, one door in the PAL, and penetrations that provide direct access from the containment atmosphere to the outside atmosphere.

The required actions shall be completed within one hour after the time of a FHA. Provision of these required actions minimizes the release of fission product radioactivity. The fuel handling accident in containment uses the conservative assumptions that activity is instantaneously released to the reactor coolant cavity water and then released over a two-hour time period from containment to the environment. Implementing closure of containment within one hour from the time of accident minimizes the dose consequences to the EAB and LPZ.

When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner.

2.8.2(2) Refueling Water Level

Prior to REFUELING OPERATIONS inside containment, the reactor refueling cavity is filled with approximately 250,000 gallons of borated water. The minimum refueling water level meets the assumption of iodine decontamination factors following a fuel handling accident. When the water level is lower than the required level, CORE ALTERATIONS and REFUELING OPERATIONS inside of containment shall be suspended immediately. This effectively precludes a fuel handling accident from occurring. When "immediately" is used as a completion time, the required action

2.0 LIMITING CONDITIONS FOR OPERATION
2.8 Refueling

Bases (Continued)

2.8.2(2) Refueling Water Level (Continued)

should be pursued without delay and in a controlled manner. Suspension of REFUELING OPERATIONS and CORE ALTERNATIONS shall not preclude completion of movement of a component to a safe, conservative position. In addition to suspending REFUELING OPERATIONS and CORE ALTERATIONS, action to restore the refueling water level must be initiated immediately.

Movement of irradiated fuel from the reactor core is not initiated before the reactor core has been subcritical for a minimum of 72 hours if the reactor has been operated at power levels in excess of 2% rated power. The restriction of not moving fuel in the reactor for a period of 72 hours after the power has been removed from the core takes advantage of the decay of the short half-life fission products and allows for any failed fuel to purge itself of fission gases, thus reducing the consequences of a fuel handling accident.

2.8.2(3) *Ventilation Isolation Actuation Signal (VIAS)*

A Ventilation Isolation Actuation Signal (VIAS) is initiated by a Safety Injection Actuation Signal (SIAS), a Containment Spray Actuation Signal (CSAS) or a Containment Radiation High Signal (CRHS). During CORE ALTERATIONS and REFUELING OPERATIONS only the CRHS is required to respond to a fuel handling or reactivity accident. At least one of the following three radiation monitors (Containment Monitor (RM-051), Containment/Auxiliary Building Stack Swing Monitor (RM-052), Auxiliary Building Stack Radiation Monitor (RM-062) must be OPERABLE and aligned to monitor the containment atmosphere or stack effluents. (Note, the Offsite Dose Calculation Manual may have additional requirements/restrictions concerning operation of these monitors.)

In the event that none of the above radiation monitors are OPERABLE or VIAS manual actuation capability is inoperable, CORE ALTERATIONS and REFUELING OPERATIONS must be suspended thus precluding the possibility of a fuel handling/reactivity accident.

For the fuel handling accident in containment, the very conservative assumption that all the rods in a single assembly fail with no credit taken for containment isolation or atmosphere filtration yields doses at the exclusion area boundary (EAB) and low population zone (LPZ) that remain well within the limits of 10 CFR 50.67.

VIAS initiates closure of the containment pressure relief, air sample, and purge system valves, if open. This action minimizes release of significant radionuclides from the containment to the environment. VIAS also initiates other actions, such as opening of the air supply and exhaust dampers in the safety injection pump rooms in preparation for safety injection pump operation. These other functions are not required to mitigate the consequences of a fuel handling accident, and therefore are not required to be OPERABLE.

2.0 LIMITING CONDITIONS FOR OPERATION
2.8 Refueling
Bases (Continued)

2.8.2(3) Ventilation Isolation Actuation Signal (VIAS) (Continued)

Requiring one (1) radiation monitor to be OPERABLE and aligned to monitor the containment atmosphere [or stack effluents] is a conservative measure to reduce exposure. Radiation monitoring will assure operators are alerted if a radiological incident occurs in containment to enable implementation of administrative controls as specified in the Bases for 2.8.2(1) "Containment Penetrations." During CORE ALTERATIONS and REFUELING OPERATIONS, the OPERABILITY of the control room ventilation system is addressed by Specification 2.8.2(4). The control room ventilation system is placed in Filtered Air mode as a conservative measure to reduce control room operator exposure. Specification 2.8.2(4) allows the radiological consequences analysis for a fuel handling accident to credit the Filtered Air mode at the time of the accident.

When VIAS is inoperable, CORE ALTERATIONS and REFUELING OPERATIONS in containment are immediately suspended. This effectively precludes a fuel handling accident from occurring. When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner. Suspension of CORE ALTERATIONS and REFUELING OPERATIONS shall not preclude completion of movement of a component to a safe, conservative position.

2.8.2(4) Control Room Ventilation System

Operating the control room ventilation system in the Filtered Air mode is a conservative measure to reduce control room operator exposure. This allows the radiological consequences analysis for a fuel handling accident to credit the Filtered Air mode at the time of the accident. When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner. Suspension of CORE ALTERATIONS and REFUELING OPERATIONS shall not preclude completion of movement of a component to a safe, conservative position.

2.8.3(1) Spent Fuel Assembly Storage

The spent fuel pool is designed for noncriticality by use of neutron absorbing material. The restrictions on the placement of fuel assemblies within the spent fuel pool, according to Figure 2-10, and the accompanying LCO, ensures that the k_{eff} of the spent fuel pool always remains < 0.95 assuming the pool to be flooded with unborated water.

A spent fuel assembly may be transferred directly from the reactor core to the spent fuel pool Region 2 provided an independent verification of assembly burnups has been completed and the assembly burnup meets the acceptance criteria identified in Figure 2-10. When the configuration of fuel assemblies stored in Region 2 (including the peripheral cells) is not in accordance with Figure 2-10, immediate action must be taken to make the necessary fuel assembly movement(s) to bring the configuration into compliance with Figure 2-10. Acceptable fuel assembly burnup is not a prerequisite for Region 1 storage because Region 1 will maintain any type of fuel assembly that the plant is licensed for in a safe, coolable, subcritical geometry.

Bases (Continued)

2.8.3(1) Spent Fuel Assembly Storage (Continued)

The provisions of Specification 2.0.1 for Limiting Conditions for Operations are not applicable. If moving fuel assemblies while in MODES 4 or 5, LCO 2.0.1 would not specify any actions. If moving fuel assemblies in MODES 1, 2, or 3, the fuel movement is independent of reactor operation. Therefore, inability to suspend movement of fuel assemblies is not sufficient reason to require a reactor shutdown. When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner.

2.8.3(2) Spent Fuel Pool Water Level

The minimum water level in the spent fuel pool meets the assumption of iodine decontamination factors following a fuel handling accident. When the water level is lower than the required level, the movement of irradiated fuel assemblies in the spent fuel pool is immediately suspended. This effectively precludes a fuel handling accident from occurring in the spent fuel pool. Suspension of REFUELING OPERATION shall not preclude completion of movement of a component to a safe, conservative position. The provisions of Specification 2.0.1 for Limiting Conditions for Operations are not applicable. If moving fuel assemblies while in MODES 4 or 5, LCO 2.0.1 would not specify any actions. If moving fuel assemblies in MODES 1, 2, or 3, the fuel movement is independent of reactor operation. Therefore, inability to suspend movement of fuel assemblies is not sufficient reason to require a reactor shutdown. When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner.

2.8.3(3) Spent Fuel Pool Boron Concentration

The basis for the 500 ppm boron concentration requirement with Boral poisoned storage racks is to maintain the k_{eff} below 0.95 in the event a misloaded unirradiated fuel assembly is located next to a spent fuel assembly. A misloaded unirradiated fuel assembly at maximum enrichment condition, in the absence of soluble poison, may result in exceeding the design effective multiplication factor. Soluble boron in the spent fuel pool water, for which credit is permitted under these conditions, would assure that the effective multiplication factor is maintained substantially less than the design condition.

This LCO applies whenever unirradiated fuel assemblies are stored in the spent fuel pool. The boron concentration is periodically sampled in accordance with Specification 3.2. Sampling is performed prior to movement of unirradiated fuel to the spent fuel pool and periodically when unirradiated fuel is stored in the spent fuel pool.

The provisions of Specification 2.0.1 for Limiting Conditions for Operations are not applicable. If moving fuel assemblies while in MODES 4 or 5, LCO 2.0.1 would not specify any actions. If moving fuel assemblies in MODES 1, 2, or 3, the fuel movement is independent of reactor operation. Therefore, inability to suspend movement of fuel assemblies is not sufficient reason to require a reactor shutdown.

2.0 LIMITING CONDITIONS FOR OPERATION
2.8 Refueling

Bases (Continued)

2.8.3(3) Spent Fuel Pool Boron Concentration (Continued)

When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner. Suspension of refueling operations shall not preclude completion of movement of a component to a safe, conservative position.

2.8.3(4) Spent Fuel Pool Area Ventilation

The spent fuel pool area ventilation system contains a charcoal filter to prevent release of significant radionuclides to the outside atmosphere. The system does not automatically realign and therefore must be IN OPERATION prior to REFUELING OPERATIONS in the spent fuel pool. When the spent fuel pool area ventilation system is not IN OPERATION, the movement of irradiated fuel assemblies in the spent fuel pool is immediately suspended. This effectively precludes a fuel handling accident from occurring in the spent fuel pool. When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner. Suspension of REFUELING OPERATIONS shall not preclude completion of movement of a component to a safe, conservative position.

The provisions of Specification 2.0.1 for Limiting Conditions for Operations are not applicable. If moving fuel assemblies while in MODES 4 or 5, LCO 2.0.1 would not specify any actions. If moving fuel assemblies in MODES 1, 2, or 3, the fuel movement is independent of reactor operation. Therefore, inability to suspend movement of fuel assemblies is not sufficient reason to require a reactor shutdown.

2.8.3(5) Control Room Ventilation System

Operating the control room ventilation system in the Filtered Air mode and requiring a radiation monitor to be IN OPERATION are conservative measures to reduce control room operator exposure. This allows the radiological consequences analysis for a fuel handling accident to credit the Filtered Air mode at the time of the accident.

Radiation monitoring will assure operators are alerted if a radiological incident occurs. This specification can be satisfied by using a permanent spent fuel pool area radiation monitor or a portable area radiation monitor.

When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner. Suspension of REFUELING OPERATIONS shall not preclude completion of movement of a component to a safe, conservative position.

2.0 LIMITING CONDITIONS FOR OPERATION
2.8 Refueling

Bases (Continued)

2.8.3(6) Spent Fuel Cask Loading

(1) Soluble Boron

The basis for the 800 ppm minimum boron concentration requirement during spent fuel cask loading operations is to maintain the k_{eff} in the cask system less than or equal to 0.95 in the event a mis-loaded unirradiated fuel assembly is located anywhere in the cask with up to 31 other fuel assemblies meeting the burnup and enrichment requirements of LCO 2.8.3(6)(2). This boron concentration also ensures the k_{eff} in the cask system will be less than or equal to 0.95 if an unirradiated fuel assembly is dropped in the space between the spent fuel racks and the cask loading area during cask loading operations next to a spent fuel assembly. A mis-loaded or dropped irradiated fuel assembly at maximum enrichment condition, in the absence of soluble poison, may result in exceeding the design effective multiplication factor. Soluble boron in the spent fuel pool water, for which credit is permitted during spent fuel cask loading operations, assures that the effective multiplication factor is maintained substantially less than the design basis limit.

This LCO applies whenever a fuel assembly is located in a spent fuel cask submerged in the spent fuel pool. The boron concentration is periodically sampled in accordance with Specification 3.2. Sampling is performed prior to movement of fuel into the spent fuel cask and periodically thereafter during cask loading operations, until the cask is removed from the spent fuel pool.

The provisions of Specification 2.0.1 for Limiting Conditions for Operations are not applicable. If moving fuel assemblies while in MODES 4 or 5, LCO 2.0.1 would not specify any actions. If moving fuel assemblies in MODES 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of fuel assemblies is not sufficient reason to require a reactor shutdown.

When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner. Suspension of refueling operations shall not preclude completion of movement of a component to a safe, conservative position.

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.8 Refueling

Bases (Continued)

2.8.3(6) Spent Fuel Cask Loading (Continued)

(2) Burnup vs. Enrichment

The spent fuel cask is designed for subcriticality by use of neutron absorbing material. The restrictions on the placement of fuel assemblies within the spent fuel pool, according to Figure 2-11, and the accompanying LCO, ensure that the k_{eff} of the spent fuel pool always remains ≤ 0.95 assuming the pool to be flooded with borated water and < 1.0 assuming the pool is flooded with unborated water, in accordance with 10 CFR 50.68(b)(4).

A spent fuel assembly may be transferred directly from the spent fuel racks to the spent fuel cask provided an independent verification of assembly burnups has been completed and the assembly burnup meets the acceptance criteria identified in Figure 2-11. If any fuel assembly located in the spent fuel cask is not in accordance with Figure 2-11, *immediate action must be taken to make the remove of non-complying fuel assembly* from the spent fuel cask and return it to the spent fuel rack.

The provisions of Specification 2.0.1 for Limiting Conditions for Operations are not applicable. If moving fuel assemblies while in MODES 4 or 5, LCO 2.0.1 would not specify any actions. If moving fuel assemblies in MODES 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of fuel assemblies is not sufficient reason to require a reactor shutdown. When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner.

References

(1) USAR Section 9.5
(2) USAR Section 14.18

3.0 **SURVEILLANCE REQUIREMENTS**

3.2 Equipment and Sampling Tests

Applicability

Applies to plant equipment and conditions related to safety.

Objective

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

Specifications

Equipment and sampling tests shall be conducted as specified in Tables 3-4 and 3-5.

Basis

The equipment testing and system sampling frequencies specified in Tables 3-4 and 3-5 are considered adequate, based upon experience, to maintain the status of the equipment and systems so as to assure safe operation. Thus, those systems where changes might occur relatively rapidly are sampled frequently and those static systems not subject to changes are sampled less frequently.

The control room air treatment system consists of redundant high efficiency particulate air filters (HEPA) and charcoal adsorbers. HEPA filters are installed before and after the charcoal adsorbers. The charcoal adsorbers are installed to reduce the potential intake of iodine to the control room. The in-place test results will confirm system integrity and performance. The laboratory carbon sample test results should indicate methyl iodide removal efficiency of at least 99.825 percent for expected accident conditions.

The spent fuel storage-decontamination areas air treatment system is designed to filter the building atmosphere to the auxiliary building vent during refueling operations. The charcoal adsorbers are installed to reduce the potential release of radioiodine to the environment. In-place testing is performed to confirm the integrity of the filter system. The charcoal adsorbers are periodically sampled to insure capability for the removal of radioactive iodine.

3.0 SURVEILLANCE REQUIREMENTS

3.2 Equipment and Sampling Tests (continued)

The Safety Injection (SI) pump room air treatment system consists of charcoal adsorbers which are installed in normally bypassed ducts. This system is designed to reduce the potential release of radioiodine in SI pump rooms during the recirculation period following a DBA. The in-place and laboratory testing of charcoal adsorbers will assure system integrity and performance.

Pressure drops across the combined HEPA filters and charcoal adsorbers, of less than 9 inches of water for the control room filters (VA-64A & VA-64B) and of less than 6 inches of water for each of the other air treatment systems will indicate that the filters and adsorbers are not clogged by amounts of foreign matter that would interfere with performance to established levels. Operation of each system for 10 hours every month will demonstrate operability and remove excessive moisture build-up in the adsorbers.

The hydrogen purge system provides the control of combustible gases (hydrogen) in containment for a post-LOCA environment. The surveillance tests provide assurance that the system is operable and capable of performing its design function. VA-80A or VA-80B is capable of controlling the expected hydrogen generation (67 SCFM) associated with 1) Zirconium - water reactions, 2) radiolytic decomposition of sump water and 3) corrosion of metals within containment. The system should have a minimum of one blower with associated valves and piping (VA-80A or VA-80B) available at all times to meet the guidelines of Regulatory Guide 1.7 (1971).

If significant painting, fire or chemical release occurs such that the HEPA filters or charcoal adsorbers could become contaminated from the fumes, chemicals or foreign materials, testing will be performed to confirm system performance.

Demonstration of the automatic and/or manual initiation capability will assure the system's availability.

Verifying Reactor Coolant System (RCS) leakage to be within the LCO limits ensures the integrity of the Reactor Coolant Pressure Boundary (RCPB) is maintained. Pressure boundary leakage would at first appear as unidentified leakage and can only be positively identified by inspection. Unidentified leakage is determined by performance of an RCS water inventory balance. Identified leakage is then determined by isolation and/or inspection. Primary to secondary leakage is also measured by performance of an RCS water inventory balance in conjunction with effluent monitoring within the secondary steam and feedwater systems.

3.0 **SURVEILLANCE REQUIREMENTS**

3.2 Equipment and Sampling Tests (continued)

The RCS water inventory balance must be performed with the reactor at stable operating conditions (stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and Reactor Coolant Pump (RCP) seal leakoff flows). Therefore, a note is added allowing that this surveillance requirement is not required to be performed until after establishing normal operating temperature and pressure.

Stable operation is required to perform a proper water inventory balance since calculations during maneuvering are not useful. For RCS operational leakage determined by water inventory balance, stable operation is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal leakoff flows. The water inventory balance should be performed as soon as practical after stable conditions are met.

During Plant startup, a visual leak check is performed at normal system pressure prior to entering MODE 3. This verification is performed to ensure no RCPB leaks exist.

Table 3-5, Item 9b ensures that sufficient lube oil inventory is available to support at least 7 days of full load operation for each DG. The 500 gallon requirement is based on the DG manufacturer consumption values for the run time of the DG. Implicit in this Surveillance Requirement is the requirement to assure the capability to transfer the lube oil from its storage location to the DG, since the DG lube oil sump does not hold adequate inventory for 7 days of full load operation without the level reaching the manufacturer recommended minimum level. A 31 day Surveillance interval is adequate to ensure that a sufficient lube oil supply is onsite, since DG starts and run time are closely monitored by the unit staff.

For Table 3-5, Item 9c, the tests listed below are a means of determining whether new fuel oil is of the appropriate grade and has not been contaminated with substances that would have an immediate, detrimental impact on diesel engine combustion. If results from these tests are within acceptable limits, the fuel oil may be added to the storage tanks without concern for contaminating the entire volume of fuel oil in the storage tanks. These tests are to be conducted prior to adding the new fuel to the storage tank(s), but in no case is the time between receipt of new fuel and conducting the tests to exceed 31 days. The tests, limits, and applicable ASTM Standards are as follows:

a. Sample the new fuel oil in accordance with ASTM D4057-95(2000) (Ref. 2),

b. Verify in accordance with the tests specified in ASTM D975-98b (Ref. 2) that the sample has an absolute specific gravity at 60/60°F of ≥ 0.83 and ≤ 0.89, or an API gravity at 60°F of ≥ 27° and ≤ 39° when tested in accordance with ASTM D287-82 (Ref. 2), a kinematic viscosity at 40°C of ≥ 1.9 centistokes and ≤ 4.1 centistokes, and a flash point ≥ 125°F, and

c. Verify that the new fuel oil has a clear and bright appearance with proper color when tested in accordance with ASTM D4176-93 or a water and sediment content within limits when tested in accordance with ASTM D2709-96 (Ref. 2).

3.0 SURVEILLANCE REQUIREMENTS

3.2 Equipment and Sampling Tests (continued)

Failure to meet any of the above limits is cause for rejecting the new fuel oil, but does not represent a failure to meet the LCO concern since the fuel oil is not added to the storage tanks. Within 31 days following the initial new fuel oil sample, the fuel oil is analyzed to establish that the other properties specified in Table 1 of ASTM D975-98b (Ref. 3) are met for new fuel oil when tested in accordance with ASTM D975-98b (Ref. 2), except that the analysis for sulfur may be performed in accordance with ASTM D129-00 (Ref. 2) or ASTM D2622-87 (Ref. 2). The 31 day period is acceptable because the fuel oil properties of interest, even if they were not within stated limits, would not have an immediate effect on DG operation. This Surveillance ensures the availability of high quality fuel oil for the DGs. Fuel oil degradation during long term storage shows up as an increase in particulate, due mostly to oxidation. The presence of particulate does not mean the fuel oil will not burn properly in a diesel engine. The particulate can cause fouling of filters and fuel oil injection equipment, however, which can cause engine failure. Particulate concentrations should be determined in accordance with ASTM 6217-98 (Ref. 2) with the exception that the filters specified in the ASTM method may have a nominal pore size of up to 3 microns. This method involves a gravimetric determination of total particulate concentration in the fuel oil and has a limit of 10 mg/l. It is acceptable to obtain a field sample for subsequent laboratory testing in lieu of field testing. For those designs in which the total stored fuel oil volume is contained in two or more interconnected tanks, each tank must be considered and tested separately. The Surveillance interval of this test takes into consideration fuel oil degradation trends that indicate that particulate concentration is unlikely to change significantly between Surveillance intervals.

Table 3-5, Item 9d ensures that, without the aid of the refill compressor, sufficient air start capacity for each DG is available. The system design requirements provide for a minimum of five engine start cycles without recharging. A start cycle is defined as the cranking time required to accelerate the DG to firing speed. The pressure specified in this Surveillance Requirement is intended to reflect the lowest value at which the five starts can be accomplished. The 31 day Surveillance interval takes into account the capacity, capability, redundancy, and diversity of the AC sources and other indications available in the control room, including alarms, to alert the operator to below normal air start pressure.

Microbiological fouling is a major cause of fuel oil degradation. There are numerous bacteria that can grow in fuel oil and cause fouling, but all must have a water environment in order to survive. Removal of water from the fuel storage tanks once every 92 days per Table 3-5, Item 9e, eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during DG operation. Water may come from any of several sources, including condensation, ground water, rain water, and contaminated fuel oil, and from breakdown of the fuel oil by bacteria. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system. The Surveillance interval is established to ensure excessive water does not accumulate in the fuel oil system, which meets the intent of Regulatory Guide 1.137 (Ref. 4). This Surveillance Requirement is for preventative maintenance. The presence of water does not necessarily represent failure of this Surveillance Requirement provided the accumulated water is removed during performance of the Surveillance.

3.0 SURVEILLANCE REQUIREMENTS

3.2 Equipment and Sampling Tests (continued)

References

1) USAR, Section 9.10
2) ASTM D4057-95(2000), ASTM D975-98b, ASTM D4176-93, ASTM D129-00, ASTM D2622-87, ASTM D287-82, ASTM 6217-98, ASTM D2709-96
3) ASTM D975-98b, Table 1
4) Regulatory Guide 1.137

TABLE 3-4

MINIMUM FREQUENCIES FOR SAMPLING TESTS

	Type of Measurement and Analysis	Sample and Analysis Frequency
1. Reactor Coolant		
(a) Power Operation (Operating Mode 1)	(1) Gross Radioactivity (Gamma emitters)	1 per 3 days
	(2) Isotopic Analysis for DOSE EQUIVALENT I-131	(i) 1 per 14 days
		(ii) 1 per 8 hours(1) whenever the radioactivity exceeds 1.0 μCi/gm DOSE EQUIVALENT I-131.
		(iii) 1 sample between 2-8 hours following a thermal power change exceeding 15% of the rated thermal power within a 1-hour period.
	(3) E Determination	1 per 6 months(2)
	(4) Dissolved oxygen and chloride	1 per 3 days
(b) Hot Standby (Operating Mode 2)	(1) Gross Radioactivity (Gamma emitters)	1 per 3 days
Hot Shutdown (Operating Mode 3)	(2) Isotopic Analysis for DOSE EQUIVALENT I-131	(i) 1 per 8 hours(1) whenever the radioactivity exceeds 1.0 μCi/gm DOSE EQUIVALENT I-131.
		(ii) 1 sample between 2-8 hours following a thermal power change exceeding 15% of the rated thermal power change exceeding 15% of the rated thermal power within a 1-hour period.
	(3) Dissolved oxygen and chloride	1 per 3 days

TABLE 3-4 (Continued)

MINIMUM FREQUENCIES FOR SAMPLING TESTS

	Type of Measurement and Analysis	Sample and Analysis Frequency
1. Reactor Coolant (Continued)		
(c) Cold Shutdown (Operating Mode 4)	(1) Chloride	1 per 3 days
(d) Refueling Shutdown (Operating Mode 5)	(1) Chloride (2) Boron Concentration	1 per 3 days[3] 1 per 3 days[3]
(e) Refueling Operation	(1) Chloride (2) Boron Concentration	1 per 3 days[3] 1 per 3 days[3]
2. SIRW Tank	Boron Concentration	M
3. Concentrated Boric Acid Tanks	Boron Concentration	W
4. SI Tanks	Boron Concentration	M
5. Spent Fuel Pool	Boron Concentration	See Footnote 4 below
6. Steam Generator Blowdown (Operating Modes 1 and 2)	Isotopic Analysis for Dose Equivalent I-131	W[5]

(1) Until the radioactivity of the reactor coolant is restored to ≤1 μCi/gm DOSE EQUIVALENT I-131.

(2) Sample to be taken after a minimum of 2 EFPD and 20 days of power operation have elapsed since reactor was subcritical for 48 hours or longer.

(3) Boron and chloride sampling/analyses are not required when the core has been off-loaded. Reinitiate boron and chloride sampling/analyses prior to reloading fuel into the cavity to assure adequate shutdown margin and allowable chloride levels are met.

(4) Prior to placing unirradiated fuel assemblies in the spent fuel pool or placing fuel assemblies in a spent fuel cask in the spent fuel pool, and weekly when unirradiated fuel assemblies are stored in the spent fuel pool, or every 48 hours when fuel asemblies are in a spent fuel storage cask in the spent fuel pool.

(5) When Steam Generator Dose Equivalent I-131 exceeds 50 percent of the limits in Specification 2.20, the sampling and analysis frequency shall be increased to a minimum of 5 times per week. When Steam Generator Dose Equivalent I-131 exceeds 75 percent of this limit, the sampling and analysis frequency shall be increased to a minimum of once per day.

TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

		Test	Frequency	USAR Section Reference
**1.	Control Element Assemblies	Drop times of all full-length CEA's	Prior to reactor criticality after each removal of the reactor vessel closure head	7.5.3
**2.	Control Element Assemblies	Partial movement of all CEA's (Minimum of 6 in)	Q	7
3.	Pressurizer Safety Valves	Verify each pressurizer safety valve is OPERABLE in accordance with the Inservice Testing Program. Following testing, lift settings shall be 2485 psig ±1% and 2530 psig ±1% respectively.	R	7
4.	Main Steam Safety Valves	Set Point	R	4
5.	DELETED			
6.	DELETED			
7.	DELETED			
8.	Reactor Coolant System Leakage	Evaluate	D*	4
9a	Diesel Fuel Supply	Fuel Inventory	M	8.4
9b.	Diesel Lubricating Oil Inventory	Lube Oil Inventory	M	8.4
9c.	Diesel Fuel Oil Properties	Test Properties	In accordance with the Diesel Fuel Oil Testing Program	8.4
9d.	Required Diesel Generator Air Start Receiver Bank Pressure	Air Pressure	M	8.4

* Whenever the system is at or above operating temperature and pressure.
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TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

		Test	Frequency	USAR Section Reference
9e.	Check for and Remove Accumulated Water from Each Fuel Oil Storage Tank	Check for Water and Remove	Q	8.4
10a.	Charcoal and HEPA Filters for Control Room	1. In-Place Testing** Charcoal adsorbers and HEPA filter banks shall be leak tested and show ≥99.95% Freon (R-11 or R-112) and cold DOP particulates removal, respectively.	On a refueling frequency or every 720 hours of system operation or after each complete or partial replacement of the charcoal adsorber/HEPA filter banks, or after any major structural maintenance on the system housing or following significant painting, fire or chemical releases in a ventilation zone communicating with the system.	9.10
		2. Laboratory Testing** Verify, within 31 days after removal, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows methyliodide penetration less than 0.175% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F) and a relative humidity of 70%.	On a refueling frequency or every 720 hours of system operation or after any structural maintenance on the HEPA filter or charcoal adsorber housing or following significant painting, fire or chemical release in a ventilation zone communicating with the system.	

**Tests shall be performed in accordance with applicable section(s) of ANSI N510-1980.

TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

	Test	Frequency	USAR Section Reference
10a. (continued)	3. Overall System Operation		
	a. Each circuit shall be operated.	Ten hours every month.	
	b. The pressure drop across the combined HEPA filters and charcoal adsorber banks shall be demonstrated to be less than 9 inches of water at system design flow rate.	R	
	c. Fan shall be shown to operate within ± 10% design flow.	R	
	4. Automatic and manual initiation of the system shall be demonstrated.	R	
10b. Charcoal Adsorbers for Spent Fuel Storage Pool Area	1. In-Place Testing** Charcoal adsorbers shall be leak tested and shall show ≥99% Freon (R-11 or R-112) removal.	On a refueling frequency or every 720 hours of system operation, or after each complete or partial replacement of the charcoal adsorber bank, or after any major structural maintenance on the system housing or following significant painting, fire or chemical release in a ventilation zone communicating with the system.	6.2 9.10
	2. Laboratory Testing Verify, within 31 days after removal, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows methyliodide penetration less than 10% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F) and a relative humidity of 95%.	On a refueling frequency or every 720 hours of system operation or after any structural maintenance on the HEPA filter or charcoal adsorber housing or following significant painting, fire or chemical release in a ventilation zone communicating with the system.	

**Tests shall be performed in accordance with applicable section(s) of ANSI N510-1980.

TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

		Test	Frequency	USAR Section Reference
10b.	(continued)	3. Overall System Operation		
		a. Operation of each circuit shall be demonstrated.	Ten hours every month.	
		b. Volume flow rate through charcoal filter shall be shown to be between 4500 and 12,000 cfm.	R	
		4. Manual initiation of the system shall be demonstrated.	R	
10c.	Charcoal Adsorbers for S.I. Pump Room	1. In-Place Testing** Charcoal adsorbers shall be leak tested and shall show ≥99% Freon (R-11 or R-112) removal.	On a refueling frequency or every 720 hours of system operation, or after each complete or partial replacement of the charcoal adsorber bank, or after any major structural maintenance on the system housing or following significant painting, fire or chemical release in any ventilation zone communicating with the system.	9.10 6.2
		2. Laboratory Testing Verify, within 31 days after removal, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows methyliodide penetration less than 10% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F) and a relative humidity of 95%.	On a refueling frequency or following 720 hours of system operation or after any structural maintenance on the HEPA filter or charcoal adsorber housing or following significant painting, fire or chemical release in a ventilation zone communicating with the system.	
		3. Overall System Operation		
		a. Operation of each circuit shall be demonstrated.	Ten hours every month.	
		b. Volume flow rate shall be shown to be between 3000 and 6000 cfm.	R	

**Tests shall be performed in accordance with applicable section(s) of ANSI N510-1980.

TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

		Test	Frequency	USAR Section Reference
10c.	(continued)	4. Automatic and/or manual initiation of the system shall be demonstrated.	R	
11.	Containment Ventilation System Fusible Linked Dampers	1. Demonstrate damper action. 2. Test a spare fusible link.	1 year, 2 years, 5 years, and every 5 years thereafter.	9.10
12.	Diesel Generator Calibrate Under-Voltage Relays		R	8.4.3
13.	Motor Operated Safety Injection Loop Valve Motor Starters (HCV-311, 314, 317, 320, 327, 329, 331, 333, 312, 315, 318, 321)	Verify the contactor pickup value at ≤85% of 460 V.	R	
14.	Pressurizer Heaters	Verify control circuits operation for post-accident heater use.	R	
15.	Spent Fuel Pool Racks	Test neutron poison samples for dimensional change, weight, neutron attenuation change and specific gravity change.	1, 2, 4, 7, and 10 years after installation, and every 5 years thereafter.	
16.	Reactor Coolant Gas Vent System	1. Verify all manual isolation valves in each vent path are in the open position.	During each refueling outage just prior to plant start-up.	
		2. Cycle each automatic valve in the vent path through at least one complete cycle of full travel from the control room. Verification of valve cycling may be determined by observation of position indicating lights.	R	
		3. Verify flow through the reactor coolant vent system vent paths.	R	

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TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

		Test	Frequency
17.	Hydrogen Purge System	1. Verify all manual valves are operable by completing at least one cycle.	R
		2. Cycle each automatic valve through at least one complete cycle of full travel from the control room. Verification of the valve cycling may be determined by the observation of position indicating lights.	R
		3. Initiate flow through the VA-80A and VA-80B blowers, HEPA filter, and charcoal adsorbers and verify that the system operates for at least (a) 30 minutes with suction from the auxiliary building (Room 59) (b) 10 hours with suction from the containment	a) M b) R
		4. Verify the pressure drop across the VA-82 HEPAs and charcoal filter to be less than 6 inches of water. Verify a system flow rate of greater than 80 scfm and less than 230 scfm during system operation when tested in accordance with 3b. above.	R
18.	Shutdown Cooling	1. Verify required shutdown cooling loops are OPERABLE and one shutdown cooling loop is IN OPERATION.	S (when shutdown cooling is required by TS 2.8).
		2. Verify correct breaker alignment and indicated power is available to the required shutdown cooling pump that is not IN OPERATION.	W (when shutdown cooling is required by TS 2.8).

TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

		Test	Frequency
19.	Refueling Water Level	Verify refueling water level is ≥ 23 ft. above the top of the reactor vessel flange.	Prior to commencing, and daily during CORE ALTERATIONS and/or REFUELING OPERATIONS inside containment.
20.	Spent Fuel Pool Level	Verify spent fuel pool water level is ≥ 23 ft. above the top of irradiated fuel assemblies seated in the storage racks.	Prior to commencing, and weekly during REFUELING OPERATIONS in the spent fuel pool.
21.	Containment Penetrations	Verify each required containment penetration is in the required status.	Prior to commencing, and weekly during CORE ALTERATIONS and/or REFUELING OPERATIONS in containment.
22.	Spent Fuel Assembly Storage	Verify by administrative means that initial enrichment and burnup of the fuel assembly is in accordance with Figure 2-10.	Prior to storing the fuel assembly in Region 2 (including peripheral cells).
23.	P-T Limit Curve	Verify RCS Pressure, RCS temperature, and RCS heatup and cooldown rates are within the limits specified by the P-T limit Figure(s) shown in the PTLR.	This test is only required during RCS heatup and cooldown operations and RCS inservice leak and hydrostatic testing. While these operations are occurring, this test shall be performed every 30 minutes.
24.	Spent Fuel Cask Loading	Verify by administrative means that initial enrichment and burnup of the fuel assembly is in accordance with Figure 2-11.	Prior to placing the fuel assembly in a spent fuel cask in the spent fuel pool.

4.0 **DESIGN FEATURES** (Continued)

c. A nominal 8.6 inch center to center distance between fuel assemblies placed in Region 2, the high density fuel storage racks,

d. A nominal 9.8 inches (East-West) by 10.3 inches (North South) center to center distances between fuel assemblies placed in Region 1, the low density fuel storage racks,

e. New or partially spent fuel assemblies with a discharge burnup in the "acceptable domain" of Figure 2-10 for "Region 2 Unrestricted" may be allowed unrestricted storage in any of the Region 2 fuel storage racks in compliance with Reference (1).

f. Partially spent fuel assemblies with a discharge burnup between the "acceptable domain" and "Peripheral Cells" of Figure 2-10 may be allowed unrestricted storage in the peripheral cells of the Region 2 fuel storage racks in compliance with Reference (1).

g. New or partially spent fuel assemblies with a discharge burnup in the "unacceptable domain" of Figure 2-10 will be stored in Region 1 in compliance with Reference (1).

4.3.1.2 The new fuel storage racks are designed and shall be maintained with:

a. Fuel assemblies having a maximum U-235 enrichment of 5.0 weight percent,

b. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Reference (2).

c. $k_{eff} \leq 0.98$ if moderated by aqueous foam, which includes an allowance for uncertainties as described in Reference (2).

d. A nominal 16 inch center to center distance between fuel assemblies placed in the storage racks.

4.3.1.3 The spent fuel casks are designed and shall be maintained with:

a. Fuel assemblies having a maximum U-235 enrichment of 4.5 weight percent,

b. $k_{eff} < 1.0$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.5 of the USAR,

c. $k_{eff} \leq 0.95$ if fully flooded with borated water $\geq$ 800 ppm, which includes an allowance for uncertainties as described in Section 9.5 of the USAR,

d. A nominal 9.075-inch center-to-center distance between fuel assemblies placed in the spent fuel cask,

e. Spent fuel assemblies with a combination of discharge burnup and initial average assembly enrichment in the "acceptable" range of Figure 2-11.

4.0 **DESIGN FEATURES** (Continued)

4.3.2 Drainage

The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 23 ft.

4.3.3 Capacity

The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 1083 fuel assemblies.

References:

(1) Letter from R. Wharton (NRC) to T. Patterson (OPPD), Amendment 174 to Facility Operating License No. DPR-40, (TAC NO. M94789) Dated July 30, 1996, NRC-96-0126.

(2) Ft. Calhoun USAR, Reference 9.5-1