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(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.

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.

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 should be pursued without delay and in

Bases (Continued)

2.8.2(2) Refueling Water Level (Continued)

a controlled manner. Suspension of REFUELING OPERATIONS and CORE ALTERATIONS 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 mitiate the consequences of a fuel handling accident, and therefore are not required to be OPERABLE.

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 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.

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.

References

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