Attachment B to BECo Letter 92-

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|---|---|
| 3.5 CORE COOLING SYSTEMS | 4.5 CORE COOLING SYSTEMS |
| Applicability | Applicability |
| Applies to the operational status of the core cooling systems. | Applies to the Surveillance Requirements of the core cooling systems which are required when the corresponding Limiting Condition for operation is in effect. |
| Objective | Objective |
| To assure the operability of the core cooling systems under all conditions for which this cooling capability is an essential response to station abnormalities. | To verify the operability of the core cooling systems under all conditions for which this cooling capability is an essential response to station abnormalities. |
| Specification | Specification |
| A. Core Spray and LPCI Systems | A. Core Spray and LPCI Systems |
| 1. Both core spray systems shall be operable whenever irradiated fuel is in the vessel except as specified in 3.5.A.2, 3.5.G.1, 3.5.G.2, 3.5.G.3 and 3.5.G.4 below. | 1. Core Spray System Testing. |

| Item | Frequency |
|---|---|
| a. Simulated Automatic Actuation test. | Once/Operating Cycle |
| b. Pump Operability | Once/month |
| c. Motor Operated Valve Operability | Once/month |
| d. Pump flow rate Each pump shall deliver at least 3300 gpm against a system head corresponding to a reactor vessel pressure of 104 psig. | Once/3 months |
| e. Core Spray Header Δp Instrumentation | |

| LIMITING CONDITION FOR OPERATION | SURVEILLANCE REQUIREMENT |
|---|---|
| 3.5.A Core Spray and LPCI Systems (cont'd) | 4.5.A Core Spray and LPCI Systems (cont'd) |
| | Check Once/day<br>Calibrate Once/3 months<br>Test Step Once/3 months |
| 2. From and after the date that one of the core spray systems is made or found to be inoperable for any reason, continued reactor operation is permissible during the succeeding seven days, provided that during such seven days all active components of the other core spray system and active components of the LPCI system and the diesel generators are operable. | 2. This section intentionally left blank |
| 3. The LPCI system shall be operable whenever irradiated fuel is in the reactor vessel except as specified in 3.5.A.4, 3.5.G.1, 3.5.G.2, 3.5.G.3 and 3.5.G.4. | 3. LPCI system Testing shall be as follows:<br>a. Simulated Automatic Actuation Test — Once/Operating Cycle<br>b. Pump Operability — Once/month<br>c. Motor Operated valve operability — Once/Month<br>d. Pump Flow — Once/3 months<br>Each LPCI pump shall pump 4800 gpm at a head across the pump of at least 380 ft. |
| 4. From and after the date that the LPCI system is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding seven days unless it is sooner made operable, provided that during such seven days the containment cooling system (including 2 LPCI pumps) and active components of both core spray systems, and the diesel generators are operable. | |
| 5. If the requirements of 3.5.A cannot be met, an orderly shutdown of the reactor shall be initiated and the reactor shall be in the Cold Shutdown Condition within 24 hours. | |

| LIMITING CONDITION FOR OPERATION | SURVEILLANCE REQUIRFMENT |
|---|---|
| 3.5.B Shutdown Cooling System (RHR) | 4.5.B Shutdown Cooling System (RHR) |
| 1. When in the Hot Shutdown condition and not steaming to the main condenser, two* shutdown Cooling Loops (SDC) shall be operable. If the requirements of 3.5.B.1 cannot be met immediately initiate corrective action to return the required loop to operable status as soon as possible or be in Cold Shutdown in 24 hours. | 1. Shutdown Cooling System [illegible] shall be as follows: |
| 2. When irradiated fuel is in the vessel and the reactor is in the Cold Condition, two* SDC loops shall be operable and specification 3.9.C shall be met. If the requirements of 3.5.B.2 cannot be met, immediately initiate corrective action to return the required loop to operable status as soon as possible. | |
| 3. When irradiated fuel is in the vessel with the reactor head removed, the cavity flooded, the fuel pool gates removed and water level maintained to at least elevation 114'0", at least one Shutdown Cooling loop shall be operable. If the requirements of 3.5.B.3 cannot be met, immediately suspend all operations involving an increase in the reactor decay heat load, and close all secondary containment penetrations providing direct access from secondary containment atmosphere to the outside atmosphere within 4 hours. | |
| * NOTE: One SDC loop may be inoperable for surveillance testing provided the other loop is operable. | |

| Item | Fr[illegible] |
|---|---|
| Shutdown Cooling Pump and Valve Operability. Each pump shall be started, and each valve required to provide recirculation of coolant through the RHR heat exchanger shall be cycled through at least one full cycle of travel if the SDC loop is not already operating | Once/[illegible] ys |

| LIMITING CONDITION FOR OPERATION | SURVEILLANCE REQUIREMENT |
|---|---|
| 3.5.F Minimum Low Pressure Cooling and Diesel Generator Availability | 4.5.F Minimum Low Pressure Cooling and Diesel Generator Availability |
| 1. During any period when one diesel generator is inoperable, continued reactor operation is permissible only during the succeeding 72 hours unless such diesel generator is sooner made operable, provided that all of the low pressure core and containment cooling systems and the remaining diesel generator shall be operable. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be placed in the Cold Shutdown Condition within 24 hours. | 1. When it is determined that one diesel generator is inoperable, the operable diesel generator shall be demonstrated to be operable immediately and daily thereafter until the inoperable diesel is repaired. |
| 2. Any combination of inoperable components in the core and containment cooling systems shall not defeat the capability of the remaining operable components to fulfill the cooling functions. | |
| 3.5.G CSCS-Shutdown and Refueling | 4.5.G CSCS-Shutdown/Refueling |
| 1. When irradiated fuel is in the vessel and the reactor is in the Cold Condition, except as specified in 3.5.G.2, 3.5.G.3 and 3.5.G.4 below, a combination of 2 low pressure CSCS subsystems shall be operable and specification 3.9.C shall be met. | 1. Surveillance requirements are the same as 4.5.A. |
| 2. a. With only one low pressure CSCS system available, restore the second system in 4 hours or suspend operations that have a potential for draining the vessel.<br><br>b. With no systems available, immediately suspend core alterations and activities with the potential to drain the vessel. Restore one system in 4 hours or establish secondary containment within 8 hours. | |

| LIMITING CONDITION FOR OPERATION | SURVEILLANCE REQUIREMENT |
|---|---|
| 3. With the reactor head removed, the cavity flooded, the fuel pool gates removed and water level maintained to at least elevation 114'0", all low pressure CSCS subsystems may be inoperable. Specification 3.5.B must be met. | |
| 4. When irradiated fuel is in the reactor vessel and the reactor is in the Refueling Condition with the torus drained, a single control rod drive mechanism may be removed, if both of the following conditions are satisfied: | |
| a) No work on the reactor vessel, in addition to CRD removal, will be performed which has the potential for exceeding the maximum leak rate from a single control blade seal if it became unseated. | |
| b) i) the core spray systems are operable and aligned with a suction path from the condensate storage tanks. ii) the condensate storage tanks shall contain at least 200,000 gallons of usable water and the refueling cavity and dryer/separator pool shall be flooded to at least elevation 114'-0" | |
| 3.5.H Maintenance of Filled Discharge Pipe | 4.5.H Maintenance of Filled Discharge Pipe |
| Whenever core spray systems, LPCI system, HPCI or RCIC are required to be operable, the discharge piping from the pump discharge of these systems to the last block valve shall be filled. | The following surveillance requirements shall be adhered to to assure that the discharge piping of the core spray systems, LPCI system, HPCI and RCIC are filled: |

4.5.H Maintenance of Filled Discharge Pipe (Cont'd)

1. Every month prior to the testing of the LPCI system and core spray systems, the discharge piping of these systems shall be vented from the high point and water flow observed.

2. Following any period where the LPCI system or core spray systems have not been required to be operable, the discharge piping of the inoperable system shall be vented from the high point prior to the return of the system to service.

3. Whenever the HPCI or RCIC system is lined up to take suction from the torus, the discharge piping of the HPCI and RCIC shall be vented from the high point of the system and water flow observed on a monthly basis.

4. The pressure switches which monitor the discharge lines to ensure that they are full shall be functionally tested every month and calibrated every three months.

BASES:

3/4.5B Shutdown Cooling System (RHR)

Maintaining decay heat removal (DHR) capability is a key function during shutdown conditions. During normal refueling outage conditions, the shutdown cooling (SDC) mode of the RHR system and its supporting systems are the primary means of removing decay heat when fuel is in the reactor vessel. An extended loss of the DHR function can lead to coolant boiling and potentially result in a depletion of reactor coolant and eventual uncovering of the core. While irradiated fuel remains in the reactor vessel during an outage, maintaining the DHR function is important to shutdown safety.

When the Main Steam Isolation Valves (MSIV) or the MSIV drains are open and vessel temperture is at or above 212°F, 3.5.B.1 does not apply because the plant is in Hot Shutdown but is steaming to the main condenser.

Two RHR shutdown cooling subsystems are required to be OPERABLE. An OPERABLE RHR shutdown cooling subsystem consists of one OPERABLE RHR pump, one heat exchanger, and the associated piping and valves. The two subsystems have a common suction source and are allowed to have a common heat exchanger and common discharge piping. Thus, to meet the LCO, both pumps in one loop or one pump in each of the two loops must be OPERABLE. Since the piping and heat exchangers are passive components that are assumed not to fail, they are allowed to be common to both subsystems.

Additionally, each shutdown cooling subsystem is considered OPERABLE if it can be manually aligned (remote or local) in the shutdown cooling mode for removal of decay heat. An RHR pump is OPERABLE when it is capable of being powered and able to provide flow if required.

The specification for two SDC loops in the cold condition includes the condition that specification 3.9.C be met. Specification 3.9.C requires one offsite power source and either Emergency Diesel Generator operable when in the cold condition and subcritical.

Specification 3.5.B.3 allows refueling operations to continue with one SDC loop operable with the reactor head removed, the cavity flooded, the fuel pool gates removed and water level maintained to at least elevation 114'0". This is acceptable because the large inventory of water acts as a diverse method of providing backup for the decay heat removal safety function. During refueling with irradiated fuel in the vessel, the reactor head removed and the cavity flooded the Augmented Fuel Pool Cooling loop satisfies the requirement to have one SDC loop operable once the decay heat load is within its capacity. Activities that can increase decay heat load are the reduction of decay heat cooling or insertion of a fuel bundle. The requirement of 3.5.B.3 to close all secondary containment penetrations providing direct access to the outside atmosphere requires the isolation of secondary containment within 4 hours if SDC is not operable.

BASES:

3.5.F Minimum Low Pressure Cooling and Diesel Generator Availability

The purpose of specifications F is to ensure adequate core cooling equipment is available at all times during power operation. If, for example, one core spray were out of service and the diesel which powered the opposite core spray were out of service, only 2 LPCI pumps would be available. During shutdown and refueling the configuration of shared equipment is different, and requirements for some equipment are reduced or unnecessary. (Specification 3/4.5G addresses Shutdown and Refueling conditions).

Continued operation is permissible for 72 hours with one diesel generator out of service. In addition, all low pressure core and containment cooling systems and the remaining diesel generator must be operable. If these requirements are not met the reactor must be brought to the Cold Shutdown condition and low pressure cooling requirements provided in 3.5.G become applicable.

Specification 3.9 must also be consulted to determine other requirements for the diesel generators.

3.5.G CSCS - Shutdown and Refueling

During Shutdown and Refueling conditions CSCS requirements are reduced. During Refueling, with the cavity flooded, increased coolant inventory provides sufficient time to make up lost inventory without relying on Low Pressure Cooling. Hence, with the cavity flooded the CSCS is allowed to be unavailable.

A minimum of two low pressure CSCS injection/spray subsystems are required to be OPERABLE in Shutdown and Refueling. Two OPERABLE low pressure CSCS subsystems also ensure adequate vessel inventory makeup in the event of an inadvertent vessel draindown. For Shutdown and Refueling conditions the low pressure CSCS injection/spray system consists of two Core Spray (CS) subsystems and the Low Pressure Coolant Injection (LPCI) system configured into two loops.

Each CS subsystem consists of one motor driven pump, piping, and valves to transfer water from the suppression pool or condensate storage tank (CST) to the reactor pressure vessel (RPV).

Each LPCI loop consists of one motor driven pump, piping, and valves to transfer water from the suppression pool to the RPV. Only a single LPCI pump is required per loop because loop injection capacity for shutdown and refueling conditions is less than for other operational modes. One LPCI loop may be aligned in the decay heat removal mode and be considered OPERABLE for the CSCS function, if it can be manually realigned (remote or local) to the LPCI mode and is not otherwise inoperable. Because of low pressure and low temperature conditions in Shutdown and Refueling sufficient time will be available to manually align and initiate LPCI operation to provide core cooling prior to postulated fuel uncovery.

CSCS is not required during refueling when the spent fuel storage pool gate is removed and the water level is maintained at $\geq$ 117 feet. This configuration provides sufficient coolant inventory to allow operator action to terminate the inventory loss prior to fuel uncovery in case of an inadvertent draindown.

Specification 3.5.G.4 allows removal of one CRD mechanism while the torus is in a drained condition without compromising core cooling capability. The available core cooling capability for a potential draining of the reactor vessel while this work is performed is based on an estimated drain rate of 300 gpm if the control rod blade seal is unseated. Flooding the refuel cavity and dryer/separator pool to elevation 114'-0" corresponds to approximately 350,000 gallons of water and will provide core cooling capability in the event leakage from the control rod drive does occur. A potential draining of the reactor vessel (via control rod blade leakage) would allow this water to enter into the torus and after approximately 140,000 gallons have accumulated (needed to meet minimum NPSH requirements for the LPCI and/or core spray pumps), the torus would be able to serve as a common suction header. This would allow a closed loop operation of the LPCI system and the core spray system (once re-aligned) to the torus. In addition, the other core spray system is lined up to the condensate storage tanks which can supplement the refuel cavity and dryer/separator pool water to provide core flooding, if required.

Specification 3.9 must also be consulted to determine other requirements for the diesel generators.

BASES:

4.5 Core Cooling Systems Surveillance Frequencies

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

The surveillance requirements provide adequate assurance that the subject cooling systems will be operable when required.

3.7 CONTAINMENT SYSTEMS (Con't)

1. If the specifications of Item i, above, cannot be met, and the differential pressure cannot be restored within the subsequent (6) hour period, an orderly shutdown shall be initiated and the reactor shall be in a cold shutdown condition in twenty-four (24) hours.

m. Suppression chamber water level shall be maintained between -6 to -3 inches on torus level instrument which corresponds to a downcomer submergence of 3.00 and 3.25 feet respectively.

n. The suppression chamber can be drained if the conditions specified in Section 3.5.G.4 of this Technical Specification are adhered to.

o. With irradiated fuel in the vessel and reactor coolant greater than 212°F there shall be two operable loops of Drywell Spray and Torus Spray. With one loop inoperable, restore the inoperable loop within 72 hours or be in the Cold Condition in 24 hours. With both loops inoperable, restore one loop in 8 hours or be in the Cold Condition within 24 hours.

p. With irradiated fuel in the vessel and reactor coolant greater than 212°F there shall be two loops of Suppression Chamber Cooling. With one inoperable loop, restore the inoperable loop within 72 hours or be in the Cold Condition in 24 hours. With both loops inoperable, restore one loop in 8 hours or be in the Cold Condition within 24 hours.

4.7 CONTAINMENT SYSTEMS (Cont'd)

h. Containment Cooling System (Drywell Spray, Torus Spray and Suppression Chamber Cooling) testing shall be as follows:

| Item | Frequency |
|---|---|
| 1. Pump & Valve Operability | Once/3 months |
| 2. Pump Capacity Test. Each RBCCW pump shall deliver 1700 gpm at 70 ft. TDH. Each SSWS pump shall deliver 2700 gpm at 55 ft. TDH. | After pump maintenance and every 3 months |
| 3. Air test the drywell and torus headers and nozzles. | Once/5 years |

| LIMITING CONDITIONS FOR OPERATION | SURVEILLANCE REQUIREMENTS |
|---|---|
| 3.7.B Standby Gas Treatment System and Control Room With Efficiency Air Filtration System | 4.7.B Standby Gas Treatment System and Control Room High Efficiency Air Filtration System |
| 1. Standby Gas Treatment System | 1. Standby Gas Treatment System |
| a. Except as specified in 3.7.B.1.c below, both trains of the standby gas treatment system shall be operable at all times when secondary containment integrity is required or the reactor shall be shutdown in 36 hours. When the reactor is in the Cold Condition and Subcritical, electric support requirements are as specified in 3.9.C. | a. (1.) At least once every 18 months, it shall be demonstrated that pressure drop across the combined high efficiency filters and charcoal adsorber banks is less than 8 inches of water at 4000 cfm. |
| | (2.) At least once every 18 months, demonstrate that the inlet heaters on each train are operable and are capable of an output of at least 14 kW. |
| b. (1.) The results of the in-place cold DOP tests on HEPA filters shall show ≥99% DOP removal. The results of halogenated hydrocarbon tests on charcoal adsorber banks shall show ≥99% halogenated hydrocarbon removal. | (3.) The tests and analysis of Specification 3.7.B.1.b. shall be performed at least once every 18 months or following painting, fire or chemical release in any ventilation zone communicating with the system while the system is operating that could contaminate the HEPA filters or charcoal adsorbers. |
| (2.) The results of the laboratory carbon sample analysis shall show ≥95% methyl iodide removal at a velocity within 10% of system design, 0.5 to 1.5 $mg/m^3$ inlet methyl iodide concentration, ≥70% R.H. and ≥190°F. | (4.) At least once every 18 months, automatic initiation of each branch of the standby gas treatment system shall be demonstrated, with Specification 3.7.B.1.d satisfied. |
| The analysis results are to be verified as acceptable within 31 days after sample removal, or declare that train inoperable and take the actions specified 3.7.B.1.c. | (5.) Each train of the standby gas treatment system shall be operated for at least 15 minutes per month. |
| c. From and after the date that one train of the Standby Gas Treatment System is made or found to be inoperable for any reason, continued reactor operation, irradiated fuel handling, or new fuel | (6.) The tests and analysis of Specification 3.7.B.1.b.(2) shall be performed after every 720 hours of system operation. |

3.7.B (Continued)

handling over the spent fuel pool or core is permissible only during the succeeding seven days providing that the other Standby Gas Treatment train is operable.

d. Fans shall operate within ±10% of 4000 cfm.

e. Except as specified in 3.7.B.1.c, both trains of the Standby Gas Treatment System shall be operable during irradiated fuel handling, or new fuel handling over the spent fuel pool or core. If the system is not operable, fuel movement shall not be started. Any fuel assembly movement in progress may be completed.

4.7.B (Continued)

b. (1.) In-place cold DOP testing shall be performed on the HEPA filters after each completed or partial replacement of the HEPA filter bank and after any structural maintenance on the HEPA filter system housing which could affect the HEPA filter bank bypass leakage.

(2.) Halogenated hydrocarbon testing shall be performed on the charcoal adsorber bank after each partial or complete replacement of the charcoal adsorber bank or after any structural maintenance on the charcoal adsorber housing which could affect the charcoal adsorber bank bypass leakage.

| LIMITING CONDITIONS FOR OPERATION | SURVEILLANCE REQUIREMENTS |
|---|---|
| 3.7.B (Continued) | 4.7.B (Continued) |
| 2. Control Room High Efficiency Air Filtration System | 2. Control Room High Efficiency Air Filtration System |
| a. Except as specified in Specification 3.7.B.2.c below, both trains of the Control Room High Efficiency Air Filtration System used for the processing of inlet air to the control room under accident conditions shall be operable whenever secondary containment integrity is required. When in the Cold Condition and Subcritical, electric support requirements are as specified in 3.9.C. | a. At least once every 18 months the pressure drop across each combined filter train shall be demonstrated to be less than 6 inches of water at 1000 cfm or the calculated equivalent. |
| b. (1.) The results of the in-place cold DOP tests on HEPA filters shall show ≥99% DOP removal. The results of the halogenated hydrocarbon tests on charcoal adsorber banks shall show ≥99% halogenated hydrocarbon removal when test results are extrapolated to the initiation of the test. | b. (1.) The tests and analysis of Specification 3.7.B.2.b shall be performed once every 18 months or following painting, fire or chemical release in any ventilation zone communicating with the system while the system is operating. |
| (2.) The results of the laboratory carbon sample analysis shall show ≥95% methyl iodide removal at a velocity within 10% of system design, 0.05 to 0.15 mg/m$^3$ inlet methyl iodide concentration, ≥70% R.H., and ≥125°F. The analysis results are to be verified as acceptable within 31 days after sample removal, or declare that train inoperable and take the actions specified in 3.7.B.2.c. | (2.) In-place cold DOP testing shall be performed after each complete or partial replacement of the HEPA filter bank or after any structural maintenance on the system housing which could affect the HEPA filter bank bypass leakage. |
| | (3.) Halogenated hydrocarbon testing shall be performed after each complete or partial replacement of the charcoal adsorber bank or after any structural maintenance on the system housing which could affect the charcoal adsorber bank bypass leakage. |
| | (4.) Each train shall be operated with the heaters in automatic for at least 15 minutes every month. |
| | (5.) The test and analysis of Specification 3.7.B.2.b.(2) shall be performed after every 720 hours of system operation. |

| LIMITING CONDITIONS FOR OPERATION | SURVEILLANCE REQUIREMENTS |
|---|---|
| 3.7.B (Continued) | 4.7.B (Continued) |
| c. From and after the date that one train of the Control Room High Efficiency Air Filtration System is made or found to be incapable of supplying filtered air to the control room for any reason, reactor operation or refueling operations are permissible only during the succeeding 7 days providing the other CRHEAF train is operable. If the system is not made fully operable within 7 days, reactor shutdown shall be initiated and the reactor shall be in cold shutdown within the next 36 hours and irradiated fuel handling operations shall be terminated within 2 hours. Fuel handling operations in progress may be completed. | c. At least once every 18 months demonstrate that the inlet heaters on each train are operable and capable of an output of at least 14 kw. |
| d. Fans shall operate within ±10% of 1000 cfm. | d. Perform an instrument functional test on the humidistats controlling the heaters once per 18 months. |

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| LIMITING CONDITIONS FOR OPERATION | SURVEILLANCE REQUIREMENTS |
|---|---|
| 3.7.C Secondary Containment | 4.7.C Secondary Containment |
| 1. Secondary containment integrity shall be maintained during all modes of plant operation except when all of the following conditions are met. | 1. Secondary containment surveillance shall be performed as indicated below: |
| a. The reactor is subcritical and Specification 3.3.A is met. | a. A preoperational secondary containment capability test shall be conducted after isolating the reactor building and placing either standby gas treatment system filter train in operation. Such tests shall demonstrate the capability to maintain 1/4 inch of water vacuum under calm wind (<5 mph) conditions with a filter train flow rate of not more than 4000 cfm. |
| b. The reactor water temperature is below 212°F and the reactor coolant system is vented. | b. (DELETED) |
| c. No activity is being performed which can reduce the shutdown margin below that specified in Specification 3.3.A. | c. Secondary containment capability to maintain 1/4 inch of water vacuum under calm wind (< 5mph) conditions with a filter train flow rate of not more than 4000 cfm, shall be demonstrated at each refueling outage prior to refueling. |
| d. The fuel cask or irradiated fuel is not being moved in the reactor building. | |
| e. No core alterations are being performed with fuel in the vessel. | |
| f. No operations with a potential to drain the reactor vessel are in progress with fuel in the vessel. | |
| 2. If Specification 3.7.C.1 cannot be met, procedures shall be initiated to establish conditions listed in Specification 3.7.C.1.a through f. | |

BASES:

3.7.A & 4.7.A Primary Containment

Experimental data indicates that excessive steam condensing loads can be avoided if the peak local temperature of the pressure suppression pool is maintained below 200°F during any period of relief-valve operation with sonic conditions at the discharge exit. Analysis has been performed to verify that the local pool temperature will stay below 200°F and the bulk temperature will stay below 160°F for all SRV transients. Specifications have been placed on the envelope of reactor operating conditions so that the reactor can be depressurized in a timely manner to avoid the regime of potentially high pressure suppression chamber loadings.

In addition to the limits on temperature of the suppression chamber pool water, operating procedures define the action to be taken in the event a relief valve inadvertently opens or sticks open. This action would include: (1) use of all available means to close the valve, (2) initiate suppression pool water cooling heat exchangers, (3) initiate reactor shutdown, and (4) if other relief valves are used to depressurize the reactor, their discharge shall be separated from that of the stuck-open relief valve to assure mixing and uniformity of energy insertion to the pool.

Because of the large volume and thermal capacity of the suppression pool, the volume and temperature normally changes very slowly and monitoring these parameters daily is sufficient to establish any temperature trends. By requiring the suppression pool temperature to be continually monitored and frequently logged during periods of significant heat addition, the temperature trends will be closely followed so that appropriate action can be taken. The requirement for an external visual examination following any event where potentially high loadings could occur provides assurance that no significant damage was encountered. Particular attention should be focused on structural discontinuities in the vicinity of the relief valve discharge since these are expected to be the points of highest stress.

If a loss-of-coolant accident were to occur when the reactor water temperature is below approximately 330°F, the containment pressure will not exceed the 62psig code permissible pressure, even if no condensation were to occur. The maximum allowable pool temperature, whenever the reactor is above 212°F, shall be governed by this specification. Thus, specifying water volume-temperature requirements applicable for reactor-water temperature above 212°F provides additional margin above that available at 330°F.

3.7.A. Containment Cooling System-Drywell Spray, Torus Spray, Suppression Chamber Cooling

The containment cooling system for Pilgrim I consists of two independent loops each of which to be an operable loop requires one LPCI pump, two RBCCW pumps and two SSW pumps. There are installed spares for margin above the design conditions. Each system has the capability to perform its function; i.e., removing 64 x $10^6$ Btu/hr (Ref. Amendment 18), even with some system degradation. If one loop is out-of-service, reactor operation is permitted for 72 hours.

BASES:

3.7.A. Containment Cooling System (Cont'd)

With components or systems out-of-service, overall containment cooling reliability is maintained by the operability of the remaining cooling equipment.

Since some of the SSW and RBCCW pumps associated with the Containment Cooling System are required for normal operation, capacity testing of individual pumps by direct flow measurement is impractical. The pump capacity test is a comparison of measured pump performance parameters to shop performance tests combined with a comparison to the performance of the previously tested pump. These pumps are rotated during operation and performance testing will be integrated with this or performed during refueling when pumps can be flow tested individually. Tests during normal operation will be performed by measuring the shutoff head. Then the pump under test will be placed in service and one of the previously operating pumps secured. Total flow indication for the system will be compared for the two cases. Where this is not feasible due to changing system conditions, the pump discharge pressure will be measured and its power requirement will be used to establish flow at that pressure.

The Drywell Spray, Torus Spray and Suppression Chamber Cooling systems are necessary during power operations. Specification 3.7 imposes Surveillances and Limiting Conditions for Operation to ensure the operability of the equipment. When the equipment is inoperable the plant is brought to a condition where the equipments is not necessary.

BASES:

3.7.B.1 and 4.7.B.1 (continued)

The test frequencies are adequate to detect equipment deterioration prior to significant defects, but the tests are not frequent enough to load the filters or adsorbers, thus reducing their reserve capacity too quickly. The filter testing is performed pursuant to appropriate procedures reviewed and approved by the Operations Review Committee pursuant to Section 6 of these Technical Specifications. The in-place testing of charcoal filters is performed by injecting a halogenated hydrocarbon into the system upstream of the charcoal adsorbers. Measurements of the concentration upstream and downstream are made. The ratio of the inlet and outlet concentrations gives an overall indication of the leak tightness of the system. A similar procedure substituting dioctyl phthalate for halogenated hydrocarbon is used to test the HEPA filters.

Pressure drop tests across filter and adsorber banks are performed to detect plugging or leak paths though the filter or adsorber media. Considering the relatively short times the fans will be run for test purposes, plugging is unlikely and the test interval of once per 18 months is reasonable.

System drains and housing gasket doors are designed such that any leakage would be inleakage from the Standby Gas Treatment System Room. This ensures that there will be no bypass of process air around the filters or adsorbers.

Only one of the two Standby Gas Treatment Systems (SBGTS) is needed to maintain the secondary containment at a 0.25 inch of water negative pressure upon containment isolation. If one system is made or found to be inoperable, there is no immediate threat to the containment system performance and reactor operation or refueling activities may continue for seven days while repairs are being made to the inoperable system. The other system must be operable.

If both trains of SBGTS are inoperable, the plant is brought to a condition where the SBGTS is not required.

BASES:

3.7.B.2. and 4.7.B.2. (continued)

Air flow through the filters and charcoal adsorbers for 15 minutes each month assures operability of the system. Since the system heaters are automatically controlled, the air flowing through the filters and adsorbers will be ≤70% relative humidity and will have the desired drying effect.

If one train of the system is found to be inoperable, there is no immediate threat to the control room, and reactor operation or fuel handling may continue for seven days while repairs to the inoperable train are being made. The other train must be operable. If both trains of the CRHEAF system are inoperable, the reactor will be brought to a condition where the Control Room High Efficiency Air Filtration System is not required.

| LIMITING CONDITIONS FOR OPERATION | SURVEILLANCE REQUIREMENTS |
|---|---|
| 3.9.C Diesel Generator Requirements - Cold Condition and Subcritical | |
| 1. When the reactor is in the Cold Condition and Subcritical there shall be one offsite power source capable of energizing the emergency buses and either Emergency Diesel Generator operable. | |
| 2. When the reactor is in the Cold Condition and Subcritical if a train or loop of a required system is inoperable, the Emergency Diesel Generator associated with the operable train or loop must be operable. | |
| 3. With no offsite power supplies operable and/or both Emergency Diesel Generators inoperable, suspend core alterations, handling of irradiated fuel in the secondary containment, and operations with a potential for draining the vessel. | |

BASES:

3.9.C Diesel Generator Requirements - Cold Condition and Subcritical

The operability of A.C. power sources when in shutdown and refuel conditions assures: (1) adequate coolant inventory for the irradiated fuel in the core in case of an inadvertent draindown of the vessel; (2) mitigation of a fuel bundle handling accident; (3) sufficient power for required support systems (e.g., decay heat removal, refueling activities, component cooling); and (4) sufficient instrumentation and control capability for monitoring and maintaining the unit status.

It is unnecessary to require the sources of emergency power to be completely redundant. Specification 3.9.C.1 considers emergency electrical power bus requirements met with offsite power and one emergency diesel generator operable. The remaining bus is considered operable with just a source of offsite power available.

This specification impacts other safety functions which electric power supports. Each of these safety functions has been evaluated previously, and it was concluded that the power requirements of Specification 3.9.C.1 support the other safety functions such that shutdown risk is acceptably low.

This specification precludes the potential for having unacceptable combinations of system alignments, and enhances safety by eliminating the potential for misinterpreting 3.9.C.1.

Specification 3.9.C.3 requires the suspension of core alterations, the handling of irradiated fuel in the secondary containment and operations with a potential to drain the vessel when no sources of offsite and/or emergency power is available.

Thus, operations which have the potential to result in an event requiring the operation of a safety system, such as SGTS, must be suspended if both emergency buses are supplied by only one source of power. This reduces the probability of an adverse event and maintains the reactor in a safe condition while additional sources of power are restored.

Attachment C to BECo Letter 92-

# TABLE OF CONTENTS

LIMITING CONDITION FOR OPERATION

3.5 CORE ~~AND CONTAINMENT~~ COOLING SYSTEMS

Applicability

Applies to the operational status of the core ~~and suppression pool~~ cooling systems.

Objective

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

Specification

A. Core Spray and LPCI Systems

1. Both core spray systems shall be operable whenever irradiated fuel is in the vessel ~~and prior to reactor startup from a Cold Condition, except as specified in 3.5.A.2 below.~~

except as specified in 3.5.A.2, 3.5.G.1, 3.5.G.2, 3.5.G.3, and 3.5.G.4 below.

SURVEILLANCE REQUIREMENT

4.5 CORE ~~AND CONTAINMENT~~ COOLING SYSTEMS

Applicability

Applies to the Surveillance Requirements of the core ~~and suppression pool~~ cooling systems which are required when the corresponding Limiting Condition for operation is in effect.

Objective

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

Specification

A. Core Spray and LPCI Systems

1. Core Spray System Testing.

| Item | | Frequency |
|---|---|---|
| a. | Simulated Automatic Actuation test. | Once/Operating Cycle |
| b. | Pump Operability | Once/month |
| c. | Motor Operated Valve Operability | Once/month |
| d. | Pump flow rate Each pump shall deliver at least 3300 gpm against a system head corresponding to a reactor vessel pressure of 104 psig. | Once/3 months |
| e. | Core Spray Header Δp Instrumentation | |

| LIMITING CONDITION FOR OPERATION | SURVEILLANCE REQUIREMENT |
|---|---|
| 3.5.A Core Spray and LPCI Systems (cont'd) | 4.5.A Core Spray and LPCI Systems (cont'd) |

| | |
|---|---|
| Check | Once/day |
| Calibrate | Once/3 months |
| Test Step | Once/3 months |

2. From and after the date that one of the core spray systems is made or found to be inoperable for any reason, continued reactor operation is permissible during the succeeding seven days, provided that during such seven days all active components of the other core spray system and active components of the LPCI system and the diesel generators are operable.

2. This section intentionaliy left blank

3. The LPCI system shall be operable whenever irradiated fuel is in the reactor vessel~~, and prior to reactor startup from a Cold Condition,~~ except as specified in 3.5.A.4~~, and 3.5.F.5.~~ 3.5.G.1, 3.5.G.2. 3.5.G.3 and 3.5.G.4.

3. LPCI system Testing shall be as follows:

| | |
|---|---|
| a. Simulated Automatic Actuation Test | Once/Operating Cycle |
| b. Pump Operability | Once/month |
| c. Motor Operated valve operability | Once/Month |
| d. Pump Flow | Once/3 months |

Each LPCI pump shall pump 4800 gpm at a head across the pump of at least 380 ft.

4. From and after the date that the LPCI system is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding seven days unless it is sooner made operable, provided that during such seven days the containment cooling system (including 2 LPCI pumps) and active components of both core spray systems, and the diesel generators ~~required for operation of such components if no external source of power were available shall be~~ operable.
are

5. If the requirements of 3.5.A cannot be met, an orderly shutdown of the reactor shall be initiated and the reactor shall be in the Cold Shutdown Condition within 24 hours.

moved to page 154 under "Containment Systems" as 4.7.A.1.h

| LIMITING CONDITION FOR OPERATION | SURVEILLANCE REQUIREMENT |
|---|---|
| 3.5.B ~~Containment~~ SHUTDOWN Cooling System (RHR) | 4.5.B ~~Containment~~ SHUTDOWN Cooling System (RHR) |

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

2. ~~From and after the date that one containment cooling system loop is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding 72 hours unless such system loop is sooner made operable, provided that the other containment cooling system loop, including its associated diesel generator, is operable.~~

3. ~~If the requirements of 3.5.B cannot be met, an orderly shutdown shall be initiated and the reactor shall be in a Cold Shutdown Condition within 24 hours.~~

When in the Hot Shutdown condition and not steaming to the main condenser, two* Shutdown Cooling Loops (SDC) shall be operable. If the requirements of 3.5.B.1 cannot be met immediately initiate corrective action to return the required loop to operable status as soon as possible and be in Cold Shutdown in 24 hours.

When irradiated fuel is in the vessel and the reactor is in the Cold Condition, two* SDC loops shall be operable and specification 3.9.C shall be met. If the requirements of 3.5.B.2 cannot be met immediately initiate corrective action to return the required loop to operable status as soon as possible.

1. ~~Containment~~ SHUTDOWN Cooling system Testing shall be as follows:

| | Item | Frequency |
|---|---|---|
| a. | Pump & Valve Operability | Once/3 months |
| b. | Pump Capacity Test Each RBCCW pump shall deliver 1700 gpm at 70 ft. TDH. Each SSWS pump shall deliver 2700 gpm at 55 ft. TDH. | After pump maintenance and every 3 months |
| c. | Air test on drywell and torus headers and nozzles | Once/5 years |

| Item | Frequency |
|---|---|
| Shutdown Cooling Pump and Valve Operability (~~from Control Room if SDC is not already in service~~) | Once/31 days |

(each pump shall be started and each valve required to provide recirculation coolant through the RHR heat exchanger shall be cycled through at least one full cycle of travel)

When irradiated fuel is in the vessel ~~during refueling~~ with the reactor head removed, the cavity flooded, the fuel pool gates removed and water level maintained to at least elevation 114'0", at least one Shutdown Cooling loop shall be operable. If the requirements of 3.5.B.3 cannot be met immediately suspend all operations involving an increase in the reactor decay heat load, and close all secondary containment penetrations providing direct access from secondary containment atmosphere to the outside atmosphere within 4 hours.

If the SDC loop is not already operating.

* Note: One SDC loop may be inoperable for surveillance testing provided the other loop is operable.

| LIMITING CONDITION FOR OPERATION | SURVEILLANCE REQUIREMENT |
|---|---|
| 3.5.F Minimum Low Pressure Cooling and Diesel Generator Availability | 4.5.F Minimum Low Pressure Cooling and Diesel Generator Availability |
| 1. During any period when one diesel generator is inoperable, continued reactor operation is permissible only during the succeeding . hours unless such diesel generator is sooner made operable, provided that all of the low pressure core and containment cooling systems and the remaining diesel generator shall be operable. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be placed in the Cold Shutdown Condition within 24 hours. | 1. When it is determined that one diesel generator is inoperable, the operable diesel generator shall be demonstrated to be operable immediately and daily thereafter until the inoperable diesel is repaired. |
| 2. Any combination of inoperable components in the core and containment cooling systems shall not defeat the capability of the remaining operable components to fulfill the cooling functions. | |
| ~~3. When irradiated fuel is in the reactor vessel and the reactor is in the Cold Shutdown condition, both core spray systems, the LPCI and containment cooling systems may be inoperable, provided no work is being done which has the potential for draining the reactor vessel.~~ | INSERT I 3.5.G. INSERT I 4.5.G |
| ~~4. During a refueling outage, for a period of 30 days, refueling operation may continue provided that one core spray system or the LPCI system is operable or Specification 3.5.F.5 is met.~~ | |
| 5. When irradiated fuel is in the reactor vessel and the reactor is in the Refueling Condition with the torus drained, a single control rod drive mechanism may be removed, if both of the following conditions are satisfied: | 3.5.G.4 (now on page 111) |

Insert I

New section inserted onto page 110

3.5.G CSCS-Shutdown and Refueling

1. When irradiated fuel is in the vessel and the reactor is in the Cold Condition, except as specified in 3.5.G.2, 3.5.G.3 and 3.5.G.4 below, a combination of 2 low pressure CSCS subsystems shall be operable and specification 3.9.C shall be met

2. a. With only one low pressure CSCS system available, restore the second system in 4 hours or suspend operations that have a potential for draining the vessel.

   b. With no systems available immediately suspend core alterations and activities with the potential to drain the vessel. Restore one system in 4 hours or establish secondary containment within 8 hours.

4.5.G CSCS-Shutdown/Refueling

1. Surveillance requirements are the same as 4.5.A.

LIMITING CONDITION FOR OPERATION | SURVEILLANCE REQUIREMENT

~~3.5.F Minimum Low Pressure Cooling and Diesel Generator Availability~~

a) No work on the reactor vessel, in addition to CRD removal, will be performed which has the potential for exceeding the maximum leak rate from a single control blade seal if it became unseated.

b) i) the core spray systems are operable and aligned with a suction path from the condensate storage tanks. ii) the condensate storage tanks shall contain at least 200,000 gallons of usable water and the refueling cavity and dryer/separator pool shall be flooded to at least elevation 114'-0" at

This moves down on page

This material, currently 3.5.F.5 becomes 3.5.G.4

3. When irradiated fuel is in the vessel during Refueling, with the reactor head removed, the cavity flooded, the fuel pool gates removed and water level maintained to at least elevation 114'0", all low pressure CSCS subsystems may be inoperable.

~~3.5.G~~

~~(Intentionally left blank)~~

3.5.H Maintenance of Filled Discharge Pipe

Whenever core spray systems, LPCI system, HPCI or RCIC are required to be operable, the discharge piping from the pump discharge of these systems to the last block valve shall be filled.

3/4.5.H moved down

This material moves onto page 112

4.5.H Maintenance of Filled Discharge Pipe

The following surveillance requirements shall be adhered to to assure that the discharge piping of the core spray systems, LPCI system, HPCI and RCIC are filled:

1. Every month prior to the testing of the LPCI system and core spray systems, the discharge piping of these systems shall be vented from the high point and water flow observed.

2. Following any period where the LPCI system or core spray systems have not been required to be operable, the discharge piping of the inoperable system shall be vented from the high point prior to the return of the system to service.

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| LIMITING CONDITION FOR OPERATION | SURVEILLANCE REQUIREMENT |
|---|---|

4.5.H and 2 moved here from page 111

3 and 4 move down on page

4.5.H Maintenance of Filled Discharge Pipe (Cont'd)

3. Whenever the HPCI or RCIC system is lined up to take suction from the torus, the discharge piping of the HPCI and RCIC shall be vented from the high point of the system and water flow observed on a monthly basis.

4. The pressure switches which monitor the discharge lines to ensure that they are full shall be functionally tested every month and calibrated every three months.

BASES: 3/4.5B

3.5.B ~~Containment~~ SHUTDOWN Cooling System (RHR)

The containment cooling system for Pilgrim I consists of two independent loops each of which to be an operable loop requires one LPCI pump, two RBCCW pumps, and two SSW pumps to be operable. There are installed spares for margin above the design conditions. Each system has the capability to perform its function; i.e., removing 64 x $10^6$ Btu/hr (Ref. Amendment 18), even with some system degradation. If one loop is out-of-service, reactor operation is permitted for 72 hours.

With components or systems out-of-service, overall core and containment cooling reliability is maintained by the operability of the remaining cooling equipment.

Since some of the SSW and RBCCW pumps are required for normal operation, capacity testing of individual pumps by direct flow measurement is impractical. The pump capacity test is a comparison of measured pump performance parameters to shop performance tests combined with a comparison to the performance of the previously tested pump. These pumps are rotated during operation and performance testing will be integrated with this or performed during refueling when pumps can be flow tested individually. Tests during normal operation will be performed by measuring the shutoff head. Then the pump under test will be placed in service and one of the previously operating pumps secured. Total flow indication for the system will be compared for the two cases. Where this is not feasible due to changing system conditions, the pump discharge pressure will be measured and its power requirement will be used to establish flow at that pressure.

[ This information is moved to page 166 and 166A for section 3.7.A, "Containment Cooling System"

Insert III goes on this page. It is new material for section 3/5.B, "Shutdown Cooling System (RHR)

Revision 1A0
Amendment No. 135

Insert III
for Bases page 115 for section 3.4.5.B

BASES:

3/4.5B Shutdown Cooling System (RHR) "Shutdown Cooling Systems (RHR)"

Maintaining decay heat removal (DHR) capability is a key function during shutdown conditions. During normal refueling outage conditions, the shutdown cooling (SDC) mode of the RHR system and its supporting systems are the primary means of removing decay heat when fuel is in the reactor vessel. An extended loss of the DHR function can lead to coolant boiling and potentially result in a depletion of reactor coolant and eventual uncovering of the core. While irradiated fuel remains in the reactor vessel during an outage, maintaining the DHR function is important to shutdown safety.

When the Main Steam Isolation Valves (MSIV) or the MSIV drains are open and vessel temperture is at or above 212°F, 3.5.B.1 does not apply because the plant is in Hot Shutdown but is steaming to the main condenser.

Two RHR shutdown cooling subsystems are required to be OPERABLE. An OPERABLE RHR shutdown cooling subsystem consists of one OPERABLE RHR pump, one heat exchanger, and the associated piping and valves. The two subsystems have a common suction source and are allowed to have a common heat exchanger and common discharge piping. Thus, to meet the LCO, both pumps in one loop or one pump in each of the two loops must be OPERABLE. Since the piping and heat exchangers are passive components that are assumed not to fail, they are allowed to be common to both subsystems.

Additionally, each shutdown cooling subsystem is considered OPERABLE if it can be manually aligned (remote or local) in the shutdown cooling mode for removal of decay heat. An RHR pump is OPERABLE when it is capable of being powered and able to provide flow if required.

The specification for two SDC loops in the cold condition includes the condition that specification 3.9.C be met. Specification 3.9.C requires one offsite power source and either Emergency Diesel Generator operable when in the cold condition and subcritical.

Specification 3.5.B.3 allows refueling operations to continue with one SDC loop operable with the reactor head removed, the cavity flooded, the fuel pool gates removed and water level maintained to at least elevation 114'0". This is acceptable because the large inventory of water acts as a diverse method of providing backup for the decay heat removal safety function. During refueling with irradiated fuel in the vessel, the reactor head removed and the cavity flooded the Augmented Fuel Pool Cooling loop satisfies the requirement to have one SDC loop operable once the decay heat load is within its capacity. Activities that can increase decay heat load are the reduction of decay heat cooling or insertion of a fuel bundle. The requirement of 3.5.B.3 to close all secondary containment penetrations providing direct access to the outside atmosphere requires the isolation of secondary containment within 4 hours if SDC is not operable.

BASES:

3.5.F Minimum Low Pressure Cooling and Diesel Generator Availability

The purpose of Specification F is to ~~assure~~ ensure that adequate core cooling equipment is available at all times. If, for example, one core spray were out of service and the diesel which powered the opposite core spray were out of service, only 2 LCPI pumps would be available. ~~it is during refueling outages that major maintenance is performed and during such time that all low pressure core cooling systems may be out of service.~~ This specification provides that should this occur, no work will be performed on the primary system which could lead to draining the vessel. This work would include work on certain control rod drive components and recirculation system. Specification ~~(F)~~ G allows removal of one CRD mechanism while the torus is in a drained condition without compromising core cooling capability. The available core cooling capability for a potential draining of the reactor vessel while this work is perfomed is based on an estimated drain rate of 300 gpm if the control rod blade seal is unseated. Flooding the refuel cavity and dryer/separator pool to elevation 114'-0" corresponds to approximately 350,000 gallons of water and will provide core cooling capability in the event leakage from the control rod drive does occur. A potential draining of the reactor vessel (via control rod blade leakage) would allow this water to enter into the torus and after approximately 140,000 gallons have accumulated (needed to meet minimum NPSH requirements for the LPCI and/or core spray pumps), the torus would be able to serve as a common suction header. This would allow a closed loop operation of the LPCI system and the core spray system (once re-aligned) to the torus. In addition, the other core spray system is lined up to the condensate storage tanks which can supplement the refuel cavity and dryer/separator pool water to provide core flooding, if required.

This is moved to page 120 for section 3.5.G

Specification 3.9 must also be consulted to determine other requirements for the diesel generators.

During shutdown and refueling the configuration of shared equipment is different, and requirements for some equipment are reduced or unnecessary. (Specification 3/4.5.G addresses Shutdown and Refueling conditions).

Insert IV replaces this.

Insert IV

For Bases page 119 for section 3.5.F, "Minimum Low Pressure Cooling and Diesel Generator Availability"

Continued operation is permissible for 72 hours with one diesel generator out of service. In addition, all low pressure core and containment cooling systems and the remaining diesel generator must be operable. If these requirements are not met the reactor must be brought to the Cold Shutdown condition and low pressure cooling requirements provided in 3.5.G become applicable.

BASES:

3.5.G ECCS- shutdown and Refueling

INSERT V

This information was for 3.5. For page 119. Moved here to support new section 3.5.G

~~(THIS PAGE INTENTIONALLY LEFT BLANK)~~

3.5.G.4

~~This specification requires that should ECCS be out of service, no work will be performed on the primary system which could lead to draining the vessel. Such work includes work on certain control rod drive components and the recirculation system~~. Specification 4 allows removal of one CRD mechanism while the torus is in a drained condition without compromising core cooling capability. The available core cooling capability for a potential draining of the reactor vessel while this work is performed is based on an estimated drain rate of 300 gpm if the control rod blade seal is unseated. Flooding the refuel cavity and dryer/separator pool to elevation 114'-0" corresponds to approximately 350,000 gallons of water and will provide core cooling capability in the event leakage from the control rod drive does occur. A potential draining of the reactor vessel (via control rod blade leakage) would allow this water to enter into the torus and after approximately 140,000 gallons have accumulated (needed to meet minimum NPSH requirements for the LPCI and/or core spray pumps), the torus would be able to serve as a common suction header. This would allow a closed loop operation of the LPCI system and the core spray system (once re-aligned) to the torus. In addition, the other core spray system is lined up to the condensate storage tanks which can supplement the refuel cavity and dryer/separator pool water to provide core flooding, if required.

Specification 3.9 must also be consulted to determine other requirements for the diesel generators.



amendment No.

3.5.G CSCS - Shutdown and Refueling

During Shutdown and Refueling conditions CSCS requirements are reduced. During Refueling, with the cavity flooded, increased coolant inventory provides sufficient time to make up lost inventory without relying on Low Pressure Cooling. Hence, with the cavity flooded the CSCS is allowed to be unavailable.

A minimum of two low pressure CSCS injection/spray subsystems are required to be OPERABLE in Shutdown and Refueling. Two OPERABLE low pressure CSCS subsystems also ensure adequate vessel inventory makeup in the event of an inadvertent vessel draindown. For Shutdown and Refueling conditions the low pressure CSCS injection/spray system consists of two Core Spray (CS) subsystems and the Low Pressure Coolant Injection (LPCI) system configured into two loops.

Each CS subsystem consists of one motor driven pump, piping, and valves to transfer water from the suppression pool or condensate storage tank (CST) to the reactor pressure vessel (RPV).

Each LPCI loop consists of one motor driven pump, piping, and valves to transfer water from the suppression pool to the RPV. Only a single LPCI pump is required per loop because loop injection capacity for shutdown and refueling conditions is less than for other operational modes. One LPCI loop may be aligned in the decay heat removal mode and be considered OPERABLE for the CSCS function, if it can be manually realigned (remote or local) to the LPCI mode and is not otherwise inoperable. Because of low pressure and low temperature conditions in Shutdown and Refueling sufficient time will be available to manually align and initiate LPCI operation to provide core cooling prior to postulated fuel uncovery.

CSCS is not required during refueling when the spent fuel storage pool gate is removed and the water level is maintained at $\geq$ 114 feet. This configuration provides sufficient coolant inventory to allow operator action to terminate the inventory loss prior to fuel uncovery in case of an inadvertent draindown.

Insert V

For Bases page 120, Section 3.5.G

"CSCS - Shutdown and Refueling"

BASES:

4.5 Core ~~and Containment~~ Cooling Systems Surveillance Frequencies

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

The surveillance requirements provide adequate assurance that the ~~core and cont. inment~~ subject cooling systems will be operable when required.

LIMITING CONDITIONS FOR OPERATION

3.7 CONTAINMENT SYSTEMS (Con't)

l. If the specifications of Item i, above, cannot be met, and the differential pressure cannot be restored within the subsequent (6) hour period, an orderly shutdown shall be initiated and the reactor shall be in a cold shutdown condition in twenty-four (24) hours.

m. Suppression chamber water level shall be maintained between -6 to -3 inches on torus level instrument which corresponds to a downcomer submergence of 3.00 and 3.25 feet respectively.

n. The suppression chamber can be drained if the conditions as specified in Section ~~3.5.F.3~~ and ~~3.5.F.5~~ of this Technical Specification are adhered to. 3.5.G.4

o. With irradiated fuel in the vessel and reactor coolant greater than 212°F there shall be two loops of Drywell Spray and Torus Spray. ~~Each loop shall consist of one RHR Pump and an RHR Heat Exchanger~~. With one loop inoperable restore the inoperable loop within 72 hours or be in the Cold Condition in 24 hours. With both loops inoperable, restore one loop in 8 hours or be in the Cold Condition within 24 hours.

p. With irradiated fuel in the vessel and reactor coolant greater than 212°F there shall be two loops of Suppression Chamber Cooling. ~~Each loop shall consist of one RHR pump and one RHR Heat Exchanger~~. With one inoperable loop. restore the inoperable loop within 72 hours or be in the Cold Condition in 24 hours. With both loops inoperable, restore one loop in 8 hours or be in the Cold Condition within 24 hours.

SURVEILLANCE REQUIREMENTS

4.7 CONTAINMENT SYSTEMS (Cont'd)

new surveillance (name and description)

h. Containment Cooling System (Drywell Spray, Torus Spray and Suppression Chamber Cooling) testing shall be as follows:

| Item | Frequency |
|---|---|
| 1. Pump & Valve Operability | Once/3 months |
| 2. Pump Capacity Test. Each RBCCW pump shall deliver 1700 gpm at 70 ft. TDH. Each SSWS pump shall deliver 2700 gpm at 55 ft. TDH. | After pump maintenance and every 3 months |
| 3. Air test the drywell and torus headers and nozzles. | Once/5 years |

operable

new surveillance (containment cooling) (replaces B/4.5.B)

"New" surveillances moved from Section 4.5.B.1

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Amendment No. 77, 113

| LIMITING CONDITIONS FOR OPERATION | SURVEILLANCE REQUIREMENTS |
|---|---|
| 3.7.B Standby Gas Treatment System and Control Room with Efficiency Air Filtration System | 4.7.B Standby Gas Treatment System and Control Room High Efficiency Air Filtration System |
| 1. Standby Gas Treatment System | 1. Standby Gas Treatment System |
| a. Except as specified in 3.7.B.1.c below, both trains of the standby gas treatment system ~~and the diesel generators required for operation of such trains~~ shall be operable at all times when secondary containment integrity is required or the reactor shall be shutdown in 36 hours. | a. (1.) At least once every 18 months, it shall be demonstrated that pressure drop across the combined high efficiency filters and charcoal adsorber banks is less than 8 inches of water at 4000 cfm. |
| b. (1.) The results of the in-place cold DOP tests on HEPA filters shall show ≥99% DOP removal. The results of halogenated hydrocarbon tests on charcoal adsorber banks shall show ≥99% halogenated hydrocarbon removal. | (2.) At least once every 18 months, demonstrate that the inlet heaters on each train are operable and are capable of an output of at least 14 kW. |
| (2.) The results of the laboratory carbon sample analysis shall show ≥95% methyl iodide removal at a velocity within 10% of system design, 0.5 to 1.5 mg/m$^3$ inlet methyl iodide concentration, ≥70% R.H. and ≥190°F. The analysis results are to be verified as acceptable within 31 days after sample removal, or declare that train inoperable and take the actions specified 3.7.B.1.c. | (3.) The tests and analysis of Specification 3.7.B.1.b. shall be performed at least once every 18 months or following painting, fire or chemical release in any ventilation zone communicating with the system while the system is operating that could contaminate the HEPA filters or charcoal adsorbers. |
| c. From and after the date that one train of the Standby Gas Treatment System is made or found to be inoperable for any reason, continued reactor operation, irradiated fuel handling, or new fuel | (4.) At least once every 18 months, automatic initiation of each branch of the standby gas treatment system shall be demonstrated, with Specification 3.7.B.1.d satisfied. |
| | (5.) Each train of the standby gas treatment system shall be operated for at least 15 minutes per month. |
| | (6.) The tests and analysis of Specification 3.7.B.1.b.( shall be performed after every 720 hours of system operation. |

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Amendment No. 80, 81, 82, 117

when the reactor is in the cold condition and subcritical, electrical support requirements are as specified in 3.9.C.

LIMITING CONDITIONS FOR OPERATION

3.7.B (Continued)

handling over the spent fuel pool or core is permissible only during the succeeding seven days providing that ~~within 2 hours all active components of~~ the other standby gas treatment train is ~~shall be demonstrated to be~~ operable.

d. Fans shall operate within ±10% of 4000 cfm.

e. Except as specified in 3.7.B.1.c, both trains of the Standby Gas Treatment System shall be operable during irradiated fuel handling, or new fuel handling over the spent fuel pool or core. If the system is not operable, fuel movement shall not be started. Any fuel assembly movement in progress may be completed.

SURVEILLANCE REQUIREMENTS

4.7.B (Continued)

b. (1.) In-place cold DOP testing shall be performed on the HEPA filters after each completed or partial replacement of the HEPA filter bank and after any structural maintenance on the HEPA filter system housing which could affect the HEPA filter bank bypass leakage.

(2.) Halogenated hydrocarbon testing shall be performed on the charcoal adsorber bank after each partial or complete replacement of the charcoal adsorber bank or after any structural maintenance on the charcoal adsorber housing which could affect the charcoal adsorber bank bypass leakage.

| LIMITING CONDITIONS FOR OPERATION | SURVEILLANCE REQUIREMENTS |
|---|---|
| 3.7.B (Continued) | 4.7.B (Continued) |
| 2. Control Room High Efficiency Air Filtration System | 2. Control Room High Efficiency Air Filtration System |
| a. Except as specified in Specification 3.7.B.2.c below, both trains of the Control Room High Efficiency Air Filtration System used for the processing of inlet air to the control room under accident conditions ~~and the diesel generator(s) required for operation of each train of the system~~ shall be operable whenever secondary containment integrity is required and during fuel handling operations. | a. At least once every 18 months the pressure drop across each combined filter train shall be demonstrated to be less than 6 inches of water at 1000 cfm or the calculated equivalent. |
| b. (1.) The ~~results of~~ the in-place cold DOP tests on HEPA filters shall show ≥99% DOP removal. The results of the halogenated hydrocarbon tests on charcoal adsorber banks shall show ≥99% halogenated hydrocarbon removal when test results are extrapolated to the initiation of the test. | b. (1.) The tests and analysis of Specification 3.7.B.2.b shall be performed once every 18 months or following painting, fire or chemical release in any ventilation zone communicating with the system while the system is operating. |
| (2.) The results of the laboratory carbon sample analysis shall show ≥95% methyl iodide removal at a velocity within 10% of system design, 0.05 to 0.15 mg/m$^3$ inlet methyl iodide concentration, ≥70% R.H., and ≥125°F. The analysis results are to be verified as acceptable within 31 days after sample removal, or declare that train inoperable and take the actions specified in 3.7.B.2.c. | (2.) In-place cold DOP testing shall be performed after each complete or partial replacement of the HEPA filter bank or after any structural maintenance on the system housing which could affect the HEPA filter bank bypass leakage. |
| | (3.) Halogenated hydrocarbon testing shall be performed after each complete or partial replacement of the charcoal adsorber bank or after any structural maintenance on the system housing which could affect the charcoal adsorber bank bypass leakage. |
| | (4.) Each train shall be operated with the heaters in automatic for at least 15 minutes every month. |
| | (5.) The test and analysis of Specification 3.7.B.2.b.(2) shall be performed after every 720 hours of system operation. |

When the reactor is in the cold condition and subcritical, electrical support requirements are as specified in 3.9.C.

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| LIMITING CONDITIONS FOR OPERATION | SURVEILLANCE REQUIREMENTS |
|---|---|

3.7.B (Continued)

c. From and after the date that one train of the Control Room High Efficiency Air Filtration System is made or found to be incapable of supplying filtered air to the control room for any reason, reactor operation or refueling operations are permissible only during the succeeding 7 days providing ~~that within 2 hours all active components of~~ the other CRHEAF train ~~shall be demonstrated~~ is operable. If the system is not made fully operable within 7 days, reactor shutdown shall be initiated and the reactor shall be in cold shutdown within the next 36 hours and irradiated fuel handling operations shall be terminated within 2 hours. Fuel handling operations in progress may be completed.

d. Fans shall operate within ±10% of 1000 cfm.

4.7.B (Continued)

c. At least once every 18 months demonstrate that the inlet heaters on each train are operable and capable of an output of at least 14 kw.

d. Perform an instrument functional test on the humidistats controlling the heaters once per 18 months.

LIMITING CONDITIONS FOR OPERATION

3.7.C Secondary Containment

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

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

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

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

   d. The fuel cask or irradiated fuel is not being moved in the reactor building.

2. If Specification 3.7.C.1 cannot be met, procedures shall be initiated to establish conditions listed in Specification 3.7.C.1.a through ~~d~~ f.

new requirements

e. No core alterations are being performed with fuel in the vessel

f. No operations with a potential to drain the reactor vessel are in progress with fuel in the vessel.

SURVEILLANCE REQUIREMENTS

4.7.C Secondary Containment

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

a. A preoperational secondary containment capability test shall be conducted after isolating the reactor building and placing either standby gas treatment system filter train in operation. Such tests shall demonstrate the capability to maintain 1/4 inch of water vacuum under calm wind (<5 mph) conditions with a filter train flow rate of not more than 4000 cfm.

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

c. Secondary containment capability to maintain 1/4 inch of water vacuum under calm wind (<5 mph) conditions with a filter train flow rate of not more than 4000 cfm, shall be demonstrated at each refueling outage prior to refueling.

(DELETED)

BASES:

3.7.A & 4.7.A Primary Containment

Experimental data indicates that excessive steam condensing loads can be avoided if the peak local temperature of the pressure suppression pool is maintained below 200°F during any period of relief-valve operation with sonic conditions at the discharge exit. Analysis has been performed to verify that the local pool temperature will stay below 200°F and the bulk temperature will stay below 160°F for all SRV transients. Specifications have been placed on the envelope of reactor operating conditions so that the reactor can be depressurized in a timely manner to avoid the regime of potentially high pressure suppression chamber loadings.

In addition to the limits on temperature of the suppression chamber pool water, operating procedures define the action to be taken in the event a relief valve inadvertently opens or sticks open. This action would include: (1) use of all available means to close the valve, (2) initiate suppression pool water cooling heat exchangers, (3) initiate reactor shutdown, and (4) if other relief valves are used to depressurize the reactor, their discharge shall be separated from that of the stuck-open relief valve to assure mixing and uniformity of energy insertion to the pool.

Because of the large volume and thermal capacity of the suppression pool, the volume and temperature normally changes very slowly and monitoring these parameters daily is sufficient to establish any temperature trends. By requiring the suppression pool temperature to be continually monitored and frequently logged during periods of significant heat addition, the temperature trends will be closely followed so that appropriate action can be taken. The requirement for an external visual examination following any event where potentially high loadings could occur provides assurance that no significant damage was encountered. Particular attention should be focused on structural discontinuities in the vicinity of the relief valve discharge since these are expected to be the points of highest stress.

If a loss-of-coolant accident were to occur when the reactor water temperature is below approximately 330°F, the containment pressure will not exceed the 62psig code permissible pressure, even if no condensation were to occur. The maximum allowable pool temperature, whenever the reactor is above 212°F, shall be governed by this specification. Thus, specifying water volume-temperature requirements applicable for reactor-water temperature above 212°F provides additional margin above that available at 330°F.

3.7.A. Containment Cooling System-Drywell Spray, Torus Spray, Suppression Chamber Cooling

The containment cooling system for Pilgrim I consists of two independent loops each of which to be an operable loop requires one LPCI pump, two RBCCW pumps and two SSW pumps. There are installed spares for margin above the design conditions. Each system has the capability to perform its function; i.e., removing 64 x $10^6$ Btu/hr (Ref. Amendment 18), even with some system degradation. If one loop is out-of-service, reactor operation is permitted for 72 hours.

new title

moved from page 115

NEW PAGE

BASES:

3.7.A. Containment Cooling System (Cont'd)

With components or systems out-of-service, overall containment cooling reliability is maintained by the operability of the remaining cooling equipment.

Since some of the SSW and RBCCW pumps associated with the Containment Cooling System are required for normal operation, capacity testing of individual pumps by direct flow measurement is impracti-al. The pump capacity test is a comparison of measured pump performance parameters to shop performance tests combined with a comparison to the performance of the previously tested pump. These pumps are rotated during operation and performance testing will be integrated with this or performed during refueling when pumps can be flow tested individually. Tests during normal operation will be performed by measuring the shutoff head. Then the pump under test will be placed in service and one of the previously operating pumps secured. Total flow indication for the system will be compared for the two cases. Where this is not feasible due to changing system conditions, the pump discharge pressure will be measured and its power requirement will be used to establish flow at that pressure.

The Drywell Spray, Torus Spray and Suppression Chamber Cooling systems are necessary during power operations. Specification 3.7 imposes Surveillances and Limiting Conditions for Operation to ensure the operability of the equipment. When the equipment is inoperable the plant is brought to a condition where the equipments is not necessary.

This is new information

This information was moved from page 115 for 3/4.5 B "Containment Cooling Systems."

New page

BASES:

3.7.B.1 and 4.7.B.1 (continued)

The test frequencies are adequate to detect equipment deterioration prior to significant defects, but the tests are not frequent enough to load the filters or adsorbers, thus reducing their reserve capacity too quickly. The filter testing is performed pursuant to appropriate procedures reviewed and approved by the Operations Review Committee pursuant to Section 6 of these Technical Specifications. The in-place testing of charcoal filters is performed by injecting a halogenated hydrocarbon into the system upstream of the charcoal adsorbers. Measurements of the concentration upstream and downstream are made. The ratio of the inlet and outlet concentrations gives an overall indication of the leak tightness of the system. A similar procedure substituting dioctyl phthalate for halogenated hydrocarbon is used to test the HEPA filters.

Pressure drop tests across filter and adsorber banks are performed to detect plugging or leak paths though the filter or adsorber media. Considering the relatively short times the ...s will be run for test purposes, plugging is unlikely and the test interval of once per 18 months is reasonable.

System drains and housing gasket doors are designed such that any leakage would be inleakage from the Standby Gas Treatment System Room. This ensures that there will be no bypass of process air around the filters or adsorbers.

Only one of the two Standby Gas Treatment Systems (SBGTS) is needed to maintain the secondary containment at a 0.25 inch of water negative pressure upon containment isolation. If one system is found to be inoperable, there is no immediate threat to the containment system performance and reactor operation or refueling activities may continue while repairs are being made ~~In the event one SBGTS is inoperable, the redundant system's active components will be tested within 2 hours. This substantiates the availability of the operable system and justifies continued reactor or refueling operations.~~

If both trains of SBGTS are inoperable, the plant is brought to a condition where the SBGTS is not required.

made or found

for seven days

to the inoperable system. The other system must be operable.

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BASES:

3.7.B.2. and 4.7.B.2. (continued)

Air flow through the filters and charcoal adsorbers for 15 minutes each month assures operability of the system. Since the system heaters are automatically controlled, the air flowing through the filters and adsorbers will be ≤70% relative humidity and will have the desired drying effect.

If one train of the system is found to be inoperable, there is no immediate threat to the control room, and reactor operation or fuel handling may continue for ~~a limited period of time~~ while repairs are being made. ~~In the event one CRHEAF train is inoperable, the redundant system's active components will be tested within 2 hours.~~ If both trains of the CRHEAF system are inoperable, the reactor will be brought to a condition where the Control Room High Efficiency Air Filtration System is not required.

severe days

to the inoperable train

The other train must be operable.

| LIMITING CONDITIONS FOR OPERATION | SURVEILLANCE REQUIREMENTS |
| --- | --- |
| 3.9 C Diesel Generator Requirements-Cold Condition and Subcritical<br><br>1. When the reactor is in the Cold Condition and Subcritical there shall be one offsite power source capable of energizing the emergency buses and either Emergency Diesel Generator operable.<br><br>2. When the reactor is in the Cold Condition and Subcritical if a train or loop of a required system is inoperable, the Emergency Diesel Generator associated with the operable train or loop must be operable.<br><br>3. With no offsite power supplies operable and/or both Emergency Diesel Generators inoperable, suspend core alterations, handling of irradiated fuel in the secondary containment, and operations with a potential for draining the vessel. | |

This page and its contents are new

New Page

BASES:

3.9.C Diesel Generator Requirements - Cold Condition and Subcritical

The operability of A.C. power sources when in shutdown and refuel conditions assures: (1) adequate coolant inventory for the irradiated fuel in the core in case of an inadvertent draindown of the vessel; (2) mitigation of a fuel bundle handling accident; (3) sufficient power for required support systems (e.g., decay heat removal, refueling activities, component cooling); and (4) sufficient instrumentation and control capability for monitoring and maintaining the unit status.

It is unnecessary to require the sources of emergency power to be completely redundant. Specification 3.9.C.1 considers emergency electrical power bus requirements met with offsite power and one emergency diesel generator operable. The remaining bus is considered operable with just a source of offsite power available.

This specification impacts other safety functions which electric power supports. Each of these safety functions has been evaluated previously, and it was concluded that the power requirements of Specification 3.9.C.1 support the other safety functions such that shutdown risk is acceptably low.

This specification precludes the potential for having unacceptable combinations of system alignments, and enhances safety by eliminating the potential for misinterpreting 3.9.C.1.

Specification 3.9.C.3 requires the suspension of core alterations, the handling of irradiated fuel in the secondary containment and operations with a potential to drain the vessel when no sources of offsite and/or emergency power is available.

Thus, operations which have the potential to result in an event requiring the operation of a safety system, such as SGTS, must be suspended if both emergency buses are supplied by only one source of power. This reduces the probability of an adverse event and maintains the reactor in a safe condition while additional sources of power are restored.

All new information for new section 3.9.C.

New Page