Enclosure II to Letter From C. W. Giesler

To H. R. Denton

Dated August 24, 1983

Proposed Amendment No. 55 to the KNPP Technical Specifications

Affected Pages

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3.0 LIMITING CONDITIONS FOR OPERATION

3.1 REACTOR COOLANT SYSTEM

Applicability

Applies to the operating status of the Reactor Coolant System.

Objective

To specify those limiting conditions for operation of the Reactor Coolant System which must be met to ensure safe reactor operation.

Specifications

a. OPERATIONAL COMPONENTS

Specification:

1. Reactor Coolant Pumps

   A. At least one reactor coolant pump or one residual heat removal pump shall be in operation when a reduction is made in the boron concentration of the reactor coolant.

   B. When the reactor is in the operating mode of operation, except for low power tests, both reactor coolant pumps shall be in operation.

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2. Decay Heat Removal Capability

A. At least TWO of the following FOUR heat sinks shall be operable whenever the average reactor coolant temperature is less than or equal to 350°F but greater than 200°F.

1. Steam Generator 1A [(a)] 55
2. Steam Generator 1B [(a)]
3. Residual Heat Removal Train A
4. Residual Heat Removal Train B

B. TWO residual heat removal trains shall be operable whenever the average reactor coolant temperature is less than or equal to 200°F and irradiated fuel is in the reactor.

1. Each residual heat removal train shall be comprised of:

   a) ONE operable residual heat removal pump

   b) ONE operable residual heat removal heat exchanger

   c) An operable flow path consisting of all valves, piping and instrumentation associated with the above train of components and required to remove decay heat from the core during normal shut down situations. This flow path shall be capable of taking suction from the appropriate reactor coolant system hot leg and returning to the loop B cold leg.

2. If one residual heat removal train is inoperable, corrective action shall be taken immediately to return it to the operable status.

(a) An operable steam generator is defined by TS 3.4.a.1. 55

3. Pressurizer Safety Valves

A. At least one pressurizer safety valve shall be operable whenever the reactor head is on the reactor pressure vessel, except for a hydro test of the RCS the pressurizer safety valves may be blanked provided the power operated relief valves and the safety valve on the discharge of the charging pump are set for test pressure plus 35 psi to protect the system. 55

B. Both pressurizer safety valves shall be operable whenever the reactor is critical.

4. Pressure Isolation Valves

Applicability:

Operational defined as Operating, and Hot Standby.

Objective:

To increase the reliability of reactor coolant system pressure isolation valves thereby reducing the potential of an intersystem loss of coolant accident.

Specification:

A. All pressure isolation valves listed in Table TS 3.1-2 shall be functional as a pressure isolation device, except as specified in B. Valve leakage shall not exceed the amounts indicated.

B. In the event that integrity of any pressure isolation valve as specified in Table TS 3.1-2 cannot be demonstrated, reactor operation may continue, provided that at least two valves in each high pressure line having a non-functional valve are in and remain in, the mode corresponding to the isolated condition. (a)

C. If Specification A and B cannot be met, an orderly shutdown shall be initiated and the reactor shall be in the Hot Shutdown condition within the next 4 hours, the Intermediate Shutdown condition in the next 6 hours and the Cold Shutdown condition within the next 24 hours.

(a) Manual valves shall be locked in the closed position; motor operated valves shall be placed in the closed position with their power breakers locked out. 55

Basis

When the boron concentration of the Reactor Coolant System is to be reduced, the process must be uniform to prevent sudden reactivity changes in the reactor. Mixing of the reactor coolant will be sufficient to maintain a uniform boron concentration if at least one reactor coolant pump or one residual heat removal pump is running while the change is taking place. The residual heat removal pump will circulate the equivalent of the primary system volume in approximately one-half hour.

Part 1 of the specification requires that both reactor coolant pumps be operating when the reactor is in power operation to provide core cooling. 55
Planned power operation with one loop out of service is not allowed in the present design because the system does not meet the single failure (locked rotor) criteria requirement for this mode of operation. The flow provided in each case in Part 1 will keep DNBR well above 1.30. Therefore, cladding damage and release of fission products to the reactor coolant will not occur.
One pump operation is not permitted except for tests. Upon loss of one pump 55
below 10% full power the core power shall be reduced to a level below the
maximum power determined for zero power testing. Natural circulation can 55
remove decay heat up to 10% power. Above 10% power, an automatic reactor trip will occur if flow from either pump is lost. (1)

When the average reactor coolant temperature is less than or equal to 350°F a combination of the available heat sinks is sufficient to remove the decay heat and provide the necessary redundancy to meet the single failure criterion.

When the average reactor coolant temperature is less than or equal to 200°F, 55
the plant is in a cold shutdown condition and there is a negligible amount of sensible heat energy stored in the reactor coolant system. Should one residual heat removal train become inoperable under these conditions the remaining train is capable of removing all of the decay heat being generated.

Each of the pressurizer safety valves is designed to relieve 325,000 lbs per hour of saturated steam at set point. Below 350°F and 350 psig, the Residual Heat Removal System can remove decay heat and thereby control system temperature and pressure. If no residual heat were removed by any of the means available, the amount of steam which could be generated at safety valve relief pressure would be less than half the valves' capacity. One valve therefore provides adequate protection against over-pressurization. 55

The Basis for the Pressure Isolation Valves is contained with Reference 2.

The pressurizer power operated relief valves (PORV's) operate as part of the pressurizer pressure control system. They are intended to relieve RCS pressure below the setting of the code safety valves. These relief valves have remotely operated block valves to provide a positive shutoff capability should a relief valve become inoperable.

Pressurizer heaters are vital elements in the operation of the pressurizer which is necessary to maintain system pressure. Loss of energy to the heaters would result in the inability to maintain system pressure via heat addition to the pressurizer. Hot functional tests [3] have indicated that 55 one group of heaters is required to overcome ambient heat losses. Placing heaters necessary to overcome ambient heat losses on emergency power will assure the ability to maintain pressurizer pressure. Annual surveillance tests are performed to ensure heater operability.

References:

(1) FSAR Section 7.2.2
(2) Order for Modification of License dated 4/20/81.
(3) Hot functional test (PT-RC-31)

c. Any one of the following conditions of inoperability may exist during the time intervals specified. The reactor shall be placed in the hot shutdown condition if operability is not restored within the time specified, and it shall be placed in the cold shutdown condition if operability is not restored within an additional 48 hours.

1. ONE of the operable charging pumps may be removed from service provided two pumps are again operable within 24 hours.

2. ONE boric acid transfer pump may be out of service provided both pumps are operable within 24 hours. 55

3. ONE channel of heat tracing may be out of service provided it is restored to operable status within 48 hours.

4. Deleted 55

Basis

The Chemical and Volume Control System provides control of the Reactor Coolant System boron inventory. This is normally accomplished by using any one of the three charging pumps in series with any one of the two boric acid transfer pumps. An alternate method of boration will be use of the charging pumps directly from the Refueling Water Storage Tank. A third method will be to use the safety injection pumps. There are two sources of borated water available for injection through 3 different paths.

(1) The boric acid transfer pumps can deliver the boric acid tank contents to the suction of the charging pumps.

(2) The charging pumps can take suction directly from the Refueling Water Storage Tank containing a concentration of 1950 ppm boron solution. Reference is made to Specification 3.3.a.

3.3 ENGINEERED SAFETY FEATURES AND AUXILIARY SYSTEMS

Applicability

Applies to the operating status of Engineered Safety Features and Auxiliary Systems.

Objective

To define those limiting conditions for operation that are necessary: (1) to remove decay heat from the core in emergency or normal shutdown situations, and (2) to remove heat from containment in normal operating and emergency situations.

Specification

a. Accumulators

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1. The reactor shall not be made critical unless the following conditions are satisfied, except as provided by Specification 3.3.a.2.

   A. Each accumulator is pressurized to at least 700 psig and contains at least 1250 $ft^3 \pm 25\ ft^3$ of water with a boron concentration of at least 1900 ppm, and is not isolated.

   B. Accumulator isolation valves SI-20A and SI-20B shall be opened with their power breakers locked out before reactor coolant system pressure exceeds 1000 psig.

2. During power operation or recovery from an inadventent trip, ONE accumulator may be inoperable for a period of 1 hour. If operability is not

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restored within the time specified, then withi[illegible] hour action shall be initiated to:

- -Achieve Hot Standby within the next 6 hours.
- -Achieve Hot Shutdown within the following 6 hours.
- -Achieve Cold Shutdown within an additional 36 hours.

b. Safety Injection/Residual Heat Removal Systems

1. The reactor shall not be made critical unless the following conditions are satisfied, except as provided by Specification 3.3.b.2.

   A. The Refueling Water Storage Tank contains not less than 272,500 gal. of water with a boron concentration of at least 1950 ppm.

   B. TWO SI/RHR trains are operable with each train comprised of:

      1. ONE operable safety injection pump. 55

      2. ONE operable residual heat removal pump.

      3. ONE operable residual heat removal heat exchanger.

      4. An operable flow path consisting of all valves, piping and interlocks associated with the above train of components and required to function during accident conditions. This flow path shall be capable of taking suction from the selected boric acid tank and the refueling water storage tank upon a safety injection signal and after manual transfer taking suction from the containment sump.

   C. Isolation valves SI-9A, SI-11A and SI-11B in the discharge of the high head SIS and block valve SI-3 are in the open position with their power breaker locked out.

D. During the Monthly Valve Operation Surveillance Testing of the Safety Injection System it is permissible to close the hand operated valve isolating the Boric Acid Storage Tanks from the Safety Injection Pumps Suction. During this short test period an operator shall stand by the valve to open it if Safety Injection is required. He will have headset communication with the Control Room.

2. During power operation or recovery from an inadvertent trip, ONE SI/RHR train may be inoperable for a period of 72 hours.

A. If the inoperability is due to a component in the safety injection system and operability is not restored within 72 hours, then within 1 hour action shall be initiated to:

-Achieve Hot Standby within the next 6 hours. 55

-Achieve Hot Shutdown within the following 6 hours.

-Achieve Cold Shutdown within an additional 36 hours.

B. If the inoperability is due to a component in the residual heat removal system and operability is not restored within 72 hours, then within 1 hour action shall be initiated to:

-Achieve Hot Standby within the next 6 hours.

-Achieve Hot Shutdown within the following 6 hours.

-Achi[illegible] and maintain the Reactor Cool[illegible] System T_{avg} less than 350°F by use of alternate heat removal methods within an additional 36 hours.

c. Containment Cooling Systems

1. The reactor shall not be made critical unless the following conditions are satisfied, except as provided by Specification 3.3.c.2.

   A. A minimum of three hundred (300) gallons of not less than 30% by weight of NaOH solution is available as a containment spray additive.

   B. Two containment spray trains are operable with each train comprised of:

      1. ONE containment spray pump.

      2. An operable flow path consisting of all valves and piping asso- 55
      ciated with the above train of components and required to function during accident conditions. This flow path shall be capable of taking suction from the refueling water storage tank and the spray additive tank upon a Hi-Hi Containment Pressure signal and after manual transfer being supplied from the containment sump.

   C. TWO trains of containment fan-coil units are operable with two fan-coil units in each train.

2. During power operation or recovery from inadvertent trip, any one of the following conditions of inoperability may exist during the time inter-

vals specified. If operability is not restored within the time specified, then within 1 hour action shall be initiated to:

-Achieve Hot Standby within the next 6 hours.

-Achieve Hot Shutdown within the following 6 hours.

-Achieve Cold Shutdown within an additional 36 hours.

A. The quantity of NaOH solution available as a containment spray additive may be less than that specified in TS 3.3.c.1.A for a period of 48 hours.

B. Any ONE of the following FOUR trains of equipment may be out of service for a period of 7 days provided the remaining THREE trains are operable.

   1. Containment Spray - Train A

   2. Containment Spray - Train B 55

   3. Containment Fan Coil Units - 1A and 1B

   4. Containment Fan Coil Units - 1C and 1D

C. Any TWO of the following FOUR trains of equipment may be out of service for a period of 72 hours provided the remaining TWO trains are operable.

   1. Containment Spray - Train A

   2. Containment Spray - Train B

   3. Containment Fan Coil Units - 1A and 1B

   4. Containment Fan Coil Units - 1C and 1D

d. Component Cooling System

1. The reactor shall not be made critical unless the following conditions are satisfied, except as provided by Specification 3.3.d.2.

   A. TWO component cooling water trains are operable with each train consisting of:

      1. ONE component cooling water pump

      2. ONE component cooling water heat exchanger

      3. An operable flow path consisting of all valves and piping associated with the above train of components and required to function during accident conditions.

2. During power operation on recovery from an inadvertent trip, ONE component cooling water train may be inoperable for a period of 72 hours. If operability is not restored within 72 hours, then within 1 hour 55
action shall be initiated to:

   -Achieve Hot Standby within the next 6 hours.

   -Achieve Hot Shutdown within the following 6 hours.

   -Achieve Cold Shutdown within an additional 36 hours.

e. Service Water System

1. The reactor shall not be made critical unless the following conditions are satisfied, except as provided by Specification 3.3.e.2.

   A. TWO service water trains are operable with each train consisting of:

1. TWO service water pumps

2. An operable flow path consisting of all valves and piping associated with the above train of components and required to function during accident conditions. This flow path shall be capable of taking a suction from the forebay and supplying water to the redundant safeguards headers.

B. The forebay water level trip system is operable.

2. During power operation or recovery from an inadvertent trip, ONE service water train may be inoperable for a period of 72 hours. If operability is not restored within 72 hours, then within 1 hour action shall be initiated to:

-Achieve Hot Standby within the next 6 hours.

-Achieve Hot Shutdown within the following 6 hours. 55

-Achieve Cold Shutdown within an additional 36 hours.

Basis

The normal procedure for starting the reactor is, first, to heat the reactor coolant to near operating temperature by running the reactor coolant pumps. The reactor is then made critical by withdrawing control rods and/or diluting boron in the coolant.(1) With this mode of start-up, the energy stored in the reactor coolant during the approach to criticality is substantially equal to that during power operation and therefore, to be conservative, most engineered safety features components and auxiliary cooling systems shall be fully operable.

The operable status of the various systems and components is to be demonstrated by periodic tests, defined by Specification 4.5. These periodic tests ensure, with a high reliability, that the various systems will function properly if required to do so. A large fraction of these tests will be performed while the reactor is operating in the power range. If a component is found to be inoperable, it will be possible in most cases to effect repairs and restore the system to full operability within a relatively short time. Limiting conditions of operation permit temporary outages of redundant components and are specified for specific time intervals that are consistent with minor maintenance. These permissible conditions and time intervals are specified in such a manner as to apply identically during sustained power operation and during recovery from an inadvertent trip. The transient condition of restart in the latter case in no way alters the types of safety features equipment nor the extent of redundancy that must be available.

Inoperability of a single component does not negate the ability of the system to 55
perform its function, but it reduces the redundancy provided in the plant design and thereby limits the ability to tolerate additional equipment failures. However, the equipment out-of-service times specified in the limiting conditions for operation are a temporary relaxation of the single failure criterion, which, consistent with overall system reliability considerations, provides a limited time to restore equipment to the operable condition. If the inoperable component is not repaired within the specified allowable time period or a second component in the same or related system is found to be inoperable and cannot be repaired within the specified time, the reactor will initially be put in hot standby and subsequently in the hot shutdown condition to reduce the stored energy in the reactor coolant system and to provide for the reduction of the decay heat from the fuel. These actions result in a reduction of the cooling

requirements after a postulated loss-of-coolant accident. If the malfunction(s) are not corrected after the specified time in a hot shutdown condition, the reactor will be placed in the cold shutdown condition, utilizing normal shutdown and cooldown procedures. In the cold shutdown condition there is no possibility of an accident that would release fission products or damage the fuel elements.

When the inoperable component is part of the residual heat removal (RHR) system the average reactor coolant system temperature (T_{avg}) will be maintained below 350°F through an alternate heat removal method. The various alternate heat removal methods include the redundant RHR train and the steam generators.

Assuming the reactor has been operating at full rated power for at least 100 days, the magnitude of the decay heat decreases as follows after initiating hot shutdown.

Time After Shutdown	Decay Heat, % of Rated Power	
1 min.	4.5	55
30 min.	2.0	
1 hour	1.62	
8 hours	0.96	
48 hours	0.62	

Thus the requirement for core cooling in case of a postulated loss-of-coolant accident while in the hot shutdown condition is significantly reduced below the requirements for a postulated loss-of-coolant accident during power operation. Putting the reactor in the hot shutdown condition significantly reduces the potential consequences of a loss-of-coolant accident, and also allows more free access to some of the engineered safety features in order to effect repairs. Failure to complete repairs after placing the reactor in the hot shutdown condition may be indicative of need for major maintenance, and in such cases the reactor should therefore be placed in the cold shutdown condition.

The accumulator and refueling water storage tank conditions specified are consistent with those assumed in the LOCA analysis.(2)

The containment cooling function is provided by two independent systems: fan-coil units and containment sprays. During normal operation, usually three of the four fan-coil units are required to remove heat lost from equipment and piping within the containment.(3) In the event of the Design Basis Accident, any one of the following combinations will provide sufficient cooling to reduce containment pressure: four fan-coil units, two containment spray pumps, or two fan-coil units plus one containment spray pump.(4)

In addition to heat removal, the containment spray system is also effective in scrubbing fission products from the containment atmosphere. However, no credit is taken for this scrubbing action in the analysis of the Design Basis Accident. 55

Caustic (NaOH) is added to the spray solution for ph adjustment to preclude chloride stress corrosion cracking of stainless steel components in the postaccident environment. Test data has shown that no significant stress corrosion cracking will occur provided the ph is adjusted within two (2) days following the Design Basis Accident.(4)(7) A minimum of 300 gallons of not less than 30% by weight of NaOH solution is sufficient to adjust the ph of the spray solution adequately. The additive will still be considered available whether it is contained in the spray additive tank or the containment spray system piping due to an inadvertent opening of the spray additive valves (CI-1001A and CI-1001B).

One component cooling water pump together with one component cooling heat exchanger can accommodate the heat removal load either following a loss-of-coolant accident, or during normal plant shutdown. If, during the post-accident phase, the component cooling water supply were lost, core and containment cooling could be maintained until repairs were effected.[5]

A total of four service water pumps are installed, and a minimum of two are required to operate during the postulated loss-of-coolant accident.[6] The service water valves in the redundant safeguards headers have to be operable in order for the components that they supply to be considered operable.

The various trains of equipment referred to in the specifications are separated by their power supplies (i.e.: SI Pump 1A, RHR Pump 1A, Valves SI-2A and SI-4A, etc.). Shared piping and valves are considered to be common to both trains of the systems (i.e.: SI-3, etc.).

The closure of the hand operated valve for a brief period of time during the surveillance testing of the automatic valves in the safety injection system will prevent dilution of the concentrated boric acid or loss of concentrated boric acid to the refueling water storage tank. 55

References

(1) FSAR Section 3.2

(2) FSAR Section 14.3

(3) FSAR Section 6.3

(4) FSAR Section 6.4

(5) FSAR Section 9.3

(6) FSAR Section 9.6

(7) Westinghouse Chemistry Manual SIP 5-1, Rev. 2, dated 3-77, Section 4.

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3.4 STEAM AND POWER CONVERSION SYSTEM

Applicability

Applies to the operating status of the Steam and Power Conversion System.

Objective

To assure minimum conditions of steam-relieving capacity and auxiliary feedwater supply necessary to assure the capability of removing decay heat from the reactor, and to limit the concentrations of water activity that might be released by steam relief to the atmosphere.

Specification

a. The reactor shall not be heated above 350°F unless the following conditions are satisfied.

   1. TWO steam generators are operable.
      A. System piping and valves directly associated with providing auxiliary feedwater flow to the steam generators are operable. 55
      B. Five main steam safety valves per operable steam generator are available. Note: See P.A. No. 54

   2. Three auxiliary feedwater pumps are operable.

   3. A minimum of 30,000 gallons of water is available in the condensate storage tanks and the Service Water System is capable of delivering an unlimited supply from Lake Michigan. 55

   4. The iodine-131 activity on the secondary side of the steam generators does not exceed 1.0 μCi/cc. 55

b. If, when the reactor is above 350°F, any of the conditions of Specification 3.4.a cannot be met within 48 hours, and except for the conditions of 3.4.c, the reactor shall be shut down and cooled below 350°F using normal operating procedures. 55

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Remarks Cont'd from 20166

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Basis

Two steam generators are required to be operable when the average reactor coolant temperature is above 350°F to ensure that sufficient heat removal capability exists for power operation and decay heat removal. Although one steam generator would provide sufficient decay heat removal capability, two steam generators are required in order to provide the necessary redundancy to meet the single failure criterion. An operable steam generator is defined by TS 3.4.a.1. 55

The ten main steam safety valves (five per steam generator) have a total combined rated capability of 7,765,000 lbs/hr. The maximum full-power steam flow is 7,449,000 lbs/hr; therefore, the main steam safety valves will be able to relieve the total maximum steam flow if necessary. The requirement that five main steam safety valves per operable steam generator are available will assure sufficient steam relief capability. 55

Note: See P.A. No. 54

In the unlikely event of complete loss of electrical power to the plant, continued capability of decay heat removal would be assured by the availability of either the steam-driven auxiliary feedwater pump or one of the two motor-driven auxiliary feedwater pumps, and by steam discharge to the atmosphere through the main steam safety valves. Each motor-driven pump is normally aligned with one steam generator; the discharge of the turbine-driven pump, which starts automatically, is manually valved as necessary to backup either or both motor-driven pumps, or to replace the standby function of either motor-driven pump when it is out of service. Any single auxiliary feedwater pump can supply sufficient feedwater for removal of decay heat from the reactor.

The specified minimum water supply in the condensate storage tanks is sufficient for ninety minutes of hot shutdown plus a suitable margin to prevent loss of net positive suction head prior to switching suction to the service water system. Unlimited replenishment of the condensate storage supply is available from Lake Michigan through the Service Water System.

The secondary coolant activity is based on a postulated release of the contents of one steam generator to the atmosphere. This could happen, for example, as a result of a steam break accident combined with failure of a steam line isolation valve. The limiting dose for this case results from iodine-131 because of its low MPC, and because its long half-life relative to the other iodine isotopes results in its greater concentration in the liquid. The accident is assumed to occur at zero load when the steam generators contain maximum water. With allowance for plate-out retention in water droplets, one-tenth of the contained iodine is assumed released from the plant. The maximum inhalation dose at the site boundary is then as follows: 55

$$\text{Dose (rem)} = \frac{C \cdot V}{10} \cdot B(t) \cdot \chi/Q \cdot DCF$$

where: C = secondary coolant activity, 1.0 μCi/cc

V = water volume in one steam generator, 3510 ft^3 = 99 m^3

B(t) = breathing rate, 3.47×10^{-4} m^3/sec

$\chi/Q = 2.9 \times 10^{-4}$ sec/m^3

DCF = 1.48×10^6 rem/Ci iodine-131 inhaled

The resultant dose is less than 1.5 rem.

References:

FSAR Section 10

FSAR Section 14.1

b. During power operation or recovery from inadvertent trip, any of the following conditions of inoperability may exist during the time intervals specified. If operability is not restored within the time specified, then within 1 hour action shall be initiated to achieve hot standby within the next 6 hours. 55

1. Either Auxiliary Transformer may be out of service for a period not exceeding 7 days provided the other Auxiliary Transformer and both diesel generators are operable.
2. ONE diesel generator may be inoperable for a period not exceeding 7 days provided the other diesel generator is tested daily to ensure operability and the engineered safety features associated with this diesel generator are operable.
3. ONE battery may be inoperable for a period not exceeding 24 hours provided the other battery and two battery chargers remain operable with one charger carrying the d-c supply system.
4. The North Appleton Line may be out of service for a period not to exceed 7 days provided at least two other transmission lines serving the substation are in service. 55
5. Three off site power supply transmission lines may be out of service for a period of 7 days provided reactor power is reduced to 50% of rated power and the two diesel generators shall be tested daily for operability.
6. One 4160V or 480V Engineered Safety Features bus may be out of service for 24 hours provided the redundant bus and its loads remain operable.

Basis

The intent of this specification is to provide assurance that at least one external source and one standby source of electrical power is always available to accomplish safe shutdown and containment isolation and to operate required engineered safety features equipment following an accident.

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3.8 REFUELING

Applicability

Applies to operating limitations during refueling operations.

Objective

To ensure that no incident occurs during refueling operations that would affect public health and safety.

Specification

a. During refueling operations:

1. The equipment hatch and at least one door in each personnel air lock shall be closed. In addition, each line that penetrates containment and which provides a direct air path from containment atmosphere to the outside atmosphere shall have a closed isolation valve or an operable automatic isolation valve. 55

2. Radiation levels in fuel handling areas, the containment and the spent fuel storage pool shall be monitored continuously.

3. The reactor will be subcritical for 100 hours prior to movement of its irradiated fuel assemblies. Core subcritical neutron flux shall be continuously monitored by at least TWO neutron monitors, each with continuous visual indication in the control room and ONE with audible indication in the containment whenever core geometry is being changed. When core geometry is not being changed at least ONE neutron flux monitor shall be in service.

4. At least ONE residual heat removal pump shall be operable.

5. When there is fuel in the reactor, a minimum boron concentration of 2100 ppm shall be maintained in the Reactor Coolant System during reactor vessel head removal or while loading and unloading fuel from the reactor and verified by sampling daily.

6. Direct communication between the control room and the operating floor of the containment shall be available whenever changes in core geometry are taking place.

7. Heavy loads, greater than the weight of a fuel assembly, will not be transported over or placed in either spent fuel pool when spent fuel is stored in that pool. Placement of additional fuel storage racks is permitted, however, these racks may not traverse directly above spent fuel stored in the pools.

8. The containment ventilation and purge system, including the capability to initiate automatic containment ventilation isolation, shall be tested and verified to be operable immediately prior to and daily during refueling operations. 55

9. A. The spent fuel pool sweep system, including the charcoal adsorbers, shall be operating during fuel handling and when any load is carried over the pool if irradiated fuel in the pool has decayed less than 30 days. If the spent fuel pool sweep system, including the charcoal adsorber, is not operating when required, fuel movement shall not be started (any fuel assembly movement in progress may be completed).

B. Performance Requirements

(1) The results of the in-place cold DOP and halogenated hydrocarbon tests at design flows on HEPA filters and charcoal adsorber banks shall show $\geq$ 99% DOP removal and $\geq$ 99% halogenated hydrocarbon removal.

(2) The results of laboratory carbon sample analysis from spent fuel pool sweep system carbon shall show $\geq$ 90% radioactive methyl iodide removal at conditions of $66^{\circ}C$ and 95% RH.

(3) Fans shall operate within $\pm$ 10% of design flow when tested.

10. The minimum water level above the vessel flange shall be maintained at 23 feet. 55

11. A dead-load test shall be successfully performed on both the fuel handling and manipulator cranes before fuel movement begins. The load assumed by the cranes for this test must be equal to or greater than the maximum load to be assumed by the cranes during the refueling operation. A thorough visual inspection of the cranes shall be made after the dead-load test and prior to fuel handling.

TABLE TS 3.5-3 (Page 1 of 2)

EMERGENCY COOLING

		1	2	3	4	5	6
NO.	FUNCTIONAL UNIT	NO. OF CHANNELS	NO. OF CHANNELS TO TRIP	MINIMUM OPERABLE CHANNELS	MINIMUM DEGREE OF REDUNDANCY	PERMISSIBLE BYPASS CONDITIONS	OPERATOR ACTION IF CONDITIONS OF COLUMN 3 or 4 CANNOT BE MET
1	SAFETY INJECTION						
	a. Manual	2	1	1	-		Hot Shutdown***
	b. High Containment Pressure	3	2	2	-		Hot Shutdown***
	c. Low Steam Pressure/Line	3	2	2	-		Hot Shutdown***
	d. Pressurizer Low Pressure	3	2	2	-	Primary pressure < 2000 psig	Hot Shutdown***
2	SELECTED BORIC ACID STORAGE TANK LEVEL	4	-	4	-	-	One channel may be inoperable for a period of 72 hrs. otherwise take action in accordance with TS 3.3.b.2.A.
3	CONTAINMENT SPRAY						
	a. Manual	2	2	2	**		Hot Shutdown***
	b. Hi-Hi Containment Pressure (Containment Spray)	3 sets of 2	1 of 2 in each set	1 per set	1/set		Hot Shutdown***

(Deleted)

TABLE TS 3.5-3 (Page 2 of 2)

EMERGENCY COOLING

NO.	FUNCTIONAL UNIT	1 NO. OF CHANNELS	2 NO. OF CHANNELS TO TRIP	3 MINIMUM OPERABLE CHANNELS	4 MINIMUM DEGREE OF REDUNDANCY	5 PERMISSIBLE BYPASS CONDITIONS	6 OPERATOR ACTION IF CONDITIONS OF COLUMN 3 OR 4 CANNOT BE MET	
4	MOTOR DRIVEN AUXILIARY FEEDWATER PUMPS							55
	a. Either Steam Generator Lo-Lo Level	3/loop	2/loop	2/loop	-		Maintain hot shutdown	
	b. Loss of Main Feed-water ****	1	1	1			Maintain hot shutdown	
	c. Safety Injection	(Refer to Item 1 of this Table)						
	d. 4 KV Buses 1-5 and 1-6 under voltage	2/Bus*	1/Bus	1/Bus*****			Maintain hot shutdown or operate diesel generators.	
5	TURBINE DRIVEN AUXILIARY FEEDWATER PUMPS							55
	a. Both Steam Generator Lo-Lo Level	3/loop	2/loop	2/loop	-		Maintain hot shutdown	
	b. 4 KV Buses 1-1 and 1-2 under voltage	(Refer to Item 13 of Table TS 3.5-2)						

* Each channel consists of one instantenous and one-time relay connected in series.

** Must actuate 2 switches

*** If minimum conditions are not met within 24 hours, steps shall be taken to place the plant in cold shutdown condition.

**** Tripping of both Main Feedwater Pump Breakers starts both motor driven auxiliary feedwater pumps.

***** When one component of a channel is taken out of service, that component shall be in the tripped condition.

to this value.

c. Residual Heat Removal System

1. Those portions of the Residual Heat Removal System external to the isolation valves at the containment shall be hydrostatically tested at 350 psig at each major refueling outage, or they shall be tested during their use in normal operation at least once between successive major refueling outages.

2. The total leakage from either training shall not exceed two gallons per hour. Visible leakage that cannot be stopped at test conditions shall be suitably measured to demonstrate compliance with this Specification. Note: See PA No. 54

3. Any repairs necessary to meet the specified leak rate shall be accomplished within seven days of resumption of power operation.

d. Shield Building Ventilation System

1. At least once per operating cycle or once every 18 months whichever occurs first, the following conditions shall be demonstrated:

   A. Pressure drop across the combined HEPA filters and charcoal adsorber banks is less than 10 inches of water and the pressure drop across any HEPA filter bank is less than 4 inches of water at the system design flow rate (±10%). 55

   B. Automatic initiation of each train of the system.

   C. Operability of heaters at rating and the absence of defects by visual inspection.

2. A. The in-place DOP test for HEPA filters shall be performed: (1) at least once per 18 months, and (2) after each complete or partial replacement of a HEPA filter bank or after any maintenance on the system that could affect the HEPA bank bypass leakage. 55

   B. The laboratory tests for activated carbon in the charcoal filters shall be performed: (1) at least once per 18 months for filters in a standby status or after 720 hours of filter operation, and 55

(2) following painting, fire or chemical release in any ventilation zone communicating with the system. 55

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C. Halogenated hydrocarbon testing shall be performed after each complete or partial replacement of a charcoal adsorber bank or after any maintenance on the system that could affect the charcoal adsorber bank bypass leakage. 55

D. Each train shall be operated with the heaters on at least 10 hours every month. 55

3. Perform an air distribution test on the HEPA filter bank after any maintenance or testing that could affect the air distribution within the systems. The test shall be performed at design flow rate (± 10%). The results of the test shall show the air distribution is uniform within ±20%.*

4. Each train shall be determined to be operable at the time of its periodic test if it produces measurable indicated vacuum in the annulus within two minutes after initiation of a simulated safety injection signal and obtains equilibrium discharge conditions that demonstrate the Shield Building leakage is within acceptable limits.

e. Auxiliary Building Special Ventilation System

1. Periodic tests of the Auxiliary Building Special Ventilation System, including the door interlocks, shall be performed in accordance with Specifications 4.4.d.1 through 4.4.d.3 except for Specification 4.4.d.2.D. 55

2. Each train of Auxiliary Building Special Ventilation System shall be operated with the heaters on at least 15 minutes every month.

* See Note p.p. TS 4.12-2

3. Each train shall be determined to be operable at the time of its periodic test if it starts with coincident isolation of the normal ventilation ducts and produces a measurable vacuum throughout the Special Ventilation Zone with respect to the outside atmosphere. 55

f. Containment Vacuum Breaker System

The power operated valve in each vent line shall be tested during each refueling outage to demonstrate that a simulated containment vacuum of 0.5 psi will open the valve and a simulated accident signal will close the valve. The check and butterfly valves will be leak tested in accordance with specification 4.4.b during each refueling.

Basis

The Containment System consists of a steel Reactor Containment Vessel within a concrete Shield Building and a Shield Building Ventilation System which, in the event of a loss-of-coolant accident, will provide a vacuum in the Shield Building annulus and will cause all leakage from the Reactor Containment Vessel to be mixed in the annulus volume and recirculated through a filter system before its deferred release to the environment through the exhaust fan that maintains vacuum in the annulus. Potential leakage from the FHRS or from the majority of lines that span the Shield Building annulus is collected in a special ventilation zone of the Auxiliary Building and filtered before its release.

Note: See P.A. 52B

The free-standing Reactor Containment Vessel is designed to accomodate the maximum internal pressure that would result from the Design Basis Accident.[1] For initial conditions typical of normal operation, 120°F and 15 psia, an instantaneous double-ended break with minimum safety features results in a peak pressure of 42.2 psig at 268°F.

4.12 SPENT FUEL POOL SWEEP SYSTEM

Applicability

Applies to testing and surveillance requirements for the spent fuel pool sweep system in Specifications 3.8.a.9.

Objective

To verify the performance capability of the spent fuel pool sweep system.

Specification

a. At least once per operating cycle or once every 18 months, whichever occurs first, the following conditions shall be demonstrated:

   1. Pressure drop across the combined HEPA filters and charcoal adsorber banks is less than 10 inches of water and the pressure drop across any HEPA bank is less than 4 inches of water at the system design flow rate ($\pm$10%).

   2. Automatic initiation of each train of the system.

b. 1. The in-place DOP test for HEPA filters should be performed: (1) at least once per 18 months, and (2) after each complete or partial replacement of a HEPA filter bank or after any maintenance on the system that could affect the HEPA bank bypass leakage. 55

   2. The laboratory tests for activated carbon in the charcoal filters shall be performed: (1) at least once per 18 months for filters in a standby status or after 720 hours of filter operation, and (2) following painting, fire or chemical release in any ventilation zone communicating with the system. 55

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3. Halogenated hydrocarbon testing shall be performed after each complete or partial replacement of a charcoal adsorber bank or after any maintenance on the system that could affect the charcoal adsorber bank bypass leakage. 55

c. Perform an air distribution test on the HEPA filter bank after any maintenance or testing that could affect the air distribution within the system. The test shall be performed at design flow rate (±10%). The results of the test shall show the air distribution is uniform within ±20%.*

* This note applies here and also to 4.4.d.3 on p.p. TS 4.4-6.

In WPS letter of August 25, 1976 to Mr. Al Schwencer (NRC) from Mr. E. W. James, we relayed test results for flow distribution for tests performed in accordance with ANSI N510-1975. This standard refers to flow distribution tests performed upstream of filter assemblies. Since the test results upstream of filters were inconclusive due to high degree of turbulence, tests for flow distribution were performed downstream of filter assemblies with acceptable results (within 20%). The safety evaluation attached to Amendment 12 references our letter of August 25, 1976 and acknowledges acceptance of the test results.

Basis

Pressure drop across the combined HEPA filters and charcoal adsorbers of less than 10 inches of water and 4 inches across any HEPA filter bank at the system design flow rate (±10%) will indicate that the filters and adsorbers are not clogged by excessive amounts of foreign matter. A test frequency of once per operating cycle establishes system performance capability. This pressure drop is approximately 6 inches of water when filters are clean.

The frequency of tests and sample analysis are necessary to show that the HEPA filters and charcoal adsorbers can perform as evaluated. Replacement adsorbent should be qualified according to the guidelines of Regulatory Guide 1.52 dated June 1973. The charcoal adsorber efficiency test procedures should allow for the removal of one adsorber tray, emptying of one bed from the tray, mixing the adsorbent thoroughly, and obtaining at least two samples. Each sample should be at least two inches in diameter and a length equal to the thickness of the bed. The use of multi-sample assemblies for test samples in an acceptable alternate to mixing one bed for a sample. If the iodine removal efficiency test results are unacceptable, all adsorbent in the system should be replaced. Any HEPA filters found defective should be replaced with filters qualified pursuant to Regulatory Position C.3.d of Regulatory Guide 1.52 (Rev. 1) dated June 1976.

If painting, fire, or chemical release occurs such that the charcoal adsorbers become contaminated from the fumes, chemicals, or foreign materials, the same tests and sample analysis should be performed as required for operational use. 55

Degradation of the HEPA filters due to painting, fire or chemical release in a communicating ventilation zone would be detected by an increased pressure drop across the filters. Should the filters become contaminated, engineering judgment would be used to determine if further leakage and/or efficiency testing was required. 55

Demonstration of the automatic initiation capability is necessary to assure system performance capability.

the adsorbent thoroughly, and obtaining at least two samples. Each sample should be at least two inches in diameter and a length equal to the thickness of the bed. The use of multi-sample assemblies for test samples is an acceptable alternate to mixing one bed for a sample. If the iodine removal efficiency test results are unacceptable, all adsorbent in the system should be replaced. Any HEPA filters found defective should be replaced with filters qualified pursuant to Regulatory Position C.3.d of Regulatory Guide 1.52 (Rev. 1) dated June 1976.

Operation of the systems every month will demonstrate operability of the filters and adsorber system. Operation of the Shield Building Ventilation System will result in a discharge to the environment. This discharge is made after at
least 2 samples of the building atmosphere have been analyzed to determine the 55
concentration of activity in the atmosphere.

If painting, fire or chemical release occurs such that the charcoal adsorbers
become contaminated from the fumes, chemicals, or foreign materials, the 55
same tests and sample analysis should be performed as required for operational use.

Degradation of the HEPA filters due to painting, fire or chemical release in a communicating ventilation zone would be detected by an increased pressure
drop across the filters. Should the filters become contaminated, engineering 55
judgment would be used to determine if further leakage and/or efficiency testing was required.

Demonstration of the automatic initiation capability is necessary to assure system performance capability.

Periodic checking of the inlet heaters and associated controls for each train will provide assurance that the system has the capability of reducing inlet air humidity so that charcoal adsorber efficiency is enhanced.

In-place testing procedures will be established utilizing applicable sections on ANSI N 510 - 1975 standard as a procedural guideline only.

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References:

(1) FSAR Section 5

(2) FSAR Section 14.3.3

(3) Proposed 10 CFR Part 50, Appendix J (Revised)

(4) FSAR Section 5.5

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TABLE TS 4.1-2

MINIMUM FREQUENCIES FOR SAMPLING TESTS

	Sampling Tests	Test	Frequency	Maximum Time Between Tests (Days)	
1.	Reactor Coolant Samples	Gross Beta-Gamma activity (excluding tritium)	5/week	3	
		Tritium activity	Monthly	37	Note: See PA No. 54
		*Chemistry (Cl, F O_2)	3/week	4	
2.	Reactor Coolant Boron(1)	*Boron concentration	2/week	5	55
3.	Refueling Water Storage(2) Tank Water Sample	Boron concentration	Monthly *****	37	
4.	Boric Acid Tanks	Boron concentration	Weekly	8	
5.	Accumulator	Boron concentration	Monthly	37	
6.	Spent Fuel Pool	Boron concentration	Monthly **	37	
7.	Secondary Coolant	pH	5/week	3	
		Ammonia	5/week	3	
		Sodium	5/week	3	
		Gross Beta-Gamma activity	Weekly	8	
		Iodine concentration	Weekly when gross Beta-Gamma activity $\geq 1.0\ \mu Ci/cc$	8	
8.	Waste Disposal System Liquid Effluent Monitor	Gross Beta-Gamma activity	Prior to each batch release	N.A.	
9.	Circulating Water Monitor	Radioactivity analysis	Continuous ***	N.A.	Note: See PA No. 54
10.	Auxiliary Building Vent Monitor	Gross Beta-Gamma activity	Continuous ****	N.A.	
11.	Containment Vessel Vent Air Particulate Monitor	I-131 and particulate activity	Continuous ***	N.A.	
12.	Containment Vessel Vent Radiogas Monitor	I-131	Continuous ***	N.A.	

Notes

* See Spec 4.1.D
** Sample will be taken monthly when fuel is in the pool.
*** Continuous monitoring takes place when reactor is in operation.
**** Operable during refueling also.
***** And after adjusting tank contents.

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TABLE TS 4.1-2 (Cont.)

MINIMUM FREQUENCIES FOR SAMPLING TESTS

(1) A reactor coolant boron concentration sample does not have to be taken when the core is completely unloaded.

(2) A refueling water storage tank (RWST) boron concentration sample does not have to be taken when the RWST is empty during refueling outages. 55

RESPONSIBILITIES

6.5.1.6 The PORC shall be responsible for:

a. Review of operating, maintenance and other procedures including emergency operating procedures, or changes to those procedures as determined by the Plant Manager to affect nuclear safety.

b. Review of all proposed tests and experiments that affect nuclear safety.

c. Review of all proposed changes to the Technical Specifications.

d. Review of all proposed changes or modifications to plant systems or equipment that affect nuclear safety.

e. Review of all proposed changes to the Security Plan and Emergency Plan and their respective implementing procedures. 55

f. Review all reports covering the investigation of all violations of the Technical Specifications and tbe recommendations to prevent recurrence. 55

g. Review plant operations to detect potential safety hazards. 55

h. Performance of special reviews and investigations and prepare reports thereon as requested by the Chairman of the Nuclear Safety Review and Audit Committee. 55

Deleted 55

AUTHORITY

6.5.1.7 The PORC shall:

a. Recommend to the Plant Manager approval or disapproval of items considered under 6.5.1.6a through e above. 55

b. Make determinations with regard to whether or not each item considered under 6.5.1.6 above constitutes an unreviewed safety question. 55

c. Provide immediate notification in the form of draft meeting minutes to the Vice-President-Nuclear Power and the Chairman-Nuclear Safety Review and Audit Committee of disagreement between the PORC and the Plant Manager. The Plant Manager shall have responsibility for resolution of such disagreements. 55

RECORDS

6.5.1.8 Minutes shall be kept of all meetings of the PORC and copies shall be sent to the Vice-President-Nuclear Power and the Chairman-Nuclear Safety Review and Audit Committee. 55

6.5.2 CORPORATE NUCLEAR ENGINEERING STAFF (CNES)

FUNCTION

6.5.2.1 The CNES shall function to provide engineering,

(c) Disposition including date and destination if shipped offsite.

c. Deleted 55

6.10 RECORD RETENTION

6.10.1 The following records shall be retained for at least five years:

a. Records and logs of plant operation, including power levels and periods of operation at each power level.

b. Records and logs of principal maintenance activities, inspections, repair and replacement of principal items of equipment pertaining to nuclear safety.

c. Reports of all events which are required by regulations or Technical Specifications to be reported to the NRC in writing within 24 hours.

d. Records of periodic checks, inspections, and calibrations required by these Technical Specifications.

e. Records of nuclear safety related tests or experiments.

f. Records of radioactive shipments.

g. Records of changes to operating procedures.

h. Records of sealed source leak tests and results.

i. Records of annual physical inventory of all source material of record.

j. Records of Quality Assurance activities required by the Operational Quality Assurance Program (OQAP) except where it is determined that the records should be maintained for a longer period of time. 55