Current Technical Specification (CTS) Markup Pages

5.5.2
5.5.3
5.5.10

Not addressed by TSIP.

and safeguards contingency plans, including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822) and to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The plan, which contains Safeguards Information protected under 10 CFR 73.21, is entitled: "Arkansas Nuclear One Industrial Security Plan," with revisions submitted through August 2, 1995. The Industrial Security Plan also includes the requirements for guard training and qualification in Appendix A and the safeguards contingency events in Chapter 7. Changes made in accordance with 10 CFR 73.55 shall be implemented in accordance with the schedule set forth therein.

5.5.2

(5) Systems Integrity — Deleted

EOI shall implement a program to reduce leakage from systems outside containment that would or could contain highly radioactive fluids during a serious transient or accident to as low as practical levels. This program shall include the following:

1. Provisions establishing preventive maintenance and periodic visual inspection requirements, and

2. Integrated leak test requirements for each system at a frequency not to exceed refueling cycle intervals.

A20

<All ANO-4/26>

5.5.3

(6) Iodine Monitoring — Deleted

LA4

EOI shall implement a program which will ensure the capability to accurately determine the airborne iodine concentration in vital areas under accident conditions. This program shall include the following:

1. Training of personnel,

2. Procedures for monitoring, and

3. Provisions for maintenance of sampling and analysis equipment.

A20

5.5.10

(7) Secondary Water Chemistry Monitoring — Deleted

This program provides controls for monitoring

A secondary water chemistry monitoring program shall be implemented to minimize steam generator tube degradation. This program shall include:

inhibit

1. Identification of a sampling schedule for the critical parameters and control points for these parameters;

variables

A1

A20

Insert → Amendment No. A1

5.5.10

5.5.10

2. Identification of the procedures used to measure the values of the critical ~~parameters~~ variables; A1

3. Identification of process sampling points;

4. Procedures for the recording and management of data;

5. Procedures defining corrective actions for off-control point chemistry conditions; and

6. A procedure identifying the authority responsible for the interpretation of the data and the sequence and timing of administrative events required to initiate a corrective action. A20

<All ANO-426>

Not addressed by TSIP.

(8) Fire Protection

EOI shall implement and maintain in effect all provisions of the approved Fire Protection Program as described in Appendix 9A to the SAR and as approved in the Safety Evaluation dated March 31, 1992, subject to the following provision:

1. AP&L [1] may proceed with and is required to complete the modifications identified in Paragraphs 3.1 through 3.19 of the NRC's Fire Protection Safety Evaluation on the facility dated August 22, 1978 and supplements thereto. These modifications shall be completed as specified in Table 3.1 of the Safety Evaluation Report or supplements thereto. In addition, the licensee may proceed with and is required to complete the modifications identified in Supplement 1 to the Fire Protection Safety Evaluation Report, and any future supplements. These modifications shall be completed by the dates identified in the supplement.

2. The licensee may make changes to the approved Fire Protection Program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

Not addressed by TSIP.

[1] The Original licensee authorized to possess, use, and operate the facility was AP&L. Consequently, certain historical references to AP&L remain in the license conditions.

3.6.1
3.6.2
3.6.3

1.7 REACTOR BUILDING

Reactor building integrity exists when the following conditions are satisfied: A1

3.6.1 LCO
3.6.2 LCO

a. The equipment hatch is closed and sealed and both doors of the personnel lock and emergency lock are closed and sealed, or b. below. OPERABLE A18 LA1 Bases OPERABLE A18

ANO-360 3.6.3-2 3.6.3-11

3.6.2 LCO

b. At least one door on each of the personnel lock and emergency lock is closed and sealed during personnel access or repair. are OPERABLE LA1 Bases A18

3.6.3 LCO
3.6.3 Act. Note 1

c. All non-automatic reactor building isolation valves and blind flanges are closed as required. manual valves OPERABLE A19 LA1 L23 Bases A22

3.6.1-1

3.6.1 + 3.6.3 LCO

d. All automatic reactor building isolation valves are operable or deactivated in the closed position. A18

SR 3.6.1.1

e. The reactor building leakage determined at the last testing interval satisfies Specification 4.4.1. is in accordance with the RBLRTP of LA1 Bases A20 LA1 Bases

<Later> (1.0)

1.8 FIRE SUPPRESSION WATER SYSTEM

The fire suppression water system consists of: water sources, pumps, and distribution piping with associated sectionalizing isolation valves. Such valves include the hose standpipe shutoff valves and the first valve ahead of the water flow alarm device or each sprinkler system.

1.9 STAGGERED TEST BASIS

A staggered test basis shall consist of:

a. A test schedule for n systems, subsystems, trains or designated components obtained by dividing the specified test interval into n equal subintervals.

b. The testing of one system, subsystem, train or designated component at the beginning of each subinterval.

Later

3.4.4 3.4.7
3.4.5 3.4.8
3.4.6

<Add 3.4.5 LCO Note> L12
<Add SR 3.4.4.1> M3

No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1

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 operations.

3.1.1 Operational Components

Specification

A1

3.1.1.1 Reactor Coolant Pumps <Add 3.4.4 RA B.1.> A17

3.4.4 LCO & Appl.
3.4.4 RA A.1

A. Pump combinations permissible for given power levels shall be as shown in Table 2.3-1. Operation with one Reactor Coolant Pump operating in each loop is limited to 24 hours ~~with the reactor critical.~~ (MODES 1 & 2) M1

B. ~~The boron concentration in the reactor coolant system shall not be reduced unless at least one reactor coolant pump or one decay heat removal pump is circulating reactor coolant.~~ L11
~~With no reactor coolant pumps or decay heat removal pumps running, immediately suspend all operations involving a reduction of boron concentration in the reactor coolant system.~~ that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1. A3 L11

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3.4.5 RA C.1
3.4.6 RA B.1
3.4.6/7/8 LCO Note 1a
3.4.7 RA B.1
3.4.8 RA B.1
& <LATER> (3.9)

3.1.1.2 Steam Generator LA1

3.4.4 LCO & Appl.
3.4.5 LCO & Appl.

A. ~~Two steam generators shall be operable whenever the reactor coolant average temperature is above 280°F.~~ in MODES 1, 2 & 3 A1 Bases

<LATER> (3.4B)

3.1.1.3 Pressurizer Safety Valves LATER

A. Both pressurizer code safety valves shall be operable when the reactor is critical. With one pressurizer code safety valve inoperable, either restore the valve to operable status within 15 minutes or be in HOT SHUTDOWN within 12 hours.

B. When the reactor is subcritical, at least one pressurizer code safety valve shall be operable if all reactor coolant system openings are closed, except for hydrostatic tests in accordance with ASME Boiler and Pressure Vessel Code, Section III. The provisions of Specification 3.0.3 are not applicable.

ANO-423

3.1.1.4 Reactor Internals Vent Valves

The structural integrity and operability of the reactor internals vent valves shall be maintained at a level consistent with the acceptance criteria in Specification 4.1. The provisions of Specification 3.0.3 are not applicable. R TRM

3.1.1.5 Reactor Coolant Loops

3.4.4 LCO & Appl.
3.4.5 LCO & Appl.

A. With the reactor coolant average temperature above 280°F, (MODE 1, 2, 3) the reactor coolant loops listed below shall be operable: A4

ANO-2 TS

3.1.1.7 Reactor Coolant System Vents

At least one reactor coolant system vent path consisting of at least two valves in series shall be operable at each of the following locations whenever the Reactor Coolant average temperature is above 280F.

1. Reactor vessel head
2. Pressurizer steam space
3. Reactor coolant system Hot Leg high point (2 locations)

A. With one of the above vent paths inoperable, startup and/or power operation may continue provided the inoperable vent path is maintained closed; restore the inoperable vent path to operable status within 30 days, or be in hot standby within 6 hours and in cold shutdown within the following 30 hours.

B. With two or more of the above vent paths inoperable, maintain the inoperable vent paths closed and restore at least two vent paths to operable status within 72 hours or be in hot standby within 6 hours and in cold shutdown within the following 30 hours.

R TRM

< Add 3.4.3 Appl. > A15

3.1.2 Pressurization, Heatup, and Cooldown Limitations

Specification

3.4.3 LCO

3.1.2.1 Hydro Tests

SR 3.4.3.1
SR 3.4.3.2
SR 3.4.3.3 & Note

For thermal steady state system hydro tests, the system may be pressurized to the limits set forth in Specification 2.2 when there are fuel assemblies in the core, under the provisions of 3.1.2.3, and to ASME Code limits when no fuel assemblies are present provide the reactor coolant system limits are to the right of and below the limit line in Figure 3.1.2-1. The provisions of Specifications 3.0.3 are not applicable. M7 A6

3.1.2.2 Leak Tests

Leak tests required by Specification 4.3 shall be conducted under the provision of 3.1.2.3. The provisions of Specification 3.0.3 ar not applicable. A11 M2

3.4.3 LCO & Note

3.1.2.3 The reactor coolant pressure and the system heatup and cooldown rates (with the exception of the pressurizer) shall be limited in accordance with Figure 3.1.2-2 and Figure 3.1.2-3, and are as follows:

SR 3.4.3.1 & Note
SR 3.4.3.4 & Note
SR 3.4.3.2 & Note

Heatup:

Allowable combinations of pressure and temperature shall be to the right of and below the limit line in Figure 3.1.2-2. The heatup rates shall not exceed those shown in Figure 3.1.2-2. A16

Cooldown:

Allowable combinations of pressure and temperature for a specific cooldown shall be to the right of and below the limit line in Figure 3.1.2-3. Cooldown rates shall not exceed those shown in Figure 3.1.2-3. M7

3.1.2.4 The secondary side of the steam generator shall not be pressurized above 200 psig if the temperature of the steam generat shell is below 100F. R TRM

3.1.2.5 The pressurizer heatup and cooldown rates shall not exceed 100F/hr. The spray shall not be used if the temperature difference between the pressurizer and the spray fluid is greater than 430F. R TRM

3.1.2.6 With the limits of Specifications 3.1.2.3 or 3.1.2.4 or 3.1.2.5 exceeded, restore the temperature and/or pressure to within the limit within 30 minutes; perform an engineering evaluation to determine the effects of the out-of-limit condition on the fracture toughness properties of the Reactor Coolant System; determine that the Reactor Coolant System remains acceptable for continued operations or be in at least HOT STANDBY within the next 6 hours and reduce the RCS Tave to less than 200F, while maintaining RCS temperature and pressure below the curve, within the following 30 hours. R TRM LA1 Bases M5 MODE 3 M6 Be in MODE 5 A1 A7

3.4.3 RA B.1
3.4.3 RA B.2
3.4.3 RA D.1
3.4.3 RA D.2

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3.1.2.7	Prior to reaching thirty one effective full power years of operation, Figures 3.1.2-1, 3.1.2-2 and 3.1.2-3 shall be updated for the next service period in accordance with 10CFR50, Appendix G. The service period shall be of sufficient duration to permit the scheduled evaluation of a portion of the surveillance data scheduled in accordance with the latest revision of Topical Report BAW-1543(5). The highest predicted adjusted reference temperature of all the beltline region materials shall be used to determine the adjusted reference temperature at the end of the service period. The basis for this prediction shall be submitted for NRC staff review in accordance with Specification 3.1.2.8. The provisions of Specification 3.0.3 are not applicable.	LA1 Bases
3.1.2.8	The updated proposed technical specifications referred to in 3.1.2.7 shall be submitted for NRC review at least 90 days prior to the end of the service period.	LA1 Bases
3.1.2.9	With the exception of ASME Section XI testing and when the core flood tank is depressurized, during a plant cooldown the core flood tank discharge valves shall be closed and the circuit breakers for the motor operators opened before depressurizing the reactor coolant system below 600 psig.	LATER (3.4B) LATER
3.1.2.10	With the exception of ASME Section XI testing, fill and vent of the reactor coolant system, emergency RCS makeup and to allow maintenance of the valves, when the reactor coolant temperature is less than 262°F, the High Pressure Injection motor operated valves shall be closed with their opening control circuits for the motor operators disabled.	
3.1.2.11	The plant shall not be operated in a water solid condition when the RCS pressure boundary is intact except as allowed by Emergency Operating Procedures and during System Hydrotest.	

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<Add 3.4.3 Condition B Note> M5

<Add 3.4.3 Condition D with Note> M5

ANO-423

3.1.5 Chemistry

Applicability

Applies to the limiting conditions of reactor coolant chemistry for continuous operation of the reactor.

Objective

To protect the reactor coolant system from the effects of impurities in the reactor coolant.

Specification

3.1.5.1 The following limits shall not be exceeded for the listed reactor coolant conditions.

Contaminant	Specification	Reactor Coolant Conditions
Oxygen as O_2	0.10 ppm max	above 250°F
Chloride as Cl^-	0.15 ppm max	above cold shutdown conditions
Fluoride as F^-	0.15 ppm max	above cold shutdown conditions

3.1.5.2 During operation above 250°F, if any of the specifications in 3.1.5.1 is exceeded, corrective action shall be initiated within 8 hours. If the concentration limit is not restored within 24 hours after initiation of corrective action, the reactor shall be placed in a cold shutdown condition using normal procedures.

3.1.5.3 During operations between 250°F and cold shutdown conditions, if the chloride or fluoride specification in 3.1.5.1 are exceeded, corrective action shall be initiated within 8 hours to restore the normal operating limits. If the specifications are not restored within 24 hours after initiation of corrective action, the reactor shall be placed in a cold shutdown condition using normal procedures.

3.1.5.4 If the oxygen concentration and either the chloride or fluoride concentration of the primary coolant system exceed 1.0 ppm, the reactor shall be immediately brought to the hot shutdown condition using normal shutdown procedures, and action is to be taken immediately to return the system to within normal operation specifications. If specifications given in 3.1.5.1 have not been reached in 12 hours, the reactor shall be brought to a cold shutdown condition using normal procedures.

R

TRM

Bases

By maintaining the chloride, fluoride, and oxygen concentration in the reactor coolant within the specifications, the integrity of the reactor coolant system is protected against potential stress corrosion attack [1,2].

A2

3.5.1
3.5.2
3.5.3
3.5.4

3.5.2 (for LPI), 3.5.3, 3.5.4 LCO

<LATER (3.6, 3.7)

(I) The engineered safety features valves associated with each of the above systems shall be operable or locked, sealed, or otherwise secured in the ES position. L10 LATER

3.3.2
3.5.2 Appl. (for HPI)

In addition to 3.3.1 above, the following ECCS equipment shall be operable when the reactor coolant system is above 350F and irradiated fuel is in the core: A1 A4

3.5.2 LCO

(A) Two out of three high pressure injection (makeup) pumps shall be maintained operable, powered from independent essential buses, to provide redundant and independent flow paths. A1 LA3 SAR

(B) Engineered safety features valves associated with 3.3.2.a above shall be operable or locked, sealed, or otherwise secured in the ES position. L10

3.3.3
3.5.1 Appl.

In addition to 3.3.1 and 3.3.2 above, the following ECCS equipment shall be operable when the reactor coolant system is above 800 psig: A1

3.5.1 LCO

(A) The two core flooding tanks shall each contain an indicated minimum of 13 ± 0.4 feet (1040 ± 30 ft³) of borated water at 600 ± 25 psig. 40 70 A12

(B) Core flooding tank boron concentration shall not be less than 2270 ppm boron. A8

(C) The electrically operated discharge valves from the core flood tanks shall be open and breakers locked open and tagged. LA3 SAR

(D) One of the two pressure instrument channels and one of the two level instrument channels per core flood tank shall be operable. LA3 TRM

3.3.4 The reactor shall not be made critical unless the following equipment in addition to 3.3.1, 3.3.2, and 3.3.3 above is operable.

<LATER (3.6)

(A) Two reactor building spray pumps and their associated spray nozzle headers and two trains of reactor building emergency cooling. The two reactor building spray pumps shall be powered from operable independent emergency buses and the two reactor building emergency cooling trains shall be powered from operable independent emergency buses. LATER

(B) The sodium hydroxide tank shall contain a volume of ≥9,000 gallons of sodium hydroxide at a concentration >5.0 wt% and <16.5 wt%.

(C) All manual valves in the main discharge lines of the sodium hydroxide tanks shall be locked open.

< Add SR 3.5.1.5 > M5

< Add SR 3.5.1.1, SR 3.5.1.2, & SR 3.5.1.3 > M4

ANO-432

<Add 3.5.1 Condition A> L1

<Add 3.5.1 Condition C - Second entry condition> A3

See page 38-2 & 38-3 <LATER (3.6)>

systems which will not remove more than one train of each system from service. Maintenance shall not be performed on components which woul make the affected system train inoperable for more than 24 consecutiv hours. Prior to initiating maintenance on any component of a train i any system, the redundant component of that system shall be demonstra to be operable within 24 hours prior to the maintenance.

See page 38-2 — Later

3.5.1 Cond. B

3.5.1 Cond. C & <Later> (3.3D, 3.6, 3.7)

AN0-413

3.3.6 If the conditions of Specifications ~~3.3.1, 3.3.2~~, 3.3.3, ~~3.3.4~~ ~~and 3.3.5~~ cannot be met except as noted in 3.3.7 below, reactor shutdown shall be initiated ~~and~~ the reactor shall be in ~~hot shutdown condition~~ within ~~36~~ 6 hours, and, if not corrected, in ~~cold shutdown condition~~ within an ~~additional 12~~ hours. 12 within 1 hour OR MODE 3 with RCS pressure ≤800 psig — MODE 3 — M2 & LATER

3.3.7 Exceptions to 3.3.6 shall be as follows: — L2

<Later> (3.3D)

(A) If the conditions of Specification 3.3.1(F) cannot be met, reactor operation is permissible only during the succeeding seven days unless such components are sooner made operable, provided that during such seven days the other BWST level instrument channel shall be operable. — Later

(B) If the conditions of Specification 3.3.3(D) cannot be met, reactor operation is permissible only during the succeeding seven days unless such components are sooner made operable, provided that during such seven days the other CFT instrument channel (pressure or level) shall be operable. [sic] — M15 — L12

<Later> (3.6)

(C) If the conditions of Specification 3.3.4(A) cannot be met because one train of the required reactor building emergency cooling is inoperable but both reactor building spray systems are operable, restore the inoperable train of cooling to operable status within days or be in at least hot shutdown within the next 6 hours and cold shutdown within the following 30 hours.

(D) If the conditions of Specification 3.3.4(A) cannot be met because two trains of the required reactor building emergency cooling are inoperable but both reactor building spray systems are operable, restore at least one train of cooling to operable status within 7 hours or be in at least hot shutdown within the next 6 hours and cold shutdown within the following 30 hours. Restore both above required cooling trains to operable status within 7 days of initi loss or be in at least hot shutdown within the next 6 hours and i cold shutdown within the following 30 hours. — Later

370,100 gallons of borated water are supplied for emergency core cooling and reactor building spray in the event of a loss-of-coolant accident. This amount fulfills requirements for emergency core cooling. Approximately 16,000 gallons of borated water are required to reach cold shutdown. The original nominal borated water storage tank capacity of 380,000 gallons is based on refueling volume requirements. Heaters maintain the borated water supply at a temperature to prevent crystallization and local freezing of the boric acid. The minimum required BWST boron concentration of 2270 ppm assures that the core will be maintained at least 1 percent Δk/k subcritical at 70°F without any control rods in the core.

Specification 3.3.2 assures that above 350°F two high pressure injection pumps are also available to provide injection water as the energy of the reactor coolant system is increased.

Specification 3.3.3 assures that above 800 psig both core flooding tanks are operational. Since their design pressure is 600 ± 25 psig, they are not brought into the operational state until 800 psig to prevent spurious injection of borated water. Both core flooding tanks are specified as a single core flood tank has insufficient inventory to reflood the core.(1)

Specification 3.3.4 assures that prior to going critical the redundant train of reactor building emergency cooling and spray train are operable.

The spray system utilizes common suction lines with the low pressure injection system. If a single train of equipment is removed from either system, the other train must be assured to be operable in each system.

The volume specified by 3.3.4.B is the safety analysis volume and does not contain allowances for instrument uncertainty. 9,000 gallons corresponds to a level of approximately 26 feet at a temperature of 77°F and a NaOH concentration of 5.0 wt%. No maximum volume is specified as the value used as the maximum volume in the safety analysis bounds the physical size of the NaOH tank. Additional allowances for instrument uncertainties, as determined in Reference 6, are incorporated in the operating procedures associated with the level instrumentation used in the control room.

When the reactor is critical, maintenance is allowed per Specification 3.3.5. Operability of the specified components shall be based on the results of testing as required by Technical Specification 4.5. The maintenance period of up to 24 hours is acceptable if the operability of equipment redundant to that removed from service is demonstrated within 24 hours prior to removal. Exceptions to Specification 3.3.6 permit continued operation for seven days if one of two BWST level instrument channels is operable or if either the pressure or level instrument channel in the CFT instrument channel is operable.

In the event that the need for emergency core cooling should occur, functioning of one train (one high pressure injection pump, one low pressure injection pump, and both core flooding tanks) will protect the core and in the event of a main coolant loop severance, limit the peak clad temperature to less than 2200°F and the metal-water reaction to that representing less than 1 percent of the clad.

The service water system consists of two independent but interconnected, full capacity, 100% redundant systems, to ensure continuous heat removal.(4)

One service water pump is required for normal operation. The normal operating requirements are greater than the emergency requirements following a loss-of-coolant accident.

A2

ANO-386

3.5

370,100 gallons of borated water are supplied for emergency core cooling and reactor building spray in the event of a loss-of-coolant accident. This amount fulfills requirements for emergency core cooling. Approximately 16,000 gallons of borated water are required to reach cold shutdown. The original nominal borated water storage tank capacity of 380,000 gallons is based on refueling volume requirements. Heaters maintain the borated water supply at a temperature to prevent crystallization and local freezing of the boric acid. The minimum required BWST boron concentration of 2270 ppm assures that the core will be maintained at least 1 percent $\Delta k/k$ subcritical at 70°F without any control rods in the core.

Specification 3.3.2 assures that above 350°F two high pressure injection pumps are also available to provide injection water as the energy of the reactor coolant system is increased.

Specification 3.3.3 assures that above 800 psig both core flooding tanks are operational. Since their design pressure is 600 ± 25 psig, they are not brought into the operational state until 800 psig to prevent spurious injection of borated water. Both core flooding tanks are specified as a single core flood tank has insufficient inventory to reflood the core.(1)

Specification 3.3.4 assures that prior to going critical the redundant train of reactor building emergency cooling and spray train are operable.

The spray system utilizes common suction lines with the low pressure injection system. If a single train of equipment is removed from either system, the other train must be assured to be operable in each system.

The volume specified by 3.3.4.B is the safety analysis volume and does not contain allowances for instrument uncertainty. 9,000 gallons corresponds to a level of approximately 26 feet at a temperature of 77°F and a NaOH concentration of 5.0 wt%. No maximum volume is specified as the value used as the maximum volume in the safety analysis bounds the physical size of the NaOH tank. Additional allowances for instrument uncertainties, as determined in Reference 6, are incorporated in the operating procedures associated with the level instrumentation used in the control room. A2

When the reactor is critical, maintenance is allowed per Specification 3.3.5. Operability of the specified components shall be based on the results of testing as required by Technical Specification 4.5. The maintenance period of up to 24 hours is acceptable if the operability of equipment redundant to that removed from service is demonstrated within 24 hours prior to removal. Exceptions to Specification 3.3.6 permit continued operation for seven days if one of two BWST level instrument channels is operable or if either the pressure or level instrument channel in the CFT instrument channel is operable.

In the event that the need for emergency core cooling should occur, functioning of one train (one high pressure injection pump, one low pressure injection pump, and both core flooding tanks) will protect the core and in the event of a main coolant loop severance, limit the peak clad temperature to less than 2200°F and the metal-water reaction to that representing less than 1 percent of the clad.

The service water system consists of two independent but interconnected, full capacity, 100% redundant systems, to ensure continuous heat removal.(4)

One service water pump is required for normal operation. The normal operating requirements are greater than the emergency requirements following a loss-of-coolant accident.

ANO-432

3.4 STEAM AND POWER CONVERSION SYSTEM

Applicability

Applies to the turbine cycle components for removal of reactor decay heat.

Objective

To specify minimum conditions of the turbine cycle equipment necessary to assure the capability to remove decay heat from the reactor core.

Specifications

3.4.4 APPL
3.4.5 APPL
& <LATER> (3.7)

MODES 1, 2, 3 — A1 — LATER

3.4.1 The reactor shall not be heated above 280°F unless the following conditions are met:

3.4.4 LCO
3.4.5 LCO

1. Capability to remove decay heat by use of two steam generators. — LA1 — Bases

<LATER> (3.7)

2. Fourteen* of the steam system safety valves are operable.

3. A minimum of 267,000 gallons of water is available in condensate storage tank, T41B, when required for both units. A minimum of 107,000 gallons of water is available in T41B when only required for Unit 1.

4. (Deleted)

5. Both main steam block valves and both main feedwater isolation valves are operable. — LATER

3.4.4 RA A.1
3.4.5 RA A.1, & 1
& <LATER> (3.7)

3.4.2 Components required to be operable by Specification 3.4.1 shall not be removed from service for more than 24 consecutive hours. If the system is not restored to meet the requirements of Specification 3.4.1 within 24 hours, the reactor shall be placed in the hot shutdown condition within 12 hours. If the requirements of Specification 3.4.1 are not met within an additional 48 hours, the reactor shall be placed in the cold shutdown condition within 24 hours. — M9 — L6 — LATER

<LATER> (3.7)

3.4.3 Two (2) EFW trains shall be operable as follows:

1. The motor driven EFW pump and its associated flow path shall be operable when the RCS is above CSD conditions and any Steam Generator is relied upon for heat removal.

2. The turbine driven EFW pump and its associated flow path shall be operable when the RCS temperature is ≥ 280°F.** — LATER

<LATER> (3.7)

* Except that during hydrotests, with the reactor subcritical, fourteen of the steam system safety valves may be gagged and two (one on each header), may be reset for the duration of the test, to allow the required pressure for the test to be attained. — LATER

** Except that the surveillance testing of the turbine driven EFW pump shall be performed at the appropriate plant conditions as specified by Surveillance Requirement 4.8.1.

ANO-425

3.4 STEAM AND POWER CONVERSION SYSTEM

Applicability

Applies to the turbine cycle components for removal of reactor decay heat.

Objective

To specify minimum conditions of the turbine cycle equipment necessary to assure the capability to remove decay heat from the reactor core. A1

Specifications

3.7.1 APPL & <LATER> (3.4A)

3.4.1 The reactor shall not be heated above 280°F unless the following conditions are met: A1 & LATER

1. Capability to remove decay heat by use of two steam generators. LATER

*2. Fourteen of the steam system safety valves are operable. L1 M2

3.7.1 LCO See pg 40-5

3. A minimum of 267,000 gallons of water is available in condensate storage tank, T41B, when required for both units. A minimum of 107,000 gallons of water is available in T41B when only required for Unit 1. A1

4. (Deleted) <ADD TABLE 3.7.1-1> L1

& See pg 40-2 & See pg 40-3

5. Both main steam block valves and both main feedwater isolation valves are operable. (Reduce power per Table 3.7.1-1 -- 4 hours) M24

3.7.1 RA A.1 3.7.1 RA B.1, B.2 & <LATER> (3.4A)

3.4.2 Components required to be operable by Specification 3.4.1 shall not be removed from service for more than 24 consecutive hours. If the system is not restored to meet the requirements of Specification 3.4.1 within 24 hours, the reactor shall be placed in the hot/shutdown (MODE 3) condition within 12 hours. If the requirements of Specification 3.4.1 are not met within an additional 48 hours, the reactor shall be placed in the cold shutdown condition (MODE 4) within 24 hours. L1 A1 M1 L3

3.4.3 Two (2) EFW trains shall be operable as follows:

See pg 40-4

1. The motor driven EFW pump and its associated flow path shall be operable when the RCS is above CSD conditions and any Steam Generator is relied upon for heat removal.

2. The turbine driven EFW pump and its associated flow path shall be operable when the RCS temperature is ≥ 280°F.**

<ADD 3.7.1 ACTIONS NOTE> L1

<ADD 3.7.1 RA A.2> M24

3.7-01 3.7.1 LCO NOTE

* Except that during hydrotests, with the reactor subcritical, fourteen of the steam system safety valves may be gagged and two (one on each header), may be reset for the duration of the test, to allow the required pressure for the test to be attained. LA1 Base

See pg 40-4

** Except that the surveillance testing of the turbine driven EFW pump shall be performed at the appropriate plant conditions as specified by Surveillance Requirement 4.8.1.

AND-420

3.7.2

Applicability

Applies to the turbine cycle components for removal of reactor decay heat.

Objective

To specify minimum conditions of the turbine cycle equipment necessary to assure the capability to remove decay heat from the reactor core. A1

Specifications

3.7.2 APPL & <LATER (3.4A)> 3.4.1 The reactor shall not be heated above 280°F (MODE 1, 2, and 3) unless the following conditions are met: A1 & LATER

1. Capability to remove decay heat by use of two steam generators. LATER

See pg 40-1 — *2. Fourteen of the steam system safety valves are operable.

See pg 40-5 — 3. A minimum of 267,000 gallons of water is available in condensate storage tank, T41B, when required for both units. A minimum of 107,000 gallons of water is available in T41B when only required for Unit 1.

4. (Deleted) A1

3.7.2 LCO See pg 40-3 — 5. Both main steam block valves and both main feedwater isolation valves are operable.

3.4.2 3.7.2 RA A.1, B.1, C.1, D.1 & <LATER (3.4A)> Components required to be operable by Specification 3.4.1 shall not be removed from service for more than 24 consecutive hours. If the system is not restored to meet the requirements of Specification 3.4.1 within 24 hours, the reactor shall be placed in the hot shutdown (MODE 3) condition within 12 hours. A1 If the requirements of Specification 3.4.1 are not met within an additional 48 hours, the reactor shall be placed in the cold shutdown condition (MODE 4) within 24 hours. L4 L3

3.4.3 Two (2) EFW trains shall be operable as follows:

See pg 40-4 —

1. The motor driven EFW pump and its associated flow path shall be operable when the RCS is above CSD conditions and any Steam Generator is relied upon for heat removal.

2. The turbine driven EFW pump and its associated flow path shall be operable when the RCS temperature is ≥ 280°F.**

<ADD 3.7.2 Cond C Note> L4

<ADD 3.7.2 RA C.2> L4

See pg 40-1 — * Except that during hydrotests, with the reactor subcritical, fourteen of the steam system safety valves may be gagged and two (one on each header), may be reset for the duration of the test, to allow the required pressure for the test to be attained.

See pg 40-4 — ** Except that the surveillance testing of the turbine driven EFW pump shall be performed at the appropriate plant conditions as specified by Surveillance Requirement 4.8.1.

ANO-420

3.7.3

Applicability

Applies to the turbine cycle components for removal of reactor decay heat.

Objective

To specify minimum conditions of the turbine cycle equipment necessary to assure the capability to remove decay heat from the reactor core. A1

ANO-388 3.7-02

Specifications

3.7.3 APPL & LATER (3.4A)

3.4.1 The reactor shall not be heated above 280°F (MODES 1, 2, and 3) unless the following conditions are met: A1 & LATER

1. Capability to remove decay heat by use of two steam generators. LATER

See pg 40-1 — *2. Fourteen of the steam system safety valves are operable.

See pg 40-5 — 3. A minimum of 267,000 gallons of water is available in condensate storage tank, T41B, when required for both units. A minimum of 107,000 gallons of water is available in T41B when only required for Unit 1.

4. (Deleted) A1

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See pg 40-2 — 5. Both main steam block valves and (All MFIVs) both main feedwater isolation valves are operable.

3.7.3 RA A.1, B.1, C.1, D.1, F.1, F.2 & LATER (3.4A)

3.4.2 Components (Main Feedwater Block Valves, Low Load Feedwater Control Valves, and Startup Feedwater Control Valves shall be) required to be operable by (72) Specification 3.4.1 shall not be removed from service for more than (24) consecutive hours. If the system is not restored to meet the requirements of Specification 3.4.1 within (6) (24) hours, the reactor shall be placed in the hot shutdown (MODE 3) condition within (12) hours. If the requirements of Specification 3.4.1 are not met within an additional 48 hours, the reactor shall be placed in the cold shutdown condition (MODE 4) within (24) (12) hours. A1 M4 L4

3.7-02

3.4.3 Two (2) EFW trains shall be operable as follows: L3

See pg 40-4 — 1. The motor driven EFW pump and its associated flow path shall be operable when the RCS is above CSD conditions and any Steam Generator is relied upon for heat removal.

2. The turbine driven EFW pump and its associated flow path shall be operable when the RCS temperature is ≥ 280°F.**

3.7-02

<ADD 3.7.3 ACTIONS Note> L4

<ADD 3.7.3 RA A.2, B.2, C.2, D.2, & E.1> M4

See pg 40-1 — * Except that during hydrotests, with the reactor subcritical, fourteen of the steam system safety valves may be gagged and two (one on each header), may be reset for the duration of the test, to allow the required pressure for the test to be attained.

See pg 40-4 — ** Except that the surveillance testing of the turbine driven EFW pump shall be performed at the appropriate plant conditions as specified by Surveillance Requirement 4.8.1.

ANO-420

3.4 STEAM AND POWER CONVERSION SYSTEM

3.7.5

~~Applicability~~

~~Applies to the turbine cycle components for removal of reactor decay heat.~~

~~Objective~~

~~To specify minimum conditions of the turbine cycle equipment necessary to assure the capability to remove decay heat from the reactor core.~~ A1

Specifications

See pgs 40-1,2,3,5 — 3.4.1 The reactor shall not be heated above 280°F unless the following conditions are met:

<LATER> (3.4A) — ~~1. Capability to remove decay heat by use of two steam generators.~~ LATER

See pg 40-1 — 2. Fourteen of the steam system safety valves are operable.

See pg 40-5 — 3. A minimum of 267,000 gallons of water is available in condensate storage tank, T41B, when required for both units. A minimum of 107,000 gallons of water is available in T41B when only required for Unit 1.

~~4. (Deleted)~~ A1

See pgs 40-2,3 — 5. Both main steam block valves and both main feedwater isolation valves are operable.

See pgs 40-1,2,3,5 — 3.4.2 Components required to be operable by Specification 3.4.1 shall not be removed from service for more than 24 consecutive hours. If the system is not restored to meet the requirements of Specification 3.4.1 within 24 hours, the reactor shall be placed in the hot shutdown condition within 12 hours. If the requirements of Specification 3.4.1 are not met within an additional 48 hours, the reactor shall be placed in the cold shutdown condition within 24 hours.

3.7.5 LCO 3.4.3 Two (2) EFW trains shall be operable as follows:

3.7.5 APPL Note — 1. The motor driven EFW pump and its associated flow path shall be operable when the RCS is above CSD conditions and any Steam Generator is relied upon for heat removal.

3.7.5 APPL — 2. The turbine driven EFW pump and its associated flow path shall be operable when the RCS temperature is ≥ 280°F.**

See pg 40-1 — * Except that during hydrotests, with the reactor subcritical, fourteen of the steam system safety valves may be gagged and two (one on each header), may be reset for the duration of the test, to allow the required pressure for the test to be attained.

SR 3.7.5.2 Note — ** Except that the surveillance testing of the turbine driven EFW pump shall be performed at the appropriate plant conditions as specified by Surveillance Requirement 4.8.1.

ANO-420

Applicability

Applies to the turbine cycle components for removal of reactor decay heat.

Objective

To specify minimum conditions of the turbine cycle equipment necessary to assure the capability to remove decay heat from the reactor core. A1

Specifications

3.7.6 APPL 3.4.1 The reactor shall not be heated above 280°F unless the following conditions are met: (MODES 1, 2, 3, and 4 when relying on SG) M6 LATER

LATER (3.4A)

1. Capability to remove decay heat by use of two steam generators. LATER

See pg 40-1 *2. Fourteen of the steam system safety valves are operable.

3.7.6 LCO 3. A minimum of 267,000 gallons of water is available in condensate storage tank, T41B, when required for both units. A minimum of 107,000 gallons of water is available in T41B when only required for Unit 1.

4. (Deleted) A1

See pg 40-2, 3 5. Both main steam block valves and both main feedwater isolation valves are operable.

3.4.2 Components required to be operable by Specification 3.4.1 shall not be removed from service for more than 24 consecutive hours. If the system is not restored to meet the requirements of Specification 3.4.1 within 24 hours, the reactor shall be placed in the hot shutdown condition within 12 hours. If the requirements of Specification 3.4.1 are not met within an additional 48 hours, the reactor shall be placed in the cold shutdown condition within 24 hours. L7 LATER M7 L7

3.7.6 AA A.2
3.7.6 RA B.1, B.2
<LATER> (3.4A)

6

3.4.3 Two (2) EFW trains shall be operable as follows:

See pg 40-4 1. The motor driven EFW pump and its associated flow path shall be operable when the RCS is above CSD conditions and any Steam Generator is relied upon for heat removal.

2. The turbine driven EFW pump and its associated flow path shall be operable when the RCS temperature is ≥ 280°F.**

<ADD 3.7.6 RA A.1> M7

<ADD SR 3.7.6.1> M7

See pg 40-1 * Except that during hydrotests, with the reactor subcritical, fourteen of the steam system safety valves may be gagged and two (one on each header), may be reset for the duration of the test, to allow the required pressure for the test to be attained.

See Pg 40-4 ** Except that the surveillance testing of the turbine driven EFW pump shall be performed at the appropriate plant conditions as specified by Surveillance Requirement 4.8.1.

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3.7.6

The T41B condensate storage tank is seismically qualified and a portion of the tank is protected from tornado missiles. The protected volume of water in the tank can provide a source of emergency feedwater (EFW) for both units for at least 30 minutes. Thirty minutes is adequate for the operators to manually switch the EFW suction alignment to the service water system (SWS), if required. The SWS provides the assured source of cooling water.

The TS volume requirements for the condensate storage tank are based on the EFW systems of both units being aligned to T41B simultaneously or only Unit 1 being aligned. The minimum TS volume requirements are sufficient to support several hours of cooling flow for both units. During this time, the need for EFW will be determined. Alignment to available water sources will be performed as necessary to ensure adequate heat removal is maintained. The LCO volume requirements are nominal values. In the conversion of the required volumes to indicated level, instrument uncertainty need not be applied.

A2

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3.3.16 LCO
3.3.16 Appl.

3.5.1.13 Two control room ventilation radiation monitoring channels shall be operable whenever the reactor coolant system is above the cold shutdown condition or during handling of irradiated fuel. A1

in MODES 1, 2, 3 or 4 movement assemblies

3.5.1.14 ~~The Main Steam Line Radiation Monitoring Instrumentation shall be operable with a minimum measurement range from 10^{-1} to 10^{4} mR/hr, whenever the reactor is above the cold shutdown condition.~~ R

OUCM SAR

3.5.1.15 ~~Initiate functions of the EFIC system which are bypassed at cold shutdown conditions shall have the following minimum operability conditions:~~

<LATER> (3.3C)

LATER

~~a. "low steam generator pressure" initiate shall be operable when the main steam pressure exceeds 750 psig.~~

~~b. "loss of 4 RC pumps" initiate shall be operable when neutron flux exceeds 10% power.~~

~~c. "main feedwater pumps tripped" initiate shall be operable when neutron flux exceeds 10% power.~~

3.5.1.16 ~~The automatic steam generator isolation system within EFIC shall be operable when main steam pressure is greater than 750 psig.~~

<LATER> (3.3c + 3.7)

LATER

<Add 3.3.16 Condition C>

<Add 3.3.16 Condition D>

M4

<Add 3.3.16.2 Note>

L13

OTHER SAFETY RELATED SYSTEMS
(Cont'd)

Table 3.5.1-1 (cont'd)

Functional Unit	1 No. of channels	2 No. of Channels for system trip	3 Min. operable channels	4 Min. degree of redundancy	5 Operator action if conditions of column 3 or 4 cannot be met
Table 3.3.15-1 PAM #16 13. In core Thermocouples (core-exit thermocouples)	8/core quadrant	N/A	2/core quadrant	0	Note 22
3.3.16 LCO 14. Control Room Radiation Monitors	2	1	2	1	Note 17, 18
Table 3.3.15-1 PAM #5 15. Reactor Vessel Level Monitoring System	2	N/A	2	0	Note 28, 29
Table 3.3.15-1 PAM #3 16. Hot Leg Level Measurement System (HLLMS)	2	N/A	2	0	Note 28, 29
17. Main Steam Line Radiation Monitors	1/steam line	N/A	1/steam line	0	Note 30

LA1 Bases
A3
A7
A1
LA1 Bases
A3
A7
A3
A1
R
ODCM SAR

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3.3.15
3.3.16

A3

MODE 3 with the CRD breakers open within 6 hrs.

TABLE 3.5.1-1 (Cont'd)

Notes:

3.3.1 Cond. D — 1. Initiate a shutdown using normal operating instructions and place the reactor in ~~the hot shutdown condition within 12 hours~~ if the requirements of Columns 3 and 4 are not met. — M3 & LATER

3.3.2 Cond. B & <LATER> (3.3B/C/D & 3.4B) — 2. When 2 of 4 power range instrument channels are greater than ~~10%~~ 5% rated power, hot shutdown is not required. — L10

3.3.9 Appl. — 3.3.10 Appl. — 3.3.9 Cond. B — 3. When 1 of 2 intermediate range instrument channels is greater than 10-10 amps, ~~hot shutdown is not required.~~ Initiate action to restore source range channel within 1 hr. — M7

RAI 3.3.1-03

4. For channel testing, calibration, or maintenance, the minimum number of operable channels may be two and a degree of redundancy of one for a maximum of four hours, after which Note 1 applies. — A17

<LATER> (3.3B, 3.4B) — 5. If the requirements of Columns 3 or 4 cannot be met within an additional 48 hours, place the reactor in the cold shutdown condition within 24 hours. — LATER

3.3.1 RA B.1 & <LATER> (3.3B & 3.3C) — 6. The minimum number of operable channels may be reduced to 2, provided that the system is reduced to 1 out of 2 coincidence by tripping the remaining channel. Otherwise, the actions required by Column 5 shall apply. — A1 & LATER

7. These channels initiate control rod withdrawal inhibits not reactor trips at -10% rated power. Above 10% rated power, those inhibits are bypassed. — LA1 BASES

<LATER> (3.3B) — 8. If any one component of a digital subsystem is inoperable, the entire digital subsystem is considered inoperable. Hence, the associated safety features are inoperable and Specification 3.3 applies. — LATER

<LATER> (3.3D) — 9. The minimum number of operable channels may be reduced to one and the minimum degree of redundancy to zero for a maximum of 24 hours, after which Note 1 applies.

10. With the number of operable channels less than required, either restore the inoperable channel to operable status within 30 days, or be in hot shutdown within 12 hours. — LATER

11. With the number of operable channels less than required, isolate the electromatic relief valve within 4 hours, otherwise Note 9 applies.

<Added LCO 3.3.9 Condition A
Added LCO 3.3.10 Condition A> — M10

Plant temperature changes are allowed provided the temperature changes are accounted for in the SDM calculations.

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3.3.1 3.3.2 3.3.9 3.3.10

A3

Table 3.5.1-1 (cont'd)

3.3.15 PAM's #3 & #5

28. With the number of OPERABLE channels one less than the minimum number of channels required to be OPERABLE:

RA A.1 a. If repairs are feasible, restore the inoperable channel to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours. 30 L8

RA B.1 b. If repair is not feasible without shutting down, operation may continue and a special report pursuant to specification 6.12.5 shall be submitted to the NRC within 30 days following the failure, describing the action taken, the cause of the inoperability, and the plans and schedules for restoring the channel to OPERABLE status during the next scheduled refueling outage. LA1 Bases

3.3.15 PAMs #3 & #5

29. With the number of OPERABLE channels two less than the minimum channels required to be OPERABLE:

RA C.1 a. If repairs are feasible, restore at least one inoperable channel to OPERABLE status within 48 hours or be in at least HOT SHUTDOWN within the next 12 hours. 7days L8

RA G.1 b. If repair is not feasible without shutting down, operation may continue and a special report pursuant to specification 6.12.5 shall be submitted to the NRC within 30 days following the failure, describing the action taken, the cause of the inoperability, and the plans and schedules for restoring the channels to OPERABLE status during the next scheduled refueling outage. LA1 Bases

30. With the number of OPERABLE Channels less than required by the Minimum Channels OPERABLE requirements, initiate the preplanned alternate method of monitoring the appropriate parameter(s), within 72 hours, and: 1) either restore the inoperable Channel(s) to OPERABLE status within 7 days of the event, or 2) prepare and submit a Special Report to the Commission pursuant to Specification 6.12.5 within 14 days following the event outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the system to OPERABLE status. R ODCM SAR L14

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3.3.15

3.3.5

3.5.3 Safety Features Actuation System Setpoints

Applicability

This specification applies to the safety features actuation system actuation setpoints.

Objective

To provide for automatic initiation of the safety features actuation system in the event of a breach of reactor coolant system integrity.

Specification

The safety features actuation setpoints and permissible bypasses shall be as follows:

A1

Table 3.3.5-1

Functional Unit	Action	Allowable Values (Setpoint)
Parameter 1 High Reactor Building Pressure* - High High	Reactor Building Spray	≤30 psig (44.7 psia)
Parameter 2 Reactor Building Pressure High	High Pressure Injection Start of Reactor Building Cooling and Reactor Building Isolation	≤ 4 psig (18.7 psia)
	Reactor Bldg. Ventilation	≤ 4 psig (18.7 psia)
	Low Pressure Injection	≤ 4 psig (18.7 psia)
	Penetration Room Ventilation	≤ 4 psig (18.7) psia)
Parameter 3 Low Reactor Coolant System Pressure**	High Pressure Injection	≥ 1585 psig
	Low Pressure Injection	≥ 1585 psig
	Start of Reactor Building Cooling and Reactor Building Isolation	≥ 1585 psig

A1

A1

*May be bypassed during reactor building leak rate test.

**May be bypassed below 1750 psig and is automatically reinstated above 1750 psig.

LA1

A12

L1

With the safety features actuation setpoints less conservative than the above values, declare the channel inoperable and apply the applicable Action requirements of Table 3.5.1-1 until the channel is restored to OPERABLE status with the trip setpoint adjusted consistent with the trip setpoint value.

A1

Bases

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Bases

3.3B

High Reactor Building Pressure

The basis for the 30 psig and 4 psig setpoints for the high pressure signal is to establish a setting which would be reached in adequate time in the event of a DBA, cover a spectrum of break sizes and yet be far enough above normal operation maximum internal pressure to prevent spurious initiation.

Low Reactor Coolant System Pressure

AZ

The basis for the 1585 psig low reactor coolant pressure setpoint for high and low pressure injection initiation is to establish a value which is high enough such that protection is provided for the entire spectrum of break sizes and is far enough below normal operating pressure to prevent spurious initiation. (1)

REFERENCES

(1) FSAR, Section 14.2.2.5

(2) B&W Calculation 32-1158581

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<ADD: 3.6.3 ACTIONS NOTES 2 & 3> M5
<ADD: 3.6.3 COND A NOTE> A5
<ADD: 3.6.3 RA A.2, & NOTES & CTs> M5
<ADD: 3.6.3 COND B & NOTE> A5
<ADD: 3.6.3 ACTION C & NOTES> L22

3.6.3

3.6.3-8

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3.6.3 APPL 3.6.6 If, ~~while the reactor is critical~~, MODES 1,2,3,4 M3 a reactor building isolation valve is determined to be inoperable in a position other than the closed position, the other reactor building isolation valve (except for check valves) in the line shall be tested to insure operability. L16 If the inoperable valve is not restored within 48 hours, the reactor shall be brought to the cold shutdown condition within an additional 24 hours or the operable valve will be closed. A1 L25

3.6.3 RA A.1
3.6.3 RA D.2
3.6.3 RA D.1

MODE 3: 6 hrs
MODE 5: 36 hrs

MODE 5 A1

Bases

L17

Included in reactor building operability are both the reactor building integrity as defined in Specification 1.7 and the reactor building structural integrity. Structural integrity limitations as described in the ANO Containment Inspection Program ensure the reactor building will be maintained comparable to the original design standards throughout the facility life span. Visual and other required examinations of tendons, anchorages and surfaces are performed periodically in accordance with station procedures. These procedures embody applicable requirements of the 1992 Edition with the 1992 Addenda of Section XI, Subsection IWL of the ASME Boiler and Pressure Vessel Code as set forth in 10 CFR 50.55a(g)(6)(ii)(B). Any degradations exceeding the Containment Inspection Program acceptance criteria during inspection surveillances will be reviewed under an engineering evaluation within 60 days of the completion of the inspection to determine what impact the degradation has on overall containment operability, if any.

The reactor coolant system conditions of cold shutdown assure that no steam will be formed and hence there will be no pressure buildup in the reactor building if the reactor coolant system ruptures.

The selected shutdown conditions are based on the type of activities that are being carried out and will preclude criticality in any occurrence. A2

The reactor building is designed for an internal pressure of 59 psig and an external pressure 3.0 psi greater than the internal pressure. The design external pressure of 3.0 psi corresponds to a margin of 0.5 psi above the differential pressure that could be developed if the building is sealed with an internal temperature of 110°F and the building is subsequently cooled to an internal temperature of less than 50°F.

When reactor building integrity is established, the limits of 10 CFR 100 will not be exceeded should the maximum hypothetical accident occur.

REFERENCE

FSAR, Section 5.

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<Add 3.9.1 Applicability Note> — A9
<Add 3.9.5 RA A.2> — A7
<Add SR 3.9.2.1> — M6
<Add SR 3.9.2.2 with Note> — M5
<Add 3.9.2 RA B.2> — A6
<Add 3.9.4 Appl> — A6

3.9.1
3.9.2
3.9.4
3.9.5

3.8 FUEL LOADING AND REFUELING

Applicability

Applies to fuel loading and refueling operations.

Objective

To assure that fuel loading, refueling and fuel handling operations are performed in a responsible manner. — A1

Specification

3.8.1 Radiation levels in the reactor building refueling area shall be monitored by instrument RE-8017. Radiation levels in the spent fuel storage area shall be monitored by instrument RE-8009. If any of these instruments become inoperable, portable survey instrumentation, having the appropriate ranges and sensitivity to fully protect individuals involved in refueling operation, shall be used until the permanent instrumentation is returned to service. — R TRM

AND-447

3.9.2 LCO b — 3.8.2 Core subcritical neutron flux shall be continuously monitored by at least two neutron flux monitors, each with continuous indication available whenever core geometry is being changed. When core geometry is not being changed, at least one neutron flux monitor shall be in service. — LA7 Bases

3.9.2 Appl — MODE 6 — A1

3.9.2 LCO

AND-243

See <CTS INSERT 58>

3.8.3.a. At least one decay heat removal loop shall be in operation.* Otherwise, suspend all operations involving an increase in the reactor decay heat load or a reduction in boron concentration of the reactor coolant system, and close all containment penetrations providing access from the containment atmosphere to the outside atmosphere within 4 hours.

b. When the water level above the top of the irradiated fuel assemblies seated within the reactor pressure vessel is less than 23 feet, two decay heat removal loops shall be operable.**

Otherwise, immediately initiate corrective action to return the required loops to operable status as soon as possible.

3.9.1 Appl — 3.8.4 During reactor vessel (MODE 6) head removal and while loading and unloading fuel from the reactor, the boron concentration shall be maintained at not less than that required for refueling shutdown (in the COLR). — M4

3.9.1 LCO

3.8.5 Direct communications between the control room and the refueling personnel in the reactor building shall exist whenever changes in core geometry are taking place. — R TRM

3.9.4 LCO Note — *The decay heat removal loop may be removed from operation for up to 1 hour per 8 hour period during the performance of core alterations. — A4

<LATER> (3.8) — **The normal or emergency power source may be inoperable for each shutdown cooling loop. — LATER

provided no operations are permitted that would cause reduction in RCS boron concentration.

AND-245
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<Add 3.9.5 LCO Note 1> — L6
<Add 3.9.5 LCO Note 2> — L7

<ADD SR 3.9.3.2 with Note> M7
<ADD SR 3.9.6.1> M10
<ADD SR 3.9.3.1> M8

3.9.1
3.9.2
3.9.3
3.9.6

3.9.6 APPL
3.9.3 APPL

3.9.3 LCO b
3.9.3 LCO a
3.9.6 LCO

3.8.6 During the handling of irradiated fuel in the reactor building, at least one door on the personnel and emergency hatches shall be capable of being closed. The equipment hatch cover shall also be capable of being closed. At least 23 feet of water shall be maintained over the top of irradiated fuel assemblies seated within the reactor pressure vessel. LA1 Bases

3.9.3 LCO c.1
3.9.3 LCO c.2

3.8.7 Isolation valves in lines containing automatic containment isolation valves shall be operable, or at least one shall be closed. L1

AND-243

See <CTS INSERT 59>

3.8.8 When two irradiated fuel assemblies are being moved simultaneously by the bridges within the fuel transfer canal, a minimum of 10 feet separation shall be maintained between the assemblies at all times. R TRM

3.9.1 Cond A
3.9.2 Cond A
3.9.2 RA B.1
3.9.6 Cond A
3.9.3 Cond A

3.8.9 If any of the above specified limiting conditions for fuel loading and refueling are not met, movement of fuel into the reactor core shall cease; action shall be initiated immediately to correct the conditions so that the specified limits are met, and no operations which may increase the reactivity of the core shall be made. The provisions of Specification 3.0.3 are not applicable. A3 + R TRM A5

3.9.3 LCO c.3
SR 3.9.3.3

3.8.10 The reactor building purge isolation system, including the radiation monitors shall be tested and verified to be operable within 7 days prior to refueling operations. The provisions of Specification 3.0.3 are not applicable. M9 A5

3.8.11 Irradiated fuel shall not be removed from the reactor until the unit has been subcritical for at least 100 hours. In the event of a complete core offload, a full core to be discharged shall be subcritical a minimum of 175 hours prior to discharge of more than 70 assemblies to the spent fuel pool. The provisions of Specification 3.0.3 are not applicable. Even 18 months L3 M13 LA2 TRM

3.8.12 All fuel handling in the Auxiliary Building shall cease upon notification of the issuance of a tornado watch for Pope, Yell, Johnson, or Logan counties in Arkansas. Fuel handling operations in progress will be completed to the extent necessary to place the fuel handling bridge and crane in their normal parked and locked position. The provisions of Specification 3.0.3 are not applicable. R TRM

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3.8.13 No loaded spent fuel shipping cask shall be carried above or into the Auxiliary Building equipment shaft unless atmospheric dispersion conditions are equal to or better than those produced by Pasquill Type D stability accompanied by a wind velocity of 2 m/sec. In addition, the railroad spur door of the Turbine Building shall be closed and the fuel handling area ventilation system shall be in operation. The provisions of Specification 3.0.3 are not applicable. L9

3.8.14 Loads in excess of 2000 pounds shall be prohibited from travel over fuel assemblies in the storage pool. The provisions of Specification 3.0.3 are not applicable. R TRM

* Administrative controls shall ensure that appropriate personnel are aware that both personnel airlock doors and/or equipment hatch are open, a specific individual(s) is designated and available to close an airlock door and the equipment hatch cover following a required evacuation of the reactor building, and any obstruction(s) (e.g. cables and hoses) that could prevent closure of an airlock door and the equipment hatch cover be capable of being quickly removed. LA1 Bases (3.9.3)

5.5.11

<ADD PROGRAM DESCRIPTION>

LATER

<LATER> (3.7)

3.13 PENETRATION ROOM VENTILATION SYSTEM

Applicability

Applies to the operability of the penetration room ventilation system.

Objective

To ensure that the penetration room ventilation system will perform within acceptable levels of efficiency and reliability.

Specification

3.13.1 Two independent circuits of the penetration room ventilation system shall be operable whenever reactor building integrity is required with the following performance capabilities:

ANO-348

5.5.11.a.1
5.5.11.b.1

a. The results of the in-place cold DOP and halogenated hydrocarbon tests at design flow ~~@ ± 10%~~ on HEPA filters and charcoal adsorber banks shall show ≥ 99% DOP removal and ≥ 99% halogenated hydrocarbon removal. of 1800 cfm (M11)

5.5.11.c.1

b. The results of laboratory carbon sample analysis from the charcoal adsorber banks shall show the methyl iodide penetration less than 5.0% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C and a relative humidity of 95%.

5.5.11.a.1
5.5.11.b.1
5.5.11.d

c. Fans shall be shown to operate within ± 10% of design flow.

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5.5.11.d

d. The pressure drop across the combined HEPA filters (other filters in the system) and charcoal adsorber banks shall be less than 6 inches of water at system design flow rate ~~@ ± 10%~~. of 1800 cfm (M5) (M11)

e. Air distribution shall be uniform within ± 20% across HEPA filters and charcoal adsorbers when tested initially and after any maintenance or testing that could affect the air distribution within the penetration room ventilation system. (LA3) YFTP

f. Each circuit of the system shall be capable of automatic initiation.

<LATER> (3.7)

3.13.2 If one circuit of the penetration room ventilation system is made or found to be inoperable for any reason, reactor operation is permissible only during the succeeding seven days provided that during such seven days all active components of the other circuit shall be operable.

3.13.3 If the requirements of Specifications 3.13.1 and 3.13.2 cannot be met, the reactor shall be placed in the cold shutdown condition within 36 hours.

LATER

ANO-401

<ADD: SR 3.0.2 & SR 3.0.3 applicability statement> (A3)

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A3

Table 4.1-1 (Cont'd)

Channel Description	Check	Test	Calibrate	Remarks
20. Reactor Building Spray System System Logic Channels	NA	M(1)	NA	(1) Including RB spray pump, spray valves, and chem. add. valve logic channels.
21. Reactor Building Spray System Analog Channels				
a. Reactor Building Pressure Channels	NA	M	R	
22. Pressurizer Temperature Channels	S	NA	R	
23. Control Rod Absolute Position	S(1)	NA	R	(1) Compare with Relative Position Indicator.
24. Control Rod Relative Position	S(1)	NA	R	(1) Check with Absolute Position Indicator
25. Core Flooding Tanks				
a. Pressure Channels	S	NA	R	
b. Level Channels	S	NA	R	
26. Pressurizer Level Channels	S (M) SR 3.3.15.1	NA	R SR 3.3.15.2	
27. Makeup Tank Level Channels	D	NA	R	
28. Radiation Monitoring Systems other than containment high range monitors (item 57)				(1) Check functioning of self-checking feature on each detector.
a. Process Monitoring System (RCS Leakage monitors only)	S	Q	R	
b. Area Monitoring System (Control Room only)	S SR 3.3.16.1	M(1) SR 3.3.16.2	R SR 3.3.16.3	
c. Main Steam Line Radiation Monitors	S	M	R	

<LATER> (3.3B) — LATER
<LATER> (3.1) — LATER
<LATER> (3.5) — LATER
3.3.15 PAM #11 — L10
L15
<LATER> (3.4B) — LATER
3.3.16 Also See Page 71-2 — L13
R ODCM SAR

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Table 4.1-1 (Cont.)

Channel Description	Check	Test	Calibrate	Remarks
(LATER 3.5) 36. Boric Acid Addition Tank				
a. Level Channel	NA	NA	R	
b. Temperature Channel	M	NA	R	
(LATER 3.3D) 37. Degraded Voltage Monitoring	W	R	R	LATER
38. Sodium Hydroxide Tank Level Indicator	NA	NA	R	LATER
(LATER 3.2) 39. Incore Neutron Detectors	M(1)	NA	NA	(1) Check Functioning — LA3
(LATER 3.3D) 40. Emergency Plant Radiation Instruments	M(1)	NA	R	(1) Battery Check — LATER
(LATER 3.3A) 41. Reactor Trip Upon Turbine Trip Circuitry	M	PC	R	LATER
(LATER 3.3A) 42. Deleted				LATER

LATER

Amendment No. ~~25~~, ~~39~~, ~~50~~, ~~60~~, ~~61~~, ~~91~~, ~~110~~, ~~135~~, 192

3.1-3

3.4A

Table 4.1-2 (Cont.)

Minimum Equipment Test Frequency

	Item	Test	Frequency	
LATER (3.4B)	11. Decay heat removal system isolation valve automatic closure and isolation system	Functioning	Each Refueling Shutdown	LATER
LATER (5.0)	12. Flow limiting annulus on main feedwater line at reactor building penetration	Verify, at normal operating conditions, that a gap of at least 0.025 inches exists between the pipe and the annulus.	One year, two years, three years, and every five years thereafter measured from date of initial test.	LATER
LATER (3.7)	13. Main steam isolation valves	a. Exercise through approximately 10% travel b. Cycle	a. Quarterly b. Every 18 months	LATER
	14. Main feedwater isolation valves	a. Exercise through approximately 5% travel b. Cycle	a. Quarterly b. Every 18 months	
	15. Reactor internals vent valves	Demonstrate operability by: a. Conducting a remote visual inspection of visually accessible surfaces of the valve body and disc sealing faces and evaluating any observed surface irregularities. b. Verifying that the valve is not stuck in an open position, and c. Verifying through manual actuation that the valve is fully open with a force of ≤ 400 lbs (applied vertically upward).	Each refueling shutdown.	R TRM

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Table 4.1-2 (Cont.)

Minimum Equipment Test Frequency

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Item	Test	Frequency	
16. RCS Vent Paths	Demonstrate operability by flow verification	At least once per 18 months during cold shutdown	R TRM
17. PORV	Exercise	End of each refueling outage	LATER

LATER (3.4B)

Table 4.1-3

MINIMUM SAMPLING AND ANALYSIS FREQUENCY

Item	Test	Frequency	
1. Reactor Coolant Samples	a. Gamma Isotopic Analysis	a. Bi-weekly (7)	LATER (3.4B)
	b. Gross Activity Determination	b. 3 times/week and at least every third day (1)(6)(7)	LATER
	c. Gross Radioiodine Determination	c. Weekly (3)(6)(7)	
	d. Dissolved Gases	d. Weekly (7)	LA1 TRM
	e. Chemistry (Cl, F, and O_2)	e. 3 times/week (8)	LATER (3.4A) LATER
	f. Boron Concentration	f. 3 times/week	LATER (3.9) LATER
	g. Radiochemical Analysis for Ē Determination (2) (4)	g. Monthly (7)	LATER (3.4B) LA2 LATER
2. Borated Water Storage Tank Water Sample	Boron Concentration	Weekly and after each makeup	LATER (3.5) LATER
3. Core Flooding Tank Sample	Boron Concentration	Monthly and after each makeup	
4. Spent Fuel Pool Water Sample	Boron Concentration	Monthly and after each makeup (9)	LATER
5. Secondary Coolant Samples	a. Gross Radioiodine Concentration	a. Weekly (5)(7)(10)	LATER (3.7) R TRM
	b. Isotopic Radioiodine Concentration (4)	b. Monthly (7)(10)	LATER
6. Sodium Hydroxide Tank Sample	Sodium Hydroxide Concentration	Quarterly and after each makeup	LATER (3.6) LATER

Notes:

(1) A gross radioactivity analysis shall consist of the quantitative measurement of the total radioactivity of the primary coolant in units μCi/gm. The total primary coolant activity shall be the sum of the degassed beta-gamma activity and the total of all identified gaseous activities 15 minutes after the primary system is sampled. Whenever the gross radioactivity concentration exceeds 10% of the limit specified in the Specification 3.1.4.1 or increases by 10 μCi/gm from the previous measured level, the frequency of sampling and analyzing shall be increased to a minimum of once/day until a steady activity level is established. LATER (3.4B)

ANO-415

Table 4.1-3

MINIMUM SAMPLING AND ANALYSIS FREQUENCY

Item	Test	Frequency	
1. Reactor Coolant Samples	a. Gamma Isotopic Analysis	a. Bi-weekly (7)	LATER (3.4B)
	b. Gross Activity Determination	b. 3 times/week and at least every third day (1)(6)(	LATER
	c. Gross Radioiodine Determination	c. Weekly (3)(6)(7)	
	d. Dissolved Gases	d. Weekly (7)	LATER (3.1)
	e. Chemistry (Cl, F, and O_2)	e. 3 times/week (8)	R TRM
	f. Boron Concentration	f. 3 times/week	LATER (3.9)
	g. Radiochemical Analysis for $\bar{E}$ Determination (2) (4)	g. Monthly (7)	LATER (3.4B) & R TRM; LATER
2. Borated Water Storage Tank Water Sample	Boron Concentration	Weekly and after each makeup	LATER (3.5)
3. Core Flooding Tank Sample	Boron Concentration	Monthly and after each makeup	LATER
4. Spent Fuel Pool Water Sample	Boron Concentration	Monthly and after each makeup (9)	LATER
5. Secondary Coolant Samples	a. Gross Radioiodine Concentration	a. Weekly (5)(7)(10	R TRM (3.7)
	b. Isotopic Radioiodine Concentration (4)	b. Monthly (7)(10)	
6. Sodium Hydroxide Tank Sample	Sodium Hydroxide Concentration	Quarterly and after each makeup	LATER (3.6)

Notes:

(1) A gross radioactivity analysis shall consist of the quantitative measurement of the total radioactivity of the primary coolant in units µCi/gm. The total primary coolant activity shall be the sum of the degassed beta-gamma activity and the total of all identified gaseous activities 15 minutes after the primary system is sampled. Whenever t gross radioactivity concentration exceeds 10% of the limit specified i the Specification 3.1.4.1 or increases by 10 µCi/gm from the previous measured level, the frequency of sampling and analyzing shall be increased to a minimum of once/day until a steady activity level is established. — LATER (3.4B)

ANO-423

3.7.4
3.7.13

Table 4.1-3

MINIMUM SAMPLING AND ANALYSIS FREQUENCY

Item	Test	Frequency	
1. Reactor Coolant Samples	a. Gamma Isotopic Analysis	a. Bi-weekly (7)	LATER (3.4B) LATER
	b. Gross Activity Determination	b. 3 times/week and at least every third day (1)(6)(	
	c. Gross Radioiodine Determination	c. Weekly (3)(6)(7)	LATER (3.1)
	d. Dissolved Gases	d. Weekly (7)	LATER (3.4A) LATER
	e. Chemistry (Cl, F, and O_2)	e. 3 times/week (8)	LATER
	f. Boron Concentration	f. 3 times/week	LATER (3.9) LATER & R TRM
	g. Radiochemical Analysis for $\bar{E}$ Determination (2) (4)	g. Monthly (7)	LATER (3.4B) LATER
2. Borated Water Storage Tank Water Sample	Boron Concentration	Weekly and after each makeup	LATER (3.5) LATER
3. Core Flooding Tank Sample	Boron Concentration	Monthly and after each makeup	M16
4. Spent Fuel Pool Water Sample	Boron Concentration	Monthly and after each makeup (9)	SR 3.7.14.1 3.7-14 LA3 TRM
5. Secondary Coolant Samples	a. Gross Radioiodine Concentration	a. Weekly (5)(7)(10	LA5 SR 3.7.4.1 ANO-416
	b. Isotopic Radioiodine Concentration (4)	b. Monthly (7)(10)	
6. Sodium Hydroxide Tank Sample	Sodium Hydroxide Concentration	Quarterly and after each makeup	LATER (3.6) LATER

Notes:

(1) A gross radioactivity analysis shall consist of the quantitative measurement of the total radioactivity of the primary coolant in units μCi/gm. The total primary coolant activity shall be the sum of the degassed beta-gamma activity and the total of all identified gaseous activities 15 minutes after the primary system is sampled. Whenever t gross radioactivity concentration exceeds 10% of the limit specified i the Specification 3.1.4.1 or increases by 10 μCi/gm from the previous measured level, the frequency of sampling and analyzing shall be increased to a minimum of once/day until a steady activity level is established. LATER (3.4B)

3.4A

(2) A radiochemical analysis shall consist of the quantitative measurement of the activity for each radionuclide which is identified in the primary coolant 15 minutes after the primary system is sampled. The activities for the individual isotopes shall be used in the determination of $\bar{E}$. A radiochemical analysis and calculation of $\bar{E}$ and iodine isotopic activity shall be performed if the measured gross activity changes by more than 10 μCi/gm from the previous measured level. The gamma energy per disintegration for those radioisotopes determined to be present shall be as given in "Table of Isotopes" (1967) and beta energy per disintegration shall be as given in USNRDL-TR-802 (Part II) or other references using the equivalent values for the radioisotopes. — LATER (3.4B)

(3) In addition to the weekly measurement, the radioiodine concentration shall be determined if the measured gross radioactivity concentration changes by more than 10 μCi/gm from the previous measured level.

(4) Iodine isotopic activities shall be weighted to give I-131 dose equivalent activity. — LATER (3.4B & 3.7)

(5) In addition to the weekly measurement, the radioiodine concentration shall be determined if there are indications that the primary to secondary coolant leakage rate has increased by a factor of 2. — R TRM

(6) Whenever the steady state radioiodine or gross radioactivity concentration of prior operation is greater than 1 percent but less than 10 percent of Specification 3.1.4.1, a sample of reactor coolant shall be taken within 24 hours of any reactor criticality and analyzed for radioactive iodines of I-131 through I-135 and gross radioactivity as well as the coolant sample and analyses required by the above. — LATER (3.4B)

Whenever the steady state radioiodine or gross radioactivity concentration of prior operation is greater than 10 percent of Specification 3.1.4.1, a sample of reactor coolant shall be taken prior to any reactor criticality and analyzed for radioactive iodines of I-131 through I-135 and gross radioactivity as well as the coolant sample and analyses required by above.

(7) Not required when plant is in the cold shutdown condition or refueling shutdown condition. — LATER & R TRM (3.1, 3.4B, 3.7)

(8) O_2 analysis is not required when plant is in the cold shutdown condition or refueling shutdown condition. — R TRM

(9) Required only when fuel is in the pool and prior to transferring fuel to the pool. — LATER (3.7)

(10) Not required when not generating steam in the steam generators. — LATER & R TRM (3.7)

(11) The following shall be required until the end of Cycle 2 operation: — LATER (3.4B)

a. Gross radioiodine shall be determined at least three times per week during power operation.

AND-423

3.7.4
3.7.13

<LATER> (3.4B)

(2) A radiochemical analysis shall consist of the quantitative measurement the activity for each radionuclide which is identified in the primary coolant 15 minutes after the primary system is sampled. The activitie for the individual isotopes shall be used in the determination of $\bar{\epsilon}$. radiochemical analysis and calculation of $\bar{\epsilon}$ and iodine isotopic activi shall be performed if the measured gross activity changes by more than μCi/gm from the previous measured level. The gamma energy per disintegration for those radioisotopes determined to be present shall as given in "Table of Isotopes" (1967) and beta energy per disintegrat shall be as given in USNRDL-TR-802 (Part II) or other references using the equivalent values for the radioisotopes. — LATER

(3) In addition to the weekly measurement, the radioiodine concentration shall be determined if the measured gross radioactivity concentration changes by more than 10 μCi/gm from the previous measured level.

SR 3.7.4.1 & <LATER> (3.4B)

(4) Iodine isotopic activities shall be weighted to give I-131 dose equivalent activity. — & LATER

AND-416

(5) In addition to the weekly measurement, the radioiodine concentration shall be determined if there are indications that the primary to secondary coolant leakage rate has increased by a factor of 2. — LA5

<LATER> (3.4B)

(6) Whenever the steady state radioiodine or gross radioactivity concentration of prior operation is greater than 1 percent but less tha 10 percent of Specification 3.1.4.1, a sample of reactor coolant shall taken within 24 hours of any reactor criticality and analyzed for radioactive iodines of I-131 through I-135 and gross radioactivity as well as the coolant sample and analyses required by the above. — LATER

Whenever the steady state radioiodine or gross radioactivity concentration of prior operation is greater than 10 percent of Specification 3.1.4.1, a sample of reactor coolant shall be taken prio to any reactor criticality and analyzed for radioactive iodines of I-1 through I-135 and gross radioactivity as well as the coolant sample an analyses required by above.

AND-416

3.7.4 Appl. & <LATER> (3.1 & 3.4B)

(7) Not required when plant is in the cold shutdown condition or refueling shutdown condition. — LA5 & LATER

<LATER> (3.4A)

(8) O_2 analysis is not required when plant is in the cold shutdown condition or refueling shutdown condition. — LATER

3.7.13 Appl.

(9) Required only when fuel is in the pool ~~and prior to transferring fuel to the pool.~~ — LA3 TRM

AND-416

3.7.4 Appl.

(10) Not required when not generating steam in the steam generators. — A5

<LATER> (3.4B)

(11) The following shall be required until the end of Cycle 2 operation: — LA5 LATER

a. Gross radioiodine shall be determined at least three times per wee during power operation

4.5 EMERGENCY CORE COOLING SYSTEM AND REACTOR BUILDING COOLING SYSTEM PERIODIC TESTING

<LATER> (3.5)

4.5.1 Emergency Core Cooling Systems

Applicability

Applies to periodic testing requirement for emergency core cooling systems. LATER

Objective

To verify that the emergency core cooling systems are operable.

Specification

4.5.1.1 System Tests

4.5.1.1.1 High Pressure Injection System

(a) Once every 18 months, a system test shall be conducted to demonstrate that the system is operable. A test signal will be applied to demonstrate actuation of the high pressure injection system for emergency core cooling operation.

(b) The test will be considered satisfactory if control board indication verifies that all components have responded to the actuation signal properly; all appropriate pump breakers shall have opened or closed and all valves shall have completed their travel.

4.5.1.1.2 Low Pressure Injection System

SR 3.7.7.2 & <LATER> (3.5)

(a) Once every 18 months, a system test shall be conducted to demonstrate that the system is operable. The test shall be performed in accordance with the procedure summarized below:

(1) A test signal will be applied to demonstrate actuation of the low pressure injection system for emergency core cooling operation.

SR 3.7.7.2

(2) Verification of the engineered safeguard function of the service water system which supplies cooling water to the decay heat removal coolers shall be made to demonstrate operability of the coolers. A1

ANO-446

& <LATER> (3.5)

(b) The test will be considered satisfactory if control board indication verifies that all components have responded to the actuation signal properly; all appropriate pump breakers shall have opened or closed, and all valves shall have completed their travel. LA3 SAR & LATER

3.6.5

A23

3.6.5-4

4.5.2 Reactor Building Cooling Systems

Applicability

Applies to testing of the reactor building emergency cooling systems. A1

Objective

To verify that the reactor building emergency cooling systems are operable.

Specification

3.6.5-8

4.5.2.1 System Tests

4.5.2.1.1 Reactor Building Spray System

An actual or Simulated actuation L23

SR 3.6.5.5
SR 3.6.5.6

(a) Once every 18 months, a system test shall be conducted to demonstrate proper operation of the system. A test signal will be applied to demonstrate actuation of the reactor building spray system (except for reactor building inlet valves to prevent water entering nozzles). LA1

ANO-145

SR 3.6.5.8

(b) Station compressed air or smoke will be introduced into the spray headers to verify the availability of the headers and spray nozzles at least every five years. 10 LA1 Bases L10

ANO-73

SR 3.6.5.5
SR 3.6.5.6

(c) The test will be considered satisfactory if visual observation and control board indication verifies that all components have responded to the actuation signal properly. LA1 Bases

4.5.2.1.2 Reactor Building Cooling System

SR 3.6.5.3

(a) At least once per 14 days, each reactor building emergency cooling train shall be tested to demonstrate proper operation of the system. The test shall be performed in accordance with the procedure summarized below: 31 L11

SR 3.6.5.3

(1) Verifying a service water flow rate of ≥ 1200 gpm to each train of the reactor building emergency cooling.[1] A12

(2) Addition of a biocide to the service water during the surveillance in 4.5.2.1.2.a.1 above, whenever service water temperature is between 60F and 80F. LA1 Bases

SR 3.6.5.2

(b) At least once per 31 days, each reactor building emergency cooling train shall be tested to demonstrate proper operation of the system. The test shall be performed in accordance with the procedure summarized below:

3.6.5-9

(1) Starting (unless already operating) each operational cooling fan from the control room. LA1 Bases

A12

[1] Surveillance Requirement 4.5.2.1.2(a)(1) will not be performed on the green train of the reactor building emergency cooling system until cooling fan VSF-1D is repaired and the green train is returned to normal configuration. This note will remain in effect until July 14, 1995.

3.8.1-19
3.8.2-01

3.8.1
3.8.2

4.6 AUXILIARY ELECTRICAL SYSTEM TESTS

Applicability

Applies to the periodic testing and surveillance requirements of the auxiliary electrical system to ensure it will respond promptly and properly when required.

A1

Specification

AND-391 3.8.1-25 RAI

4.6.1 Diesel Generators

LA3 TRM

SR 3.8.1.2

1. Each diesel generator shall be manually started each month and demonstrated to be ready for loading within 15 seconds. The signal initiating the start of the diesel shall be varied from one test to another (start with handswitch at control room panel and at diesel local control panel) to verify all starting circuits are operable. The generator shall be synchronized from the control room and loaded to full rated load and allowed to run until diesel generator operating temperatures have stabilized. (1 hour)

LA1 Bases

A9

M15

SR3.8.1.3

AND-391 3.8.1-25

SR 3.8.1.8
SR 3.8.1.9

2. A test shall be conducted once every 18 months to demonstrate the ability of the diesel generators to perform as designed by:

M12

SR 3.8.1.8

a. simulating a loss of off-site power,

SR 3.8.1.9

b. simulating of loss of off-site power in conjunction with an ESF signal,

c. simulating interruption of off-site power and subsequent reconnection of the on-site power source to their respective busses, and

L8

SR3.8.1.8
SR 3.8.1.9

AND-394 3.8.1-16

d. operating the diesel generator for ≥1 hour after operating temperatures have stabilized. (5 minutes)

L7

3. Each diesel generator shall be given an inspection once every 18 months following the manufacturer's recommendations for this class of standby service. (A one-time extension of this interval is allowed so that these may be performed during the 1R9 refueling outage, and completed no later than December 1, 1990.)

LA3 TRM

A4

3.8.1-17

(LATER) (5.0)

SR3.8.1.6

4. During the monthly diesel generator test specified in paragraph 1 above, the following shall be performed:

L11 & LATER

SR 3.8.3.3

a. The diesel generator starting air compressors shall be checked for operation and their ability to recharge the air receivers.

L9

SR 3.8.1.6

b. The diesel oil transfer pumps shall be checked for operability and their ability to transfer oil to the day tank.

SR 3.8.1.4

c. The day tank fuel level shall be verified.

SR 3.8.3.1

d. The emergency storage tank fuel level shall be verified.

3.1

SAR

4.7.2 Control Rod Program Verification (Group Vs Core Positions)

LA3

Applicability

Applies to surveillance of the control rod systems.

Objective

To verify that the designated control rod (by core position) is operating in its programmed functional position and group (rods 1 through 12, group 1-8).

A1

Specification

4.7.2.1 Whenever the control rod drive patch panel is reconnected (after test, reprogramming, or maintenance), each control rod drive mechanism shall be selected from the control room and exercised by movement of sufficient travel to verify that the proper rod has responded as shown on the unit computer printout or on the input to the computer for that rod.

4.7.2.2 Whenever power or instrumentation cables to the control rod drive assemblies atop the reactor or at the bulkhead are disconnected or removed, an independent verification check of their reconnection shall be performed.

4.7.2.3 Any rod found to be improperly programmed shall be declared inoperable until properly programmed.

LA3

ANO-417

Bases

Each control rod has a relative and an absolute position indicator system. One set of outputs goes to the plant computer identified by a unique number associated with only one core position. The other set of outputs goes to a programmable bank of 68 edgewise meters in the control room. In the event that a patching error is made in the patch panel or connectors in the cables leading to the control rod drive assemblies or the control room meter bank is improperly transposed upon reconnection, these errors and transpositions will be discovered by a comparative check by (1) selecting a specific rod from one group (e.g., rod 1 in regulating group 6), (2) noting the program-approved core position for this rod of the group, (3) exercising the selected rod, and (4) noting that a) the computer prints out both absolute and relative position response for the approved core position, and b) the proper meter in the control room display bank indicates both absolute and relative meter positions. This type of comparative check will not assure detection of improperly connected cables inside the reactor building. For these, (Specification 4.7.2.2) it will be necessary for a responsible person, other than the one doing the work, to verify by appropriate means that each cable has been matched to the proper control rod drive assembly.

4.11 PENETRATION ROOM VENTILATION SYSTEM SURVEILLANCE

Applicability

Applies to the surveillance of the penetration room ventilation system.

Objective

To verify an acceptable level of efficiency and operability of the penetration room ventilation system.

A1

Specification

SR 3.7.11.2 & (LATER) (5.0)

4.11.1 At intervals not to exceed 18 months, the pressure drop across the combined HEPA filters and charcoal adsorber banks shall be demonstrated to be less than 6 inches of water at system design flow rate (± 10%).

4.11.2 Initially and after any maintenance or testing that could affect the air distribution within the penetration room ventilation system, air distribution shall be demonstrated to be uniform within ±20% across HEPA filters and charcoal adsorbers.

LATER

SR 3.7.11.3

4.11.3 At intervals not to exceed 18 months, automatic initiation of the penetration room ventilation system shall be demonstrated.

SR 3.7.11.2 & (LATER) (5.0)

4.11.4a The tests and sample analysis of Specification 3.13.1a, b, & c. shall be performed at intervals not to exceed 18 months or after every 720 hours of system operation and following significant painting, fire or chemical release in any ventilation zone communicating with the system.

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

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

LATER

SR 3.7.11.1

4.11.5 Each circuit shall be operated at least 1 hour every month. This test shall be considered satisfactory if control board indication verifies that all components have responded properly to the actuation signal.

L14

LA3

SAR

AVO-446

3.7

ISI Program

4.15 AUGMENTED INSERVICE INSPECTION PROGRAM FOR HIGH ENERGY LINES OUTSIDE OF CONTAINMENT

Applicability

Applies to welds in piping systems located outside of containment where protection from the consequences of postulated ruptures is not provided by a system of pipe whip restraints, jet impingement barriers, protective enclosures and/or other measures designed specifically to cope with such ruptures.

For Arkansas Nuclear One-Unit 1 this specification applies to six welds in the main steam and main feedwater lines identified as welds 6, 7, 23, 24, 55, and 56 on Figures A-7, A-8 and A-15 of the Final Safety Analysis Report.

Objective

To provide assurance of the continued integrity of the piping system over their service lifetime.

Specifications

ANO-419

4.15.1 At the first refueling outage period, a volumetric examination shall be performed with 100 percent inspection of each weld in accordance with the requirements of ASME Code Section XI, Inservice Inspection of Nuclear Power Plant Components, to establish system integrity and baseline data. LA6

4.15.2 The inservice inspection at each weld shall be performed in accordance with the requirements of ASME Code Section XI, Inservice Inspection of Nuclear Power Plant Components, with the following schedule:

(The inspection intervals identified below sequentially follow the baseline examination of 4.15.1).

First Inspection Interval

a.	First 3-1/3 years (or nearest refueling outage)	100% volumetric inspection of each weld
b.	Second 3-1/3 years (or nearest refueling outage)	100% volumetric inspection of each weld
c.	Third 3-1/3 years (or nearest refueling outage)	100% volumetric inspection of each weld

Successive Inspection Intervals

Every 10 years thereafter (or nearest refueling outage)	Volumetric inspection of two of the welds at the expiration of each 1/3 of the inspection intervals with a cumulative 100% coverage of all welds.

Note - The welds selected during each inspection period shall be distributed among the total number to be examined to provide a representative sampling of the conditions of the welds.

AND-419

4.15.3 In the event repairs of any welds are required following any examination during successive inspection intervals, the inspection schedule for the repaired welds will revert back to the first 10 year inspection program. LAG

4.15.4 Examinations that reveal unacceptable structural defects in a weld during an inspection under 4.15.2 should be extended to require an additional inspection of another 1/3 of the welds. If further unacceptable defects are detected in the second sampling, the remainder of the welds shall be inspected.

4.15.5 Repairs, reexamination and piping pressure tests shall be conducted in accordance with Section XI of the ASME Code.

5.5.9

(c). 1 ~~A~~. The first sample inspection during each inservice inspection (subsequent to the baseline inspection) of each steam generator shall include: <all changes> A1

i ~~A~~. All nonplugged tubes that previously had detectable wall penetrations (>20%), except tubes in which the wall penetration has been spanned by a sleeve, and

ii 2. At least 50% of the tubes inspected shall be in those areas where experience has indicated potential problems, except where specific groups are inspected per Specification ~~4.18.3.a.3~~. 5.5.9.c.1.iii 6.5.9.c.1.ix

A tube inspection (pursuant to Specification ~~4.18.5.a.9~~) shall be performed on each selected tube. If any selected tube does not permit the passage of the eddy current probe for a tube inspection, this shall be recorded and an adjacent tube shall be selected and subjected to a tube inspection.

iii ~~B~~. Tubes in the following groups may be excluded from the first random sample if all tubes in a group in both steam generators are inspected. The inspection may be concentrated on those portions of the tubes where imperfections were previously found. No credit will be taken for these tubes in meeting minimum sample size requirements. Where only a portion of the tube is inspected, the remainder of the tube will be subjected to the random inspection.

(1) Group A-1: Tubes within one, two or three rows of the open inspection lane.

(2) Group A-2: Unplugged tubes with sleeves installed.

(3) Group A-3: Tubes in the wedge-shaped group on either side of the lane region (Group A-1) as defined by Figure ~~4.18.1~~. 5.5.9-1

iv ~~B~~. Tubes with axially-oriented tube end cracks (TEC) which have been left inservice for the previous cycle shall be inspected with a rotating coil eddy current technique in the area of the TEC and characterized in accordance with topical report BAW-2346P, Rev.0, during all subsequent SG inspection intervals pursuant to ~~4.18.4~~ 5.5.9.d. The results of this examination may be excluded from the first random sample. Tubes with axial TECs identified during previous inspections which meet the criteria to remain in service will not be included when calculating the inspection category of the OTSG.

v ~~B~~. Implementation of the upper tubesheet ODIGA alternate repair criteria requires a 100% bobbin coil inspection of the non-plugged and non-sleeved tubes, spanning the defined region of the upper tubesheet, during all subsequent SG inspection intervals pursuant to ~~4.18.4~~ 5.5.9.d. Tubes with ODIGA identified during previous inspections which meet the criteria to remain in service will not be included when calculating the inspection category for the OTSG. The defined region begins one inch above the upper tubesheet secondary face and ends at the nearest tube roll transition. ODIGA indications detected by the bobbin coil probe shall be characterized using rotating coil probes in accordance with ANO Engineering Report No. 00-R-1005-01.

ANO-402

e 4.18.5 Acceptance Criteria

1 As used in this specification:

i Tubing or Tube means that portion of the tube or sleeve which forms the primary system to secondary system pressure boundary.

ii Imperfection means an exception to the dimensions, finish or contour of a tube from that required by fabrication drawings or specifications. Eddy current testing indications below 20% of the nominal tube wall thickness, if detectable, may be considered as imperfections.

iii Degradation means a service-induced cracking, wastage, wear or general corrosion occurring on either the inside or outside of a tube.

iv Degraded Tube means a tube containing imperfections ≥ 20% of the nominal wall thickness caused by degradation, except where all degradation has been spanned by the installation of a sleeve or repaired by a rerolled joint.

The reroll repair process can be used to repair tubes with defects in the upper and lower tubesheet areas as described in topical report, BAW-2303P, Revision 4.

v % Degradation means the percentage of the tube wall thickness affected or removed by degradation.

vi Defect means an imperfection of such severity that it exceeds the plugging limit except where the imperfection has been spanned by the installation of a sleeve. A tube containing a defect in its pressure boundary is defective.

vii Plugging Limit means the imperfection depth at or beyond 40% of the nominal tube wall thickness for which the tube shall be sleeved, rerolled, or removed from service because it may become unserviceable prior to the next inspection. This does not apply to ODIGA indications within the defined region of the upper tubesheet. These indications shall be assessed for continued plant operation in accordance with ANO Engineering Report No. 00-R-1005-01, Rev. 1.

Axially-oriented TEC indications in the tube that do not extend beyond the adjacent cladding portion of the tube sheet into the carbon steel portion are not included in this definition. These indications shall be assessed for continued plant operation in accordance with topical report BAW-2346P, Rev. 0.

viii Unserviceable describes the condition of a tube if it leaks or contains a defect large enough to affect its structural integrity in the event of an Operating Basis Earthquake, a loss-of-coolant accident, or a steam line or feedwater line break as specified in Specification 4.18/4.c. 5.5.9.d.3 A1

ix Tube Inspection means an inspection of the steam generator tube from the point of entry completely to the point of exit. For tubes that have been repaired by the reroll process within the tubesheets, that portion of the tube outboard of the new roll can be excluded from future periodic inspection requirements because it is no longer part of the pressure boundary once the repair roll is installed.

ANO-402

A2

The surveillance requirements for inspection of the steam generator tubes ensure that the structural integrity of this portion of the RCS will be maintained. The program for inservice inspection of steam generator tubes is based on a modification of Regulatory Guide 1.83, Revision 1. Inservice inspection of steam generator tubing is essential in order to maintain surveillance of the conditions of the tubes in the event that there is evidence of mechanical damage or progressive degradation due to design, manufacturing errors, or inservice conditions that lead to corrosion. Inservice inspection of steam generator tubing also provides a means of characterizing the nature and cause of any tube degradation so that corrective measures can be taken.

In general, steam generator tubes that are degraded beyond the repair limit can either be plugged, sleeved, or rerolled. The steam generator (SG) tubes that are plugged are removed from service by the installation of plugs at both ends of the associated tube and thus completely removing the tube from service. When the tube end cracking (TEC) alternate repair criteria is applied, axially-oriented indications found not to extend from the tube sheet cladding region into the carbon steel region may be left in service under the guidelines of topical report BAW-2346P, Rev. 0. When the upper tubesheet outer diameter intergranular attack (ODIGA) alternate repair criteria is applied, indications found within the defined region of the upper tubesheet may be left in service under the guidelines of ANO Engineering Report No. 00-R-1005-01, Rev. 1. The defined region begins one inch above the upper tubesheet secondary face and ends at the nearest tube roll transition. Following a SG inspection, an operational assessment is performed to ensure primary-to-secondary leak rates will be maintained within the assumptions of the accident analysis.

Degraded steam generator tubes can also be repaired by the installation of sleeves which span the area of degradation and serve as a replacement pressure boundary for the degraded portion of the tube, thus permitting the tube to remain in service.

Degraded steam generator tubes can also be repaired by the rerolling of the tube in the upper or lower tubesheet to create a new roll area and pressure boundary for the tube. The portion of the tube that is outboard of the repair roll is the portion of the tube closest to the primary side of the tubesheet and includes tubing from the tube end up to and including the heel expansion transition. The 1-inch repair roll is considered to be within the pressure boundary. If more than one repair roll is present, the outboard portion includes tubing from the tube end to the heel transition and the beginning of the 1-inch repair roll that is farthest from the primary side of the tubesheet. The rerolling methodology establishes a new pressure boundary inboard of the degradation, thus permitting the tube to remain in service. The degraded tube outboard of the new roll area can be excluded from future periodic inspection requirements because it is no longer part of the pressure boundary once the repair roll is installed in the tubesheet. The rerolling repair process will be used to repair defects in the upper and lower tubesheets in accordance with BAW-2303P, Revision 4.

All tubes which have been repaired using the reroll process will have the new roll area inspected during future inservice inspections. Defective or degraded tube indications found in the new roll and any indications found in the original roll need not be included in determining the Inspection Results Category for the generator inspection.

The reroll repair process can be used to repair tubes with defects in the upper and lower tubesheet areas. Installation of multiple repair rolls in a single tube is acceptable. The new roll area must be free of detectable degradation in order for the repair to be considered acceptable. After the new roll area is initially deemed acceptable, future degradation in the new roll area will be analyzed to determine if the tube is defective and needs to be removed from service or repaired. The reroll repair process is described in the topical report, BAW-2303P, Revision 4.

ANO-402

4.3

5.4 NEW AND SPENT FUEL STORAGE FACILITIES

~~Applicability~~

~~Applies to storage facilities for new and spent fuel assemblies.~~

~~Objective~~

~~To assure that both new and spent fuel assemblies will be stored in such a manner that an inadvertent criticality could not occur.~~

A1

Specification

5.4.1 New Fuel Storage

4.3.1.2.a-e

AND-448

1. New fuel assemblies may be stored in the Fresh Fuel Storage Rack (FFSR). The FFSR consists of ~~a nine by eight array of~~ storage cells on nominal center to center distance of 21 inches in both directions. Ten interior storage cells, as shown in Figure 5.4-1, are precluded from use ~~and will be physically blocked prior to any storage in the fresh fuel rack.~~ This configuration is sufficient to maintain a K_{eff} of less than 0.98 with optimum moderation and 0.95 under normal conditions, which includes an allowance for uncertainties as described in Section 9.6.2.4.3 of the SAR, based on fuel with an enrichment of 4.1 weight percent U-235.

LA1 SAR

LA1 TRM

A3

A1

4.0-01

2. New fuel may also be stored in the spent fuel pool ~~or in its shipping containers.~~

LA1 SAR

4.3.1.1.d
4.3.1.1.e

5.4.2 Spent Fuel Storage

4.3.1.1.b

1. The spent fuel racks are designed and shall be maintained so that the calculated effective multiplication factor is no greater than 0.95 (including all known uncertainties) when the pool is flooded with unborated water as described in Section 9.6.2.4.3 of the SAR.

A1

4.0-01

~~2. The spent fuel pool and the new fuel pool racks are designed as seismic Class I equipment.~~

LA1 SAR

~~REFERENCES~~

~~FSAR, Section 9.6~~

A1

<Add 4.3.1.1.c>

M1

<Add 4.3.2 & 4.3.3>

M2

4.0-02

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CTS

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.5.1	----------NOTE---------- Only required to be performed when specified in LCO 3.1.8, "PHYSICS TESTS Exceptions—MODE 1," or when complying with Required Actions of LCO 3.1.4, "CONTROL ROD Group Alignment Limits"; LCO 3.2.1, "Regulating Rod Insertion Limits"; LCO 3.2.2, "AXIAL POWER SHAPING ROD (APSR) Insertion Limits"; LCO 3.2.3, "AXIAL POWER IMBALANCE Operating Limits"; LCO 3.2.4, "QUADRANT POWER TILT (QPT)." ----------	NA
	Verify ~~$F_Q(Z)$ and $F^N_{\Delta H}$ are~~ LHR is within limits by using the Incore Detector System to obtain a power distribution map.	As specified by the applicable LCO(s)

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LCO 3.1.6, "Axial Power Shaping Rod (APSR) Alignment Limits";

(31)

4.1.d

(1) CTS

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY	
SR 3.3.8.1	Perform CHANNEL CHECK.	7 days ~~12 hours~~ (2)	T4.1-1 #37
SR 3.3.8.2	----------NOTE---------- When ~~EDG~~ LOPS instrumentation is placed in an inoperable status solely for performance of this Surveillance, entry into associated Conditions and Required Actions may be delayed ~~as follows: (a) up to 4 hours for the degraded voltage Function, and (b)~~ up to 4 hours for the loss of voltage Function, provided the ~~two~~ channels monitoring the Function for the bus ~~are~~ is OPERABLE ~~or tripped~~. (3) one remaining relay ---------- Perform ~~CHANNEL FUNCTIONAL TEST~~.	18 months ~~31 days~~	NA T4.1-1 #37
~~SR 3.3.8.3~~	~~Perform~~ CHANNEL CALIBRATION with setpoint Allowable Value as follows: a. Degraded voltage ≥ [ ] (423.2 V) and ≤ [ ] (436.0) V with a time delay of [ ] seconds ± [ ] (1) seconds ~~at [ ] V~~; and (B) b. Loss of voltage ≥ [ ] (1600 V) and ≤ [ ] (2000) V with a time delay of [ ] seconds ± [ ] seconds ~~at [ ] V~~ (≥ 0.30) (and ≤ 0.98) (5)	~~18 months~~ (2)	3.5.1.8

RAI 3.3.8-02

ANO-399

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CTS

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.10 Pressurizer Safety Valves

LCO 3.4.10 Two pressurizer safety valves shall be OPERABLE ~~with lift settings ≥ [2475] psig and ≤ [2525] psig.~~ 2.2.2 3.1.1.3.A (2)

3.4B-23

<INSERT 3.4-18A>

APPLICABILITY: MODES 1, 2, and 3, 3.1.1.3.A 3.1.1.3.B
MODE 4 with ~~all~~ RCS ~~cold leg~~ temperature ≥ ~~[283]~~ 262 °F. (3)

NA

the applicable portion of MODE 4

NOTE
2. The lift settings are not required to be within ~~the LCO~~ limits for entry into MODES 3 and ~~4~~ for the purpose of setting the pressurizer safety valves under ambient (hot) conditions. This exception is allowed for ~~[36]~~ 2 hours following entry into MODE 3 provided a preliminary cold setting was made prior to heatup. (4)

1. Only one pressurizer safety valve is required to be OPERABLE in MODE 3, and in MODE 4 with RCS temperature > 262°F. 3.1.1.3.B (3)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME	
A. One pressurizer safety valve inoperable in MODES 1 or 2.	A.1 Restore valve to OPERABLE status.	15 minutes	3.1.1.3.A
B. Required Action and associated Completion Time not met. of Condition A	B.1 Be in MODE 3.	6 hours	3.1.1.3.A NA
OR	~~AND~~ ~~B.2~~ C.1 Be in MODE 4 with ~~any~~ RCS ~~cold leg~~ temperature ≤ ~~[283]~~ 262 °F.	~~12~~ 18 hours ~~24~~	36
Two pressurizer safety valves inoperable in MODES 1 or 2.			3
C. Required pressurizer safety valve inoperable in MODE 3, or MODE 4 with RCS temperature > 262 F.			NA (3)

AWO-249
AWO-368

CTS

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Core Flood Tanks (CFTs)

LCO 3.5.1 Two CFTs shall be OPERABLE. 3.3.3(A)(B)(C) 3.3.4(D)

APPLICABILITY: MODES 1 and 2,
MODE 3 with Reactor Coolant System (RCS) pressure > ~~1750~~ 800 psig. 3.3.3

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME	
A. One CFT inoperable due to boron concentration not within limits.	A.1 Restore boron concentration to within limits.	72 hours	N/A
B. One CFT inoperable for reasons other than Condition A.	B.1 Restore CFT to OPERABLE status.	1 hour	3.3.6
C. Required Action and associated Completion Time of Condition A or B not met. OR	C.1 Be in MODE 3. AND C.2 Reduce RCS pressure to ≤ ~~1750~~ 800 psig.	6 hours 12 ~~12~~ hours	3.3.6
~~D.~~ Two CFTs inoperable.	~~D.1 Enter LCO 3.0.3.~~	~~Immediately~~	N/A 7

ANO-41D

CTS

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.3 ECCS—Shutdown

LCO 3.5.3 Two LPI ~~One ECCS~~ trains shall be OPERABLE. (12)

3.3.1 (D)
3.3.1 (E)
3.3.1 (H)
3.3.1 (I)
3.3.4 (D)

~~NOTE~~
~~High pressure injection (HPI) may be de-activated in accordance with LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System."~~ (12)

<INSERT 3.5-7A – NOTE> —>> (12) N/A

APPLICABILITY: MODE 4, MODE 3 with RCS temperature ≤ 350°F, (12) 3.3.1

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Two LPI trains ~~Required ECCS decay heat removal (DHR) loop~~ inoperable.	C.1 Initiate action to restore ~~required ECCS DHR loop~~ to OPERABLE status. one LPI train	Immediately
A. One LPI train ~~Required ECCS HPI subsystem~~ inoperable.	A.1 Restore LPI train ~~required ECCS HPI subsystem~~ to OPERABLE status.	48 hours (12) 3.3.6
B. ~~E.~~ Required Action and associated Completion Time of Condition ~~B~~ A not met.	B.1 Be in MODE 5.	24 hours 3.3.6

move

AND-405

------ NOTE ------
Only required if one DHR train is operable

INSERT

AND

C.2 ------ NOTE ------
Only required if one DHR train is OPERABLE.

Be in MODE 5. 24 hours.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.6.1	Verify CST ~~level~~ volume is ≥ ~~1250,000~~ 267,000 gal. ✓ lons	12 hours

edit NA

when required for both units and ≥ 107,000 gallons when only required for Unit 1.

AN0-420

3.8.5-01

CTS
NA

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources—Shutdown

ANO-438

LCO 3.8.5 DC electrical power subsystem shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown."

APPLICABILITY: MODES 5 and 6,
During movement of irradiated fuel assemblies.

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NOTE
LCO 3.0.3 is not applicable. (55)

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ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required DC electrical power subsystems inoperable.	~~A.1 Declare affected required feature(s) inoperable.~~	~~Immediately~~
	OR	
	A.~~1~~2.1 Suspend CORE ALTERATIONS.	Immediately (56)
	AND	
	A.~~2~~1.2 Suspend movement of irradiated fuel assemblies.	Immediately
	AND	
Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	A.~~3~~1.3 ~~Initiate action to suspend operations involving positive reactivity additions.~~	Immediately (62)
	AND	
		(continued)

ANO-442

a. Two Red Train inverters (Y11 and Y13, Y11 and Y15, or Y13 and Y15),
b. Two Green Train inverters (Y22 and Y24, Y22 and Y25, or Y24 and Y25), and
c. Inverter Y28

CTS

NA

3.8 ELECTRICAL POWER SYSTEMS

3.8.7 Inverters—Operating

LCO 3.8.7 The required Train A and Train B inverters shall be OPERABLE.

following

65

ANO-442

of the four inverters required by LCO 3.8.7.a and LCO 3.8.7.b

load transfer to or from the swing inverter,

NOTE

[One [two] inverter[s]] may be disconnected from [its [their]] associated DC bus for ≤ 24 hours to perform an equalizing charge on [its [their] associated [common] battery], provided:

45

a. The associated AC vital bus[es] [is [are]] energized from [its [their] [Class 1E constant voltage source] alternate transformers] [inverter using internal AC source]; and

120 V

three 120 V

b. All other AC vital buses are energized from their associated OPERABLE inverters.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One [required] inverter inoperable.	A.1 NOTE Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating" with any vital bus de-energized.	
	Restore inverter to OPERABLE status.	24 hours AND 96 hours from discovery of failure to meet LCO.
B. Inverter Y28 inoperable	B.1 NOTE Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating" with 120 VAC bus C540 de-energized. Restore inverter to OPERABLE status.	72 hours AND 96 hours from discovery of failure to meet LCO.

of the four inverters required by LCO 3.8.7.a and LCO 3.8.7.b

of the 120 VAC buses RS1, RS2, RS3, or RS4

edit

65

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ANO-295

ANO-442

(continued)

CTS
N/A

ANO-442

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time not met. OR Two or more of the inverters required by LCO 3.8.7.a and LCO 3.8.7.b inoperable.	D.1 Be in MODE 3. AND D.2 Be in MODE 5.	12 hours (36) 36 hours

(65)

3.8.7-01
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SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.7.1	Verify correct inverter voltage, frequency, and alignment to required (associated) AC vital buses: RS1, RS2, RS3, RS4, and CS40. (120 VAC)	7 days

edit

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C. Inverter Y28 inoperable AND One of the two Red Train inverters required by LCO 3.8.7.a inoperable	C.1 Restore one inverter to OPERABLE status.	2 hours

3.8.8-01

CTS

NA

3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Inverters—Shutdown

ANO-438

LCO 3.8.8 Inverters shall be OPERABLE to support the onsite Class 1E AC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown."

APPLICABILITY: MODES 5 and 6,
During movement of irradiated fuel assemblies.

ANO-365

ACTIONS

NOTE
LCO 3.0.3 is not applicable

55

ANO-438

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required inverters inoperable.	A.1 Declare affected required feature(s) inoperable.	Immediately
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend movement of irradiated fuel assemblies.	Immediately
	AND	
	A.2.3 Initiate action to suspend operations involving positive reactivity additions.	Immediately
	AND	
		(continued)

56

62

Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.

ANO-442

C. 120 VAC electrical power distribution subsystem C540 inoperable.	C.1 Enter applicable Conditions and Required Actions of LCO 3.3.11, "Emergency Feedwater Initiation and Control (EFIC) System Instrumentation," LCO 3.3.15, "Post Accident Monitoring (PAM) Instrumentation," and LCO 3.4.14, "RCS Pressure Isolation Valve (PIV) Leakage."	Immediately

CTS

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems—Operating

ANO-442

LCO 3.8.9 Two ~~Train A and Train B~~ AC, DC, and 120 VAC ~~AC vital bus~~ electrical power distribution subsystems shall be OPERABLE. edit 3.7.1.B

APPLICABILITY: MODES 1, 2, 3, and 4. 3.7.1 3.7.2.A

ACTIONS

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CONDITION	REQUIRED ACTION	COMPLETION TIME	
A. One or more AC electrical power distribution subsystem(s) inoperable.	A.1 Restore AC electrical power distribution subsystem(s) to OPERABLE status. (5) ----- NOTE ----- Enter applicable Conditions and Required Actions of LCO 3.4.14, "RCS Pressure Isolation Valve (PIV) Leakage" if 120 VAC bus C540 is de-energized.	8 hours AND 16 hours from discovery of failure to meet LCO	47 3.7.2.D NA 65
B. One or more 120 VAC ~~AC vital bus~~ inoperable. electrical power distribution subsystem(s) (RS1, RS2, RS3, RS4)	insert B.1 Restore 120 VAC ~~AC vital bus~~ subsystem(s) to OPERABLE status. (5) electrical power distribution	8 ~~2~~ hours AND 16 hours from discovery of failure to meet LCO	13 edit 3.7.2.D 35 NA 47
Insert D. One or more DC electrical power distribution subsystem(s) inoperable.	D.1 Restore DC electrical power distribution subsystem(s) to OPERABLE status. (5)	8 hours AND 16 hours from discovery of failure to meet LCO	47 3.7.2.F 13 NA

(continued)

CTS

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME	
E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3.	6 hours (12)	3.7.2.A 3.7.2.D 3.7.2.F
	AND		
	E.2 Be in MODE 5.	36 hours	3.7.2.A 3.7.2.D 3.7.2.F
F. Two or more electrical power inoperable distribution subsystems that result in a loss of function.	F.1 Enter LCO 3.0.3	Immediately	3.7.2.A (47)

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ANO-442

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY	
SR 3.8.9.1	Verify correct breaker alignments and voltage to required AC, DC, and AC vital bus electrical power distribution subsystems. (120 VAC)	7 days	NA edit (43)

ANO-442 3.8.9-03

NUREG-1430 Bases Markup Pages

BASES

ACTIONS

B.2 (continued)

time period and the number of steps required to complete this Action.

B.3

Continued operation with $F^N_{\Delta H}$ exceeding its limit is not permitted, because the initial conditions assumed in the accident analyses are no longer valid. The required Completion Time of 24 hours to restore $F^N_{\Delta H}$ within its limit at the reduced THERMAL POWER level is reasonable based on the low probability of a limiting event occurring simultaneously with $F^N_{\Delta H}$ exceeding its limit. In addition, this Completion Time precludes long term depletion with an unacceptably high local power and limits the potential for inducing an adverse perturbation in the radial xenon distribution. 31

B.1 C.1

If a THERMAL POWER reduction is not sufficient to restore $F_Q(Z)$ or $F^N_{\Delta H}$ within its limit (i.e., the Required Actions and associated Completion Times for Condition A or B are not met), then THERMAL POWER operation should cease. The reactor is placed in MODE 2 in which this LCO does not apply. The required Completion Time of 2 hours is a reasonable amount of time for the operator to reduce THERMAL POWER in an orderly manner and without challenging plant systems. 31 23 4 7 edit

be significantly reduced

1 with THERMAL POWER ≤ 20% RTP where

unit

SURVEILLANCE REQUIREMENTS

SR 3.2.5.1

power distribution

Core monitoring is performed using the Incore Detector System to obtain a three dimensional power distribution map. Maximum values of $F_Q(Z)$ and $F^N_{\Delta H}$ obtained from this map may then be compared with the $F_Q(Z)$ and limits in the COLR to verify that the limits have not been exceeded. Measurement of the core power peaking factors in this manner may be used to verify that the measured values of $F_Q(Z)$ and $F^N_{\Delta H}$ remain within their specified limits when one or more of the limits specified by LCO 3.1.4, LCO 3.2.1, LCO 3.2.2, LCO 3.2.3, or LCO 3.1.6, 31

LHR

distribution

LHR

Minimum DNBR values of DNB margins determined from the core power distribution mapping may also be compared to their limits or correlated to LHR values to verify that the limits have not been exceeded.

ANO-355

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.2.5.1 (continued)

the local LHRs

LCO 3.2.4 is exceeded, or when LCO 3.1.8 is applicable. If $F_Q(Z)$ and $F^N_{\Delta H}$ remain within their limits when one or more of these parameters exceed their limits, operation at THERMAL POWER may continue because the true initial conditions (the power peaking factors) remain within their specified limits.

Core distribution

ANO-355

Because the limits on $F_Q(Z)$ and $F^N_{\Delta H}$ are preserved when the parameters specified by LCO 3.1.4, LCO 3.2.1, LCO 3.2.2, LCO 3.2.3, and LCO 3.2.4 are within their limits, a Note is provided in the SR to indicate that monitoring of the power peaking factors is required only when complying with the Required Actions of these LCOs and when LCO 3.1.8 is applicable.

LCO 3.1.6, LHR

Core local LHRs

Frequencies for monitoring of the power peaking factors are specified in the Action statements of the individual LCOs. These Frequencies are reasonable based on the low probability of a limiting event occurring simultaneously with either $F_Q(Z)$ or $F^N_{\Delta H}$ exceeding its limit, and they provide sufficient time for the operator to obtain a power distribution map from the Incore Detector System. Indefinite THERMAL POWER operation in a Required Action of LCO 3.1.4, LCO 3.2.1, LCO 3.2.2, LCO 3.2.3, or LCO 3.2.4 is not permitted, in order to limit the potential for exceeding both the power peaking factors assumed in the accident analyses due to operation with unanalyzed core power distributions and spatial xenon distributions beyond their analyzed ranges.

31

ANO-355

LCO 3.1.6, because the core local LHRs are within

Core local LHRs

Core power distributions and spatial xenon distributions

REFERENCES

1. 10 CFR 50.46.

2. BAW-10179P-A, "Safety Criteria and Methodology for Acceptable Cycle Reload Analyses," Rev 2, October 1997. 31

3. 10 CFR 50.36 10

BASES

BACKGROUND

Reactor Coolant System Pressure (continued)

digital

(actuation channels A and B) of identical and independent channels. These two sets of HPI channels each use three logic channels used in two-out-of-three coincidence networks for HPI Actuation. The outputs of the three bistables associated with the Low Low RCS Pressure [500 psig] trip drive relays in two sets (actuation channels A and B) of identical and independent channels. These two sets of LPI channels each use three logic channels used in two-out-of-three coincidence networks for LPI Actuation. The outputs of the three Low Low RCS Pressure bistables also trip the drive relays in the corresponding HPI Actuation channel as previously described.

digital logic

INSERT B3.3-49A

Reactor Building Pressure

INSERT B 3.3-49B

RB pressure inputs to the ESFAS are provided by 12 pressure switches. Six pressure switches are used for the High RB Pressure Parameter, and six pressure switches are used for the High High Pressure Parameter.

The output contacts of six High RB Pressure switches are used in two sets of identical and independent actuation trains. These two trains each use three logic channels. The outputs of these channels are used in two-out-of-three coincidence networks. The output contacts of the six RB pressure switches also trip the drive relays in the corresponding HPI and LPI Actuation channels as previously described.

The output contacts of six High High RB Pressure switches are used in two sets of identical and independent actuation trains. These two trains each use three logic channels (RB4, RB5, and RB6). The outputs of these channels are used in two-out-of-three coincident networks for RB Spray Actuation. Each high high pressure train actuates one RB Spray train when the High High RB signal and the HPI signal are coincident in that train.

Trip Setpoints and Allowable Values

Trip setpoints are the nominal value at which the bistables are set. Any bistable is considered to be properly adjusted

(continued)

AWO-408

BASES

BACKGROUND Trip Setpoints and Allowable Values (continued)

when the "as left" value is within the band for CHANNEL CALIBRATION accuracy (i.e., ± [rack calibration + comparator setting accuracy]).

The trip setpoints used in the bistables are based on the analytical limits stated in Figure [ ], FSAR, Chapter [ ] (Ref. 3). The selection of these trip setpoints is such that adequate protection is provided when all sensor and processing time delays are taken into account. To allow for calibration tolerances, instrumentation uncertainties, instrument drift, and severe environment induced errors for those ESFAS channels that must function in harsh environments as defined by 10 CFR 50.49 (Ref. 2), the Allowable Values specified in Table 3.3.5-1 in the accompanying LCO are conservatively adjusted with respect to the analytical limits. A detailed description of the methodology used to calculate the trip setpoints, including their explicit uncertainties, is provided in the "Unit Specific Setpoint Methodology" (Ref. 3). The actual nominal trip setpoint entered into the bistable is more conservative than that specified by the Allowable Value to account for changes in random measurement errors detectable by a CHANNEL FUNCTIONAL TEST. One example of such a change in measurement error is drift during the surveillance interval. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value.

Setpoints, in accordance with the Allowable Values, ensure that the consequences of DBAs will be acceptable, providing the unit is operated from within the LCOs at the onset of the DBA and the equipment functions as designed.

Each channel can be tested online to verify that the setpoint accuracy is within the specified allowance requirements of Reference 3. Once a designated channel is taken out of service for testing, a simulated signal is injected in place of the field instrument signal. The process equipment for the channel in test is then tested, verified, and calibrated.

The Allowable Values listed in Table 3.3.5-1 are based on the methodology described in FSAR, Chapter [14] (Ref. 4), which incorporates all of the known uncertainties applicable for each channel. The magnitudes of these uncertainties are

(continued)

B 3.3 INSTRUMENTATION

B 3.3.8 Emergency Diesel Generator (EDG) Loss of Power Start (LOPS)

BASES

BACKGROUND

The EDGs provide a source of emergency power when offsite power is either unavailable or is insufficiently stable to allow safe unit operations of safety related loads. Undervoltage protection will generate a LOPS in the event a loss of voltage or degraded voltage condition occurs on unit vital buses. ~~in the switchyard.~~ There are two LOPS Functions for each 4.16 kV vital bus.

Two ~~Three~~ undervoltage relays with inverse voltage time characteristics are provided on each 4.16 kV Class 1E instrument bus for the purpose of detecting a sustained undervoltage condition or a loss of bus voltage. ~~The relays are combined in a two-out-of-three logic to generate a LOPS if the voltage is below 75% for a short time or below 90% for a long time.~~ The LOPS ~~initiated ACTIONS are~~ is further described in UFSAR, Section ~~8.3~~ 8.3.1 (Ref. 1).

INSERT B3.3-72A

Trip Setpoints and Allowable Value

The trip setpoints used in the bistables relays are based on the analytical limits presented in accident analysis in UFSAR, Chapter 15 (Ref. 2). The selection of these trip setpoint values is such that adequate protection is provided when all sensor and processing time delays are taken into account. ~~The actual nominal trip setpoint entered into the bistable is more conservative than that required by the unit specific setpoint calculations.~~ A channel is inoperable if its actuation trip setpoint is not within its required Allowable Value.

Allowable Values associated with consistent with Section 8.3.1 (Ref. 1).

~~Setpoints in accordance with the Allowable Value will assure that limits of Chapter 2.0, "Safety Limits," in the Technical Specifications are not violated during anticipated operational occurrences (AOOs); that the consequences of accidents will be acceptable, providing the unit is operated from within the LCOs at the onset of the AOO or accident; and that the equipment functions as designed.~~

~~The undervoltage protection scheme has been designed to protect the unit from spurious trips caused by the offsite power source. This is made possible by the inverse voltage~~

ANO 399

ANO-224

(continued)

<INSERT B 3.3-72A>

ANO-399

ANO-359

The relay Allowable Values are based on a maximum setting, which is below the lowest allowed motor terminal momentary voltage of 75% of motor voltage rating of 4000 V. The Allowable Values are adjusted to include channel uncertainties and calibration tolerances. Upon loss of power to either of these relays, in approximately 1.0 second, load shedding and starting of the associated DG are initiated. Isolation of the safety related buses is delayed approximately 2.0 seconds to allow an automatic transfer to offsite power. The safety related bus is isolated only if the transfer is unsuccessful.

ANO-359

ANO-399

Two definite time undervoltage relays are provided on each safety related 480 V load center bus with a coincident trip logic (2 out of 2) for the purpose of detecting a sustained undervoltage condition. The undervoltage relay Allowable Values on the 480 V bus are based on long term motor voltage requirements plus the maximum feeder voltage drop allowance resulting in a nominal setting of 92% of the motor rated voltage of 460 V. The Allowable Values are adjusted to include channel uncertainties and calibration tolerances. Upon voltage degradation to 92% of 460 V and after a delay of approximately 8 seconds, both relays must operate to isolate the associated safety related 4.16 kV bus from offsite power, and start and connect the associated DG. The relays are delayed 8.0 seconds to prevent spurious operation of the relays when large motors start on the safety related 4.16 kV and 480 V buses.

<INSERT B 3.3-75A>

ANO-399

ANO-359

The LOPS relay Allowable Values are based on the short term starting voltage protection as well as long term running voltage protection. The 4.16 kV undervoltage relay Allowable Values are based on a maximum setting, which is below the lowest allowed motor terminal momentary voltage of 75% of motor rated voltage of 4000 V. The 480 V undervoltage relay Allowable Values are based on long term motor voltage requirements plus the maximum feeder voltage drop allowance resulting in a nominal 92% setting of the motor rated voltage of 460 V. The Allowable Values for both the 4.16 kV and 480 V relays include adjustments for channel uncertainties and calibration tolerances.

<INSERT B 3.3-117A>

Engineered Safeguards Actuation System (ESAS) actuation and on Diverse Reactor Overpressure Protection System (DROPS) actuation.

<INSERT B 3.3-117B>

ANO-411

The EFIC System is also responsible for sending open or close signals to the EFW control and isolation valves. SAR Section 7.1.4 (Ref. 1), describes the EFIC vector logic. The vector logic outputs are in a neutral state (neither commanding open nor close) until an enable signal is received from either train "A" or "B" of EFW Initiation. The EFIC Logic monitors the train A and B EFW Initiation logics. When an EFW Initiation occurs, the vector logic is enabled to generate open or close signals to the EFW isolation valves and close signals to the EFW control valves depending on the relative values of SG pressures. The level control module provides input to the flow controllers which control the position of the EFW control valves.

ANO-412

Additional information relating to EFIC initiation and logics may be referenced in the Bases for LCO 3.3.11, "EFIC Instrumentation." (9)

 (9)

BASES

ANO-412

APPLICABLE SAFETY ANALYSES (continued)

<INSERT B3.3-124C>

~~60 seconds. This function would be automatically performed by EFIC. Therefore, the FSAR analysis remains conservative relative to the inclusion of the vector valve logic.~~

~~EFW vector valve logic response time is included in the required response time for each EFW actuation initiation function instrumentation and is not specified separately.~~

~~The EFIC—EFW—vector valve logic satisfies Criterion 3 of the NRC Policy Statement.~~ (9)

LCO

Four channels of the EFIC ~~EFW~~ vector ~~valve~~ logic module are required to be OPERABLE. The necessity for four channels is discussed in the BASES for ACTIONS. The 600 psig and ~~125~~ 100 psid setpoints were chosen as discussed in Specification B 3.3.11, "EFIC ~~System~~ Instrumentation." The feed only good generator verification study assumed a differential pressure vector value of 150 psid. ~~The~~ A ~~125~~ 100 psid setpoint conservatively assumes a ~~25 psi~~ margin for instrument error. Failure to meet this LCO results in not being able to meet the single-failure criterion. (9) (9) edit

50 psi (25 psi per pressure channel)

<INSERT B33-124A>

APPLICABILITY

<INSERT B3.3-124B>

~~EFIC—EFW—vector valve logic is required in MODES 1, 2, and 3 because the SGs are relied on in these MODES for required RCS heat removal. In MODES 4, 5, and 6, heat removal requirements are reduced and may be provided by the Decay Heat Removal System. Therefore, vector valve logic is not required to be OPERABLE in these MODES.~~ (11)

ACTIONS

A.1

EFIC The function of the ~~EFIC~~ EFW control/isolation valves and the vector ~~valve~~ logic is to meet the single-failure criterion while maintaining the capability to: (9)

a. Provide EFW on demand; and

b. Isolate an SG when required.

(continued)

<INSERT B 3.3-124A>

These values (i.e., 600 psig and 100 psid) do contain an allowance for instrument error.

<INSERT B 3.3-124B>

The EFIC Vector Logic shall be OPERABLE when the associated EFIC Instrumentation EFW Vector Valve Control Function is required to be OPERABLE in accordance with Table 3.3.11-1. The EFW Vector Valve Control Function is required to be OPERABLE in MODES 1 and 2, and in MODE 3 with SG pressure ≥ 750 psig because the SG inventory can contribute significantly to the reactor building peak pressure with a secondary side break. Both the normal feedwater and the EFW must be able to be isolated on each SG to limit overcooling of the primary and to limit mass and energy releases to the reactor building. Once the SG pressures have decreased below 750 psig, the energy level is low and the secondary side feedwater flow rate is low or nonexistent. Also, the primary system temperatures are typically too low to allow the SGs to effectively remove energy, or are sufficiently low to allow for operator action. Therefore, EFIC Vector Logic is not required to be OPERABLE in MODE 3 below 750 psig nor in MODES 4, 5, and 6.

ANO-412 **<INSERT B 3.3-124C>**

The SAR SLB analyses, SAR Section 14.2.2.1 (Ref. 3), consider isolation of the affected SG as a function automatically performed by the EFIC System. The EFIC Vector Logic utilizes the EFW Vector Valve Control Functions (i.e., SG Pressure—Low and SG Differential Pressure—High) to determine which steam generator is associated with the rupture and provide appropriate isolation.

<INSERT B3.4-24A>

ANO-247

ANO-369

Suspending the introduction of coolant into the RCS of coolant with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations.

<INSERT B3.4-24B>

This SR is modified by a Note that states the SR is not required to be performed until 24 hours after a required pump is not in operation.

<INSERT B3.4-28A>

This Required Action is modified by a Note which indicates that the unit must be placed in MODE 5 only if a DHR loop is OPERABLE. With no DHR loop OPERABLE, the unit is in a condition with only limited cooldown capabilities. Therefore, the actions are to be concentrated on restoration of a DHR loop, rather than a cooldown of extended duration.

<INSERT B3.4-28B>

ANO-247

ANO-369

Suspending the introduction of coolant into the RCS of coolant with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations.

<INSERT B3.4-28C>

Alternatively, verification that a pump is in operation also verifies proper breaker alignment and power availability.

<INSERT B3.4-28D>

This SR is modified by a Note that states the SR is not required to be performed until 24 hours after a required pump is not in operation.

<INSERT B3.4-33A>

ANO-247

ANO-369

Suspending the introduction of coolant into the RCS of coolant with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations.

<INSERT B3.4-37A>

ANO-247

introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1

<INSERT B3.4-37B>

ANO-247

ANO-369

Suspending the introduction of coolant into the RCS of coolant with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations.

BASES

APPLICABILITY (continued)

In MODE 3 with RCS pressure ≤ ~~[illegible]~~ 800 psig, and in MODES 4, 5, and 6, the CFT motor operated isolation valves ~~[illegible]~~ may be closed to isolate the CFTs from the RCS. This allows RCS cooldown and depressurization without discharging the CFTs into the RCS or requiring depressurization of the CFTs. edit edit

<<INSERT B3.5-6A>> 15

ACTIONS

A.1

If the boron concentration of one CFT is not within limits, ~~it must be returned to within the limits within 72 hours. In this condition,~~ the ability to maintain subcriticality may be reduced, but the effects of reduced boron concentration on core subcriticality during reflood are minor. Boiling of the ECCS water in the core during reflood concentrates the boron in the saturated liquid that remains in the core. In addition, the volume of the CFT is still available for injection. Since the boron requirements are based on the average boron concentration of the total volume of two CFTs, the consequences are less severe than they would be if the contents of a CFT were not available for injection. Thus, 72 hours is allowed to return the boron concentration to within limits. edit

B.1

If one CFT is inoperable for a reason other than boron concentration, ~~the CFT must be returned to OPERABLE status within 1 hour. In this condition~~ it cannot be assumed that the CFT will perform its required function during a LOCA. Due to the severity of the consequences should a LOCA occur in these conditions, the 1 hour Completion Time to open the valve, remove power to the valve, or restore the proper water volume or nitrogen cover pressure ensures that prompt action will be taken to return the inoperable CFT to OPERABLE status. The Completion Time minimizes the time the ~~plant~~ unit is potentially exposed to a LOCA in these conditions. edit edit

ANO-4/3

C.1 and C.2

Times of Condition A or B are not met, Or if both CFTs are inoperable,

If the ~~CFT cannot be returned to OPERABLE status within the~~ Required Actions and associated Completion ~~Time~~ Times, the ~~plant~~ unit must be brought to a MODE in which the LCO does not apply. To achieve this edit edit 7

(continued)

BASES

ACTIONS

C.1 (continued)

the LPI pumps and heat exchangers. The Completion Time of immediately, which would initiate action to restore at least one LPI to OPERABLE status, ensures that prompt action is taken to restore the required capacity. Normally, in MODE 4, reactor decay heat must be removed by an LPI train operating with suction from the RCS. If no LPI train is OPERABLE for this function, reactor decay heat must be removed by some alternate method, such as use of the steam generator(s). The alternate means of heat removal must continue until the inoperable LPI trains can be restored to operation so that continuation of decay heat removal (DHR) is provided.

With both DHR pumps and heat exchangers inoperable, it would be unwise to require the to go to MODE 5, where the only available heat removal system is the LPI trains operating in the DHR mode. Therefore, the appropriate action is to initiate measures to restore one ECCS LPI and to continue the actions until the is restored to OPERABLE status.

<< INSERT 3.5-22A >>

A.1

If is due to the the is not prepared to provide response to Events requiring ESFAS. The hour Completion Time to restore subsystem to OPERABLE status ensures that prompt action is taken to provide the required cooling capacity or to initiate actions to place the in MODE 5, where an train is not required.

B.1

When the Required Action of Condition B a controlled should be initiated. The allowed Completion Time of 24 hours is reasonable, based on operating experience, to reach MODE 5 from in an orderly manner and without challenging systems.

MODE 3 with RCS temperature ≤ 350°F

<< INSERT B3.5-22B >>

(continued)

<INSERT B3.5-22A>

C.2

Required Action C.2 requires that the unit be placed in MODE 5 within 24 hours. This Required Action is modified by a Note that states that this Required Action is only required to be performed if one DHR train is OPERABLE. This Required Action provides for those circumstances where the LPI trains may be inoperable but are otherwise capable of providing the necessary decay heat removal. Under this circumstance, the prudent action is to remove the unit from the Applicability of the LCO and place the unit in a stable condition in MODE 5. The Completion Time of 24 hours is reasonable, based on operating experience, to reach MODE 5 in an orderly manner and without challenging unit systems.

ANO-405

<INSERT B3.5-22B>

This Required Action is modified by a Note that states that this Required Action is only required to be performed if one DHR train is OPERABLE. With both DHR pumps and heat exchangers inoperable, it would be unwise to require the unit to go to MODE 5, where the only available heat removal system is the LPI trains operating in the DHR mode. Therefore, the appropriate action is to initiate measures to restore one ECCS LPI train and to continue the actions until the train is restored to OPERABLE status.

BASES (continued)

APPLICABILITY

(Insert B36-184)

In MODES 1, 2, 3, and 4, a DBA could cause a release of radioactive material to containment. In MODES 5 and 6, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Therefore, the containment isolation valves are not required to be OPERABLE in MODE 5. The requirements for containment isolation valves during MODE 5 and 6 are addressed in LCO 3.9.3, "Containment Penetrations." (Primarily related to movement of irradiated fuel in the reactor building)

edit

ACTIONS

The ACTIONS are modified by a Note allowing penetration flow paths, except for [48] inch purge valve penetration flow paths, to be unisolated intermittently under administrative controls. These administrative controls consist of stationing a dedicated operator (individual) at the valve controls, who is in continuous communication with the control room. In this way, the penetration can be rapidly isolated when a need for containment isolation is indicated. Due to the size of the containment purge line penetration and the fact that those penetrations exhaust directly from the containment atmosphere to the environment, the penetration flow paths containing these valves may not be opened under administrative controls. A single purge valve in a penetration flow path may be opened to effect repairs to an inoperable valve, as allowed by SR 3.6.3.1.

Due to ALARA Concerns, it is permissible for the dedicated individual to be stationed in a nearby lower dose area, provided the intent of rapidly isolating the penetration is retained.

3.6.3-19

3.6.3-20

A second Note has been added to provide clarification that, for this LCO, separate Condition entry is allowed for each penetration flow path. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable containment isolation valve. Complying with the Required Actions may allow for continued operation, and subsequent inoperable containment isolation valves are governed by subsequent Condition entry and application of associated Required Actions.

edit

The ACTIONS are further modified by a third Note, which ensures appropriate remedial actions are taken, if necessary, if the affected systems are rendered inoperable by an inoperable containment isolation valve.

ANO-361

In the event isolation valve leakage results in exceeding the overall containment (reactor building) leakage rate, Note 4 directs entry

(continued)

1

BASES

ANO-361

ACTIONS (continued)

into the applicable Conditions and Required Actions of LCO 3.6.1.

A.1 and A.2

In the event one containment isolation valve in one or more penetration flow paths is inoperable (except for purge valve leakage not within limit), the affected penetration flow path must be isolated. The method of isolation must include the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and de-activated automatic containment isolation valve, a closed manual valve, a blind flange, and a check valve with flow through the valve secured. For a penetration isolated in accordance with Required Action A.1, the device used to isolate the penetration should be the closest available one to containment. Required Action A.1 must be completed within the 4 hour Completion Time. The specified time period is reasonable, considering the time required to isolate the penetration and the relative importance of supporting containment OPERABILITY during MODES 1, 2, 3, and 4.

7

38

48

For affected penetration flow paths that cannot be restored to OPERABLE status within the 4 hour Completion Time and that have been isolated in accordance with Required Action A.1, the affected penetration flow paths must be verified to be isolated on a periodic basis. This periodic verification is necessary to ensure that containment penetrations required to be isolated following an accident and no longer capable of being automatically isolated will be in the isolation position should an event occur. This Required Action does not require any testing or device manipulation. Rather, it involves verification, through a system walkdown, that those isolation devices outside containment and capable of being mispositioned are in the correct position. The Completion Time of "once per 31 days for isolation devices outside containment" is appropriate considering the fact that the devices are operated under administrative controls and the probability of their misalignment is low. For the isolation devices inside containment, the time period specified as "prior to entering MODE 4 from MODE 5 if not performed within the previous

(continued)

B 3.7 PLANT SYSTEMS

B 3.7.2 Main Steam Isolation Valves (MSIVs)

BASES

BACKGROUND

The MSIVs isolate steam flow from the main steam secondary side of the steam generators following a high energy line break (HELB). MSIV closure terminates flow from the unaffected (intact) steam generator. edit

One MSIV is located in each main steam line outside of, but close to, the reactor building containment. The MSIVs are downstream from the main steam safety valves (MSSVs) and emergency feedwater pump turbine's steam supply to prevent their being isolated from the steam generators by MSIV closure. Closing the MSIVs isolates each steam generator from the other, and isolates the turbine, Turbine Bypass System, and other auxiliary steam supplies from the steam generators.

The MSIVs close on a main steam line isolation (MSLI) ~~Steam and Feedwater Rupture Control System~~ signal ~~generated by either low steam generator pressure or steam generator to feedwater differential pressure. The MSIVs fail closed on loss of control or actuation power.~~ The MSIVs may also be actuated manually. 22

<INSERT B3.7-7A>

~~A description of the MSIVs is found in the FSAR, Section [10.3] (Ref. 1).~~ edit

APPLICABLE SAFETY ANALYSES

The design basis of the MSIVs is established by the ~~containment~~ analysis for the ~~large~~ steam line break (~~SLB~~) 14.2 ~~inside containment~~, as discussed in the ~~F~~SAR, Section ~~[6.2]~~ (Ref. ~~2~~). ~~It is also influenced by the accident analysis of the SLB events presented in the FSAR, Section [15.4] (Ref. 3). The design precludes the blowdown of more than one steam generator, assuming a single active component failure (i.e., the failure of one MSIV to close on demand).~~ 22 edit

1

<INSERT B3.7-7B>

~~The limiting case for the containment analysis is the SLB inside containment with a loss of offsite power following turbine trip and failure of the MSIV on the affected steam generator to close. At 100% RTP, the steam generator inventory and temperature are at their maximum, maximizing the mass and energy release to the containment.~~

AWO-387

(continued)

<INSERT B3.7-7A>

as described in LCO 3.3.11, "Emergency Feedwater Initiation and Control (EFIC) System Instrumentation." The EFIC System is designed to prevent the simultaneous blowdown of both steam generators.

ANO-387 **<INSERT B3.7-7B>**

The analysis assumes a break in the main steam line upstream of an MSIV. Closure of the MSIVs isolates blowdown from the unaffected steam generator, reducing the overcooling effect and its subsequent effect on core reactivity. Failure of a MSIV to close is not required to be considered by the original license basis.

The limiting case for the containment analysis is the Large Break LOCA event. The pressurization of the reactor building due to the mass and energy from the blowdown of a ruptured steam line inside the reactor building does not establish the design basis of the MSIVs because of the small rate of mass and energy addition compared to a Large Break LOCA.

Since the pressurization of the reactor building by the main steam line break is not a limiting issue, the analysis conservatively maximizes the offsite dose by assuming the break occurs in the steam line outside the reactor building, but upstream of an MSIV. Although a break at this location is highly improbable, it serves to provide a direct path to the environment for any activity in the steam generators and leads to a complete blowdown of one steam generator. In addition, the analysis assumes that offsite power remains available to power the reactor coolant pumps, maximizing the overcooling effect and its subsequent effect on core reactivity. The main steam line break analysis verifies the effects of a double-ended guillotine steam line break at full power to ensure adequate margin to safety is maintained, consistent with the original license basis. The SAR does not analyze a feedwater line break.

BASES

APPLICABLE SAFETY ANALYSES (continued)

Due to reverse flow, failure of the MSIV to close contributes to the total release of the additional mass and energy in the steam headers downstream of the other MSIV. Other failures considered are the failure of a main feedwater isolation valve to close, and failure of an emergency diesel generator (EDG) to start.

The accident analysis compares several different SLB events against different acceptance criteria. The large SLB outside containment upstream of the MSIV is limiting for offsite dose, although a break in this short section of main steam header has a very low probability. The large SLB inside containment at full power is the limiting case for a post trip return to power. The analysis includes scenarios with offsite power available and with a loss of offsite power following turbine trip. With offsite power available, the reactor coolant pumps continue to circulate coolant through the steam generators, maximizing the Reactor Coolant System (RCS) cooldown. With a loss of offsite power, the response of mitigating systems, such as the High Pressure Injection (HPI) System pumps, is delayed. Significant single failures considered include failure of an MSIV to close, failure of an EDG, and failure of an HPI pump.

22

AND-387

AND-387

Closing

The MSIVs serve only a safety function and remain open during power operation. These valves operate under the following situations:

a. An HELB, an SLB, or main feedwater line breaks (FWLBs), inside containment. In order to maximize the mass and energy release into the containment, the analysis assumes the MSIV in the affected steam generator remains open. For this scenario, steam is discharged into containment from both steam generators until closure of the MSIV in the intact steam generator occurs. After MSIV closure, steam is discharged into containment only from the affected steam generator and from the residual steam in the main steam header downstream of the closed MSIV in the intact loop.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

b. An SLB outside of containment and upstream from the MSIVs is not a containment pressurization concern. The uncontrolled blowdown of more than one steam generator must be prevented to limit the potential for uncontrolled RCS cooldown and positive reactivity addition. Closure of the MSIVs isolates the break and limits the blowdown to a single steam generator.

c. A break downstream of the MSIVs will be isolated by the closure of the MSIVs. Events such as increased steam flow through the turbine or the steam bypass valves will also terminate on closing the MSIVs. 22

d. Following a steam generator tube rupture, closure of the MSIVs isolates the ruptured steam generator from the intact steam generator. In addition to minimizing radiological releases, this enables the operator to maintain the pressure of the steam generator with the ruptured tube below the MSIVs' setpoints, a necessary step toward isolating flow through the rupture.

e. The MSIVs are also utilized during other events such as an FWLB.

ANO-387

In MODE 1 The MSIVs satisfy Criterion 3 of ~~the NRC Policy Statement.~~ 10 CFR 50.36 (Ref. 3). 6

<INSERT B3.7-9A>

LCO

This LCO requires that the MSIV in ~~both~~ each steam line be OPERABLE. ~~The~~ MSIVs ~~are~~ considered OPERABLE ~~when~~ the isolation times ~~are~~ within limits and they close on an isolation actuation signal when required. 22

Must be MSIV must

This LCO provides assurance that the MSIVs will perform their design safety function to mitigate the consequences of accidents that could result in offsite exposures comparable to the 10 CFR 100 limits (Ref. 4). 8

Isolate an SLB 22

APPLICABILITY

The MSIVs must be OPERABLE in ~~MODE 1 and in~~ MODES 1, 2, and 3 ~~with any MSIVs open~~ when there is significant mass and energy in the RCS and steam generator. ~~Therefore, the MSIVs must be OPERABLE or closed. When the MSIVs are closed, they are already performing the safety function.~~ 3

to provide isolation of potential main steam line breaks

(continued)

<INSERT B3.7-9A>

ANO-387 Although no licensing basis accidents or transients relating to the function of the MSIVs exist in other modes, the MSIVs are conservatively considered to satisfy Criterion 4 of 10 CFR 50.36 in MODEs 2 and 3.

<INSERT B3.7-33A>

ANO-420

The T41B CST is seismically qualified and a portion of the tank is protected from tornado missiles. The protected volume of water in the tank can provide a source of EFW for both units for at least 30 minutes. Thirty minutes is adequate for the operators to manually switch the EFW suction alignment to the service water system (SWS), if required. The SWS provides the assured source of cooling water.

<INSERT B3.7-33B>

ANO-420

The protected volume of water in the tank can provide a source of emergency feedwater (EFW) for both units for at least 30 minutes. Thirty minutes is adequate for the operators to manually switch the EFW suction alignment to the service water system (SWS), if required. The SWS provides the assured source of cooling water.

The volume requirements for the CST are based on the EFW systems of both units being aligned to T41B simultaneously or only Unit 1 being aligned. The minimum volume requirements are sufficient to support several hours of cooling flow for both units. During this time, the need for EFW will be determined. Alignment to available water sources will be performed as necessary to ensure adequate heat removal is maintained. The volume requirements are nominal values. In the conversion of the required volumes to indicated level, instrument uncertainty need not be applied.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.6.1 (continued)

alarms, to alert the operator to abnormal deviations in CST levels.

REFERENCES

1. ~~F~~SAR, Section ~~[9.2.5]~~, 10.4.8.
2. ~~FSAR, Chapter [8]~~, 10 CFR 50.36.
3. ~~FSAR, Chapter [15]~~.

edit
6
edit

ANO-420

The volume requirements for the CST are based on the EFW systems of both units being aligned to T41B simultaneously or only Unit 1 being aligned. The minimum volume requirements are sufficient to support several hours of cooling flow for both units. During this time, the need for EFW will be determined. Alignment to available water sources will be performed as necessary to ensure adequate heat removal is maintained. The volume requirements are nominal values. In the conversion of the required volumes to indicated level, instrument uncertainty need not be applied.

<INSERT B3.8-3A>

3.8.1-11 The power sources for the two required offsite power circuits shall consist of:

ANO-441

a. Startup Transformer No. 1 and its 22 kV supply from the switchyard bus tie autotransformer, or the Unit Auxiliary Transformer and its supply from the switchyard bus tie autotransformer via the 22 kV overhead swing leads (alternate configuration of the Unit Auxiliary Transformer), and

b. Startup Transformer No. 2 and its supply from the 161 kV switchyard ring bus.

ANO-441

An offsite circuit includes the necessary breakers and equipment to properly align the circuit and transmit power from the transmission line source to a single 4160 V ES bus. The offsite power sources shall be capable of supplying 4160 V ES bus A3 via 4160 V bus A1 and capable of supplying 4160 V ES bus A4 via 4160 V bus A2. Either offsite source may be used to supply either ES bus. In this manner, along with the emergency DGs, each 4160 V ES bus is assured at least one offsite and one DG source of power. The inability of one offsite power source to supply one 4160 V ES bus does not render the offsite source inoperable as long as it remains capable of supplying the other 4160 V ES bus. However, when power to the ES bus is being supplied from the main generator via the Unit Auxiliary Transformer, automatic transfer capability to either Startup Transformer No. 1 or No. 2 is required to consider the offsite power source operable to the associated ES bus.

ANO-441

LCO 3.8.9 addresses the OPERABILITY of vital AC distribution systems, including 4160 V ES buses A3 and A4. From this respect, if power from an offsite source is verified available to the vital 4160 V ES buses (actively supplying power to the bus or appropriate switchgear and electrical components available to allow connection to the bus), then the offsite source is considered operable. Failures associated with A3 or A4, such as a loss of bus undervolatge protection, affect only bus operability and do not require the offsite power source to be considered inoperable. However, if bus A1 or A2 is not capable of supplying bus A3 or A4, respectively, one of the offsite circuits must be considered inoperable.

One required offsite source shall be capable of accepting emergency loads in an automatic transfer. Reference 1 requires one circuit to be available within a few seconds following a LOCA to assure that core cooling, reactor building integrity, and other vital safety functions are maintained. The other required offsite source may be configured for manual transfer. In the event Startup Transformer No. 2 is configured for automatic transfer, the selective load-shed features for automatic shedding of loads to avoid a degraded voltage condition shall be OPERABLE.

ANO-441

For the offsite AC sources, independence is maintained to the extent practical. An offsite source may be connected to more than one ES bus and not violate the independence criteria provided each OPERABLE required offsite source is capable of being aligned (manually or automatically, as appropriate) so that it is independent of the other required offsite source.

ANO-441

When the main generator is synchronized to the 500 kV system, AC power for the ES loads may be supplied from either the Unit Auxiliary Transformer, Startup Transformer No. 1, Startup Transformer No. 2, or a combination of these transformers concurrently sharing the load. Power from the Unit Auxiliary Transformer, when powered from the main generator, is not credited with meeting the requirements of LCO 3.8.1.a since it cannot function under all conditions (i.e., following a turbine trip) except when connected in the alternate configuration described above. However, powering the ES buses from the Unit Auxiliary Transformer is permitted during normal unit operation because of the automatic transfer capability to a startup transformer source.

3.8.2-01

<INSERT B3.8-36A>

e. The unit, while in a shutdown condition, can not affect the power grid in a manner that would result in a loss of offsite power due to a turbine trip.

The shutdown Technical Specification requirements are designed to ensure that the unit has the capability to mitigate the consequences of certain postulated accidents. Worst case DBAs which are analyzed for operating MODES are generally viewed not to be a significant concern during shutdown MODES due to the lower energies involved. The Technical Specifications therefore require a lesser complement of electrical equipment to be available during shutdown than is required during operating MODES. More recent work completed on potential risks associated with shutdown, however, have found significant risk associated with certain shutdown evolutions. As a result, in addition to the requirements established in the Technical Specifications, ANO, through industry commitment, has adopted NUMARC 91-06, "Guidelines for Industry Actions to Assess Shutdown Management," as an industry initiative to manage shutdown tasks and associated electrical support to maintain risk at an acceptable low level. This may require the availability of additional equipment beyond that required by the shutdown Technical Specifications.

ANO-440

<INSERT B3.8-36B>

In MODES 5 and 6, the AC sources satisfy Criterion 4 of 10 CFR 50.36 (Ref. 6). During handling of irradiated fuel, the AC sources satisfy Criterion 3 of 10 CFR 50.36.

3.8.2-01

<INSERT B3.8-40A>

SR 3.8.1.8 and SR 3.8.1.9 are not required to be met because they provide testing of the engineered safeguards actuation system signals which are not required to be OPERABLE except in MODES 1, 2, 3 and 4. Automatic actuation and loading of the DGs is not assumed in MODES 5 and 6.

<INSERT B3.8-40B>

When Note 1 is considered, SR 3.8.2.1 requires the following:

SR 3.8.1.1 must be performed and met,
SR 3.8.1.2 must be performed and met,
SR 3.8.1.3 must be met, but does not have to be performed,
SR 3.8.1.4 does not have to be performed or met,
SR 3.8.1.5 must be performed and met,
SR 3.8.1.6 must be performed and met,
SR 3.8.1.7 does not have to be performed or met,
SR 3.8.1.8 does not have to be performed or met, and
SR 3.8.1.9 does not have to be performed or met.

ANO-437

Note 2 exempts the 15 second start acceptance criteria for SR 3.8.1.2. This allows the AAC DG power source, which does not have auto-start capability or start-time criteria, to be used in lieu of an emergency DG. In MODES 5 and 6, there is sufficient time to manually start a DG in the event the offsite power source is lost. The required DG must be capable of being started from standby conditions and achieving ready-to-load conditions. Although the time to reach ready-to-load conditions is not a part of the acceptance criteria, it is intended that for emergency DG tests, this time is trended to help determine if a condition exists that is degrading the starting capabilities of the DG.

3.8.5-01

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.5 DC Sources—Shutdown

BASES

BACKGROUND

A description of the DC sources is provided in the Bases for LCO 3.8.4, "DC Sources—Operating."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter [6] (Ref. 1) and Chapter [14] (Ref. 2), assume that Engineered Safety Feature (ESF) systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC fuel handling subsystems is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY. 58

The OPERABILITY of the minimum DC electrical power sources during MODES 5 and 6 and during movement of irradiated fuel assemblies ensures that:

a. The unit can be maintained in the shutdown or refueling condition for extended periods;

b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and

c. Adequate DC electrical power is provided to mitigate events postulated during shutdown, such as a fuel handling accident. 56

AND-325

<INSERT B3.8-60A>

<INSERT B3.8-60B>

The DC sources satisfy Criterion 3 of the NRC Policy Statement. 57

AND-438

LCO

The DC electrical one power subsystems, each subsystem consisting of two batteries, one battery charger per battery, and the corresponding control equipment and interconnecting cabling within the train, are required to be 56 30 56

(continued)

3.8.5-01

<B3.8-60A>

In general, when the unit is shutdown, the Technical Specifications requirements ensure that the unit has the capability to mitigate the consequences of postulated accidents. However, assuming a single failure and concurrent loss of all offsite or all onsite power is not required. The rationale for this is based on the fact that many Design Basis Accidents (DBAs) that are analyzed in MODES 1 and2 have no specific analyses in MODES 3, 4, 5 and 6. Worst case bounding events are deemed not credible in MODES 5 and 6 because the energy contained within the reactor pressure boundary, reactor coolant temperature and pressure, and the corresponding stresses result in the probabilities of occurrence being significantly reduced or eliminated, and in minimal consequences. These deviations from DBA analysis assumptions and design requirements during shutdown conditions are allowed by the LCO for required systems.

The shutdown Technical Specification requirements are designed to ensure that the unit has the capability to mitigate the consequences of certain postulated accidents. Worst case DBAs which are analyzed for operating MODES are generally viewed not to be a significant concern during shutdown MODES due to the lower energies involved. The Technical Specifications therefore require a lesser complement of electrical equipment to be available during shutdown than is required during operating MODES. More recent work completed on potential risks associated with shutdown, however, have found significant risk associated with certain shutdown evolutions. As a result, in addition to the requirements established in the Technical Specifications, ANO, through industry commitment, has adopted NUMARC 91-06, "Guidelines for Industry Actions to Assess Shutdown Management," as an industry initiative to manage shutdown tasks and associated electrical support to maintain risk at an acceptable low level. This may require the availability of additional equipment beyond that required by the shutdown Technical Specifications.

ANO-440

<B3.8-60B>

In MODES 5 and 6, the DC Sources satisfy Criterion 4 of 10 CFR 50.36 (Ref. 1). During handling of irradiated fuel, the DC sources satisfy Criterion 3 of 10 CFR 50.36.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.7 Inverters—Operating

INSERT B3.8-71A

BASES

ANO-442

BACKGROUND

The inverters are the preferred source of power for the AC vital buses because of the stability and reliability they achieve. The function of the inverter is to provide AC electrical power to the vital bus. The inverters can be powered from an internal AC source/rectifier or from the station battery. The station battery provides an uninterruptible power source for the instrumentation and controls, and the Reactor Protection System (RPS), and the Engineered Safety Feature Actuation System (ESFAS). Specific details on inverters and their operating characteristics are found in FSAR, Chapter 8 (Ref. 1).

120 VAC; edit; are normally; including; Safeguards; safety significant; 31; 65; and the Emergency Feedwater Initiation and Control (EFIC) System.

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter 6 (Ref. 2), and Chapter 14 (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the RPS and ESFAS instrumentation and controls so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits, Section 3.4, Reactor Coolant System (RCS), and Section 3.6, Containment Systems.

edit; edit; safety significant; edit; edit; edit; edit; Reactor Building; reactor building; INSERT B 3.8-71B

The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and is based on meeting the design basis of the unit. This includes maintaining required AC vital buses OPERABLE during accident conditions in the event of: 33; not consider

3.8.7-03

In MODES 3 and 4, the inverters satisfy Criterion 4 of 10CFR50.36.

a. An assumed loss of all offsite AC electrical power or all onsite AC electrical power; and

b. A worst-case single failure.

Inverters are a part of the distribution system and, as such, satisfy Criterion 3 of the NRC Policy Statement. 10 CFR 50.36 (Ref. 3) in MODES 1 and 2. 52

(continued)

<INSERT B3.8-71A>

3.8.7-02 ... the 125 VDC Electrical Power System. The inverters ...

<INSERT B3.8-71B>

ANO-442 There are two RPS/ESAS related inverters per train and an additional green train safety related inverter Y28 that supports some post accident monitoring instrumentation, decay heat removal system interlocks, and control circuitry for systems such as emergency feedwater (EFW) and presurizer pressure control. Additionally, there are two swing inverters (one per train) which provide backup service in the event that an RPS/ESAS related inverter is out of service. If the swing inverter is placed in service, requirements of independence and redundancy between trains are maintained.

BASES (continued)

LCO

The inverters ensure the availability of AC electrical power for the systems instrumentation required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA.

Maintaining the required inverters OPERABLE ensures that the redundancy incorporated into the design of the RPS and ESFAS instrumentation and controls is maintained. The four inverters (two per train) ensure an uninterruptible supply of AC electrical power to the AC vital buses even if the 4.16 kV safety buses are de-energized.

OPERABLE inverters require the associated vital bus to be powered by the inverter with output voltage and frequency within tolerances, and power input to the inverter from 125 VDC station battery. Alternatively, power supply may be from an internal AC source via rectifier as long as the station battery is available as the uninterruptible power supply.

This LCO is modified by a Note that allows one two inverters to be disconnected from a common battery for ≤ 24 hours, if the vital bus is powered from an Class 1E constant voltage transformer or inverter using internal AC source during the period and all other inverters are operable. This allows an equalizing charge to be placed on one battery. If the inverters were not disconnected, the resulting voltage condition might damage the inverter(s). These provisions minimize the loss of equipment that would occur in the event of a loss of offsite power. The 24 hour time period for the allowance minimizes the time during which a loss of offsite power could result in the loss of equipment energized from the affected AC vital bus while taking into consideration the time required to perform an equalizing charge on the battery bank.

The intent of this Note is to limit the number of inverters that may be disconnected. Only those inverters associated with the single battery undergoing an equalizing charge may be disconnected. All other inverters must be aligned to their associated batteries, regardless of the number of inverters or unit design.

BASES (continued)

APPLICABILITY The inverters are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of ~~AOOs or abnormal transients~~ abnormalities, and (26)

b. Adequate core cooling is provided, and ~~containment~~ reactor building OPERABILITY and other vital functions are maintained in the event of a postulated DBA. edit

~~Inverter requirements for MODES 5 and 6 are covered in the Bases for LCO 3.8.8, "Inverters—Shutdown."~~ addressed by the definition of OPERABILITY for each required supported load (17)

ANO-442 3.8.7-06 ANO-295

ACTIONS A.1 (by LCO 3.8.7.a and LCO 3.8.7.b) (one of the four)

With ~~a~~ required inverter (by LCO 3.8.7.a and LCO 3.8.7.b) inoperable, ~~the~~ 120 associated ~~AC~~ 120 VAC vital bus becomes inoperable until it is [manually] re-energized from its [Class 1E constant voltage source transformer or inverter using internal AC source]. (65) (31)

Is automatically transferred to its alternate AC source and remains OPERABLE. In the event the automatic transfer fails, and the associated 120 VAC bus is deenergized, the 120 VAC bus is considered to be inoperable.

For this reason, a Note has been included in ~~Condition~~ ACTION A requiring entry into the Conditions and Required Actions of LCO 3.8.9, "Distribution Systems—Operating." This ensures the vital bus is re-energized within ~~2~~ 8 hours. Required Action A.1 allows 24 hours to fix the inoperable inverter and return it to service. The 24 hour limit ~~is based upon~~ takes ~~engineering judgment taking~~ into consideration the time required to repair an inverter, the availability of a swing inverter, and the additional risk to which the unit is exposed because of the inverter inoperability. This ~~has to~~ must be balanced against the risk of an immediate shutdown, along with the potential challenges to safety systems such a shutdown might entail. When the ~~AC~~ 120 VAC vital bus is powered from its ~~constant voltage~~ alternate AC source, it is relying upon interruptible AC electrical power sources (offsite and onsite). The uninterruptible inverter source to the ~~AC~~ 120 VAC vital buses is the preferred source for powering instrumentation trip setpoint devices. (New Paragraph (edit)) (13) (65) (26) (31) edit edit

ANO-442

<INSERT B 3.8-73A>

~~B.1 and B.2~~ D

If the ~~inoperable devices or components cannot be restored to OPERABLE status within the required~~ Required Action and associated Completion Time, the are not met or if any two inverters required by LCO 3.8.7.a and LCO 3.8.7.b are inoperable edit (65)

(continued)

B.1

With inverter Y28 inoperable, the associated 120 VAC bus C540 is automatically transferred to its alternate AC source and remains OPERABLE. In the event the automatic transfer fails and the associated 120 VAC bus is de-energized, the 120 VAC bus is considered to be inoperable. For this reason, a Note has been included in ACTION B requiring entry into the Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating." This ensures the bus is re-energized within 8 hours.

Required Action B.1 allows 72 hours to fix the inoperable inverter and return it to service. The 72-hour limit takes into consideration the time required to repair an inverter, the fact that Y28/C540 does not have a swing inverter, and the additional risk to which the unit is exposed because of the inverter inoperability. This must be balanced against the risk of an immediate shutdown, along with the potential challenges to safety systems such a shutdown might entail. When the 120 VAC bus is powered from its alternate AC source, it is relying upon interruptible AC electrical power sources (offsite and onsite). The uninterruptible inverter source to the 120 VAC bus is the preferred source for powering instrumentation and controls.

C.1

Because Y28 is powered from the green train, a loss of Y28 in conjunction with an inoperable red train inverter required by LCO 3.8.7.a may result in a loss of safety function if power is lost to their respective 120 VAC buses. Therefore, one of these inoperable inverters must be restored to OPERABLE status within 2 hours. The 2-hour restoration period is acceptable since it is unlikely that both Y28 and the inoperable red train inverter will fail to continue to supply their respective 120 VAC buses with power from the alternate AC source. In the unlikely event that both affected 120 VAC buses are de-energized, LCO 3.8.9 Required Action E.1 will require immediate entry into LCO 3.0.3 due to the likelihood that a loss of safety function has occurred.

BASES

ACTIONS

B.1 and B.2 (continued)

unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.8.7.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital buses energized from the inverter. The verification of proper voltage and frequency output ensures that the required power is readily available for the instrumentation ~~of the RPS and ESFAS~~ connected to the AC vital buses. The 7 day frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions.

REFERENCES

1. FSAR, Chapter [8].
2. ~~FSAR, Chapter [8].~~
2. FSAR, Chapter [14].
3. 10 CFR 50.36.

No Significant Hazards Considerations (NSHCs)

ANO-423 **3.4A L9** Not used.

ANO-423 **3.4A L10** Not used.

3.4A L11

ANO-247

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

Allowing positive reactivity additions, with no forced coolant flow available, that will not reduce RCS boron concentration below the boron concentration required to meet the minimum SDM of LCO 3.1.1 will not alter the assumed initiation, and hence, will not significantly increase the probability of any evaluated event. The ITS contains actions that maintain the initial conditions assumed in the analyses. Because these Required Actions maintain the initial conditions assumed in the safety analyses, prevent intentional actions which may lead to the occurrence of evaluated events, and preserve the mitigatory response mechanisms should an event occur, the consequences of a postulated event from this condition would not be significantly increased.

2. Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

The proposed change does not necessitate a physical alteration to the plant (no new or different type of equipment will be installed) or changes to parameters governing normal plant operation. The proposed change will continue to ensure that adequate boron concentration, and thus adequate SDM, is maintained. Therefore, this change does not result in a new or different kind of accident from any accident previously evaluated.

3. Does this change involve a significant reduction in a margin of safety?

The proposed change will allow positive reactivity changes in MODEs 3, 4, and 5 with no forced coolant flow. However, the ITS Required Actions limit such positive reactivity additions to provide assurance that the minimum SDM of LCO 3.1.1 is maintained. Therefore, this change does not result in a significant reduction in a margin of safety.

ANO-360 **3.6 L25**

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

The proposed change clarifies the exception of opening closed penetration valves under administrative controls to include deactivated automatic valves. The change is consistent with the provisions of NUREG 1430, Rev. 1, and is necessary to support operational requirements such as sampling or inventory adjustment activities. The administrative controls required to be established when applying this exception are sufficient to ensure prompt closure of the penetration should an event initiate during such an activity. Because the exception is applied only for a short period of time and effective administrative controls have been established to control the opening of deactivated automatic penetration valves, this change does not involve a significant increase in the probability or consequences of an accident previously analyzed.

2. Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

The proposed change clarifies the exception of opening closed penetration valves under administrative controls to include deactivated automatic valves. Application of this exception considering the required administrative controls does not introduce a possibility of a new or different kind of accident than any accident previously evaluated.

3. Does this change involve a significant reduction in a margin of safety?

The proposed change clarifies the exception of opening closed penetration valves under administrative controls to include deactivated automatic valves. These administrative controls require a dedicated operator, in constant communication with the control room staff, to be stationed in close proximity of the valve in order to ensure prompt valve closure should an event or transient initiate during this short time period. The projected environmental conditions of the physical valve location is also considered prior to opening a deactivated automatic valve to further ensure the operator's ability to perform the required closure duty. Because effective administrative controls are established prior to opening deactivated automatic penetration valves, this exception does not involve a significant reduction in the margin of safety.

ANO-444 **3.6 L26**

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

The proposed change exempts those valves that are locked, sealed, or otherwise secured in their required position from being tested by verifying they will reach their required position upon receipt of an actuation signal. This exemption is acceptable because these valves are not being relied upon to change states at the onset of or during an accident. Therefore, exempting those valves that are locked, sealed or otherwise secured in their required position from being tested does not involve a significant increase in the probability or consequences of an accident previoulsy evaluated.

2. Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

The proposed change exempts those valves that are locked, sealed, or otherwise secured in their required position from being tested by verifying they will reach their required position upon receipt of an actuation signal. This exemption is acceptable because these valves are not being relied upon to change states at the onset of or during an accident. Therefore, exempting those valves that are locked, sealed or otherwise secured in their required position from being tested will not create the possibility of a new or different kind of accident from any previoulsy evaluated.

3. Does this change involve a significant reduction in a margin of safety?

The proposed change exempts those valves that are locked, sealed, or otherwise secured in their required position from being tested by verifying they will reach their required position upon receipt of an actuation signal. This exemption is acceptable because these valves are not being relied upon to change states at the onset of or during an accident. Therefore, exempting those valves that are locked, sealed or otherwise secured in their required position from being tested does not result in a significant reduction in the margin of safety.

NO SIGNIFICANT HAZARDS CONSIDERATIONS STATEMENTS

NSHC 3.9 L9

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

The proposed change deletes the historical requirements associated with the shipment of irradiated fuel to offsite facilities. Future offsite shipment of irradiated fuel will be assessed given the amount, type, a decay time of the fuel proposed for shipment. In addition, prior NRC approval will be obtained prior to any such shipment in accordance with 10 CFR Part 71. The deletion of these historical requirements will not result in a significant increase in the probability or consequences of an accident previoulsy evaluated.

2. Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

The proposed change deletes the historical requirements associated with the shipment of irradiated fuel to offsite facilities. Future offsite shipment of irradiated fuel will be assessed given the amount, type, a decay time of the fuel proposed for shipment. In addition, prior NRC approval will be obtained prior to any such shipment in accordance with 10 CFR Part 71. Therefore, the deletion of these historical requirements will not create the possibility of a new or different kind of accident from any previoulsy evaluated.

3. Does this change involve a significant reduction in a margin of safety?

The proposed change deletes the historical requirements associated with the shipment of irradiated fuel to offsite facilities. Future offsite shipment of irradiated fuel will be assessed given the amount, type, a decay time of the fuel proposed for shipment. In addition, prior NRC approval will be obtained prior to any such shipment in accordance with 10 CFR Part 71. Therefore, deleting these historical requirements does not result in a significant reduction in the margin of safety.

Discussions of Differences (DODs)

ITS DISCUSSION OF DIFFERENCES
ITS Section 3.2: Power Distribution Limits

1. Several changes were made to the ACTIONS established for ITS 3.2.1. These changes include: 1) a minor editorial change, and 2) the addition of a new Condition C which is necessary because the NUREG-1430 ACTIONS do not appropriately address the Required Action and associated Completion Time for regulating rod groups that are not positioned in accordance with the required sequence or overlap requirements. The following paragraphs describe these changes in detail.

   1) Editorial changes were made to reflect consistent titles for the regions on the regulating rod group insertion limits figures contained in the COLR. In ITS 3.2.1 Condition A and Condition D, the word "operational" was changed to "operation." In ITS 3.2.1 Required Action D.2.1, the word "operating" was changed to "operation." These changes establish titles consistent with the NUREG-1430 3.2.1 Bases.

   2) NUREG 3.2.1 Condition A is entered when the regulating rods are inserted into the restricted operation region, or sequence or overlap requirements are not met. However, NUREG Required Actions A.1 and A.2 do not address the group(s) out of sequence or the group overlap requirements not met condition. Therefore, ITS Condition C is added (as in NRC approved TSTF-345) so that a specific Required Action is provided to restore compliance with the LCO should the regulating rod group sequence or overlap requirements not be met. ITS Required Action C.1 requires that the regulating rod groups be restored to within the limits with a Completion Time of 4 hours. Four hours was chosen based on CTS 3.5.2.5.3, which also provides 4 hours (Note that TSTF-345 provided 2 hours for this Required Action). This change is consistent with generic change TSTF-345, as modified to match CTS.

   3) The aforementioned changes require that NUREG 3.2.1 Condition C be revised to represent ITS 3.2.1 Condition D and that NUREG 3.2.1 Condition D be revised to represent ITS 3.2.1 Condition E. Further, the inclusion of ITS 3.2.1 Condition C (and re-designation of NUREG 3.2.1 Condition C as ITS 3.2.1 Condition D) requires that ITS 3.2.1 Condition E read "Required Actions and associated Completion Times of Conditions C or D not met" to ensure that appropriate actions are provided should Conditions C or D not be satisfied. The appropriate action is to remove the unit from the LCO Applicability, which is accomplished by having the unit proceed to MODE 3 with a Completion Time of 6 hours.

   4) TSTF-160, Rev 1, was incorporated which reflects that ITS 3.2.1 Required Action A.1, performance of SR 3.2.5.1, is only required when THERMAL POWER is greater than 20% RTP. This Note provides an Applicability for the Required Action which is consistent with the ITS LCO 3.2.5 Applicability.

   The Bases for LCO 3.2.1 were similarly marked to reflect these changes.

2. NUREG-1430 LCO 3.2.1 Required Action C.1 was modified to reflect generic change TSTF-009, Rev 1.

3. NUREG-1430 3.2.1 incorporates TSTF-110, Rev 2.

   The Bases for ITS 3.2.1 were similarly marked to reflect the modification in SR Frequency requirements. In addition to the material deleted by the TSTF, sentences containing reference to the alarm function were deleted for consistency and clarification.

3.2-02 4. Not used.

5. Bases of LCO 3.2.2 - Potentially misleading material was removed regarding the APSRs. The APSRs are designed not to insert into the reactor on a reactor trip (scram). Because they do not insert, they were never credited in the analyses as contributing to the rate of reactivity addition, net reactivity addition or the SDM.

6. NUREG-1430 3.2.2 Required Action A.1 was modified by a Note to reflect that this Required Action is only required when THERMAL POWER is greater than 20% RTP. This Note provides a Required Action which is consistent with the ITS LCO 3.2.5 Applicability. This change is consistent with TSTF-160, Rev 1.

7. ITS Completion Times for 3.2.3 RA B.1 (NUREG 3.2.3 RA B.1), 3.2.4 RA C.1 (NUREG 3.2.4 RA E.1), 3.2.4 RA D.1 (NUREG 3.2.4 RA F.1), and 3.2.5 RA B.1 (NUREG 3.2.5 RA C.1) were revised to specify 4 hours. The 4 hour Completion Time provides a more reasonable time frame for performing the required power reduction to less than or equal to 20% RTP (40% RTP for ITS 3.2.3) from full power conditions (RTP). The NUREG 2 hour Completion Time would have required the operators to violate the established normal, non-emergency, maneuvering rate of ≤30% per hour and unnecessarily challenged the operator's ability to control the unit with the potential introduction of a unit transient. Although the CTS established comparable Required Actions, it did not establish a Completion Time for those actions. Based on the foregoing discussion, the ITS 4 hour Completion Time is established which results in a prompt compensatory action while adhering to the unit's operating procedures.

   The Bases were similarly marked to reflect these changes.

8. NUREG-1430 3.2.3 incorporates TSTF-110, Rev 2.

   The Bases for ITS 3.2.3 were similarly marked to indicate this change. In addition to the material deleted by the TSTF, sentences containing reference to the alarm function were deleted for consistency and clarification.

9. NUREG-1430 LCO 3.2.4 is premised on the existence of a steady state limit, transient limit and a maximum limit for QUADRANT POWER TILT (QPT). The ANO-1 CTS and the ANO-1 COLR do not establish a transient limit for QPT. Further, the ANO-1 CTS does not provide any differentiation between the possible causes of an excessive QPT (i.e., QPT due to CONTROL ROD misalignment versus other potential causes) in specifying the required actions. Therefore, reference to a transient limit was removed from ITS LCO 3.2.4. Consequently, NUREG Condition B (which addresses the situation where QPT may exceed the transient limit but still be less then the maximum limit), and Condition D (which addresses the situation where QPT may exceed the transient limit but still be less then the maximum limit due to causes other than the misalignment of either CONTROL ROD(S) or APSR(S)) are not adopted in the ITS. NUREG Condition E has been modified in the ITS to provide the Required Action should the Required Action and associated Completion Time for Condition B not be met. These changes retain the intent that THERMAL POWER be reduced and that the ACTIONS lead to removal of the unit from the LCO Applicability if compliance is not restored. These changes maintain requirements consistent with current license basis.

   The Bases for LCO 3.2.4 were similarly marked to reflect these changes.

10. NUREG Bases - The Criterion statement at the conclusion of the Applicable Safety Analysis section was modified at each occurrence to refer to 10 CFR 50.36 instead of the NRC Policy Statement. This is an editorial change associated with the implementation of the 10 CFR 50.36 rule changes after NUREG-1430, Revision 1 was issued.

    For ITS LCO 3.2.2, the 10 CFR 50.36 Criterion statement was modified to preserve consistency with the ANO-1 license basis. Specifically, ANO-1 safety analyses, upon which ITS LCO 3.2.2 was based, were performed with the reactor critical. Thus, the Criterion statement was revised to specify that the LCO parameter satisfies Criterion 2 of 10 CFR 50.36 when in MODES 1 and 2 while critical. When in MODE 2 with the reactor subcritical, the LCO parameter satisfies Criterion 4 of 10 CFR 50.36. This change is consistent with current license basis and 10 CFR 50.36.

11. Bases - Throughout Section 3.2 Bases, numerous references to "limits" have been changed to "setpoints." In a few instances, references to "setpoints" have been changed to specify "limits." The COLR defines the regulating group insertion setpoints, group overlap limits, the APSR insertions setpoints, the AXIAL POWER IMBALANCE setpoints, and the QUADRANT POWER TILT limits and setpoints. These values are established in accordance with the NRC approved reload methodology established by BAW-10179P-A, "Safety Criteria and Methodology for Acceptable Cycle Reload Analyses," February 1991. This change is consistent with current license basis.

12. NUREG 3.2.3 and 3.2.4 Bases - In the Applicability section of the Bases for ITS 3.2.3 and 3.2.4, statements were added that the acceptability of continued operation with a significant AXIAL POWER IMBALANCE or QUADRANT POWER TILT is based on engineering judgment. ANO-1 has not performed analysis to substantiate statements made in the NUREG Bases because the accident initial conditions discussed are inconsistent with the unit's license basis accident initial conditions.

13. NUREG 3.2.2 Bases – Incorporates TSTF-125, Rev. 1.

14. Bases - In the Applicable Safety Analysis section of the Bases for LCO 3.2.4, reference was made to ANSI N18.2-1973 as establishing the requirement that the peak cladding temperature not exceed 2200°F. All similar statements in the NUREG-1430 reference 10 CFR 50.46 as the basis for this requirement. Because the statements used in all of the Bases of Section 3.2 cite 10 CFR 50.46 as the reference, the Bases for ITS LCO 3.2.4 will be similarly changed to reference 10 CFR 50.46.

15. CTS 3.5.2.4.2 establishes that the overpower protection, during periods when QPT is greater than its limit, is provided by an adjustment in the nuclear overpower based on Reactor Coolant System flow and AXIAL POWER IMBALANCE trip function. The CTS does not impose a requirement that the nuclear overpower trip setpoint be reduced. Therefore, ITS 3.2.4 Required Action A.1.2.2 will specify the current license requirement to implement a reduction in the nuclear overpower based on Reactor Coolant System flow and AXIAL POWER IMBALANCE trip setpoint. These changes maintain requirements consistent with current license basis.

    The Bases for 3.2.4 were similarly marked to reflect this change.

16. NUREG 3.2.1 - Incorporates TSTF-216.

17. ITS 3.2.4 Required Action A.1.2.2 Completion Time is modified to include a second conditional Completion Time of 10 hours after the last performance of SR 3.2.5.1. This second Completion Time is necessary to establish a Completion Time dependent on the failure to perform SR 3.2.5.1 similar to that established for NUREG RA A.1.2.1. As written in the NUREG, RA A.1.2.2 would have to be completed within 10 hours of entry in Condition A any time the A.1.2.X alternative Required Actions were chosen. However, if NUREG RA A.1.1 (SR 3.2.5.1) was being performed for an extended period of time, assume 10 hours, and then stopped, then RA A.1.2.2 could not be completed within its required Completion Time. The operators would immediately have to enter NUREG Condition B due to the failure to complete the Required Actions and associated Completion Times of Condition A within the required time frames. This change is consistent with NUREG-1430 Section 1.3 guidance on Completion Times as well as the NUREG Writer's Guide.

The Bases for ITS 3.2.4 were similarly marked to reflect this change.

18. The ITS was marked to indicate the addition of Required Actions A.1.2.3 and A.1.2.4 consistent with the current license basis (CTS 3.5.2.4.2.b and 3.5.2.4.2.c). ITS 3.2.4 Required Action A.1.2.3 requires modification of the allowed regulating group insertion setpoints given in the COLR to help ensure that core thermal limits remain acceptable for continued operation. ITS 3.2.4 Required Action A.1.2.4 requires modification of the Operational Power Imbalance setpoints as given in the COLR that similarly helps ensure that core thermal limits remain acceptable for continued operation. This is consistent with current license basis.

    The Completion Times for these Required Actions are stated as 10 hours or 10 hours after last performance of SR 3.2.5.1 because they constitute alternative actions to RA A.1.1 (SR 3.2.5.1). This Completion Time is consistent with NUREG-1430 Section 1.3 guidance on Completion Times as well as the NUREG Writer's Guide.

    The Bases for ITS 3.2.4 were similarly marked to reflect this change.

19. Not used.

20. Not used.

21. Bases of various Actions were corrected to accurately describe the Condition. Wording similar to that of the Condition was inserted in each case to remove possibly misleading or inaccurate wording from the Bases for these Actions. These changes do not change the intent or usage of these Actions but serve only as clarification.

22. NUREG 3.2.4 - Incorporates TSTF-110, Rev 2.

    The Bases for ITS 3.2.4 were similarly marked to reflect these changes. In addition to the material deleted by the TSTF, sentences containing reference to the alarm function were deleted for consistency and clarification.

23. NUREG 3.2.5 incorporates TSTF-160, Rev 1. The Applicability was modified to specify MODE 1 with THERMAL POWER > 20% RTP. This establishes an Applicability that coincides with the lower operable range for the Incore Detector system. This change in Applicability is necessary because the Incore Detector system is used to satisfy SR 3.2.5.1. Further, below 20% RTP, the probability of experiencing an event that could result in excessive linear heat rates or result in DNB is small. This establishes the LCO 3.2.5 Applicability as one that is consistent with the Applicability of ITS LCO 3.2.4, QUADRANT POWER TILT.

    ITS Required Action B.1 (NUREG-1430 Required Action C.1) was modified to maintain consistency between this Required Action and the new Applicability of this LCO.

The Bases for LCO 3.2.5 were similarly marked to reflect these changes.

24. Not used.

25. Not used.

26. Bases - At multiple locations in the Bases for Section 3.2, paragraphs stating that the actual alarm setpoints may be more conservative than the maximum allowable setpoints were deleted to remove any possible misinterpretation that this was not an acceptable practice in all other situations. Generally, alarm setpoints are conservative with respect to the allowable setpoint. The presence of this paragraph implies that this is not an acceptable practice in other circumstances. Further, this paragraph implies that this monitoring function is performed by the plant computer and is credited within the ITS; when in fact, the plant computer monitoring functions are not credited as performing or satisfying the requirements of these surveillances.

27. The Bases of Specifications 3.2.3 and 3.2.4 were revised to indicate the following changes:

    1) Bases LCO discussion which was more appropriate for the Bases Action section and which essentially duplicated information in the Bases Action section was removed.

    2) Bases discussion of PHYSICS TEST exceptions was removed from 3.2.3 Applicability Bases section. This change was made to maintain consistency between the Bases of this Specification and the Bases of other Specifications which are the subject of PHYSICS TEST exceptions.

    3) Bases Applicability for ITS 3.2.4 was revised to remove a statement that lacks an analytical justification.

28. Not used.

29. Present APSR position limitations given in the COLR specify that the APSRs are to be positioned as necessary for the control of AXIAL POWER IMBALANCE prior to 483 ±10 EFPD [Cycle 15 specific value]. After this burnup value, the APSRs shall be fully withdrawn and not reinserted. No specific limitation exists to prevent their complete withdrawal prior to this burnup value, although this would not be an expected occurrence. Therefore, the Bases for LCO 3.2.2 were modified to state that the APSRs are positioned in accordance with control rod operating guidelines provided by reactor engineering. Further, because there are no specific limits associated with APSR positioning, the discussion of error adjusted setpoints in the bases is not pertinent. Hence, its deletion.

30. ITS SR 3.2.2.1 - ANO-1 does not credit the computer generated alarm function as satisfying this surveillance requirement. The 12 hour Frequency for verification of APSR position is retained because of the infrequent usage of the APSRs and the fact that devices must be manually positioned by the operator. This change preserves the current license basis.

31. CTS 4.1.d establishes a requirement that "a power distribution map shall be made to verify the expected power distribution at periodic intervals at least every 10 effective full power days using the incore instrumentation detector system." The intent of this requirement is to ensure steady state power distributions are consistent with design and operation assumptions.

    ANO-1 presently verifies the acceptability of the core power distribution by determining that the linear heat rate (LHR) is within the limits established for various core elevations and fuel batch designs. Further, ANO-1 presently verifies that an extrapolated DNBR value at the protective system actuation point is within its limits. By performing these two verifications, core power distribution is demonstrated to satisfy LHR limitations based on the ECCS (LOCA) analyses as well as the limitations for the limiting DNBR transient (loss of forced reactor coolant flow). The current methodology does not specifically refer to or perform a verification of power peaking factors. However, the current methodology does result in a verification of acceptable power distribution equivalent to the requirements for verification of the power peaking factors referenced in NUREG LCO 3.2.5. Therefore, the ANO-1 current methodology will be retained. NUREG LCO 3.2.5 was renamed "Power Peaking" in the ITS to reflect the current methodology.

    The wording in ITS 3.2.5 LCO was modified to reflect that LHR is the parameter that is required to be verified. In addition, ITS Condition A, Required Action A.1 and SR 3.2.5.1 were modified to indicate that LHR has been substituted for the NUREG-1430 peaking factor, $F_Q(Z)$.

    NUREG-1430 3.2.5 Required Action A.1 was modified to direct a reduction in THERMAL POWER to restore the LHR to within the limit. A Completion Time of 2 hours was specified. No other Required Actions are specified because the reduction in THERMAL POWER will continue until the LHR is within its limit. The 2 hour Completion Time ensures that prompt corrective measures are initiated while providing the operator with the ability to implement a power reduction in an orderly and controlled manner in the presence of a condition that has resulted in the adverse power distribution. The CTS does not establish any specific Required Actions or Completion Times for this LCO.

NUREG-1430 3.2.5 Condition B was deleted in its entirety because ITS Condition A provides the necessary corrective action when the LHR is not within its limits. NUREG-1430 3.2.5 Condition C was editorially relabeled as ITS Condition B containing Required Action B.1. This change preserves the format of NUREG-1430 and the actions that result in the unit exiting the Applicability if the LHR cannot be restored to within its limits. The 4 hour Completion Time is based on the need to take prompt corrective actions to reduce the core THERMAL POWER level when operating with LHR greater than its limits while adhering to unit operating procedures governing normal, non-emergency, power maneuvering rates of ≤30% per hour. The 4 hour Completion Time provides a reasonable period of time for the reactor operator to reduce the THERMAL POWER of the unit during a situation in which LHR has been made to exceed its limits. This Completion Time also recognizes the low probability of an accident occurring coincident with the LHR not within its limits. The adoption of the 4 hour Completion Time in the ITS will be more restrictive because the CTS did not previously establish a Completion Time for this required power reduction.

SR 3.2.5.1 was modified to specify that LHR is the parameter being verified consistent with the above discussion.

ANO-355

Due to the incorporation of TSTF-220, Rev. 0 as referenced in Section 3.1 DOD 41 and LCO 3.1.6, reference to this LCO is included in the SR 3.2.5.1 Note.

The Bases were rewritten to reflect that the LHR is the limiting parameter and that operational constraints are based on this parameter. Through a variety of correlations, the LHR may be expressed in terms of DNBR, margin to DNB or as power peaking factors. By establishing the LHR as the operational parameter, all confusion regarding which power peaking factor is limiting and how to adjust the power peaking factor for operation at THERMAL POWER levels less than 100% RTP has been eliminated.

At numerous locations through the Section 3.2 Bases of the ITS, reference to the linear heat rate (LHR) has been substituted for the power peaking factors. This establishes consistency between the Bases of LCOs 3.2.1 through 3.2.4 and the Bases for LCO 3.2.5.

32. Text in the ITS 3.2.4 Bases providing reference to an allowance for movement through the specified Applicability conditions as an exception to ITS LCO 3.0.3 was removed from the Bases because it is unnecessary. The ITS LCO 3.2.4 Required Actions direct the necessary remedial measures. Other Condition statements provide the Required Actions should those remedial measures not be satisfied (i.e. Required Action or associated Completion Time not met). No circumstances should exist that require entry into ITS LCO 3.0.3 and no exceptions should be necessary should entry into ITS LCO 3.0.3 be required. Further, the most limiting Required Action would require that the THERMAL POWER of the unit be reduced to less than 20% RTP. This would place the unit in a condition outside of the Applicability of the Specification and simultaneously satisfy the requirements of ITS LCO 3.0.3.

31 NUREG 3.4.13 Bases - This change provides unit specific revisions to discussions of design, analysis, reference documents, or operational parameters or procedures. This change is consistent with current license basis.

32 NUREG Bases - ANO-1 was designed and licensed to the AEC's General Design Criteria (GDC) which was published in the Federal Register on July 11, 1967 [32FR10213]. Appendix A to 10 CFR 50 effective in 1971 [36FR3256] and subsequently amended, is somewhat different from the proposed 1967 criteria. SAR Section 1.4 includes an evaluation of ANO with respect to the 1967 criteria. The NUREG statement concerning the GDC criteria is modified in the ITS to reference the current licensing basis description in the SAR. This change is consistent with current license basis.

33 NURGE-1430 SR 3.4.14.1 Note 2 is deleted. It provides a performance exception during times when DHR is in service. In accordance with the LCO Note (see DOD-20) the valves are not required to meet the LCO (and therefore the SRs) when operating in the DHR mode in MODE 4. For ANO, this LCO exception encompasses the intended allowance of this SR Note. As such the Note serves no purpose and can be removed.

34 Not used

35 NUREG Bases - The Criterion statement at the conclusion of the Applicable Safety Analysis section was modified at each occurrence to refer to 10 CFR 50.36 instead of the NRC Policy Statement. This is an editorial change associated with the implementation of the 10 CFR 50.36 rule changes after NUREG-1430, Revision 1 was issued.

For ITS LCOs 3.4.9, 3.4.10, 3.4.13, 3.4.14, and 3.4.15, the 10 CFR 50.36 Criterion satisfied by the respective ITS LCOs was modified to preserve consistency with the ANO-1 license basis. Specifically, the MODE dependency of the safety analyses was represented in establishing which criterion is met as a function of the operating MODE. For lower MODE LCOs, Criterion 4 of 10 CFR 50.36 was cited as the basis for inclusion of these LCOs. This change is consistent with current license basis and 10 CFR 50.36.

ANO-249 36. ANO-368 Incorporated Generic Change TSTF-352, Rev. 1. Due to the unique nature of the current ANO-1 License bases concerning pressurizer safety valve operability and inoperability, the STS has been modified to illustrate this bases. In doing so, the Completion Time to reduce RCS temperature to less than LTOP temperature is reduced to 18 hours. The TSTF allowed a total of 24 hours to reduce plant power and temperature from a Mode 1 condition. Six hours of this 24 were intended to bring the plant from a Mode 1 to a Mode 3 condition. Since the ANO proposed ACTION C.1 assumes the unit is already in Mode 3 or 4, this 6 hour time allotted by the TSTF was subtracted from the total time of 24 hours, producing an equivalent of 18 hours to reduce temperature to a mode of non-applicability.

ANO-413

1. Not used.

2. The Applicable Safety Analysis section of the NUREG-1430 Bases for 3.5.1 were modified to: 1) add additional details concerning the ANO CFT line break analysis, 2) include reference to the role the CFTs play in satisfying long term cooling requirements following a LOCA, and 3) delete the sentence that says the CFTs do not contribute to these long term cooling requirements. Although the CFTs play no active role in mitigating a LOCA after the blowdown phase, the borated water inventory provided by the CFTs is a contributor to, and is assumed in the accident analyses as part of, the required inventory in the reactor building that supports ECCS pump operation during the recirculation phase. This change is consistent with current license basis.

3. NUREG-1430 SR 3.5.1.4 Frequency has been modified to reflect unit specific system characteristics. The change deals with the Completion Time for performing the required sampling and the qualification of the source of the inventory increase in the core flood tank (CFT). The NUREG-1430 Completion Time of 6 hours was changed to 12 hours which reflects the time needed to recirculate the CFT following makeup, obtain the sample and then perform the sample analysis. Reference to the source of inventory was changed from the "borated water storage tank" to "a borated water source of known concentration ≥ 2270 ppm." Inventory makeup to the CFTs via the CFT Makeup Tank (T-110) can be sampled to demonstrate an acceptable boron concentration of the makeup water prior to its admittance into the CFT. A statement was added to the Bases that clarifies that a borated water source of known concentration is one that sampling has shown to have a boron concentration within CFT requirements. Non-sampled makeup or makeup from other non-verified sources will continue to require the initiation of sampling in accordance with the intent of SR 3.5.1.4 Frequency criteria. In addition, the characterization of the quantity of addition has been revised from "volume increase of ≥ [80 gallons] to level increase of ≥ 0.2 feet." This change is made for consistency with the instrumentation used by the operators to diagnose a level change in the CFT. A level change of 0.2 feet corresponds to a volume addition of approximately 102 gallons.

   The Bases have also been marked to reflect this change. These changes are necessary to reflect unit specific design characteristics.

4. NUREG-1430 SR 3.5.1.5 was modified to remove reference to RCS pressure as a condition of Applicability for the SR. ANO-1 CTS 3.3.3.C requires that the CFT isolation valve breaker be open as a condition of OPERABILITY for the CFT. The removal of the pressure requirement in ITS SR 3.5.1.5 establishes that the SR is consistent with the Applicability of LCO 3.5.1 which imposes a more restrictive pressure requirement of 800 psig.

The Bases were similarly marked. In addition, extraneous text referring to a NOTE that modified NUREG-1430 SR 3.5.1.5, that is not present in NUREG-1430, was removed. This change is entirely editorial.

5. ITS LCO 3.5.2 Applicability was modified to specify that it is applicable in MODES 1 and 2 and in MODE 3 with Reactor Coolant System (RCS) temperature greater than 350°F. This establishes an Applicability consistent with the high pressure injection (HPI) requirements of CTS 3.3.2. This change is consistent with current license basis.

   In addition, the Note modifying LCO 3.5.2 was deleted because high pressure injection (HPI) OPERABILITY is not required until RCS temperature exceeds 350°F. LTOP requirements (NUREG-1430 LCO 3.4.12) will be imposed when RCS temperature is less than 300°F. Therefore, there is no overlap of Applicability between these two Specifications and the Note is not required. This change is consistent with current license basis.

3.5.2-01

   The Bases have also been marked to reflect these changes.

6. The Bases discussion for ITS SR 3.5.2.3 and SR 3.5.2.4 (NUREG-1430 SR 3.5.2.5 and SR 3.5.2.6) was revised to separate the discussion for these two SRs. No substantive changes were made to the Bases discussion for ITS SR 3.5.2.3 (NUREG-1430 SR 3.5.2.5). However, the Bases discussion for ITS SR 3.5.2.4 was modified to reflect the CTS 4.5.1.1.1 and 4.5.1.1.2 methodology for this Surveillance. This change is necessary due to the system design configuration and the limitations imposed on pump operation during unit conditions when this Surveillance would be conducted. Specifically, the high pressure injection (HPI) pumps can not be started during unit outage conditions because they are not equipped with sufficient recirculation capability to perform this test, and they must remain secured and isolated from the RCS to prevent a possible inadvertent over-pressurization of the RCS while at this low temperature condition (LTOP). Therefore, this verification must be conducted through a series of sequential, overlapping, or total steps in order to demonstrate functionality. ESAS actuation logic testing verifies the ability of that system to generate an actuation signal. ITS SR 3.5.2.4 verifies the ability of the actuation signal to initiate closure of the breaker for each ECCS pump. ITS SR 3.5.2.2 verifies that the ECCS pumps will indeed start and operate within the limits established by the Inservice Testing Program. In combination, these three tests verify the ability of the ESAS to actuate the ECCS pumps and their ability to perform as required. This change is consistent with current license basis as established by CTS 4.5.1.1.1 and CTS 4.5.1.1.2 and ANO-1 SAR Table 6-5.

7. ITS 3.5.1 Actions were modified to show the deletion of NUREG-1430 Condition D and the modification of NUREG-1430 Condition C to include inoperability of two core flood tanks (CFTs). NUREG-1430 Condition D required entry into LCO 3.0.3 upon inoperability of both CFTs. The requirements of LCO 3.0.3 would have provided roughly equivalent actions to the Required Actions established in Condition C. However, because of the RCS pressure based Applicability for LCO 3.5.1, LCO 3.0.3 would not have provided an explicit time frame for removing the unit from the Applicability of LCO 3.5.1 (i.e., LCO 3.0.3 does not provide direction for having RCS pressure below a particular value as a function of elapsed time from entry into the Condition). This change clarifies the Completion Time for removing the unit from the Applicability of the LCO. CTS 3.3.6 is not explicitly identified as "one CFT inoperable" but rather as "LCO not met." Therefore, providing an explicit ACTION rather than entering LCO 3.0.3 is consistent with CTS. This change is consistent with current license basis.

   The Bases were similarly marked.

8. NUREG-1430 SR 3.5.2.1, SR 3.5.2.3, SR 3.5.2.7 and SR 3.5.2.8 are shown as not adopted in the ITS. ANO-1 has no comparable requirement to these SRs. These changes are consistent with current license basis. Additional discussion follows:

   NUREG-1430 SR 3.5.2.1 - The ANO-1 ECCS trains contain no power operated valves that are required to remain de-energized or whose control circuits require key locked handswitches in order to prevent the disabling of both ECCS trains due to common mode failure. Information Notice 87-01, "RHR Valve Misalignment Causes Degradation of ECCS in PWRs" was reviewed for applicability. ANO-1 is not susceptible to the events described in the notice because of the physical independence of the ECCS trains and the absence of cross-tie valves between trains.

   NUREG-1430 SR 3.5.2.3 - Periodic performance of surveillances that require operation of the ECCS subsystems provides reasonable assurance that the ECCS piping remains full of water. In addition, procedural controls address filling and venting requirements for systems that are returned to service following maintenance activities. Therefore, there exists a high level of assurance that the majority of the ECCS piping is filled. Additionally, the physical design of the systems are such that this SR could not be applied to all portions of the piping because of the inability to perform venting operations to satisfy the SR due to the absence of vents, physical danger associated with the evolution, or due to localized radiation levels.

NUREG-1430 SR 3.5.2.7 - The ANO-1 HPI trains do not contain stop check valves whose purpose is to balance flow or prevent HPI pump runout. Throttle valves that are used for this purpose have welded stems to prevent movement; and thus, are not susceptible to repositioning. Therefore, this NUREG-1430 SR is not applicable to the unit.

NUREG-1430 SR 3.5.2.8 - The ANO-1 LPI trains do not contain automatic flow controlling throttle valves. Therefore, this NUREG-1430 SR has no applicability to the unit.

The Bases have also been marked to reflect this change.

9. NUREG-1430 SR 3.5.2.9 was renumbered as ITS SR 3.5.2.5 and modified to account for ANO-1 site specific characteristics. The ANO-1 containment is referred to as the reactor building. Reference to "suction inlet trash racks" was removed because these components are not present in the suction inlets. This change is consistent with the current license basis of the unit.

10. Insert B 3.5-14A was provided in the ITS Bases to cover the lack of Applicability of LCO 3.5.2 for MODE 3 with RCS temperature ≤ 350°F and in MODE 4. The NUREG-1430 Bases did not provide an Applicability discussion for these MODES. This insert was provided only for completeness.

11. ITS SR 3.5.1.2 was modified to specify only the volume requirement expressed in cubic feet (ft.^{3}) and not in gallons or the corresponding level indication in feet. CTS 3.3.3(A) and the safety analyses utilized a volume in cubic feet; therefore, the SR requirement expressed in cubic feet is a more appropriate requirement. This change is consistent with current license basis. In addition, statements in the Bases have been provided to explicitly establish that the safety analysis parameters presented in the ITS do not contain allowances for instrumentation uncertainty. This change is considered to be administrative in nature.

12. NUREG-1430 LCO 3.5.3 was modified to specify that two LPI trains shall be OPERABLE vice one ECCS train. This change is necessary because of the NUREG-1430 definition of an ECCS train, which states that it is composed of one HPI subsystem and one LPI subsystem. CTS 3.3.1 requirements specify that two LPI pumps shall be OPERABLE "when containment integrity is established by Specification 3.6.1." The requirements of CTS 3.6.1 have been correlated to ITS MODES 1, 2, 3 and 4. CTS 3.3.2 requirements specify that two HPI pumps shall be OPERABLE "when the reactor coolant system is above 350°F." Thus, the NUREG-1430 LCO 3.5.3 requirements are not consistent with the CTS requirements for OPERABLE LPI subsystems or HPI subsystems. Further, CTS 3.1.2.10 requires that "when the reactor coolant temperature is less than 300°F, the high pressure

injection motor operated valves shall be closed with their opening control circuits for the motor operators disabled." This requirement negates the OPERABILITY of the HPI system in MODE 4 which is defined as the RCS temperature range greater than 200°F but less than 280°F (ref. ITS Table. 1.1-1), and which coincides with the defined Applicability of LCO 3.5.3. Therefore, NUREG-1430 LCO 3.5.3 Applicability was modified to include MODE 3 with RCS temperature ≤ 350°F. This modification is necessary as described above and ensures continuity in the Applicability requirements for the LPI trains between ITS LCO 3.5.3 and LCO 3.5.2. These changes are consistent with current license basis.

In addition, the NUREG-1430 3.5.3 LCO NOTE regarding HPI was deleted because it is not pertinent to the revised LCO requirements that specify that LPI alone is the subject of the Specification. This change is consistent with current license basis.

NUREG-1430 3.5.3 LCO was also modified by TSTF-090, Rev. 1 which inserted a NOTE that states that a decay heat removal (DHR) train may be considered OPERABLE for the purposes of satisfying the LPI requirement during alignment and when aligned for DHR, if capable of being manually realigned to the ECCS mode of operation. This NOTE is necessary to preserve compliance with the LCO when the LPI train is performing its DHR function. The Note was derived from its original location in SR 3.5.3.1. The Bases annotation that the manual control can be accomplished either locally or remotely preserves current operational flexibility. This change is consistent with TSTF-090, Rev. 1, except that ANO has determined that deleting the Note from SR 3.5.3.1, per TSTF-90, Rev 1, could result in confusion with respect to the applicable SRs. For example, the train may be capable of satisfying the applicable SRs when aligned for LPI, but not when aligned for DHR. Upon realignment to LPI, all applicable SRs would again be satisfied. Retention of this Note resolves a potential conflict with SR 3.0.1.

NUREG-1430 LCO 3.5.3 Actions were significantly altered, while retaining the original intent of the Required Actions, in order to properly reflect the corrective actions should the LCO not be met. The individual ITS Conditions and their Bases will be discussed separately in the following paragraphs.

ITS Condition A

NUREG-1430 Condition B was designated as ITS Condition A. Condition A is entered with the declaration of one train of LPI being inoperable. ITS Required Action A.1 requires that the LPI train be restored to an OPERABLE status within a Completion Time of 48 hours. This Completion Time in conjunction with the Completion Time of ITS Required Action B.1 (24 hours) is in accordance with CTS 3.3.6 requirements for the restoration of OPERABILITY or completion of compensatory measures for the LPI systems. The 48 hour Completion Time is an acceptable allowance based on the fact that the redundant LPI train can still satisfy the required ECCS safety function for the specified LCO Applicability.

ITS Condition B

NUREG-1430 Condition C was designated as ITS Condition B. Condition B is entered when the Required Action and associated Completion Time of Condition A are not met. ITS Required Action B.1 requires that the unit be taken to MODE 5 within a Completion Time of 24 hours. This Completion Time in conjunction with the Completion Time of ITS Required Action A.1 (48 hours) is in accordance with CTS 3.3.6 requirements for the restoration of operability or completion of compensatory measures for the LPI systems. Further, the combination of ITS Conditions A and B preserves the philosophy of removing the unit from the MODES or other specified conditions for Applicability. However, this Required Action is conditional based on a NOTE that directs that this action is required only if one DHR train is OPERABLE. This is necessary to prevent entry into a mode of operation (Mode 5) that relies on the LPI pumps for decay heat removal (reactor coolant pumps are unavailable for decay heat removal in this mode).

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ITS Condition C

NUREG-1430 Condition A was designated as ITS Condition C. Condition C is entered when both of the required LPI trains are declared inoperable. ITS Required Action C.1 requires that action be immediately initiated to restore at least one of the two LPI trains to an OPERABLE status. This Required Action and its associated Completion Time are premised on the recognition that an ECCS safety function has been lost. Further, this Required Action and its associated Completion Time are structured such that no requirement for a reduction in RCS temperature exists. If both LPI trains (and consequently both DHR trains) are inoperable, the corrective action is to restore at least one train to an OPERABLE status prior to cooling the unit down and into a MODE that requires operation of the DHR system. Required Action C.2 is inserted to provide a Required Action to place the unit in MODE 5 if an OPERABLE DHR train is available despite the inoperability of both of the LPI trains. This Required Action is conditional based on a NOTE that directs that this action is required only if one DHR train is OPERABLE. If the cause of the inoperability for both LPI trains also made the DHR trains inoperable, then no attempt to cool down the unit is required. Required Action C.2 is inserted to ensure that a cooldown to MODE 5 is initiated provided the required DHR capability exists. These changes are consistent with NUREG-1430 LCO 3.4.5 and LCO 3.4.6 Actions when a decay heat removal system is unavailable.

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The Bases have also been marked to reflect these changes.

13. The CTS does not establish an upper limit on BWST temperature. An evaluation of the SAR small and large break LOCA analyses, reactor building (containment) design basis events, main steam line break analyses, steam generator tube rupture analyses, and other supporting calculations indicate that an upper limit of 110°F should be established. This temperature is above the anticipated maximum BWST temperature attributed to the meteorological conditions expected at ANO. However, to ensure that the maximum limit is not exceeded, the SR 3.5.4.1 Note will require verification of the BWST temperature when the temperature exceeds 110°F.

    The Bases have also been marked to reflect these changes.

14. Bases - The B 3.5.4 Background paragraph discussing the recirculation lines to the Borated Water Storage Tank (BWST) associated with the ECCS and containment spray pumps was deleted in its entirety because the ANO-1 unit design does not provide recirculation lines to the BWST for these components. This change is consistent with current license basis.

15. An editorial change to the Bases for the Applicability of LCO 3.5.1 was made that provides reference to the low temperature overpressure protection (LTOP) consideration extended to the CFTs. The inserted paragraph restates the Applicability of LCO 3.4.12, "Low Pressure Overpressure Protection (LTOP)." This change is provided for editorial clarification only.

16. NUREG-1430 Bases (Background and SR 3.5.1.5) text referring to an interlock associated with the CFT outlet valves and RCS pressure, and the text referring to ESAS actuated opening of the CFT outlet valves was deleted because these interlocks do not exist for the ANO-1 CFT outlet valves. These valves are operator controlled. In addition, text referring to the IEEE design requirements was removed because of the lack of applicability to ANO-1. This change is consistent with current license basis and with TSTF-316, Rev 1.

17. An editorial change to revise the Bases for ITS SR 3.5.2.2 was made. The change replaces wording in the Bases for this SR with wording that is consistent with the Bases for other SRs whose purpose is to verify pump performance. For example, the inserted wording is similar to the Bases wording for NUREG-1430 SR 3.7.5.2 which applies to inservice testing of the Emergency Feedwater Pumps.

18. ITS SR 3.5.1.4 was modified to specify only the lower boron concentration requirement in accordance with the requirements of CTS 3.3.3(B). The upper boron concentration limit will remain under administrative control. The Bases were similarly changed. This change is consistent with current license basis.

19. In multiple locations through the Bases for Section 3.5, the discussion on boron precipitation was corrected to reflect the ANO-1 credited mechanism for preventing boron precipitation in the core post LOCA. B&W has evaluated the flowpath inherent in the reactor vessel internals, commonly called the leakage gap flowpath, and demonstrated that the flowpath would be sufficient by itself to preclude boron precipitation. However, emergency procedures retain provisions for establishing flushing flow paths through the core, which would similarly prevent boron precipitation. These changes are consistent with current license basis.

20. NUREG Bases - The Criterion statement at the conclusion of the Applicable Safety Analysis section was modified at each occurrence to refer to 10 CFR 50.36 instead of the NRC Policy Statement. This is an editorial change associated with the implementation of the 10 CFR 50.36 rule changes after NUREG-1430, Revision 1 was issued.

    For ITS LCOs 3.5.1, 3.5.2, 3.5.3, and 3.5.4, the 10 CFR 50.36 Criterion satisfied by the respective ITS LCOs was modified to preserve consistency with the ANO-1 license basis. Specifically, ANO-1 safety analyses, upon which ITS LCOs 3.5.1, 3.5.2, 3.5.3, and 3.5.4 are based, were performed with the reactor in MODE 1 at RATED THERMAL POWER. The ITS Applicability for these Specifications will include other MODES and specified conditions. Thus, the Criterion statement was revised to specify that the LCO parameter satisfies Criterion 3 of 10 CFR 50.36 when in MODE 1. All other specified MODES of Applicability will satisfy Criterion 4 of 10 CFR 50.36. This change is consistent with current license basis and 10 CFR 50.36.

21. NUREG 3.5.2 Bases - Background discussion of the LPI system flowpaths for control of boron precipitation was revised to reflect the guidance currently provided in the implementing procedure. This change is consistent with the current license basis.

22. NUREG 3.5.4 Bases - Background discussion of the reactor shutdown state following a LOCA has been revised. In a Framatome Technologies Incorporated letter, FTI-99-1901, dated June 16, 1999, FTI sent the NRC a final report on PSC 1-95, Small Break LOCA Re-criticality. This report indicated that there was a possibility that re-criticality could occur due to the accumulation of de-borated water in the bottom of the steam generator. However, it was determined to be non-safety significant. This change is consistent with the current license basis.

23. NUREG-1430 3.5.4 Bases Applicable Safety Analysis is revised to delete a sentence incorrectly stating that large break LOCAs assume all control rods remain withdrawn in evaluating the core reactivity for the ensuing cold shutdown. The ANO-1 analyses for cold shutdown core reactivity following the limiting DBA LOCA assume some control rods are inserted.

Also NUREG-1430 3.5.1 Bases Applicable Safety Analysis discussion of minimum boron concentration for the CFT is revised to match the Bases for the BWST (3.5.4 Bases). Both tanks require the same 2270 ppm boron concentration, and the Bases is revised to reflect a consistent description.

24. NUREG-1430 3.5.3 Bases Applicable Safety Analysis discussion included a basis for automatic instrumentation applicability, which is appropriately addressed in Bases for Section 3.3. It is therefore deleted from this Bases discussion.

3.5.2-01 25. Incorporated TSTF 325, Rev 0.

ITS DISCUSSION OF DIFFERENCES

ITS Section 3.8: Electrical Power Systems

1 NUREG LCO 3.8.1.c, NUREG 3.8.1 Condition F, & NUREG SR 3.8.1.11,

3.8.2-01
3.8.1-07

SR 3.8.1.18, SR 3.8.1.19 and NUREG 3.8.2 LCO Bases - The automatic load sequencing design for this unit is provided by individual timers in the circuitry for each component which are initiated by a loss of power, and subsequent restoration of power, to the circuit. The design does not include an overall "train" sequencer which controls all loading to the diesel generator or engineered safety features bus. Therefore, there is no need to separately identify this component in LCO 3.8.1 and LCO 3.8.2 Bases, nor in a separate Condition if inoperable (NUREG 3.8.1 Condition F). Additionally, the diesel generator may be directly, adversely affected by an inoperable sequencing timer. Therefore, the sequencing timers are addressed with operability of the diesel generators. Statement are added to the 3.8.1 Bases LCO discussion and the Bases for NUREG SRs 3.8.1.11 and 3.8.1.19 to clarify the operability requirements of the diesel generators with respect to these sequencing timers. If the time delays between loads are degraded, two or more loads are added at insufficient intervals, the associated diesel generator is declared inoperable. However, if a relay fails to start a load, then the individual component that was not started is declared inoperable and the appropriate Conditions for that component are entered. This is consistent with the interpretation of the current license basis.

2 NUREG LCO 3.8.1, Required Action A.3, second Completion Time, and Required Action B.4 Completion Times - The CTS 3.7.2.C Completion Time of 7 days for the diesel generators (DGs) is retained. Similarly, the overall Completion Time for "failure to meet the LCO" is extended to 10 days. The overall Completion Time is the additive time for an inoperable DG and an inoperable offsite feed as though they occur back-to-back. The 7 day Completion Time has been previously found acceptable and the plant specific risk assessment has not identified the allowed outage time for the AC Sources to represent an unacceptable risk. This change is consistent with current license basis.

3 NUREG SR 3.8.1.2, SR 3.8.1.2, Notes 1 & 3, SR 3.8.1.3, Note 4, and SR 3.8.1.7 - The diesel generator design does not provide for gradual acceleration. Consequently, all starts are fast starts and subject to the 15 second acceptance criteria. Therefore, SR 3.8.1.2 is revised to be equivalent to NUREG SR 3.8.1.7, and SR 3.8.1.7 and the Notes related to use of SR 3.8.1.7 are unnecessary. These changes are consistent with current license basis.

Further, NUREG SR 3.8.1.2, Note 1 would be inconsistent with the remainder of the NUREG. Any test which satisfies the requirements of another test may be credited to satisfy both. This is standard practice and fully satisfies the requirements without specific identification. A specific note here would present confusion for other SRs which may be satisfied by alternate testing but for which the specific SR does not contain a similar note. This change incorporates TSTF-253.

4 NUREG SR 3.8.1.2 & SR 3.8.1.3 Frequency, & Table 3.8.1-1 - The variable DG test Frequency requirements are not included per Generic Letter 94-01. Implementation of the provisions of the maintenance rule for the DGs, including the applicable regulatory guidance, provides the program to assure DG reliability and performance. Further, a monthly Frequency is consistent with CTS SR 4.6.1.1. This change is consistent with current license basis.

3.8.1-25 5 Not used.

3.8.1-19 6 NUREG SR 3.8.1.4, 3.8.1.5, & SR 3.8.1.6 - The design of the DG fuel oil system includes an engine mounted day tank; but not a day tank separate from the engine mounted tank. This change is consistent with current license basis.

3.8.1-21 7 NUREG SR 3.8.1.11, Note 2, SR 3.8.1.19, Note 2, SR 3.8.4.7, Note 2, & SR 3.8.4.8, Note - The requirement to restrict the performance of this SR from MODES 1 and 2 (or MODES 1 through 4, as appropriate for the respective SRs) is not included since such a restriction is inconsistent with the remainder of the NUREG and is unnecessary. The NRC Staff has previously concluded (see Generic Letter 91-04) that the TS need not restrict surveillances as only being performed during shutdown. Administrative controls and risk insights have, to-date, provided adequate restriction such that when surveillances are performed during power operation, proper regard is considered for their effect on the safe operation of the plant. If the performance of a surveillance during plant operation would adversely affect safety, EOI/ANO-1 has postponed, and will continue to postpone, the surveillance until the unit is in a condition or mode that is consistent with the safe conduct of that surveillance. This requirement has been adequately performed under administrative control in the past (i.e., it is not in the current TS) and is proposed to continue to be administratively controlled. This is consistent with current license basis.

8 NUREG SR 3.8.1.8, Note, SR 3.8.1.11, Note 2, SR 3.8.1.19, Note 2, SR 3.8.4.7, Note 2, & SR 3.8.4.8, Note - Incorporated TSTF-008, Rev 2.

9 NUREG SR 3.8.1.9 and SR 3.8.1.10 - These SRs for testing full and partial load rejection capability of the DGs are not adopted. Failure of one DG is assumed to occur during a design basis accident without specifying the mechanism for the failure. While capability to operate following these events (i.e., DG load rejection) is desirable, it is not required by the safety analysis. Both DGs are prohibited from being
3.8.1-23 placed in parallel with the offsite power source simultaneously by station procedures. Therefore, it is not possible for both DGs to be lost due to a load rejection event. Further, such surveillance requirements do not exist in the CTS. Since the SRs are not part of the current license basis and the loss of both DGs due to a load rejection event is prohibited by requirements contained within station procedures, it is acceptable to not adopt these additional requirements. Nevertheless, ANO-1 performs a load rejection test in accordance with industry guidelines that meets the requirements of Regulatory Guide 1.108. However, performance of such is not required from a safety analysis perspective. This change is consistent with current license basis.

10 NUREG SR 3.8.1.12 & SR 3.8.1.20 - SR 3.8.1.12 is not included since it does not confirm the capability of the tested components to perform any function required or assumed by the safety analysis. The auto start initiated by a ESAS signal is intended to prepare the DG for loading should a loss of power subsequently occur. Without the ESAS start, the DG loading may be delayed for up to an additional 12 seconds. However, the safety analysis assumes DG start on undervoltage and does not credit the possibility that the DG may already be running when the undervoltage occurs. In addition, the SR does not result in load sequencing and since the ESAS start ciruitry does not affect the undervoltage start circuitry, no safety value is obtained from performance of this SR. As such, it is not appropriate for a TS requirement. The safety analysis assumes/requires loading of the DG only following a loss of offsite power. If offsite power is available, it is utilized, and if it is lost, the DG is started and loaded as tested by proposed SR 3.8.1.8 or SR 3.8.1.9. Therefore, the ESAS start of the DG is not utilized by the safety analysis. This change is consistent with the current license basis.

3.8.1-19, 3.8.1-23

SR 3.8.1.20 is not adopted since it confirms only that the unit design controls have been appropriately implemented. Such special post-modification testing is not typical for inclusion in the Technical Specifications and is not proposed to be incorporated. A similar SR is likewise not included in the CTS. It is unlikely that past modifications preventing a simultaneous start of both DGs since the DGs are redundant components and do not share same train electronic or fluid support components. The design and configuration controls for the unit have been adequately confirmed through post-modification testing and will continue to be confirmed in this manner. Since a similar requirement is not found in the CTS and since plant modifications are adequately controlled within station programs and procedures, SR 3.8.1.20 is not adopted. This change is consistent with the current license basis.

11 NUREG SR 3.8.1.13 - The ANO-1 design does not include automatic bypassing of the emergency diesel generator trips during emergency operation following an engineered safeguards actuation signal. This change is consistent with current license basis.

3.8.2-01 12 NUREG 3.8.2 - NUREG SR 3.8.2.1 and the associated Bases are revised to reflect specific changes made to the list of referenced SRs. The body of SR 3.8.2.1 has been revised to include ITS SRs 3.8.1.4, 3.8.1.7, 3.8.1.8, and 3.8.1.9 (NUREG SRs 3.8.1.4, 3.8.1.8, 3.8.1.11, and 3.8.1.19, respectively) as those SRs that are exempted in MODES 5 and 6. ITS SR 3.8.1.4 requires a verification of the diesel generator fuel oil day tank level. The purpose of this level are to provide additional volume to allow, in conjunction with the volume contained in the fuel oil storage tanks, for a seven day supply of fuel oil on site. In MODES 5 and 6, the loads experienced by the diesel should be much lower than the loads the diesel would experience if loaded with full emergency loads in response to an accident from 100% power that assumes a loss of offsite power. Since the loading of the diesel generator is expected to be lower in MODE 5 and 6, if required to run, the 160 gallons of fuel oil contributed by the diesel day tank should not be required to contribute to a seven day supply of fuel oil.

ITS SRs 3.8.1.8 and 3.8.1.9 are not applicable since they test the response to ESAS signals which are not required to be OPERABLE in shutdown MODES. ITS SR 3.8.1.7 is not applicable since only one offsite AC source is required to be Operable by LCO 3.8.2. Therefore, require an auto-transfer capability is not necessary since there may be no other source to transfer the loads to.

Although the CTS does not contain explicit requirements for electrical systems in MODES 5 and 6, these changes are consistent with ANO's interpretation of the current license basis.

The ITS SR 3.8.2.1 Bases have been revised to reflect the changes in the SR. In addition, information has been added to further clarify the applicability of the ITS 3.8.1 SRs in MODES 5 and 6.

13 NUREG 3.8.4, Condition A, NUREG 3.8.9, Conditions B and C, and NUREG 3.8.7 Bases - The NUREG 3.8.4 and 3.8.9 Conditions are revised to retain the CTS 3.7.3 allowed time for continued operation with an inoperable battery, battery charger, or DC electrical power distribution subsystem. As long as there is no "loss of function" identified, the CTS time frame of 8 hours has been previously determined to be acceptable and the plant specific risk assessment has not identified the allowed outage time for the DC Sources to represent an unacceptable risk. The "loss of function" will continue to be determined in accordance with the SFDP and if identified, appropriate actions will be taken in accordance with the Specification for the lost function. NUREG LCO 3.8.9, Condition B is also revised to allow 8 hours for one 120 VAC vital bus electrical power distribution subsystem inoperable. This time period is consistent with the proposed ITS 3.8.9 Condition A and C Completion Times for an AC or DC subsystem inoperability. The Bases provided for a 2 hour Completion Time also support an 8 hour Completion Time. The NUREG 3.8.7 Bases were revised to incorporate reference to the correct Completion Time. These changes are consistent with current license basis.

3.8.5-01 14 NUREG 3.8.4 and 3.8.5 - NUREG SR 3.8.4.2, SR 3.8.4.3, SR 3.8.4.4, and SR 3.8.4.5 are not proposed to be adopted. NUREG SR 3.8.4.2, SR 3.8.4.3 and SR 3.8.4.4 are omitted since visible corrosion does not necessarily mean the battery is inoperable (as indicated in the Bases for NUREG SR 3.8.4.4). Also, the bracketed values of resistance specified in the NUREG are vendor recommended values; that is, values at which some action should be taken, not necessarily when the OPERABILITY of the battery is in question. Therefore, NUREG SR 3.8.4.5 is also proposed to be omitted. The safety analyses do not assume a specific battery resistance value, but typically assume the batteries will supply adequate power. Therefore, the key issue is the overall battery resistance. Between surveillances, the resistance of each connection varies independently from all the others. Some of these connection resistances may be higher or lower than others, and the battery may still be able to perform its function and should not be considered inoperable solely because one connector's resistance is high. Overall resistance is a direct impact on OPERABILITY, however, it is

adequately determined as acceptable through completion of the battery service and discharge tests. Finally, acceptable resistance is currently determined through the battery service and discharge tests since the CTS does not include a surveillance equivalent to NUREG SR 3.8.4.2, SR 3.8.4.3, SR 3.8.4.4, and SR 3.8.4.5. Similarly, visual indication of physical damage or abnormal deterioration is cause for investigation, but does not necessarily mean that the battery could not perform its function if called upon. Such indication would be documented under the station's condition reporting program and evaluated consistent with the extent of the damage or deterioration.

3.8.4-04 By letter dated April 9, 1999, and supplemented by letter dated July 29, 1999, ANO proposed changes to the Surveillance Requirements (SRs) associated with the DC Sources. The proposed changes used NUREG-1430 as a template for the new SRs. These proposed SRs were approved by the NRC as Amendment 200, dated September 14, 1999. Although NUREG-1430 was used as the guidance document for the incorporation of the DC Source SRs, the NRC staff did not require the incorporation of these specific NUREG SRs. Although not required by the CTS, these SRs are performed under the ANO battery maintenance program, consistent with the requirements contained in IEEE 450 – 1995.

15 NUREG SR 3.8.1.14, SR 3.8.1.15, and SR 3.8.1.16 - These SRs for testing a twenty-four hour run, hot restart capability, and synchronization capability of the DGs are not

3.8.1-23 adopted. Critical criteria for DG operability is satisfactorily demonstrated by the one hour run which allows the DG to reach a stable engine temperature. However, operation beyond this time frame may provide information with regard to the DGs capability to perform for long periods as designed. ANO-1 currently performs a 24-hour test consistent with Regulatory Guide 1.108 requirements and will continue to do so. Nevertheless, since this test is not intended for critical data collection and verification associated with DG operability and the test is not included in the CTS, SR 3.8.1.14 is not adopted within the ITS.

The hot restart capability is considered to be a requirement beyond the current licensing basis. Although this function is likewise performed at ANO-1, it is not required by the safety analysis. By letter dated June 3, 1977 (1CNA067708) the NRC requested that ANO apply for an amendment to incorporate comparable technical specifications to those presented in the letter. These included at least once per 18 months simulating a loss of offsite power in conjunction with a safety injection actuation test signal, and:

1) verifying de-energization of the emergency busses and load shedding from the emergency buses,

2) Verifying the diesel starts from ambient condition on the auto-start signal, energizes the emergency busses with permanently connected loads, energizes the auto-connected emergency loads through the load sequencer and operates for ≥ 5 minutes while its generator is loaded with the emergency loads, and

3) Verifying that on diesel generator trip, the loads are shed from the emergency busses and the diesel re-starts on the auto-start signal, the emergency busses are energized with permanently connected loads, the auto-connected emergency loads are energized through the load sequencer and the diesel operates for ≥ 5 minutes while its generator is loaded with the emergency loads.

Item 3 did involve a hot restart. However, in a letter dated December 17, 1979 (1CNA127919), which approved modifications needed to respond to the June 3, 1977 letter, the Staff required that the Technical Specifications to be submitted should address testing of the emergency power system using the following steps:

1) Simulating a loss of off-site power,

2) Simulating a loss of off-site power in conjunction with an ESF signal, and

3) Simulating interruption of off-site power and subsequent reconnection of the onsite power source to their respective buses.

The technical specifications approved by the Staff in Amendment 60, dated October 23, 1981, required a test to be conducted once every 18 months to demonstrate the ability of the diesel generators to perform as designed by:

1) simulating a loss of off-site power,

2) simulating a loss of off-site power in conjunction with an ESF signal,

3) simulating interruption of off-site power and subsequent reconnection of the on-site power source to their respective busses, and

4) operating the diesel generator for ≥ 1 hour after operating temperatures have stabilized.

The new requirements were, therefore, approved by the NRC without the inclusion of a hot restart test. Since this test is not contained in the CTS and is not required by the current license basis, SR 3.8.1.15 is not adopted.

SR 3.8.1.16 acts to verify that the sync-check relay associated with the offsite power source breaker feeding the associated vital bus is Operable. Synchronization with the offsite power source has no impact on DG operation since the DG continues to carry the bus load after parallelling with offsite power. Once the offsite power source is connected, the DG must be manually unloaded from supplying power to the bus. In addition, the safety analysis does not require that loads be transferred back to offsite power. Further, this surveillance requirement does not exist in the CTS. Therefore, since the safety analysis does not require operation of the offsite power source bus breaker sync-check relay and no current requirement exists in the CTS, SR 3.8.1.16 will not be adopted. This change is consistent with the current license basis.

16 Not used.

3.8.2-01 3.8.5-01, 3.8.8-01, 3.8.10-01

17 Not used.

18 Not used.

19 NUREG 3.8.4 - The NUREG SR 3.8.4.7 Note 1 restriction to use the substitution of the modified performance discharge test for the service test only "once per 60 months" is not adopted. As indicated in the Bases, the modified performance discharge test is required to envelope the duty cycle of the service test. It is therefore, a conservative test and should be allowed at any time. Further, IEEE-450, on which the service test and substitution of a modified performance discharge test are based, contains no such limitation. Finally, the CTS for ANO-1 does not contain this limitation, nor the limitation for use of a "modified" performance discharge test. This change is consistent with current license basis.

3.8.1-19, 3.8.3-01

20 The deletion of NUREG SR 3.8.3.6 is consistent with Generic Traveler TSTF-002, Rev. 1.

21 NUREG SR 3.8.1.17 - The design of the diesel generator logic does not include an ESAS override of the test mode as described in this SR. As such, a similar SR is not included in the CTS and is not proposed to be included in the ITS. This change is consistent with current license basis.

22 NUREG 3.8.6 - The LCO is revised to omit the "Train A and Train B" terminology which is not used, with respect to batteries, at ANO-1. This change is administrative in that the Bases are adequate to describe the batteries to which the LCO is applicable.

23 NUREG SR 3.8.1.11 and SR 3.8.1.19 - The details of the acceptance criteria for these SRs are revised to match CTS 4.6.1.2 acceptance criteria of "demonstrate the ability of the DGs to perform as designed" for a loss of offsite power and for a loss of offsite power in conjunction with an ES signal, and to be consistent with the changes made to NUREG SR 3.8.1.2. Steady state voltage and frequency requirements are not included in the current licensing basis (see DOD 40). This change is consistent with CTS.

24 Not used.

25 NUREG LCO 3.8.3 - The lube oil requirements are not included in this Specification since the design does not provide for a measurable indication of the amount of lube oil available. The design provides only a dip stick which indicates "sufficient" lube oil available, i.e., above the minimum mark. When lube oil is below the maximum, but above the minimum, action is initiated to add lube oil to the system. Thus, sufficient lube oil is always available. The administrative controls and maintenance practices have, to-date, provided adequate restriction such that when surveillances are performed, proper regard is considered for their effect on the safe operation of the plant. If the lube oil is below the minimum mark, the DG is considered inoperable and

if the lube oil is between the maximum and minimum marks, prompt actions is initiated to restore the lube oil level. These administrative controls will continue to be imposed, and this requirement, which is not in the CTS, is proposed to continue to be administratively controlled. This change is consistent with current license basis.

26 NUREG Bases - This change is editorial in nature and incorporated only to provide nomenclature consistent with that used in other plant related documents.

27 **NUREG Bases** - This change provides plant specific revisions to discussions of design, analysis, reference documents, or operational parameters or procedures.
B 3.8.1 BACKGROUND - Added discussion of DG "intended service" rating, moved information regarding definition of an offsite circuit to the LCO section, and deleted incorrect information regarding the capability of the offsite circuit transformers.
B 3.8.1 BACKGROUND, LCO & NUREG SR 3.8.1.8- Revised discussion of offsite circuits design.
B 3.8.1 LCO - Revised offsite circuits automatic transfer design discussion since only one circuit is normally available for automatic transfer, and neither circuit is the normal ESF bus power source. The normal power source is the unit auxiliary transformer, and startup transformer No. 2 is normally unavailable for automatic transfer.
B 3.8.1 ACTIONS - Removed references to non-applicable guidance documents. These guidance documents were not used in the development of the original surveillance requirements, and are not applicable to the proposed SRs.
B 3.8.1 ACTIONS A.1, A.2, B.1, B.2, C.1 and C.2 - The turbine driven emergency feedwater (EFW) pump is redundant to the motor driven pump. There are only two EFW pumps.
B 3.8.1 Required Actions A.1 & B.1 - Added missing Completion Time Bases.
B 3.8.1 Required Action A.2 – Clarified (consistent with the Required Action presentation) that the Required Action applies to conditions when offsite power is not "available to supply." The ANO-1 design is such that offsite power is not normally connected, but available for automatic transfer to the ES buses.
B 3.8.1 Required Actions D.1 & D.2 - Omitted discussion of susceptibility to a single failure that is not be true for some situations that would result in entry into this condition.
B 3.8.1 SRs - Removed references to non-applicable guidance documents. These guidance documents were not used in the development of the original surveillance requirements, and are not applicable to the proposed SRs.
NUREG SR 3.8.1.2, SR 3.8.1.11, & SR 3.8.1.19 Bases - The DG engine coolant is not a forced circulation while the engine is not running; natural circulation provides the cooling.
NUREG SR 3.8.1.3 Bases - The discussions of DG power factors omitted since these are not included in the SR or in the CTS.
ANO-237 **NUREG SR 3.8.1.4 Bases** - The DG fuel oil day tank volume discussion is revised as appropriate to reflect unit specific design. SAR Section 8.3.1.1.7.2 provides the basis for this requirement.

3.8.1-19, 3.8.1-20

NUREG SR 3.8.1.6 (ITS SR 3.8.1.6) Bases - The SR and Bases are revised to omit discussion of automatic fuel oil transfer. Control room alarms provide indication of potential fuel oil system problems that could affect the operation of the diesel generators. Automatic operation of the diesel fuel oil transfer system is not credited in the accident analyses discussed in Section 14 of the SAR. This change is consistent with the ANO-1 current license basis.

NUREG SR 3.8.1.8 (ITS SR 3.8.1.7) Bases - The Frequency discussion is revised to match the DG testing Frequency.

NUREG SR 3.8.1.11 (ITS SR 3.8.1.8) Bases - The loss of offsite power testing is revised to reflect unit specific design.

3.8.1-19

NUREG SR 3.8.1.19 (ITS SR 3.8.1.9) Bases - Discussion of Regulatory Guide revised so that the recommendations are not stated to be "requirements" since Regulatory Guides are not requirements, but rather provide only guidance on an acceptable method to implement the requirements.

NUREG SR 3.8.1.19 (ITS SR 3.8.1.9) Bases - The loss of offsite power testing in conjunction with an ES signal is revised to reflect unit specific operating restrictions necessary to preserve decay heat removal during the conduct of the surveillance.

3.8.2-01 28 **NUREG Bases** – This change provides plant specific revisions to discussions of design, analysis, reference documents, or operational parameters or procedures.

B 3.8.2 APPLICABILITY and ACTION A.2.2 – Provided clarification that movement of irradiated fuel assemblies may occur in either the reactor building or the fuel handling area.

B 3.8.2 APPLICABILITY – Revised discussion to provide assurance that adequate decay heat removal is available for the irradiated fuel assemblies in the core. Coolant inventory makeup can be considered as a form of decay heat removal. This change provides a more encompassing statement. This is consistent with the requirements for component operability in MODES 5 and 6, as required by other LCOs in the ITS.

29 **NUREG Bases** - This change provides plant specific revisions to discussions of design, analysis, reference documents, or operational parameters or procedures.

B 3.8.3 BACKGROUND, LCO, ACTION A.1 & NUREG SR 3.8.3.1 - The DG fuel oil storage tank volume is sufficient for 3.5 days of operation at full load.

B 3.8.3 BACKGROUND - The DG fuel oil system description is revised to reflect the interconnections of storage tanks and day tanks.

B 3.8.3 BACKGROUND, ACTIONS and SRs - Removed references to non-applicable guidance documents. These guidance documents were not used in the development of the original surveillance requirements, and are not applicable to the proposed SRs.

B 3.8.3 BACKGROUND & NUREG SR 3.8.3.3 - The DG fuel oil properties discussion is revised for consistency with the ANO-specific design of the fuel oil storage system.

ANO-238 **SR 3.8.3.1 Bases** - The fuel oil storage tank volume discussion is revised as appropriate to reflect unit specific design. SAR Section 8.3.1.1.7.2 provides the basis for this requirement.

3.8.3-02 **SR 3.8.3.4 Bases** - The discussion of the DG air start system Surveillance is revised to delete bracketed information. This information adds nothing to clarify the Surveillance requirement. The SR ensures sufficient capacity for the required number of air starts by ensuring the pressure is above a minimum necessary for the five starts.
B 3.8.3 APPLICABLE SAFETY ANALYSES - Revised to refer to the Applicable Safety Analyses for LCO 3.8.1.

30 **NUREG Bases** - This change provides plant specific revisions to discussions of design, analysis, reference documents, or operational parameters or procedures.
B 3.8.4 BACKGROUND & LCO - The Battery System description is revised to reflect plant design and nomenclature and eliminate non-applicable discussions.
B 3.8.4 BACKGROUND, ACTIONS and SRs - Removed references to non-applicable guidance documents. These guidance documents were not used in the development of the original surveillance requirements, and are not applicable to the proposed SRs

3.8.4-08 **SR 3.8.4.7 and SR 3.8.4.8 Bases** – Revised to delete a statement that the performance discharge test is normally performed in an as found condition and added a statement that the modified performance discharge test is performed as found. IEEE-450 requires tests that verify that that the battery meets the design requirements of the system to which it is connected be performed "as found" (Section 5.c). The test that satisfies this requirement is the service test (Section 5.3). The performance discharge test is a test of battery capacity, not a test of battery capability to meet the design requirements of the system (Section 5.2). Therefore, IEEE-450 does not require the performance discharge test to be performed in the "as found" condition. In addition, in order to have a consistent basis for trending the results of performance discharge tests, they must be performed from a fully charged state. This usually requires that the battery be placed on an equalize charge for a short period of time just prior to the start of the test. This is consistent with the current license basis implemented in Amendment 200. Since the modified performance discharge test may be used in lieu of the service test, a statement has been added to the ITS SR 3.8.4.2 Bases that states that this test is performed "as found" Since the ITS SR 3.8.4.3 Bases refer to the ITS SR 3.8.4.2 Bases for the description of the modified performance discharge test, this provides assurance that the appropriate as found testing will occur.
B 3.8.4 ACTIONS B.1 and B.2 & NUREG SR 3.8.4.7 - Removed references to non-applicable guidance documents. These guidance documents were not used in the development of the original surveillance requirements, and are not applicable to the proposed SRs.
SR 3.8.4.8 Bases – The definition of battery degradation is revised from ≥ 10% to > 10% to be consistent with IEEE-450, 1995.

3.8.6-02, 3.8.6-03 **SR Table 3.8.6-1 Bases** – Category A, B, and C discussions of Specific gravity have been revised to reflect the manufacturer's recommendations for the ANO-1 batteries.

3.8.5-01 **B 3.8.5 LCO** – The battery system description is revised to reflect plant design and nomenclature.
B 3.8.5 APPLICABILITY and ACTION A.2.2 - Provided clarification that movement of irradiated fuel assemblies may occur in either the reactor building or the fuel handling area.

B 3.8.6 APPLICABLE SAFETY ANALYSIS - unit specific nomenclature and references provided.
B 3.8.6 SURVEILLANCE REQUIREMENTS - Battery parameters were revised to reflect plant procedure acceptance criteria.

31 **NUREG Bases** - This change provides plant specific revisions to discussions of design, analysis, reference documents, or operational parameters or procedures.
B 3.8.7 BACKGROUND, LCO - The Inverter description is revised to reflect plant design and nomenclature.

3.8.7-06 **B 3.8.7 Action A.1** – The discussion of the Required Action has been revised to recognize that with the automatic transfer to the alternate AC source, that the associated vital 120 VAC bus remains Operable. This reflects the ANO-1 plant specific design.

3.8.7-04

3.8.8-01 **B 3.8.8 APPLICABLE SAFETY ANALYSES, and LCO** – The descriptions of the inverters are revised to reflect plant design and nomenclature.
B 3.8.8 – SR 3.8.8.1 Bases has been revised to reflect that the design of the ANO-1 inverters does not include a frequency readout.
B 3.8.8 APPLICABILITY and ACTION A.2.2 - Provided clarification that movement of irradiated fuel assemblies may occur in either the reactor building or the fuel handling area.

32 **NUREG Bases** - This change provides plant specific revisions to discussions of design, analysis, reference documents, or operational parameters or procedures.
B 3.8.9 BACKGROUND, LCO, ACTIONS B.1 & C.1, & Table B 3.8.9-1 - The distribution system description is revised to reflect plant design and nomenclature.

3.8.9-04, 3.8.9-09, 3.8.9-15 **B 3.8.9 BACKGROUND, LCO, ACTION A.1, & Table B 3.8.9-1** – The distribution system is revised to delete reference to distribution panels with respect to the AC electrical power subsystem. The distribution panels referred to in the Bases for Required Action A.1 are distribution panels associated with the ES electrical subsystem. The CTS 3.7.1.B requirements define the required distribution systems as consisting of 4160 V switchgear, 480 V load centers, 480 V motor control centers, and 120 V AC distribution panels in both of the ESAS distribution systems. Amendment 176, dated February 17, 1995, included a revision to CTS 3.7.1.B that added the requirement that the 120 V AC distribution panels be Operable. Both the letter requesting the change, dated August 30, 1994, and the Safety Evaluation associated with Amendment 176 state that CTS 3.7.1.B applies to the vital 120 VAC distribution panels. Therefore, other specific distribution panels that are not classified as 120 VAC vital distribution panels are not included in the ANO-1 ITS. This change is consistent with the current license basis.

3.8.9-06 **B 3.8.9 BACKGROUND, LCO** – The description of the 120 VAC vital distribution system has been revised to reflect the description provided in SAR Section 8.3.1.1.6. The ANO-1 120 VAC vital distribution system nomenclature refers to 'distribution panels' but does not use the term 'bus.' This change maintains plant specific terminology.

3.8.10-01 **B 3.8.10 APPLICABILITY and ACTION A.2.2** – Provided clarification that movement of irradiated fuel assemblies may occur in either the reactor building or the fuel handling area.

3.8.1-09, 3.8.4-05, 3.8.6-01, 3.8.7-03, 3.8.9-07 33 NUREG 3.8.1, 3.8.4, 3.8.6, 3.8.7, and 3.8.9 Bases, Applicable Safety Analysis – revised inaccurate statement of analysis assumptions. The implication of the statement being revised is that a single failure is always assumed and that a loss of offsite power is required to be applied to all accidents. There are accidents that do not assume a loss of offsite power in the ANO-1 SAR. There are also accidents in the ANO-1 SAR that do not assume a single failure. Correction of the inaccurate statement has no impact on the remainder of the Bases.

3.8.3-03 34 NUREG Bases – The discussion related to Condition A has been revised to delete a discussion of a reduction of level caused by feed and bleed operations that may be required due to increasing particulates or other fuel oil quality degradations. The ANO fuel oil system is designed such that batch feed and bleeds, that would reduce fuel oil inventory below the minimum LCO required level, are not required. The ANO system design allows filtration of the fuel oil storage tank contents while continuously making up from the bulk storage tank. Therefore, the information on batch feed and bleeds is deleted as not applicable to ANO-1.

35 NUREG LCO 3.8.9 Condition B - This Condition and the Required Action are revised from an individual bus basis to a subsystem basis. The LCO is written on a subsystem basis because the redundancy is provided on a subsystem basis. Each subsystem contains two 120 V AC vital buses, but even with the loss of both of the buses in one subsystem, the other subsystem is adequate to provide for safe shutdown. A subsystem basis is also consistent with the Bases description of the need for the Required Action.

36 NUREG LCO 3.8.4 Required Action B.1 and LCO 3.8.9 Required Action D.1 Completion Times are revised from 6 hours to 12 hours consistent with CTS 3.7.3.B. NUREG LCO 3.8.7 (for Inverters) Required Action B.1 Completion Time is also revised from 6 hours to 12 hours for consistency with other electrical section shutdown actions. Since the CTS contains no explicit requirements for Inverters, this change is not directly related to current license basis, however, it is consistent with the current license basis for the remainder of the electrical section shutdown actions.

3.8.1-06 37 NUREG LCO 3.8.1 Required Actions A.1 and B.1 - The periodic Completion Time for these Required Actions is has been revised from once per 8 hours to once per 12 hours for consistency with the length of the shifts of the ANO-1 operating crews. This change is acceptable because incorrect breaker alignments are readily identified by either trouble alarms, which annunciate in the control room, or other indications of a "dead" bus. Verifying the operability of the offsite power sources every 12 hours in conjunction with the presence of these alarms provides assurance that a degradation of one or both offsite power sources would be readily identified, allowing a timely entry into the appropriate Condition.

3.8.1-05 38 Not used.

39 NUREG SR 3.8.1.8 - This SR revised to reflect the unit design for utilization of offsite circuits. When power is supplied from the Unit Auxiliary Transformer during normal operation, a unit trip detected by the main generator lockout relays would initiate a fast transfer to the selected preferred power supply. (ST1 is typically the selected preferred offsite circuit power supply. ST2 is typically disabled from auto transfer by placing the bus feeder breakers control switches in a pull-to-lock position, because ST2 is shared by both units and has limited capacity. This is to ensure ST2 is available to supply ES bus loads.) The transfer would open the Unit Auxiliary Transformer supply breaker and simultaneously close the preferred power supply breaker (i.e., the selected startup transformer's breaker) in a few cycles provided that the preferred power supply had acceptable voltage and was ready to accept the load. If the fast transfer to the startup transformer fails, then there will be an attempt to automatic slow transfer to the same startup transformer initiated by 4.16 KV bus A1 (A2) undervoltage auxiliary relays (after loads are shed from the bus.) If both fast and slow transfers fail to take place, then the transfer would have to be manual to the alternate offsite circuit, i.e., typically ST2. If a load is transferred to ST2 manually upon a unit trip, sufficient load is shed to ensure degraded voltage isolation does not occur. Thus, this SR is written to test the automatic transfer to the selected offsite circuit and the manual transfer to the remaining offsite circuit. As indicated in the Bases, this test maintains the requirements included in CTS Table 4.1-1, item 33. This change is consistent with current license basis.

40 NUREG SR 3.8.1.2 - This SR is revised to omit the specific acceptance criteria for steady state voltage and frequency. CTS 4.6.1.1 requires only the DG be demonstrated "ready for loading." This acceptance criteria is retained in the ITS. The Bases indicate that this acceptance criteria is met if the DG exceeds the minimum voltage of 3750 V within the time allowed. All acceptance criteria have been administratively controlled to-date and are proposed to continue to be so controlled. This change is consistent with current license basis.

3.8.1-15 41 NUREG SR 3.8.1.3 and Bases – SR 3.8.1.3 acceptance criteria have been revised to incorporate ANO-1 specific values. Regulatory Guide 1.9, Section C.2.2 requires the full load test to be conducted at 90 to 100 percent of the continuos load rating of the diesel generator. The ANO-1 diesel generator loading is based on the intended service rating of 2750 kW. Therefore a load range of ≥ 2475 kW and ≤ 2750 kW has been incorporated. The associated Bases have been revised to provide an explanation of the basis this load test range, and to discuss the ANO-1 treatment of instrument uncertainty as applied to this parameter. The maximum and minimum values for the test load range are considered to contain all necessary instrument uncertainties. Therefore, additional conservatisms are not required to be incorporated in the implementing procedures.

42 NUREG LCO 3.8.3 - NUREG Conditions E and F and NUREG SR 3.8.3.4 are revised to refer to the "required" air start receivers. The air start system for each DG consists of two redundant banks of two tanks each. One bank of two tanks is sufficient to provide margin to the required start attempt. Hence, only one bank is "required" by the LCO. This is consistent with current license basis (CTS 4.6.1.5).

3.8.10-01 43 NUREG LCO 3.8.9 and 3.8.10 - SR 3.8.9.1 and SR 3.8.10.1 are revised to omit voltage from the acceptance criteria. The installed instrumentation does not provide for direct voltage readings for each required subsystem. Rather, voltage is generally presumed to be sufficient if there is no indication of an undervoltage on the 4160 V buses. Therefore, specific requirements for verification of voltage are not included. This change is consistent with current license basis.

3.8.9-03 44 Not used.

45 NUREG LCO 3.8.7 - The LCO is revised to allow switching between the inservice inverter and a swing inverter without entering an ACTION. Both inverters are typically aligned to the alternate AC source prior to the load transfer. While this is not a frequent operation, it is unnecessarily restrictive to require entry into an ACTION to implement a design feature. An allowed time of 2 hours provides ample time to perform the transfer or return to the original configuration if the transfer can not be completed for some unforeseen reason.

3.8.7-01, 3.8.9-03 46 Not used.

47 NUREG LCO 3.8.9 - The ACTIONS for ITS 3.8.9 are revised to be applicable for more than one subsystem inoperable. Condition F identifies the appropriate ACTION for two or more electrical power distribution subsystems inoperable that result in a loss of function. However, no Condition is applicable if the inoperability of two or more subsystems does not result in a loss of function. This change allows continued operation if no loss of function exists. In addition, the Bases statements of "and a loss of function has not yet occurred" are not incorporated since this is inconsistent with usage and with the remainder of the NUREG. Such wording is inconsistent with usage since Conditions A, B, and C would still be applicable and entered, but moot since Condition E would require a shutdown. Should the lost function be restored, the Completion Time for Condition A, B, or C, as applicable, would have begun at the time of initial entry into the Condition, not at the time of restoration of the lost function. Further, the Bases wording is inconsistent with numerous other such Conditions in the NUREG which do not identify applicability based on no loss of function.

48 NUREG SR 3.8.4.6 is not adopted. This NUREG Surveillance demonstrates the design capability of the charger and is not directly related to verification of the lowest functional level required to confirm the assumed safety related function, and is not a CTS (current licensing basis) requirement. Adopting this NUREG Surveillance at ANO-1 would result in an outage impact and/or non-trivial temporary test setup.

The ANO-1 battery charger design includes a fully redundant spare charger for each of the two inservice chargers. It is standard practice to alternate chargers to equalize run times. This results in continuous verification of the charger's capability to carry nominal DC loads while maintaining the battery fully charged (which satisfies ITS SR 3.8.4.1). Furthermore, each outage (once per 18 months) one charger will be used to recharge the battery after its required service or performance discharge test. This test will confirm the charger capability to function at its current-limit, and continue to fully recharge the battery. This capability will be demonstrated by alternating chargers such that each charger is utilized once per 36 months (nominally). Together, the required ITS SR 3.8.4.1 and the other licensee-controlled performance tests and monitoring will continue to adequately verify the necessary safety function of the chargers. This is consistent with the current license basis.

49 NUREG Bases 3.8.6 - This editorial change adds Bases for the ITS 3.8.4 Actions Note where none were previously provided. NUREG 3.8.6 Actions are preceded by a Note that states that separate entry is allowed for each battery. No Bases were provided for this Note, which is inconsistent with the format of other sections of the NUREG Bases.

50 Not used

51. NUREG Bases - ANO-1 was designed and licensed to the AEC's General Design Criteria (GDC) which was published in the Federal Register on July 11, 1967 [32FR10213]. Appendix A to 10 CFR 50 effective in 1971 [36FR3256] and subsequently amended, is somewhat different from the proposed 1967 criteria. SAR Section 1.4 includes an evaluation of ANO with respect to the 1967 criteria. The NUREG statement concerning the GDC criteria is modified in the ITS to reference the current licensing basis description in the SAR.

52. NUREG Bases - The Criterion statement at the conclusion of the Applicable Safety Analysis section was modified at each occurrence to refer to 10 CFR 50.36 instead of the NRC Policy Statement. This is an editorial change associated with the implementation of the 10 CFR 50.36 rule changes after NUREG-1430, Revision 1 was issued.

3.8.4-05, 3.8.9-08

The 10 CFR 50.36 Criterion satisfied by the ITS LCOs was modified to preserve consistency with the ANO-1 license basis. The NUREG Criterion specified were modified to be consistent with the analysis assumptions regarding equipment availability and operating condition (i.e., MODE). The ANO-1 accident analyses are not specifically performed in MODES 3 and 4. With no specific analyses in these MODES, a direct comparison with the first three criteria of 10 CFR 50.36 could not be made. Therefore, Criterion 4 was determined to be applicable.

53. NUREG 3.8.6 – Incorporated TSTF-278.

54 NUREG Table 3.8.6-1, Footnote b requires level correction of specific gravity. This correction is not incorporated in the ANO-1 ITS Table 3.8.4-1, Footnote b.

If the electrolyte level is between the high and low level marks and the temperature corrected specific gravity is within the manufacturer's nominal specific gravity, IEEE-450-1995, Annex A, Paragraph A.3, states that it is not necessary to correct the specific gravity of the battery for electrolyte level. The vendor of the ANO-1 batteries (C&D Technologies, Inc) has stated that, in essence, the level correction factor allows the battery user to estimate what the specific gravity would be after the cell has been topped up with water. Thus if cells have been determined to be in a fully charged state, but electrolyte levels are below the high level indicator, the user can determine if the cells require water or electrolyte (of the same specific gravity as originally provided) for the topping up process, by applying the level correction to his "as found" specific gravity readings. Although the correction for specific gravity can provide useful information, C&D considers this correction to be meaningless as a means of determining battery operability. C&D's Operating Instructions do not recommend correcting electrolyte specific gravity for level. Therefore, a level correction is not applied to the Category A, B or C specific gravity measurement. This change is consistent with current license basis.

3.8.2-01, 3.8.5-01, 3.8.8-01, 3.8.10-01, ANO-365

55. Generic Change TSTF-36, Rev. 4, has been incorporated in ITS 3.8.2, 3.8.5, 3.8.8, and 3.8.10 and their associated Bases.

3.8.5-01, 3.8.8-01

56. Generic Change TSTF-204, Rev. 3, has been incorporated in ITS 3.8.5 and 3.8.8 and their associated Bases. This generic change has been revised to maintain the proper relationship with ITS 3.8.10. NUREG 3.8.5 Required Action A.1 and NUREG 3.8.8 Required Action A.1 have been deleted, as, with the incorporation of the generic change, the allowance to declare the affected required features inoperable is not appropriate since only one DC source and one inverter are required to be Operable in Mode 5 and 6. The remaining Required Actions in ITS 3.8.5 and 3.8.8 have been renumbered, as appropriate.

3.8.5-01, 3.8.8-01, 3.8.10-01

57. NUREG 3.8.5 and 3.8.8 and their associated Bases have been revised to include Required Action A.1.5 in the ITS. NUREG 3.8.10 and its associated Bases have been revised to include Required Action A.2.6 in the ITS. These actions direct the operator to enter the applicable Conditions and Required Actions of LCO 3.4.11, "Low Temperature Overpressure Protection (LTOP) System," for those LTOP features made inoperable as a result of entry into Condition A. NUREG 3.8.5, 3.8.8, and 3.8.10 do not provide any guidance to ensure that the appropriate actions are taken in the event an electrical failure results in deenergizing an LTOP feature. With the inclusion of LCO 3.0.6 in the ITS, inoperabilities in LTOP system features which are a result solely of inoperabilities in DC sources, inverters, or distribution, would not require the appropriate LTOP actions to be taken. The allowance of LCO 3.0.6 is based on the premise that these support systems contain appropriate Actions for the inoperability, without having to also take the supported system's Actions. However, in the case of LTOP system features, rather than attempt to apply sufficient Actions in each support

system, a Required Action has been added requiring simultaneous entry into the LTOP system Actions has been added. The addition of this Required Action to ITS 3.8.5, 3.8.8, and 3.8.10 ensures that the appropriate corrective measures will be taken in the event an electrical failure results in the loss of an LTOP feature.

3.8.2-01, 3.8.5-01, 3.8.10-01 58. NUREG 3.8.2, 3.8.5 and 3.8.10 Bases – The Bases Applicable Safety Analyses (ASA) discussions have been revised to reflect the plant specific safety analyses in MODES 5 and 6. The only accident described in the ANO-1 SAR that is analyzed for MODES 5 and 6 is the fuel handling accident. Therefore, the ASA discussions are revised accordingly. In addition, the ITS 3.8.2 Bases ASA discussion is revised to include a statement on shutdown risk and the interaction of NUMARC 91-06. This statement is consistent with statements inserted in the ASA discussions in the Bases for ITS 3.8.5 and 3.8.8 by TSTF-204, Rev. 3, and provides additional guidance concerning the need for equipment beyond that required by the technical specifications.

3.8.5-01 59. NUREG 3.8.5 Bases – Applicability discussion has been revised to provide assurance that adequate decay heat removal is available for the irradiated fuel assemblies in the core. Coolant inventory makeup can be considered as a form of decay heat removal. This change provides a more encompassing statement. This is consistent with the requirements for component operability in MODES 5 and 6, as required by other LCOs in the ITS.

3.8.2-01 60. NUREG 3.8.2 and Bases – The Bases Background and LCO discussions have been revised to provide a specific description of the ANO offsite AC sources and onsite AC sources During operation in MODES 5 and 6. This information is required to clarify the requirements due to the accident analysis assumptions in these MODES, and due to the configurations that the AC sources may be placed in during operation in these MODES. The revised discussions recognize that the unit auxiliary transformer may be used as an offsite AC source when backfed from the 500 kV switchyard. This same alignment is not credited in ITS 3.8.1.

In addition, the onsite AC sources in MODES 5 and 6 allow the use of the alternate AC (AAC) diesel generator (DG) in lieu of the required emergency diesel generator. The AAC DG was installed to meet the requirements of 10 CFR 50.63(c)(iii)(2). The AAC DG was designed to provide vital and non-vital AC power to either ANO-1 or ANO-2, or both units simultaneously. The AAC DG does not have auto-start and auto-tie on capabilities, but is manually started and aligned as required. The design considerations assumed that the AAC DG would be started from the control room and be at rated speed and voltage within 10 minutes after the onset of a station blackout condition. The capacity of the AAC DG, 4400 kW at 4160 V, is more than sufficient to accommodate the ANO-1 shutdown loads, in conjunction with the ANO-2 emergency loads in this application, since it is sized to handle the emergency loads and non-vital loads on both units simultaneously.

The NUREG 3.8.2 Bases LCO discussion states that it is acceptable for trains to be cross tied during shutdown conditions, allowing a single offsite power circuit to supply all required trains. The LCO discussion has been revised in the ITS to also

allow trains to be cross tied such that one onsite power source may supply the required equipment. This is acceptable since outage activities are evaluated to maintain risk at an acceptable low level using guidance contained in NUMARC 91-06, "Guidelines for Industry Actions to Assess Shutdown Management," as stated in the ITS 3.8.2 Bases Applicable Safety Analyses discussion.

The NUREG 3.8.2 Bases LCO discussion of the Operability requirements of the required diesel generator have also been revised to require that the emergency diesel generator be capable of being started , accelerating to rated speed and voltage, and being connected to its respective Engineered Safeguards (ES) bus, and to allow the use of the AAC DG as the required onsite AC power source. The ANO-1 SAR does not describe any accident analyses for MODE 5 and 6 accidents that would require the emergency diesel generators to automatically start and load within a 15 second timeframe. In MODES 5 and 6, assuming a single failure and concurrent loss of all offsite or all onsite power is not required. The rationale for this is based on the fact that many Design Basis Accidents (DBAs) that are analyzed in MODES 1 and 2 have no specific analyses in MODES 3, 4, 5 and 6. Worst case bounding events are deemed not credible in MODES 5 and 6 because the energy contained within the reactor pressure boundary, reactor coolant temperature and pressure, and the corresponding stresses result in the probabilities of occurrence being significantly reduced or eliminated, and in minimal consequences. In addition, accidents that could possibly occur during operation in MODES 5 and 6 are expected to occur at a pace that allows sufficient time for manual operator action. Therefore, manual actions to start and load the diesel generator are acceptable.

As a result of this change, Note 2 has been added to ITS SR 3.8.2.1, that excepts the 15 second acceptance criteria of ITS SR 3.8.1.2 (NUREG SR 3.8.1.2). The associated SR Bases discussion has been revised to discuss this Note. Although the time for the DG to reach ready-to-load conditions is not required as an acceptance criteria, the Bases does state that this time is trended to help determine if a condition exists that is degrading the starting capabilities of the DG.

3.8.10-01 61. NUREG 3.8.10 – The LCO and associated Bases have been revised to provide a list of those ITS Specifications that apply to equipment/systems that require the electrical distribution system to be Operable in order to perform their safety functions in MODES 5 and 6. This is considered to be an editorial; enhancement, to provide the operator with a clear relationship between systems that are required to be Operable and the electrical distribution system in these MODES.

3.8.2-01, 3.8.5-01, 3.8.8-01, 3.8.10-01 62. Generic Change TSTF-286, Rev. 2, has been incorporated in ITS 3.8.2, 3.8.5, 3.8.8, and 3.8.10 and their associated Bases.

ANO-363 63. NUREG-3.8.1 and Bases – Required Action A.3 has been revised to incorporate a Note allowing startup transformer No. 2 (S/U #2) to be out of service for a 30 day period of time for preplanned preventative maintenance, consistent with CTS 3.7.2.B. This allowance was granted to ANO-1 by Amendment 206, dated April 28, 2000. S/U #2 is an offsite power source that is shared by ANO-1 and ANO-2. As such, there

is no appropriate time to perform preventative maintenance, since at least one unit is always on line and the preventative maintenance can not be completed in the provided Completion Time for ANO-1, or the Allowed Outage Time provided for ANO-2. This allowance has been found acceptable, when compensatory measures are considered. These compensatory measures were provided in the Bases associated with CTS 3.7.2.B, and have been incorporated in the proposed Bases for ITS 3.8.1 Required Action A.3. This change is consistent with the current license basis.

3.8.1-21 64. Incorporated TSTF-283, Rev. 3, in the ITS SR 3.8.1.7 (NUREG SR 3.8.1.8) Note.

ANO-295 65. ANO-442 The CTS contains no references for restoration periods of inverters. Station procedures have conservatively incorporated the regulatory guidance (GL 91-11) of a 24-hour restoration period for vital inverters Y11, Y13, Y22, and Y24 until further study could be performed. The BWOG is presently developing a generic change to address extension of the 24-hour Completion Time to 72 hours. However, it is unlikely that such a change will be processed and approved prior to the ANO-1 ITS conversion. Therefore, the 24-hour Completion Time presented in STS 3.8.7 ACTION A is adopted.

STS LCO 3.8.7 has been modified due to the unique distribution design at ANO-1. For RPS and ESAS related inverters, two are required per train, consistent with the STS. However, ANO-1 has one fully qualified swing inverter per train that may be placed in service in lieu of one of these normally on-line inverters. In addition, a separate safety related green train inverter supplies some control functions, indication, and interlocks via its associated 120 VAC bus C540. The LCO, LCO Note, Condition A, and Required Action A.1 Note are subsequently modified to illustrate this unique arrangement. In turn, LCO 3.8.9 and its associated Condition B have been edited accordingly and a new Condition C proposed to address C540 inoperability separately from the RPS/ESAS related inverters.

ANO-442 STS 3.8.7 ACTION B is changed to ACTION D in order to accommodate the insertion of new ACTIONS B and C addressing Y28 inoperability. An evaluation of bus C540 loads indicates that a loss of this bus would result in a loss of power to a small number of post accident and control channel instruments, the auto-closure interlock (ACI) associated with the decay heat pumps RCS suction valves, and some control logic associated with EFW pump P-7A. The effect on instrumentation is insignificant in that other indication or control mechanisms remain available to the operator upon loss of C540. However, the new STS 3.8.9 Required Action C.1 requires the operator to enter LCO 3.3.15, "Post Accident Monitoring (PAM) Instrumentation" due to the loss of one channel of RCS wide range pressure and pressurizer level instrumentation required by this specification. The loss of the ACI has no impact in Modes 1, 2, 3, or 4 when the decay system is not in service as the associated valves are administratively de-energized closed during these modes of operation. Nevertheless, the new Required Action C.1 is added to refer the operator to LCO 3.4.14, "RCS Pressure Isolation Valve (PIV) Leakage" if bus C540 is lost. This will ensure appropriate action is taken to verify the decay heat valves are indeed closed

within the 4 hours as required by STS 3.4.14. The new Required Action C.1 also requires entry into LCO 3.3.11, "Emergency Feedwater Initiation and Control (EFIC) System Instrumentation" since loss of C540 will prevent normal EFW auto-response upon accident or transient initiation. EFW pump P-7A will auto-start, but a portion of the instrumentation and vector control features associated with this EFW train will not function as designed due to level and pressure instrumentation inputting a zero signal to the logics. Therefore, manual operator intervention will be required to ensure proper SG level is maintained when feeding with P-7A.

Station procedures provide 72 hours to restore Y28 to service. Although this allowance exceeds the 24-hour allowance of the STS relevant to RPS and ESAS related inverters, it is necessary because no backup swing inverter exists should Y28 become inoperable. Past operating experience at ANO-1 has indicated that 24 hours does not provide sufficient time to restore an inoperable inverter, especially if such inoperability is unexpected, the failure mechanism is initially unknown, and the failure occurs during non-working hours. Based on the above and given that Y28 was not considered in the CTS, the 72-hour Completion Time is acceptable.

The Completion Times for STS 3.8.7 ACTIONS A and B are modified to prevent continuous operation with an inoperable inverter. In order to accommodate this restriction, the new Completion Times will require restoration of all inverters within 96 hours. In addition, Condition D is modified such that if any two of the four RPS and ESAS related inverters are inoperable simultaneously, a shutdown to Mode 3 conditions must be performed. Although it is unlikely that the associated 120 VAC bus is de-energized in this event, the likely hood that these buses could be impacted and a possible loss of safety function occur is increased. Therefore, it is prudent to place the plant in a safe condition when two RPS and ESAS related 120 VAC buses are not powered from an uninterruptible power source.

The effects of a loss of C540 and the appropriate actions to consider are documented in station procedures. Because inverter Y28 affects the operability of some green train components as described above, it is not acceptable to allow Y28 to be inoperable while either of the two required red train inverters is inoperable as this may result in a loss of safety function. Therefore, proposed STS 3.8.7 ACTION C is fabricated such that one inverter, either the inoperable red train inverter or Y28, must be restored to OPERABLE status within 2 hours or Condition D entered. Restoration of OPERABILITY may be met by aligning an OPERABLE swing train inverter to supply the affected 120 VAC bus associated with the inoperable red train inverter. The 2-hour Completion Time is acceptable because a loss of safety function will only occur if both inoperable inverters (one red train vital inverter and inverter Y28) fail to operate in the alternate source mode and maintain bus voltage. In this event, LCO 3.8.9 ACTION F will require immediate entry into LCO 3.0.3.

ANO-442

The above changes are consistent with the current license basis and with NUREG-1430, Rev.1, given the unique arrangement of the ANO-1 inverter and 120 VAC bus electrical distribution subsystems.

3.8.8-01 **<B3.8-75A>**

In general, when the unit is shutdown, the Technical Specifications requirements ensure that the unit has the capability to mitigate the consequences of postulated accidents. However, assuming a single failure and concurrent loss of all offsite or all onsite power is not required. The rationale for this is based on the fact that many Design Basis Accidents (DBAs) that are analyzed in MODES 1 and2 have no specific analyses in MODES 3, 4, 5 and 6. Worst case bounding events are deemed not credible in MODES 5 and 6 because the energy contained within the reactor pressure boundary, reactor coolant temperature and pressure, and the corresponding stresses result in the probabilities of occurrence being significantly reduced or eliminated, and in minimal consequences. These deviations from DBA analysis assumptions and design requirements during shutdown conditions are allowed by the LCO for required systems.

The shutdown Technical Specification requirements are designed to ensure that the unit has the capability to mitigate the consequences of certain postulated accidents. Worst case DBAs which are analyzed for operating MODES are generally viewed not to be a significant concern during shutdown MODES due to the lower energies involved. The Technical Specifications therefore require a lesser complement of electrical equipment to be available during shutdown than is required during operating MODES. More recent work completed on potential risks associated with shutdown, however, have found significant risk associated with certain shutdown evolutions. As a result, in addition to the requirements established in the Technical Specifications, ANO, through industry commitment, has adopted NUMARC 91-06, "Guidelines for Industry Actions to Assess Shutdown Management," as an industry initiative to manage shutdown tasks and associated electrical support to maintain risk at an acceptable low level. This may require the availability of additional equipment beyond that required by the shutdown Technical Specifications.

ANO-440

3.8.8-01

BASES (continued)

ANO-438

LCO

The inverters ensure the availability of electrical power for the instrumentation for systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or a postulated DBA. The battery powered inverters provide uninterruptible supply of AC electrical power to the ac vital buses even if the 4.16 kV safety buses are de-energized. OPERABILITY of the inverters requires that the vital bus be powered by the inverter. This ensures the availability of sufficient inverter power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents).

its 120 VAC

<INSERT B3.8-76A>

56 edit 31

ANO-438

APPLICABILITY

The inverters required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies provide assurance that: In either the reactor building or fuel handling area

56 31

a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core;

decay heat removal

b. Systems needed to mitigate a fuel handling accident are available;

c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition. MODE 5 or 6.

edit

Inverter requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.7.

ANO-365

<INSERT B3.8-76B>

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ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

ANO-325

<INSERT B3.8-76C>

If two trains are required by LCO 3.8.10, "Distribution Systems—Shutdown," the remaining OPERABLE inverters may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for positive reactivity

56

(continued)

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.9 Distribution Systems—Operating

ANO-442

BASES

BACKGROUND

The onsite Class 1E AC, DC, and ~~AC~~ vital (120 VAC) bus electrical power distribution systems are divided by train into ~~[two]~~ redundant and independent AC, DC, and ~~AC~~ vital (120 VAC) bus electrical power distribution subsystems. edit edit

Each ~~The~~ AC electrical power ~~subsystem for each train~~ (Safeguards) consists of ~~an primary~~ Engineered ~~Safety Feature~~ (ESF) 4.16 kV bus and ~~secondary~~ 480 ~~and 120~~ V buses, ~~distribution panels, motor control centers and load centers.~~ Each ~~[4.16 kV ESF bus]~~ has ~~at least~~ two ~~one separate and independent~~ offsite sources of power ~~as well as a dedicated onsite diesel generator (DG) source~~. ~~Each [4.16 kV ESF bus] is normally connected to a preferred offsite source. After a loss of the preferred offsite power source to a 4.16 kV ESF bus, a transfer to the alternate offsite source is accomplished by utilizing a time delayed bus undervoltage relay. If all offsite sources are unavailable, the onsite emergency DG supplies power to the 4.16 kV ESF bus. Control power for the 4.16 kV breakers is supplied from the Class 1E batteries. Additional description of this system may be found in the Bases for LCO 3.8.1, "AC Sources—Operating," and the Bases for LCO 3.8.4, "DC Sources—Operating."~~ 32 32

as described in the Bases for LCO 3.8.1, "AC Sources - Operating."

The secondary AC electrical power distribution system for each train includes the safety related load centers, and motor control centers, ~~and distribution panels~~ shown in Table B 3.8.9-1. 32

<INSERT B3.8-79A>

The 120 VAC ~~vital~~ buses (distribution panels) are arranged in two load groups per ~~train~~ (subsystem) and are normally powered from the inverters. ~~The alternate power supply for the vital buses are Class 1E constant voltage source transformers powered from the same train as the associated inverter, and its use is governed by LCO 3.8.7, "Inverters—Operating." Each constant voltage source transformer is powered from a Class 1E AC bus.~~ 32

Upon loss of the inverter DC supply, or in the event of an inverter failure, a static transfer switch automatically transfers the 120 VAC vital load to an AC supply from an ES motor control center

There are two independent 125/250 VDC electrical power distribution subsystems (one for each train).

The list of all required distribution buses is presented in Table B 3.8.9-1.

3.8.9-16 3.8.9-06 ANO-442

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter [6] (Ref. 1) and Chapter [14] (Ref. 10), assume ESF systems are OPERABLE. The AC, DC, and AC vital bus electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, "Power Distribution Limits," Section 3.4, "Reactor Coolant System (RCS)," and Section 3.6, "Containment Systems."

The OPERABILITY of the AC, DC, and AC vital bus electrical power distribution systems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining power distribution systems OPERABLE during accident conditions in the event of:

a. An assumed loss of all offsite power or all onsite AC electrical power; and

b. A worst-case single failure.

The distribution systems satisfy Criterion 3 of the NRC Policy Statement.

LCO

The required power distribution subsystems listed in Table B 3.8.9-1 ensure the availability of AC, DC, and AC vital bus electrical power for the systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. The AC, DC, and AC vital bus electrical power distribution subsystems are required to be OPERABLE.

Maintaining the Train A and Train B AC, DC, and AC vital bus electrical power distribution subsystems OPERABLE ensures that the redundancy incorporated into the design of ESF is not defeated. Therefore, a single failure within any system or within the electrical power distribution subsystems will not prevent safe shutdown of the reactor.

(continued)

BASES

LCO (continued)

OPERABLE AC electrical power distribution subsystems and require the associated buses, load centers, motor control centers, and distribution panels to be energized to their proper voltages. OPERABLE DC electrical power distribution subsystems require the associated buses to be energized to their proper voltage from either the associated battery or charger. OPERABLE vital bus electrical power distribution subsystems require the associated buses to be energized to their proper voltage from the associated inverter via inverted DC voltage, inverter using internal AC source, or Class 1E constant voltage transformer. AC source.

120 V AC

distribution panels

from its alternate

In addition, tie breakers between redundant safety related AC, DC, and AC vital bus power distribution subsystems, if they exist, must be open. This prevents any electrical malfunction in any power distribution subsystem from propagating to the redundant subsystem, that could cause the failure of a redundant subsystem and a loss of essential safety function(s). If any tie breakers are closed, the affected redundant electrical power distribution subsystems are considered inoperable. This applies to the onsite, safety related redundant electrical power distribution subsystems. It does not, however, preclude redundant Class 1E 4.16 kV buses from being powered from the same offsite circuit.

Cross-

cross-

32 edit 32 32 edit edit

3.8.9-06 3.8.9-09 AND-442

APPLICABILITY

The electrical power distribution subsystems are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of AOOs or abnormal transients; and

abnormalities

b. Adequate core cooling is provided, and containment OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

reactor building

26 edit

Electrical power distribution subsystem requirements for MODES 5 and 6 are covered in the Bases for LCO 3.8.10, "Distribution Systems—Shutdown."

3.8.9-10

(continued)

BASES

ACTIONS

A.1 (continued)

become inoperable, and AC distribution restored OPERABLE. This could continue indefinitely.

The Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition A was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

B.1

With one required AC vital bus inoperable, the remaining OPERABLE AC vital buses are capable of supporting the minimum safety functions necessary to shut down the unit and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum required ESF functions not being supported. Therefore, the required AC vital bus must be restored to OPERABLE status within 2 hours by powering the bus from the associated inverter via inverted DC, ~~inverter using internal AC source~~ or ~~Class 1E constant voltage transformer~~.

Condition B represents one AC vital bus without power; potentially both the DC source and the associated AC source are nonfunctioning. In this situation the unit is significantly more vulnerable to a complete loss of all noninterruptible power. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for loss of power to the remaining vital buses and restoring power to the affected vital bus.

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components that are without adequate vital AC power. Taking exception to LCO 3.0.2 for components without adequate vital AC power, that would have the Required Action Completion Times shorter than 2 hours if declared inoperable, is acceptable because of:

(continued)

BASES

ACTIONS

B.1 (continued)

a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) and not allowing stable operations to continue;

b. The potential for decreased safety by requiring entry into numerous applicable Conditions and Required Actions for components without adequate vital AC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and

c. The potential for an event in conjunction with a single failure of a redundant component.

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The 2 hour Completion Time takes into account the importance to safety of restoring the AC vital bus to OPERABLE status, the redundant capability afforded by the other OPERABLE vital buses, and the low probability of a DBA occurring during this period.

The second Completion Time for Required Action B.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 16 hours, since initial failure of the LCO, to restore the vital bus distribution system. At this time, an AC train could again become inoperable, and vital bus distribution restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition B was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

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<INSERT B 3.8-84A>

(continued)

<INSERT B3.8-84A>

C.1

With 120 VAC panel C540 inoperable, a portion of the instrumentation associated with green train equipment is lost. Because C540 is not a RPS or ESAS related panel and is limited in its effect on various system/component operabilities, it is not necessary to impose an 8-hour Completion Time for panel restoration. However, it is important to ensure that equipment affected by the loss of C540 is quickly identified and appropriate corrective actions taken. Therefore, Required Action C.1 requires entry into the appropriate Conditions and Required Actions associated with equipment affected by the loss of C540. The purpose for entry into these related specifications is discussed below.

LCO 3.3.11, "Emergency Feedwater Initiation and Control (EFIC) System Instrumentation," requires all associated instruments that are used to perform actuation or vector functions within the EFIC system to be OPERABLE. A loss of C540 will result in some green train SG level and pressure inputs from both SGs to fail to zero. The zero signals will result in a half-leg trip of EFIC. Therefore, entry into LCO 3.3.11 Condition A is appropriate. Should an actual actuation occur while C540 is de-energized, the vector logic, receiving zero inputs from SG pressure instrumentation, will not function to isolate flow from the green EFW train to either SG upon a steam line break event. Therefore, entry into LCO 3.3.11 Condition C is also appropriate. However, both the EFIC logic matrixes and the EFIC vector logic matrixes are not physically affected by the loss of C540 and continue to perform their functions, although the input instrumentation is inoperable. Because these logics remain operable and because LCO 3.3.11 Condition C provides an acceptable restoration period for these instruments, it is not necessary to enter the Conditions or Required Actions of LCO 3.3.13, "Emergency Feedwater Initiation and Control (EFIC) Logic" or LCO 3.3.14, "Emergency Feedwater Initiation and Control (EFIC) Vector Logic." Likewise, the physical capability of the EFW system also remains unaffected, although some automatic functions are impacted. Therefore, entry into LCO 3.7.5, "Emergency Feedwater (EFW) System," is not required. The loss of C540 does not prevent manual control of the green EFW train and does not affect the OPERABILITY of the red EFW train.

LCO 3.3.15, "Post Accident Monitoring (PAM) Instrumentation," requires specific instrumentation to be available to the operators following an accident. The loss of C540 will result in the loss of one of the PAM-required RCS wide-range pressure and pressurizer level instruments. Therefore, entry into LCO 3.3.15 Condition A is appropriate upon loss of C540.

LCO 3.4.14, "RCS Pressure Isolation Valve (PIV) Leakage," requires the automatic closure interlock (ACI) associated with the decay heat removal pump RCS suction valves to be OPERABLE. A loss of C540 renders the ACI function inoperative. Therefore, entry into LCO 3.4.14 Condition B is appropriate.

Other functions and instrumentation are affected by the loss of C540. However, these additional affects do not alone result in a loss of any safety function or violate any technical specification other than those discussed above. Station procedures address these additional components and provide corrective action guidance where appropriate.

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BASES

ACTIONS (continued)

D.1 one or more subsystems may be OPERABLE portions of the

With DC ~~bus(es) in one train~~ inoperable, the remaining DC electrical power distribution subsystems ~~are~~ capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining DC electrical power distribution subsystem could result in the minimum required ESF functions not being supported. Therefore, the ~~required~~ DC buses must be restored to OPERABLE status within 2 hours by powering the bus from the associated battery or chargers. one of the two associated

or more DC subsystem(s)

Condition C represents one ~~train~~ without adequate DC power; potentially both with the battery significantly degraded and the associated charger nonfunctioning. In this situation, the unit is significantly more vulnerable to a complete loss of all DC power. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for loss of power to the remaining trains and restoring power to the affected train.

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components that are without power. Taking exception to LCO 3.0.2 for components without adequate DC power, which would have Required Action Completion Times shorter than 2 hours, is acceptable because of:

a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) while allowing stable operations to continue;

b. The potential for decreased safety by requiring entry into numerous applicable Conditions and Required Actions for components without DC power and not providing sufficient time for the operators to perform the necessary evaluations and actions to restore power to the affected train; and

c. The potential for an event in conjunction with a single failure of a redundant component.

~~The 2 hour Completion Time for DC buses is consistent with Regulatory Guide 1.93 (Ref. 3).~~

(continued)

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BASES

65

ACTIONS

D ~~C~~.1 (continued)

The second Completion Time for Required Action C.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition C is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of ~~16~~ 16 hours, since initial failure of the LCO, to restore the DC distribution system. At this time, an AC train could again become inoperable and DC distribution restored OPERABLE. This could continue indefinitely. 13

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition C was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

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E ~~D~~.1 and ~~D~~.2

If the inoperable distribution subsystem cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to 12 at least MODE 3 within ~~8~~ hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems. 36

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E ~~D~~.1 65

Condition E corresponds to a level of degradation in the electrical distribution system that causes a required safety function to be lost. ~~When more than one Condition is entered, and this results in the loss of a required function, the plant is in a condition outside the accident analysis.~~ Therefore, no additional time is justified for 47

(continued)

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BASES

ACTIONS

F ~~2.1~~ (continued) 65

continued operation. LCO 3.0.3 must be entered immediately to commence a controlled shutdown.

SURVEILLANCE REQUIREMENTS

SR 3.8.9.1

This Surveillance verifies that the ~~[required]~~ AC, DC, and 120 VAC ~~AC vital~~ bus electrical power distribution systems are functioning properly, with the correct circuit breaker alignment. The correct breaker alignment ensures the appropriate separation and independence of the electrical divisions is maintained, and the appropriate voltage is available to each required bus. The verification of proper voltage availability on the buses ensures that the required voltage is readily available for motive as well as control functions for critical system loads connected to these buses. The 7 day Frequency takes into account the redundant capability of the AC, DC, and 120 VAC ~~AC vital~~ bus electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions. 43 edit edit

ANO-442

3.8.9-03

REFERENCES

~~1. FSAR, Chapter [6].~~ edit

1 ~~2.~~ FSAR, Chapter ~~[14]~~.

~~3. Regulatory Guide 1.93, December 1974.~~ 13

~~2.~~ 10 CFR 50.36. 52

Table B 3.8.9-1 (page 1 of 1)
AC and DC Electrical Power Distribution Systems

TYPE	VOLTAGE	Red TRAIN A*	Green TRAIN B*
AC safety buses	4160 V 480 V 480 V [120 V]	ES Bus [NB01] A3 Load Centers [NG01, NG03] B5 Motor Control Centers [NG01A, NG01I, NG01B, NG03C, NG03I, NG03D] B51, B52, B53, B57 Distribution Panels [NP01, NP03]	ES Bus [NB02] A4 Load Centers [NG02, NG04] B6 Motor Control Centers [NG02A, NG02I, NG02B, NG04C, NG04I, NG04D] BC1, BC2, BC3, BC5, B56 ** and B55 Distribution Panels [NP02, NP04]
DC buses	125 V	Bus [NK01] D01 Bus [NK03] RA1 Distribution Panel [NK41, NK43, NK51] D11	Bus [NK02] D02 Bus [NK04] RA2 Distribution Panel [NK42, NK44, NK52] D21
120 VAC vital buses distribution panels	120 V	Panel Bus [NN01] RS1 Bus [NN03] RS3	Panel Bus [NN02] RS2 Bus [NN04] RS4

* Each train of the AC and DC electrical power distribution systems is a subsystem.

** Swing bus (normally associated with Green Train). Bus B55 is Powered from bus B56.

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3.8.9-16 AND-442

Panel C540

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and safeguards contingency plans, including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822) and to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The plan, which contains Safeguards Information protected under 10 CFR 73.21, is entitled: "Arkansas Nuclear One Industrial Security Plan," with revisions submitted through August 2, 1995. The Industrial Security Plan also includes the requirements for guard training and qualification in Appendix A and the safeguards contingency events in Chapter 7. Changes made in accordance with 10 CFR 73.55 shall be implemented in accordance with the schedule set forth therein.

(5) Deleted

(6) Deleted

(7) Deleted

(8) Fire Protection

EOI shall implement and maintain in effect all provisions of the approved Fire Protection Program as described in Appendix 9A to the SAR and as approved in the Safety Evaluation dated March 31, 1992, subject to the following provision:

1. AP&L [1] may proceed with and is required to complete the modifications identified in Paragraphs 3.1 through 3.19 of the NRC's Fire Protection Safety Evaluation on the facility dated August 22, 1978 and supplements thereto. These modifications shall be completed as specified in Table 3.1 of the Safety Evaluation Report or supplements thereto. In addition, the licensee may proceed with and is required to complete the modifications identified in Supplement 1 to the Fire Protection Safety Evaluation Report, and any future supplements. These modifications shall be completed by the dates identified in the supplement.

2. The licensee may make changes to the approved Fire Protection Program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

[1] The Original licensee authorized to possess, use, and operate the facility was AP&L. Consequently, certain historical references to AP&L remain in the license conditions.

3. This renewed license is effective as of the date of issuance and shall expire at midnight, May 20, 2034.

FOR THE NUCLEAR REGULATORY COMMISSION

Original Signed by:
Jon R. Johnson

Jon R. Johnson, Acting Director
Office of Nuclear Reactor Regulation

Attachment:
Appendix A - Technical Specifications and
Technical Specification Bases (ML011710071 and ML011710100)
Date of Issuance: June 20, 2001

3.2 POWER DISTRIBUTION LIMITS

3.2.5 Power Peaking

LCO 3.2.5 Linear Heat Rate (LHR) shall be within the limits specified in the COLR.

APPLICABILITY: MODE 1 with THERMAL POWER > 20% RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LHR not within limits.	A.1 Reduce THERMAL POWER to restore LHR to within limits.	2 hours
B. Required Action and associated Completion Time not met.	B.1 Reduce THERMAL POWER to ≤ 20% RTP.	4 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.5.1	----------NOTE---------- Only required to be performed when specified in LCO 3.1.8, "PHYSICS TESTS Exceptions – MODE 1," or when complying with Required Actions of LCO 3.1.4, "CONTROL ROD Group Alignment Limits"; LCO 3.1.6, "Axial Power Shaping Rod (APSR) Alignment Limits"; LCO 3.2.1, "Regulating Rod Insertion Limits"; LCO 3.2.2, "AXIAL POWER SHAPING ROD (APSR) Insertion Limits"; LCO 3.2.3, "AXIAL POWER IMBALANCE Operating Limits"; LCO 3.2.4, "QUADRANT POWER TILT (QPT)." ---------- Verify LHR is within limits by using the Incore Detector System to obtain a power distribution map.	As specified by the applicable LCO(s)

SURVEILLANCE		FREQUENCY
SR 3.3.8.2	----------NOTE---------- When DG LOPS instrumentation is placed in an inoperable status solely for performance of this Surveillance, entry into associated Conditions and Required Actions may be delayed up to 4 hours for the loss of voltage Function, provided the one remaining relay monitoring the Function for the bus is OPERABLE. ---------- Perform CHANNEL CALIBRATION with setpoint Allowable Value as follows: a. Degraded voltage $\geq$ 423.2 V and $\leq$ 436.0 V with a time delay of 8 seconds $\pm$ 1 second; and b. Loss of voltage $\geq$ 1600 V and $\leq$ 3000 V with a time delay of $\geq$ 0.30 seconds and $\leq$ 0.98 seconds.	18 months

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Core Flood Tanks (CFTs)

LCO 3.5.1 Two CFTs shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODE 3 with Reactor Coolant System (RCS) pressure > 800 psig.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CFT inoperable due to boron concentration not within limits.	A.1 Restore boron concentration to within limits.	72 hours
B. One CFT inoperable for reasons other than Condition A.	B.1 Restore CFT to OPERABLE status.	1 hour
C. Required Action and associated Completion Time of Condition A or B not met. OR Two CFTs inoperable.	C.1 Be in MODE 3. AND C.2 Reduce RCS pressure to ≤ 800 psig.	6 hours 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.1.1	Verify each CFT isolation valve is fully open.	12 hours
SR 3.5.1.2	Verify borated water volume in each CFT is ≥ 970 ft^3 and ≤ 1110 ft^3.	12 hours
SR 3.5.1.3	Verify nitrogen cover pressure in each CFT is ≥ 560 psig and ≤ 640 psig.	12 hours

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.3 ECCS – Shutdown

LCO 3.5.3 Two LPI trains shall be OPERABLE.

----------NOTE----------
An LPI train may be considered OPERABLE during alignment and when aligned for decay heat removal, if capable of being manually realigned to the LPI mode of operation.

APPLICABILITY: MODE 3 with Reactor Coolant System (RCS) temperature ≤ 350°F, MODE 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One LPI train inoperable.	A.1 Restore LPI train to OPERABLE status.	48 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 ----------NOTE---------- Only required if one DHR train is OPERABLE. ---------- Be in MODE 5.	24 hours
C. Two LPI trains inoperable.	C.1 Initiate action to restore one LPI train to OPERABLE status.	Immediately
	AND	
	C.2 ----------NOTE---------- Only required if one DHR train is OPERABLE. ---------- Be in MODE 5.	24 hours

3.7 PLANT SYSTEMS

3.7.6 Q Condensate Storage Tank (QCST)

LCO 3.7.6 The QCST shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 when steam generator is relied upon for heat removal.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. The QCST inoperable.	A.1	Verify by administrative means OPERABILITY of backup water supply.	4 hours AND Once per 12 hours thereafter
	AND		
	A.2	Restore QCST to OPERABLE status.	7 days
B. Required Action and associated Completion Time not met.	B.1	Be in MODE 3.	6 hours
	AND		
	B.2	Be in MODE 4 without reliance on steam generator for heat removal.	24 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.6.1	Verify QCST volume is $\geq$ 267,000 gallons when required for both units and $\geq$ 107,000 gallons when only required for Unit 1.	12 hours

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources - Operating

LCO 3.8.4 Both DC electrical power subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One DC electrical power subsystem inoperable.	A.1 Restore DC electrical power subsystem to OPERABLE status.	8 hours
B. Required Action and Associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	12 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is ≥ 124.7 V on float charge.	7 days
SR 3.8.4.2	Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test or a modified performance discharge test.	18 months

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources - Shutdown

LCO 3.8.5 The DC electrical power subsystem shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems – Shutdown."

APPLICABILITY: MODES 5 and 6,
During movement of irradiated fuel assemblies.

ACTIONS

----------NOTE----------
LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required DC electrical power subsystems inoperable.	A.1.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.1.2 Suspend movement of irradiated fuel assemblies.	Immediately
	AND	
	A.1.3 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
	.AND	
	A.1.4 Initiate action to restore required DC electrical power subsystems to OPERABLE status.	Immediately
	AND	

3.8 ELECTRICAL POWER SYSTEMS

3.8.7 Inverters - Operating

LCO 3.8.7 The following inverters shall be OPERABLE.

a. Two Red Train inverters (Y11 and Y13, Y11 and Y15, or Y13 and Y15),

b. Two Green Train inverters (Y22 and Y24, Y22 and Y25, or Y24 and Y25), and

c. Inverter Y28

----------NOTE----------
One of the four inverters requried by LCO 3.8.7.a and LCO 3.8.7.b may be disconnected from its associated DC bus for ≤ 2 hours to perform load transfer to or from the swing inverter, provided:

a. The associated 120 VAC bus is energized from its alternate AC source; and

b. The other three 120 VAC buses are energized from their associated OPERABLE inverters.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One of the four inverters required by LCO 3.8.7.a and LCO 3.8.7.b inoperable.	A.1 ----------NOTE---------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating" with any of the 120 VAC buses RS1, RS2, RS3, or RS4 de-energized. ---------- Restore inverter to OPERABLE status.	24 hours <u>AND</u> 96 hours from discovery of failure to meet LCO

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Inverter Y28 inoperable.	B.1 ----------NOTE---------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating" with 120 VAC bus C540 de-energized. ---------- Restore inverter to OPERABLE status.	

3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Inverters - Shutdown

LCO 3.8.8 Inverters shall be OPERABLE to support the onsite Class 1E AC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems – Shutdown."

APPLICABILITY: MODES 5 and 6,
During movement of irradiated fuel assemblies.

ACTIONS

----------NOTE----------
LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more required inverters inoperable.	A.2.1	Suspend CORE ALTERATIONS.	Immediately
	AND		
	A.2.2	Suspend movement of irradiated fuel assemblies.	Immediately
	AND		
	A.2.3	Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
	AND		
	A.2.4	Initiate action to restore required inverters to OPERABLE status.	Immediately
	AND		

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems - Operating

LCO 3.8.9 Two AC, DC, and 120 VAC electrical power distribution subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more AC electrical power distribution subsystem(s) inoperable.	A.1 Restore AC electrical power distribution subsystem(s) to OPERABLE status.	8 hours AND 16 hours from discovery of failure to meet LCO
B. One or more 120 VAC electrical power distribution subsystem(s) (RS1, RS2, RS3, RS4) inoperable.	B.1 Restore 120 VAC electrical power distribution subsystem(s) to OPERABLE status.	8 hours AND 16 hours from discovery of failure to meet LCO
C. 120 VAC electrical power distribution subsystem C540 inoperable.	C.1 Enter applicable Conditions and Required Actions of LCO 3.3.11, "Emergency Feedwater Initiation and Control (EFIC) System Instrumentation," LCO 3.3.15, "Post Accident Monitoring (PAM) Instrumentation," and LCO 3.4.14, "RCS Pressure Isolation Valve (PIV) Leakage."	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One or more DC electrical power distribution subsystem(s) inoperable.	D.1 Restore DC electrical power distribution subsystem(s) to OPERABLE status.	8 hours AND 16 hours from discovery of failure to meet LCO
E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3. AND E.2 Be in MODE 5.	12 hours 36 hours
F. Two or more electrical power distribution subsystems inoperable that result in a loss of function.	F.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.9.1	Verify correct breaker alignments to required AC, DC, and 120 VAC bus electrical power distribution subsystems.	7 days

3.9 REFUELING OPERATIONS

3.9.4 Decay Heat Removal (DHR) and Coolant Circulation - High Water Level

LCO 3.9.4 One DHR loop shall be OPERABLE and in operation.

----------NOTE----------
The required DHR loop may be removed from operation for ≤ 1 hour per 8 hour period, provided no operations are permitted that would cause introduction into the Reactor Coolant System, coolant with boron concentration less than that required to meet the minimum required boron concentration of LCO 3.9.1.

APPLICABILITY: MODE 6 with the water level ≥ 23 ft above the top of the irradiated fuel seated in the reactor pressure vessel.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. DHR loop requirements not met.	A.1	Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet the boron concentration of LCO 3.9.1.	Immediately
	AND		
	A.2	Suspend loading irradiated fuel assemblies in the core.	Immediately
	AND		
	A.3	Initiate action to satisfy DHR loop requirements.	Immediately
	AND		
	A.4	Close all reactor building penetrations providing direct access from the reactor building atmosphere to outside atmosphere.	4 hours

5.0 ADMINISTRATIVE CONTROLS

5.5 Programs and Manuals

5.5.10 Secondary Water Chemistry

This program provides controls for monitoring secondary water chemistry to inhibit SG tube degradation. The program shall include:

a. Identification of a sampling schedule for the critical variables and control points for these variables;

b. Identification of the procedures used to measure the values of the critical variables;

c. Identification of process sampling points;

d. Procedures for the recording and management of data;

e. Procedures defining corrective actions for all off control point chemistry conditions; and

f. A procedure identifying the authority responsible for the interpretation of the data and the sequence and timing of administrative events required to initiate corrective action.

5.5.11 Ventilation Filter Testing Program (VFTP)

A program shall be established to implement the following required testing of Engineered Safeguards (ES) ventilation systems filters at the frequencies specified in Regulatory Guide 1.52, Revision 2. The VFTP is applicable to the Penetration Room Ventilation System (PRVS), the Fuel Handling Area Ventilation System (FHAVS), and the Control Room Emergency Ventilation System (CREVS).

a. Demonstrate that an inplace cold DOP test of the high efficiency particulate (HEPA) filters shows:

1. ≥ 99% DOP removal for the PRVS when tested at the system design flowrate of 1800 scfm ± 10% and the FHAVS when tested at the system design flowrate of 39000 cfm ± 10%; and

2. ≥ 99.95% DOP removal for the CREVS when tested in accordance with Regulatory Guide 1.52, Revision 2, at the system design flowrate of 2000 cfm ± 10%.

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ACTIONS

The operator must take care in interpreting the relationship of the LHRs, DNBRs, and power peaking factors to their limits. Limiting values may be expressed as an LHR, DNBR, margin to DNB or as power peaking factors. When expressed as power peaking factors, the value must be adjusted in inverse proportion to the THERMAL POWER level of the core as the power is reduced from RTP. Thus, the allowable peaking factors will increase as THERMAL POWER decreases.

A.1

When the LHR is determined not to be within its specified limit as determined by a three dimensional power distribution map, a THERMAL POWER reduction is taken to reduce the limiting LHR in the core. The Completion Time of 2 hours provides an acceptable time to reduce power in an orderly manner and without allowing the unit to remain in an unacceptable condition for an extended period of time.

B.1

If the Required Action and associated Completion Time for Condition A are not met, then THERMAL POWER operation should be reduced. The reactor is placed in MODE 1 with THERMAL POWER less than or equal to 20% RTP where this LCO does not apply. The required Completion Time of 4 hours is a reasonable amount of time for the operator to reduce THERMAL POWER in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.2.5.1

Core power distribution monitoring is performed using the Incore Detector System to obtain a three dimensional power distribution map. Maximum LHR values obtained from this map may then be compared with the limits in the COLR to verify that the limits have not been exceeded. Minimum DNBR values or DNB margins determined from the core power distribution mapping may also be compared to their limits or correlated to LHR values to verify that the limits have not been exceeded. Measurement of the core power distribution in this manner may be used to verify that the measured LHR values remain within their specified limits when one or more of the limits specified by LCO 3.1.4, LCO 3.1.6, LCO 3.2.1, LCO 3.2.2, LCO 3.2.3, or LCO 3.2.4 is exceeded, or when LCO 3.1.8 is applicable. If the local LHRs remain within their limits when one or more of these parameters exceed their limits, operation at THERMAL POWER may continue because the true initial conditions (the core power distribution) remain within their specified limits.

Because the limits on LHR are preserved when the parameters specified by LCO 3.1.4, LCO 3.1.6, LCO 3.2.1, LCO 3.2.2, LCO 3.2.3, or LCO 3.2.4 are within their limits, a Note is provided in the SR to indicate that monitoring core local LHRs is required only when complying with the Required Actions of these LCOs and when LCO 3.1.8 is applicable.

Frequencies for monitoring of the core local LHRs are specified in the Action statements of the individual LCOs. These Frequencies are reasonable based on the low probability of a limiting event occurring simultaneously with LHR exceeding its limit, and they provide sufficient time for the operator to obtain a power distribution map from the Incore Detector System. Indefinite THERMAL POWER operation in a Required Action of LCO 3.1.4, LCO 3.1.6, LCO 3.2.1, LCO 3.2.2, LCO 3.2.3, or LCO 3.2.4 is permitted, because the core local LHRs assumed in the accident analyses are within analyzed core power distributions and spatial xenon distributions.

REFERENCES

1. 10 CFR 50.46.

2. BAW-10179P-A, "Safety Criteria and Methodology for Acceptable Cycle Reload Analyses," Rev. 2, October 1997.

3. 10 CFR 50.36.

Each analog channel can be tested online to verify that the signal and trip setpoint are within the specified allowance requirements of approved calibration procedures. The built-in test facilities permit an electrical trip test of each analog instrument string by the substitution of signals at the buffer amplifiers. When an analog instrument string is placed in test, all associated analog subsystem outputs go to the trip state. This assures that all protective action cannot be defeated by placing analog instrument strings in test.

Reactor Building Pressure

The RB pressure is monitored by three independent pressure transmitters located inside the RB. These transmitters are separate from the transmitters that feed the Reactor Protection System (RPS). Each of the pressure signals generated by these transmitters is monitored by two bistables to provide trip signals. The outputs of the bistables, associated with the RB Pressure—High and RB Pressure—High High trips, drive relays in two sets of identical and independent digital instrument channels. These two sets of channels each use two-out-of-three coincidence digital logic for automatic actuation.

Each channel can be tested online to verify that the signal and trip setpoint are within the specified allowance requirements of approved calibration procedures. The built-in test facilities permit an electrical trip test of each analog instrument string by the substitution of signals at the buffer amplifiers. When an analog instrument string is placed in test, all associated analog subsystem outputs go to the trip state. This assures that all protective action cannot be defeated by placing analog instrument strings in test.

Trip Setpoints and Allowable Values

Trip setpoints are the nominal value at which the bistables are set. Any bistable is considered to be properly adjusted when the "as left" value is within the band for CHANNEL CALIBRATION accuracy.

The trip setpoints used in the bistables are based on the analytical limits used in the safety analysis described in SAR, Chapter 14 and Chapter 3A (Ref. 2). The selection of these trip setpoints is such that adequate protection is provided when appropriate sensor and processing time delays are taken into account. To allow for calibration tolerances, instrumentation uncertainties, instrument drift, and environment induced errors, the Allowable Values specified in Table 3.3.5-1 are equal to or conservatively adjusted with respect to the analytical limits. Guidance used to calculate uncertainties associated with the trip setpoints is provided in the Instrument Loop Error Analysis and Setpoint Methodology Manual, Design Guide, IDG-001 (Ref. 4). The trip setpoint entered into the bistable may be more conservative than that specified by the Allowable Value to account for changes in instrument error detectable by a CHANNEL FUNCTIONAL TEST. A channel is inoperable if its as-found trip setpoint is not within its required Allowable Value.

Setpoints, in accordance with the Allowable Values, ensure that the consequences of DBAs will be acceptable, providing the unit is operated from within the LCOs at the onset of the DBA and the equipment functions as analyzed.

Each channel can be tested online to verify that the trip setpoint is within the specified allowance requirements of approved calibration procedures. Once a designated channel is taken out of service for testing, a simulated signal may be injected in place of the field instrument signal. The process equipment for the channel may then be tested, verified, and calibrated.

APPLICABLE SAFETY ANALYSES

The following ESAS Functions have been assumed within the accident analyses.

High Pressure Injection

The ESAS actuation of HPI has been assumed for core cooling in the LOCA analysis and is available for boron addition in the SLB analysis.

Low Pressure Injection

The ESAS actuation of LPI has been assumed for large break LOCAs.

Reactor Building Spray, Reactor Building Cooling, and Reactor Building Isolation

The ESAS actuation of the RB coolers and RB Spray have been credited in the RB analysis for LOCAs. Accident dose calculations have credited RB Penetration Room Ventilation, RB Isolation, and RB Spray. The MSLB analysis also credits ESAS actuation of the RB Cooling and RB Spray.

Emergency Power

The ESAS initiated DG Start and ES electrical equipment alignment have been included in the design to ensure that emergency power is available throughout the limiting LOCA scenarios.

The small and large break LOCA analyses (Ref. 2) assume a conservative delay time for the actuation of HPI and LPI. This delay time includes allowances for DG starting, DG loading, Emergency Core Cooling Systems (ECCS) pump starts, and valve alignment. Similarly, the RB Cooling, RB Isolation, and RB Spray have been analyzed with delays appropriate for the entire system analyzed.

Accident analyses rely on automatic ESAS actuation for protection of the core temperature and containment pressure limits and for limiting off site dose levels following an accident. These include LOCA, SLB, and other events that result in RCS inventory reduction or severe loss of RCS cooling.

The ESAS instrumentation satisfies Criterion 3 of 10 CFR 50.36 (Ref. 3) for operation in MODE 1. There are no specific safety analyses for operation in MODES 2, 3 and 4. However, industry operating experience has identified the ESAS instrumentation as significant to public health and safety during these operating conditions. Therefore, the ESAS instrumentation satisfies Criterion 4 of 10 CFR 50.36 for operation in MODES 2, 3 and 4.

LCO

The LCO requires three ESAS analog instrument channels for each Parameter in Table 3.3.5-1 to be OPERABLE. Failure of any instrument renders the affected analog instrument channel(s) inoperable and reduces the reliability of the affected Functions.

Only the Allowable Value is specified for each ESAS Function in the LCO. Trip setpoints are provided in the calibration procedures. The trip setpoints are selected to ensure the setpoints measured by CHANNEL FUNCTIONAL TESTS do not exceed the Allowable Value if the bistable is performing as required. Each Allowable Value specified is equal to or more conservative than any analytical limit assumed in the safety analysis to account for instrument uncertainties appropriate to the trip Parameter. Guidance used to calculate the uncertainties associated with the trip setpoints is contained in Instrument Loop Error Analysis Setpoint Methodology, Design Guide, IDG-001 (Ref. 3).

The values for bypass removal functions are stated in the Applicable MODES or Other Specified Condition column of Table 3.3.5-1.

Three ESAS analog instrument channels shall be OPERABLE to ensure that a single failure in one channel will not result in loss of the ability to automatically actuate the required safety systems.

Reactor Coolant System Pressure

Three channels of RCS Pressure - Low are required OPERABLE. Each channel includes a sensor, trip bistable, bypass bistable, bypass relays, and output relays. Failure of a bypass bistable or bypass circuitry, such that an analog instrument channel cannot be bypassed, does not render the channel inoperable since the channel is still capable of performing its safety function, i.e., this is not a safety related bypass function.

The trip setpoints are the nominal values at which the bistables are set. For the RCS Pressure—Low, the limiting safety analysis assumes the HPI, LPI, EFIC EFW, ES electrical alignment, and two subsets of RB isolation actuate at ≥ 1520 psig (≥ 1535 psia). The Allowable Value of ≥ 1585 psig includes considerations for instrumentation error and an allowance for margin. Allowances for instrument drift and additional margin are included in the trip setpoint.

Guidance used to calculate the uncertainties associated with the trip setpoints is provided in Instrument Loop Error Analysis and Setpoint Methodology Manual, Design Guide, IDG-001 (Ref. 4). The explicit uncertainties associated with each setpoint are addressed in the individual design calculations or calibration procedures. Setpoints in accordance with the Allowable Value in conjunction with the LCOs and administrative controls ensure that the consequences of DBAs will be acceptable, providing the unit is operated from within the LCOs at the onset of the DBA and the equipment functions as analyzed. An analog instrument channel is inoperable if its actual trip setpoint is not within its required Allowable Value.

Reactor Building Pressure

Three channels of RB Pressure—High and RB Pressure—High High are required to be OPERABLE. Each channel includes a pressure switch, bypass relays, and output relays.

The trip setpoints are the nominal values at which the bistables are set. Credit is taken in the safety analyses for RB Pressure—High trip for the actuation of selected systems. The safety analyses for reactor building performance and equipment environmental qualification (pressure and temperature envelope definition) conservatively assume the RB cooling is not initiated until well beyond the expected actual automatic actuation time frame. Therefore, no additional consideration of the instrumentation uncertainties is warranted.

Credit is taken in the safety analyses for RB Pressure—High High trip for the actuation of selected systems. The safety analyses for reactor building performance and equipment environmental qualification (pressure and temperature envelope definition) conservatively assumes the RB spray is not initiated until well beyond the expected actual automatic actuation time frame. Therefore, no additional consideration of the instrumentation uncertainties is warranted.

Therefore, the bistable is considered to be properly adjusted when the "as left" value is consistent with the identified Allowable Value, i.e., for this parameter the trip setpoint and the Allowable Value are the same. Guidance used to calculate the uncertainties associated with the trip setpoints is provided in Instrument Loop Error Analysis and Setpoint Methodology Manual, Design Guide, IDG-001 (Ref. 4). Setpoints in accordance with the Allowable Value ensure that the consequences of DBAs will be acceptable, providing the unit is operated from within the LCOs at the onset of the DBA and the equipment functions as analyzed. An analog instrument channel is inoperable if its actual trip setpoint is not within its required Allowable Value.

APPLICABILITY

Three ESAS analog instrument channels for each of the following Parameters shall be OPERABLE.

1. Reactor Coolant System Pressure - Low Setpoint

The RCS Pressure - Low Setpoint actuation Parameter shall be OPERABLE during operation at or above 1750 psig. This requirement ensures the capability to automatically actuate safety systems and components during conditions indicative of a LOCA or secondary unit overcooling. Below 1750 psig, the low RCS Pressure actuation Parameter can be bypassed to avoid actuation during normal unit cooldowns when safety systems actuations are not required.

The allowance for the bypass is consistent with the transition of the unit to a lower energy state, where there is more margin to safety limits. The unit response to any event, given that the reactor is already tripped, will be less severe and allows more time for operator action to provide manual safety system actuations than in higher energy states. This is even more appropriate during unit heatups when the primary system and core energy content is low, prior to power operation.

In MODES 5 and 6, there is more time for the operator to evaluate unit conditions and respond by manually starting individual systems, pumps, and other equipment to mitigate the consequences of an abnormal condition or accident than in higher MODES. RCS pressure and temperature are very low, and many ES components are administratively controlled or otherwise prevented from actuating to prevent inadvertent overpressurization of unit systems.

2., 3. Reactor Building Pressure - High Setpoint and Reactor Building Pressure - High High Setpoint

The RB Pressure - High and RB Pressure - High High actuation Functions of ESAS shall be OPERABLE in MODES 1, 2, 3, and 4 when the potential for a HELB exists. In MODES 5 and 6, there is more time for the operator to evaluate unit conditions and respond by manually starting individual systems, pumps, and other equipment to mitigate the consequences of an abnormal condition or accident than in higher MODES. Plant pressure and temperature are very low and many ES components are administratively controlled or otherwise prevented from actuating to prevent inadvertent overpressurization of unit systems.

ACTIONS

Required Actions A and B apply to the ESAS instrumentation Parameters listed in Table 3.3.5-1.

A Note has been added to the ACTIONS indicating separate Condition entry is allowed for each Parameter.

If an analog instrument channel's trip setpoint is found nonconservative with respect to the Allowable Value, or the transmitter, instrument loop, signal processing electronics, or ESAS bistable is found inoperable, then all affected functions provided by that channel should be declared inoperable and the unit must enter the Conditions for the particular protection Parameter affected.

A.1

Condition A applies when one analog instrument channel becomes inoperable in one or more Parameters. If one ESAS analog instrument channel is inoperable, placing it in a tripped condition leaves the system in a one-out-of-two condition for actuation. Thus, if another analog instrument channel were to fail, the ESAS instrumentation could still perform its actuation functions. This action is completed when all of the affected output relays are tripped. This can normally be accomplished by tripping the affected bistables.

The 1 hour Completion Time is sufficient time to perform the Required Action.

B.1, B.2, and B.3

Condition B applies when Required Action A.1 and its associated Completion Time are not met, or when one or more parameters have more than one analog instrument channel inoperable. If Condition B applies, the unit must be brought to a condition in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours. Additionally, for the RCS Pressure—Low parameter, the unit must be brought to < 1750 psig within 36 hours, and for the RB Pressure—High and High High parameters, the unit must be brought to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

The ESAS Parameters listed in Table 3.3.5-1 are subject to CHANNEL CHECK, CHANNEL FUNCTIONAL TEST, and CHANNEL CALIBRATION.

SR 3.3.5.1

Performance of the CHANNEL CHECK every 12 hours provides reasonable assurance for prompt identification of a gross failure of instrumentation. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. CHANNEL CHECK will detect gross channel failure; therefore, it is key in verifying that the instrumentation continues to operate properly between CHANNEL CALIBRATIONs.

Agreement criteria are determined by the unit staff, based on a combination of factors including channel instrument uncertainties. If a channel is outside the criteria, it may be an indication that the transmitter or the signal processing equipment has drifted outside its limit.

The Frequency is based on operating experience that demonstrates channel failure is rare. Since the probability of two random failures in redundant channels in any 12 hour period is extremely low, the CHANNEL CHECK minimizes the chance of loss of protective function due to failure of redundant channels. The CHANNEL CHECK supplements less formal, but potentially more frequent, checks of channel OPERABILITY during normal operational use of the displays associated with the LCO's required channels.

SR 3.3.5.2

A CHANNEL FUNCTIONAL TEST is performed on each required ESAS analog instrument channel to ensure the entire channel will perform the intended functions. Any setpoint adjustment shall be consistent with the assumptions of the setpoint calculations.

The Frequency of 31 days is based on unit operating experience, with regard to channel OPERABILITY and drift, which demonstrates that failure of more than one channel of a given function in any 31 day interval is a rare event. The RCS low pressure automatic bypass removal feature is verified during its CHANNEL FUNCTIONAL TEST.

SR 3.3.5.3

CHANNEL CALIBRATION is a complete check of the analog instrument channel, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drift to ensure that the analog instrument channel remains OPERABLE between successive tests. CHANNEL CALIBRATION shall find that measurement errors and bistable setpoint errors are within the assumptions of the setpoint calculations. CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the setpoint calculations.

This Frequency is justified by the assumption of at least an 18 month calibration interval to determine the magnitude of equipment drift in the setpoint calculations.

REFERENCES

1. SAR, Chapter 7.

2. SAR, Chapter 14 and Chapter 3A.

3. 10 CFR 50.36.

4. Instrument Loop Error Analysis and Setpoint Methodology Manual, Design Guide, IDG-001.

B 3.3 INSTRUMENTATION

B 3.3.8 Diesel Generator (DG) Loss of Power Start (LOPS)

BASES

BACKGROUND

The DGs provide a source of emergency power when offsite power is either unavailable or is insufficiently stable to allow operation of safety related loads. Undervoltage protection will generate a LOPS in the event a loss of voltage or degraded voltage condition occurs on unit vital buses. There are two LOPS Functions for each 4.16 kV vital bus.

Two undervoltage relays with inverse voltage time characteristics are provided on each 4.16 kV Class 1E bus for the purpose of detecting a loss of bus voltage. The relay Allowable Values are based on a maximum setting, which is below the lowest allowed motor terminal momentary voltage of 75% of motor voltage rating of 4000 V. The Allowable Values are adjusted to include channel uncertainties and calibration tolerances. Upon loss of power to either of these relays, in approximately 1.0 second, load shedding and starting of the associated DG are initiated. Isolation of the safety related buses is delayed approximately 2.0 seconds to allow an automatic transfer to offsite power. The safety related bus is isolated only if the transfer is unsuccessful.

Two definite time undervoltage relays are provided on each safety related 480 V load center bus with a coincident trip logic (2 out of 2) for the purpose of detecting a sustained undervoltage condition. The undervoltage relay Allowable Values on the 480 V bus are based on long term motor voltage requirements plus the maximum feeder voltage drop allowance resulting in a nominal setting of 92% of the motor rated voltage of 460 V. The Allowable Values are adjusted to include channel uncertainties and calibration tolerances. Upon voltage degradation to 92% of 460 V and after a delay of 8 seconds, both relays must operate to isolate the associated safety related 4.16 kV bus from offsite power, and start and connect the associated DG. The relays are delayed 8.0 seconds to prevent spurious operation of the relays when large motors start on the safety related 4.16 kV and 480 V buses. The LOPS is further described in SAR, Section 8.3.1 (Ref. 1).

Trip Setpoints

The Allowable Values associated with the relays are consistent with the analytical limits presented in SAR, Section 8.3.1 (Ref. 1). The selection of these values is such that adequate protection is provided when all sensor and processing time delays are taken into account. A channel is inoperable if its actuation trip setpoint is not within its required Allowable Value.

A complete loss of offsite power will result in approximately a 1 second delay in LOPS actuation. The DG starts and is available to accept loads within a 15 second time interval on actuation by the Engineered Safeguards Actuation System (ESAS) or LOPS. Emergency power is established within the maximum time delay assumed for each event analyzed in the accident analysis in which a loss of offsite power is assumed (Ref. 2).

The DG LOPS protection channels conform to the single failure criteria of IEEE-279-1971 as discussed in Ref. 1.

APPLICABLE SAFETY ANALYSES

The DG LOPS is required for the Engineered Safeguards (ES) to function in any accident which assumes a loss of offsite power.

Accident analyses credit the loading of the DG, based on the loss of offsite power, during a loss of coolant accident (LOCA). The actual DG start has historically been associated with the ESAS actuation. The diesel loading has been included in the assumed delay time associated with each safety system component requiring DG supplied power following a loss of offsite power. The analysis assumes a nonmechanistic DG loading, which does not explicitly account for each individual component of the loss of power detection and subsequent actions. The total assumed actuation time for the limiting systems, high pressure injection, and low pressure injection includes contributions from the DG Start, DG loading, and safety injection system component actuation. The response of the DG to a loss of power must be demonstrated to fall within this analysis response time when including the contributions of all portions of the delay.

The required channels of LOPS, in conjunction with the ES systems powered from the DGs, provide unit protection for the analyzed accidents in which a loss of offsite power is assumed.

The delay times assumed in the safety analysis for the ES equipment include the 15 second DG start delay and, if applicable, the appropriate sequencing delay. The assumed response times for ESAS actuated equipment in LCO 3.3.5, "Engineered Safeguards Actuation System (ESAS) Instrumentation," include the appropriate DG loading and sequencing delay.

In MODE 1, the DG LOPS channels satisfy Criterion 3 of 10 CFR 50.36 (Ref. 3). There are no specific safety analyses for operation in MODES 2, 3, and 4. However, industry operating experience has identified DG LOPS as significant to public health and safety during these operating conditions. Therefore, in MODES 2, 3 and 4, the DG LOPS channels satisfy Criterion 4 of 10 CFR 50.36.

LCO

The LCO for the DG LOPS requires that two relays per DG (DG1 and DG2) of the loss of voltage instrumentation Function shall be OPERABLE and two relays per DG of the degraded voltage instrumentation Function shall be OPERABLE to ensure that the automatic 4.16 kV bus isolation capability and automatic start of the DG is available when needed. The degraded voltage relays may be bypassed for ≤ 30 seconds during reactor coolant pump start to prevent such starts from initiating spurious DG LOPS, separation of the ES busses from offsite power, and subsequent loading of the DG. Therefore, the automatic bypass and associated alarms are required functions for OPERABILITY of the DG LOPS instrumentation.

Loss of either DG LOPS function could result in the delay of safety systems initiation when required. This could lead to unacceptable consequences during accidents.

The Allowable Values must be met for each Function to be considered OPERABLE. Allowable Values are specified in the specifications. The setpoints are selected to ensure that the setpoint measured by CHANNEL FUNCTIONAL TESTS does not exceed the Allowable Value if the relay is performing as required. Each Allowable Value is more conservative than any analytical limit assumed in the transient and accident analysis and the trip setpoint is equal to or more conservative to the Allowable Value, accounting for instrument uncertainties appropriate to the trip function. Guidance used to calculate the uncertainties associated with the relay settings is contained in the ANO-1 Design Guide, IDG-001, "Instrument Loop Error Analysis and Setpoint Methodology Manual" (Ref. 4).

The LOPS relay Allowable Values are based on the short term starting voltage protection as well as long term running voltage protection. The 4.16 kV undervoltage relay Allowable Values are based on a maximum setting, which is below the lowest allowed motor terminal momentary voltage of 75% of motor rated voltage of 4000 V. The 480 V undervoltage relay Allowable Values are based on long term motor voltage requirements plus the maximum feeder voltage drop allowance resulting in a nominal 92% setting of the motor rated voltage of 460 V. The Allowable Values for both the 4.16 kV and the 480 V relays include adjustments for channel uncertainties and calibration tolerances.

APPLICABILITY

The DG LOPS actuation Function shall be OPERABLE in MODES 1, 2, 3, and 4 because ES Functions are required to be OPERABLE in these MODES. Automatic actuation is not required in MODES 5 or 6 since there is no automatic protective function on a loss of power or degraded power to the vital bus.

ACTIONS

A Note has been added to the ACTIONS indicating that separate Condition entry is allowed for each Function.

If a relay's trip setpoint is found nonconservative with respect to the Allowable Value, or the relay is found inoperable, then the function that the relay provides must be declared inoperable and the LCO Condition entered for the particular protection function affected. Since the required relay Functions are specified on a per DG basis, the Condition may be entered separately for each DG.

A.1

With one or more relays in one or more Functions for one or more DGs inoperable, Required Action A.1 requires the inoperable relay(s) to be restored to OPERABLE status within 1 hour. With a relay of a Function inoperable, the logic is not capable of providing an automatic DG LOPS signal for valid conditions for the associated DG. The 1 hour Completion Time is reasonable to evaluate and to take action by correcting the degraded condition in an orderly manner and takes into account the low probability of an event requiring LOPS occurring during this interval.

B.1

Condition B applies if the Required Action and associated Completion Time of Condition A are not met.

Required Action B.1 ensures that Required Actions for affected diesel generator inoperabilities are initiated. Depending on the DG(s) affected, the appropriate Actions specified in LCO 3.8.1, "AC Sources - Operating," are required immediately.

SURVEILLANCE REQUIREMENTS

SR 3.3.8.1

Performance of the CHANNEL CHECK once every 7 days provides reasonable assurance for prompt identification of a gross failure of instrumentation. CHANNEL CHECK will detect gross channel failure; therefore, it is key in verifying that the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

The Frequency is based on operating experience that demonstrates channel failure is rare. Since the probability of random failure in any 7 day period is low, the CHANNEL CHECK minimizes the chance of loss of protective function due to failure of this instrumentation.

SR 3.3.8.2

The Note allows channel bypass for testing of the loss of voltage Function without entering the associated Conditions and Required Actions, although during this time period it cannot actuate a diesel start. This allowance is based on the assumption that 4 hours is the average time required to perform channel Surveillance. The 4 hour testing allowance does not significantly reduce the probability that the DG will start when necessary. It is not acceptable to remove channels from service for more than 4 hours to perform required Surveillance testing without declaring the channel inoperable.

A CHANNEL CALIBRATION is a complete check of the instrument channel, including the sensor. The setpoints and the response to a loss of voltage and a degraded voltage test shall include a single point verification that the trip occurs within the required delay time. CHANNEL CALIBRATION shall verify that setpoints are within the required ranges.

The Frequency is based on the reliability of the components, on operating experience which demonstrates channel failure is rare, and on consistency with the typical industry refueling cycle, and is justified by the assumption of at least an 18 month calibration interval in the determination of equipment drift.

REFERENCES

1. SAR, Section 8.3.1.

2. SAR, Chapter 6 and 14.

3. 10 CFR 50.36.

4. ANO-1 Design Guide, IDG-001, "Instrument Loop Error Analysis and Setpoint Methodology Manual."

EFW Initiation functions use the same actuation logic combinations as Main Steam Line Isolation. EFW initiation also occurs on Engineered Safeguards Actuation System (ESAS) actuation and on Diverse Reactor Overpressure Protection System (DROPS) actuation.

EFIC automatically initiates the EFW System when any of the following conditions exist:

a. All four reactor coolant pumps are tripped;

b. Both MFW pumps are tripped and reactor power is > 10% RTP;

c. Low level in either SG;

d. Low pressure in either SG;

e. Actuation of ESAS channels 3 or 4; or

f. Actuation of DROPS channels 1 or 2.

Vector Valve Enable Logic

The EFIC System is also responsible for sending open or close signals to the EFW control and isolation valves. SAR Section 7.1.4 (Ref. 1), describes the EFIC vector logic. The vector logic outputs are in a neutral state (neither commanding open nor close) until an enable signal is received from either train "A" or "B" of EFW Initiation. The EFIC Logic monitors the train A and B EFW Initiation logics. When an EFW Initiation occurs, the vector logic is enabled to generate open or close signals to the EFW isolation valves and close signals to the EFW control valves depending on the relative values of SG pressures. The level control module provides input to the flow controllers which control the position of the EFW control valves.

APPLICABLE SAFETY ANALYSES

The Applicable Safety Analysis discussion for the Main Steam Line Isolation and EFW Initiation Functions is discussed in the Bases for LCO 3.3.11, "EFIC Instrumentation."

LCO

Two trains each of Main Steam Line Isolation and EFW Initiation logics shall be OPERABLE. There are only two trains of automatic actuation logic per Function. Therefore, violation of this LCO could result in a complete loss of the automatic Function assuming a single failure of the other train.

The valve open/close commands are determined by the relative values of steam generator pressures as follows:

	SG VALVES	
PRESSURE STATUS	"A"	"B"
If SG "A" & SG "B" > 600 psig	Open	Open
If SG "A" > 600 psig & SG "B" < 600 psig	Open	Close
If SG "A" < 600 psig & SG "B" > 600 psig	Close	Open
If SG "A" & SG "B" < 600 psig		
AND		
• SG "A" & SG "B" within 100 psid	Open	Open
• SG "A" 100 psid > SG "B"	Open	Close
• SG "B" 100 psid > SG "A"	Close	Open

APPLICABLE SAFETY ANALYSES

The SAR SLB analyses, SAR Section 14.2.2.1 (Ref. 3), consider isolation of the affected SG as a function automatically performed by the EFIC System. The EFIC Vector Logic utilizes the EFW Vector Valve Control Functions (i.e., SG Pressure—Low and SG Differential Pressure—High) to determine which steam generator is associated with the rupture and provide appropriate isolation.

Additional information relating to EFIC initiation and logics may be referenced in the Bases for LCO 3.3.11, "EFIC Instrumentation."

LCO

Four channels of the EFIC vector logic module are required to be OPERABLE. The necessity for four channels is discussed in the BASES for ACTIONS. The 600 psig and 100 psid setpoints were chosen as discussed in Specification B 3.3.11, "EFIC Instrumentation." The feed only good generator verification study assumed a differential pressure vector value of 150 psid. A 100 psid setpoint conservatively assumes a 50 psi (25 psi per pressure channel) margin for instrument error. Failure to meet this LCO results in not being able to meet the single-failure criterion. These values (i.e., 600 psig and 100 psid) do contain an allowance for instrument error.

APPLICABILITY

The EFIC Vector Logic shall be OPERABLE when the associated EFIC Instrumentation EFW Vector Valve Control Function is required to be OPERABLE in accordance with Table 3.3.11-1. The EFW Vector Valve Control Function is required to be OPERABLE in MODES 1 and 2, and in MODE 3 with SG pressure ≥ 750 psig because the SG inventory can contribute significantly to the reactor building peak pressure with a secondary side break. Both the normal feedwater and the EFW must be able to be isolated on each SG to limit overcooling of the primary and to limit mass and energy releases to the reactor building. Once the SG pressures have decreased below 750 psig, the energy level is low and the secondary side feedwater flow rate is low or nonexistent. Also, the primary system temperatures are typically too low to allow the SGs to effectively remove energy, or are sufficiently low to allow for operator action. Therefore, EFIC Vector Logic is not required to be OPERABLE in MODE 3 below 750 psig nor in MODES 4, 5, and 6.

ACTIONS

A.1

The function of the EFW control/isolation valves and the EFIC vector logic is to meet the single-failure criterion while maintaining the capability to:

a. Provide EFW on demand; and

b. Isolate an SG when required.

These conflicting requirements result in the necessity for two valves in series, in parallel with two valves in series, and a four channel valve command system.

With one channel inoperable, the system cannot meet the single-failure criterion and still meet the dual functional criteria previously described. Therefore, when one vector valve logic channel is inoperable, the channel must be restored to OPERABLE status within 72 hours. This is analogous to having one EFW train inoperable; wherein a 72 hour Completion Time is provided by the Required Actions of LCO 3.7.5, "EFW System." As such, the Completion Time of 72 hours is based on engineering judgment.

B.1 and B.2

If Required Action A.1 cannot be met within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and SG pressure must be reduced to < 750 psig within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

- LCO 3.9.4, "Decay Heat Removal (DHR) and Coolant Circulation-High Water Level" (MODE 6); and
- LCO 3.9.5, "Decay Heat Removal (DHR) and Coolant Circulation-Low Water Level" (MODE 6).

ACTIONS

A.1

If one RCS loop is inoperable, redundancy for forced flow heat removal is lost. The Required Action is restoration of the RCS loop to OPERABLE status within a Completion Time of 72 hours. This time allowance is a justified period to be without the redundant nonoperating loop because a single loop in operation has a heat transfer capability greater than that needed to remove the decay heat produced in the reactor core.

B.1

If the Required Action and associated Completion Time of Condition A are not met, the unit must be brought to MODE 4. In MODE 4, the unit may be placed on the DHR System. The allowed Completion Time of 12 hours is reasonable, based on operating experience, to achieve cooldown and depressurization from the existing unit conditions and without challenging unit systems.

C.1 and C.2

If no RCS loop is OPERABLE or a required RCS loop is not in operation, (no RCS loop is required to be in operation provided the conditions of the Note in the LCO section are met), all operations involving introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 must be immediately suspended. Action to restore one RCS loop to operation shall be immediately initiated and continued until one RCS loop is restored to operation and to OPERABLE status. Suspending the introduction of coolant into the RCS of coolant with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations. The immediate Completion Time reflects the importance of maintaining operation for decay heat removal.

- LCO 3.9.5, "Decay Heat Removal (DHR) and Coolant Circulation-Low Water Level" (MODE 6).

ACTIONS

A.1

If only one required RCS loop or DHR loop is OPERABLE and in operation, redundancy for heat removal is lost. Action must be initiated to restore a second loop to OPERABLE status. The immediate Completion Time reflects the importance of maintaining the availability of two paths for heat removal.

A.2

If restoration is not accomplished and a DHR loop is OPERABLE, the unit must be brought to MODE 5 within the following 24 hours. Bringing the unit to MODE 5 is a conservative action with regard to decay heat removal. With only one DHR loop OPERABLE, redundancy for decay heat removal is lost and, in the event of a loss of the remaining DHR loop, it would be safer to initiate that loss from MODE 5 rather than MODE 4. The Completion Time of 24 hours is reasonable, based on operating experience, to reach MODE 5 in an orderly manner and without challenging unit systems.

This Required Action is modified by a Note which indicates that the unit must be placed in MODE 5 only if a DHR loop is OPERABLE. With no DHR loop OPERABLE, the unit is in a condition with only limited cooldown capabilities. Therefore, the actions are to be concentrated on restoration of a DHR loop, rather than a cooldown of extended duration.

B.1 and B.2

If no RCS or DHR loops are OPERABLE or a required loop is not in operation (no loop is required to be in operation provided the conditions of the Note in the LCO section are met), all operations involving introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 must be suspended and action to restore one RCS or DHR loop to OPERABLE status and operation must be initiated. The required margin to criticality must not be reduced in this type of operation. Suspending the introduction of coolant into the RCS of coolant with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations. The immediate Completion Times reflect the importance of maintaining operation for decay heat removal. The action to restore must continue until one loop is restored to operation.

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restore the secondary side water level in the SG(s), and action must be taken immediately. Either Required Action will restore redundant decay heat removal paths. The immediate Completion Time reflects the importance of maintaining the availability of two paths for heat removal.

C.1 and C.2

If no required DHR loop is in operation, except as provided in Note 1, or no required DHR loop is OPERABLE, all operations involving introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 must be suspended and action to restore a DHR loop to OPERABLE status and operation must be initiated. The margin to criticality must not be reduced in this type of operation. Suspending the introduction of coolant into the RCS of coolant with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations. The immediate Completion Time reflects the importance of maintaining operation for decay heat removal.

SURVEILLANCE REQUIREMENTS

SR 3.4.7.1

This SR requires verification every 12 hours that the required DHR loop is in operation. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing heat removal. The 12 hour Frequency has been shown by operating practice to be sufficient to regularly assess degradation. In addition, control room indication and alarms will normally indicate loop status.

SR 3.4.7.2

Verifying the SGs are OPERABLE by ensuring their secondary side water levels are ≥ 20 inches ensures that redundant heat removal paths are available if the second DHR loop is not OPERABLE. If both DHR loops are OPERABLE, this Surveillance is not needed. The 12 hour Frequency has been shown by operating practice to be sufficient to regularly assess RCS loop status.

SR 3.4.7.3

Verification that each required DHR pump is OPERABLE ensures that a DHR loop can be placed in operation if needed to maintain decay heat removal and reactor coolant circulation. If the secondary side water level is ≥ 20 inches in both SGs, this Surveillance is not needed. Verification is performed by verifying proper breaker

ACTIONS

A.1

If one required DHR loop is inoperable, redundancy for heat removal is lost. Required Action A.1 is to immediately initiate activities to restore a second loop to OPERABLE status. The immediate Completion Time reflects the importance of maintaining the availability of two paths for heat removal.

B.1, B.2, and B.3

If no required loop is OPERABLE or the required loop is not in operation, except as provided by Note 1 in the LCO, the Required Action requires immediate suspension of all operations involving introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 or reduction of RCS water inventory and requires initiation of action to immediately restore one DHR loop to OPERABLE status and operation. The Required Action for restoration does not apply to the condition of both loops not in operation when the exception Note in the LCO is in force. Suspending the introduction of coolant into the RCS of coolant with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations. The immediate Completion Time reflects the importance of maintaining operations for decay heat removal. The action to restore must continue until one loop is restored.

SURVEILLANCE REQUIREMENTS

SR 3.4.8.1

This Surveillance requires verification every 12 hours that at least one loop is in operation. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing heat removal. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess RCS loop status.

SR 3.4.8.2

Verification that each required pump is OPERABLE ensures that redundancy for heat removal is provided. The requirement also ensures that a DHR loop can be placed in operation if needed to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power available to each required pump. Alternatively, verification that a pump is in operation also verifies proper breaker alignment and power availability. The

B.1

If one CFT is inoperable for a reason other than boron concentration, it cannot be assumed that the CFT will perform its required function during a LOCA. Due to the severity of the consequences should a LOCA occur in these conditions, the 1 hour Completion Time to open the valve, remove power to the valve, or restore the proper water volume or nitrogen cover pressure ensures that prompt action will be taken to return the inoperable CFT to OPERABLE status. The Completion Time minimizes the time the unit is potentially exposed to a LOCA in these conditions.

C.1 and C.2

If the Required Actions and associated Completion Times of Condition A or B are not met, or if both CFTs are inoperable, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and RCS pressure reduced to ≤ 800 psig within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.5.1.1

Verification every 12 hours that each CFT isolation valve is fully open ensures that the CFTs are available for injection and ensures timely discovery if a valve should be less than fully open. If an isolation valve is not fully open, the rate of injection to the RCS would be reduced. Although a motor operated valve position should not change with power removed, a closed valve could result in accident analysis assumptions not being met. A 12 hour Frequency is considered reasonable in view of administrative controls that ensure that a mispositioned isolation valve is unlikely.

SR 3.5.1.2 and SR 3.5.1.3

Verification every 12 hours of each CFT's nitrogen cover pressure and the borated water volume is sufficient to ensure adequate injection during a LOCA. Due to the static nature of these parameters, a 12 hour Frequency usually allows the operator to identify changes before the limits are reached. Operating experience has shown that this Frequency is appropriate for early detection and correction of off normal trends.

This Required Action is modified by a Note that states that this Required Action is only required to be performed if one DHR train is OPERABLE. With both DHR pumps and heat exchangers inoperable, it would be unwise to require the unit to go to MODE 5, where the only available heat removal system is the LPI trains operating in the DHR mode. Therefore, the appropriate action is to initiate measures to restore one ECCS LPI train and to continue the actions until the train is restored to OPERABLE status.

C.1

If no LPI train is OPERABLE, the unit is not prepared to respond to an event requiring low pressure injection and may not be prepared to continue cooldown using the LPI pumps and DHR heat exchangers. The Completion Time of immediately, which would initiate action to restore at least one LPI train to OPERABLE status, ensures that prompt action is taken to restore the required LPI capacity. Normally, in MODE 4, reactor decay heat must be removed by an LPI train operating with suction from the RCS. If no LPI train is OPERABLE for this function, reactor decay heat must be removed by some alternate method, such as use of the steam generator(s). The alternate means of heat removal must continue until one of the inoperable LPI trains can be restored to operation so that continuation of decay heat removal (DHR) is provided.

With both DHR pumps and heat exchangers inoperable, it would be unwise to require the unit to go to MODE 5, where the only available heat removal system is the LPI trains operating in the DHR mode. Therefore, the appropriate action is to initiate measures to restore one ECCS LPI train and to continue the actions until the train is restored to OPERABLE status.

C.2

Required Action C.2 requires that the unit be placed in MODE 5 within 24 hours. This Required Action is modified by a Note that states that this Required Action is only required to be performed if one DHR train is OPERABLE. This Required Action provides for those circumstances where the LPI trains may be inoperable but are otherwise capable of providing the necessary decay heat removal. Under this circumstance, the prudent action is to remove the unit from the Applicability of the LCO and place the unit in a stable condition in MODE 5. The Completion Time of 24 hours is reasonable, based on operating experience, to reach MODE 5 in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.5.3.1

The applicable Surveillance descriptions from Bases B 3.5.2 apply. This SR is modified by a Note that allows an LPI train to be considered OPERABLE during alignment and operation for DHR, if capable of being manually realigned (remote or local) to the LPI mode of operation and not otherwise inoperable. This allows operation in the DHR mode during MODE 4, if necessary.

REFERENCES

1. The applicable references from Bases B 3.5.2 apply.

LCO

Reactor Building isolation valves form a part of the reactor building boundary. The reactor building isolation valve safety function is related to minimizing the loss of reactor coolant inventory and establishing the reactor building boundary during a DBA.

The automatic power operated reactor building isolation valves are required to have isolation times within limits and to actuate on an automatic isolation signal. The 24 inch purge valves must be maintained closed. The valves covered by this LCO are listed in the SAR (Ref. 4). Their associated stroke times are contained in the Inservice Testing Program. The normally closed manual reactor building isolation valves are considered OPERABLE when the valves are closed, blind flanges are in place, or open under administrative controls. These passive isolation valves/devices are listed in Reference 4.

The reactor building isolation valve leakage rates are addressed by LCO 3.6.1, "Reactor Building," as Type C testing.

This LCO provides assurance that the reactor building isolation valves will perform their designated safety functions to minimize the loss of reactor coolant inventory and establish the reactor building boundary during accidents.

APPLICABILITY

In MODES 1, 2, 3 and 4, the reactor building isolation valves OPERABILITY for the limiting Design Basis Accidents is based on full power operation. Although reduced power in the lower MODES would not require the same level of accident mitigation performance, there are no accident analyses for reduced performance in the lower MODES. In MODES 5 and 6, the probability and consequences of events are reduced due to the pressure and temperature limitations of these MODES. The requirements for reactor building isolation valves during MODE 5 and 6, primarily related to movement of irradiated fuel in the reactor building, are addressed in LCO 3.9.3, "Reactor Building Penetrations."

ACTIONS

The ACTIONS are modified by a Note allowing penetration flow paths, except for purge valve penetration flow paths, to be unisolated intermittently under administrative controls. These administrative controls consist of stationing a dedicated individual at the valve controls, who is in continuous communication with the control room. In this way, the penetration can be rapidly isolated when a need for reactor building isolation is indicated. Due to ALARA concerns, it is permissible for this dedicated individual to be stationed in a nearby lower dose area provided the intent of rapidly isolating the penetration is retained. Due to the size of the reactor building purge line penetration and the fact that those penetrations exhaust directly from the reactor building atmosphere to the environment, the penetration flow paths containing these valves may not be opened under administrative controls.

A second Note has been added to provide clarification that, for this LCO, separate Condition entry is allowed for each penetration flow path. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable reactor building isolation valve. Complying with the Required Actions may allow for continued operation, and subsequent inoperable reactor building isolation valves are governed by subsequent Condition entry and application of associated Required Actions.

The ACTIONS are further modified by a third Note, which ensures appropriate remedial actions are taken, if necessary, if the affected systems are rendered inoperable by an inoperable reactor building isolation valve.

In the event isolation valve leakage results in exceeding the overall reactor building leakage rate, Note 4 directs entry into the applicable Conditions and Required Actions of LCO 3.6.1.

A.1 and A.2

In the event one reactor building isolation valve in one or more penetration flow paths is inoperable, the affected penetration flow path must be isolated. The method of isolation must include the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and de-activated automatic reactor building isolation valve, a closed manual valve, a blind flange, and a check valve with flow through the valve secured. For a penetration isolated in accordance with Required Action A.1, the device used to isolate the penetration should be the closest available one to the reactor building. Required Action A.1 must be completed within the 48 hour Completion Time. The specified time period is reasonable, considering the time required to isolate the penetration and the relative importance of supporting reactor building OPERABILITY during MODES 1, 2, 3, and 4.

For affected penetration flow paths that cannot be restored to OPERABLE status within the 48 hour Completion Time and that have been isolated in accordance with Required Action A.1, the affected penetration flow paths must be verified to be isolated on a periodic basis. This periodic verification is necessary to ensure that the reactor building penetrations required to be isolated following an accident and no longer capable of being automatically isolated will be in the isolation position should an event occur. This Required Action does not require any testing or device manipulation. Rather, it involves verification, through a system walkdown, that those isolation devices outside the reactor building and capable of being mispositioned are in the correct position. The Completion Time of "once per 31 days for isolation devices outside the reactor building" is appropriate considering the fact that the devices are operated under administrative controls and the probability of their misalignment is low. For the isolation devices inside the reactor building, the time period specified as "prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days" is considered reasonable in view of the inaccessibility of the isolation devices and other administrative controls that will ensure that isolation device misalignment is an unlikely possibility.

B 3.7 PLANT SYSTEMS

B 3.7.2 Main Steam Isolation Valves (MSIVs)

BASES

BACKGROUND

The MSIVs isolate steam flow from the secondary side of the steam generators following a main steam line break. MSIV closure terminates flow from the unaffected (intact) steam generator.

One MSIV is located in each main steam line outside of, but close to, the reactor building. The MSIVs are downstream from the main steam safety valves (MSSVs) and emergency feedwater pump turbine's steam supply to prevent their being isolated from the steam generators by MSIV closure. Closing the MSIVs isolates each steam generator from the other, and isolates the turbine, Turbine Bypass System, and other auxiliary steam supplies from the steam generators.

The MSIVs close on a main steam line isolation (MSLI) signal as described in LCO 3.3.11, "Emergency Feedwater Initiation and Control (EFIC) System Instrumentation." The EFIC System is designed to prevent the simultaneous blowdown of both steam generators. The MSIVs may also be actuated manually.

APPLICABLE SAFETY ANALYSES

The design basis of the MSIVs is established by the analysis for the steam line break as discussed in the SAR, Section 14.2 (Ref. 1). The analysis assumes a break in the main steam line upstream of an MSIV. Closure of the MSIVs isolates blowdown from the unaffected steam generator, reducing the overcooling effect and its subsequent effect on core reactivity. Failure of a MSIV to close is not required to be considered by the original license basis.

The limiting case for the containment analysis is the Large Break LOCA event. The pressurization of the reactor building due to the mass and energy from the blowdown of a ruptured steam line inside the reactor building does not establish the design basis of the MSIVs because of the small rate of mass and energy addition compared to a Large Break LOCA.

Since the pressurization of the reactor building by the main steam line break is not a limiting issue, the analysis conservatively maximizes the offsite dose by assuming the break occurs in the steam line outside the reactor building, but upstream of an MSIV. Although a break at this location is highly improbable, it serves to provide a direct path to the environment for any activity in the steam generators and leads to a complete blowdown of one steam generator. In addition, the analysis assumes that offsite power remains available to power the reactor coolant pumps, maximizing the overcooling effect and its subsequent effect on core reactivity. The

main steam line break analysis verifies the effects of a double-ended guillotine steam line break at full power to ensure adequate margin to safety is maintained, consistent with the original license basis. The SAR does not analyze a feedwater line break.

The MSIVs serve a closing safety function. In MODE 1 the MSIVs satisfy Criterion 3 of 10 CFR 50.36 (Ref. 3). Although no licensing basis accidents or transients relating to the function of the MSIVs exist in other modes, the MSIVs are conservatively considered to satisfy Criterion 4 of 10 CFR 50.36 in MODEs 2 and 3.

LCO

This LCO requires that the MSIV in each steam line be OPERABLE. For an MSIV to be considered OPERABLE, the isolation time must be within limits and the MSIV must close on an isolation actuation signal when required.

This LCO provides assurance that the MSIVs will perform their design safety function to isolate an SLB.

APPLICABILITY

The MSIVs must be OPERABLE to provide isolation of potential main steam line breaks in MODES 1, 2, and 3, when there is significant mass and energy in the RCS and steam generators.

In MODE 4, the steam generator energy is low. Therefore, the MSIVs are not required to be OPERABLE.

In MODES 5 and 6, the steam generators are depressurized and the MSIVs are not required for isolation of potential main steam line breaks.

ACTIONS

A.1

With one or more MSIVs inoperable in MODE 1 or 2, action must be taken to restore the component to OPERABLE status within 24 hours. Some repairs can be made to the MSIV with the unit hot. The 24 hour Completion Time is reasonable, considering the probability of an accident that would require actuation of the MSIVs occurring during this time interval. Although not credited, the turbine throttle valves may be available to provide isolation for some postulated accidents.

The main steam and feedwater systems do not provide a direct path from the reactor building atmosphere to the environment. Therefore, the Completion Time is reasonable, and provides for diagnosis and repair of many MSIV problems, thereby avoiding unnecessary shutdown.

B.1

If the Required Action and associated Completion Time of Condition A are not met, the unit must be placed in MODE 3 within the next 12 hours. The Completion Time is reasonable, based on operating experience, to reach MODE 3.

C.1 and C.2

Condition C is modified by a Note indicating that separate Condition entry is allowed for each MSIV.

Since the MSIVs are required to be OPERABLE in MODE 3, the inoperable MSIV(s) may either be restored to OPERABLE status or closed. When closed, the MSIVs are already in the position required by the assumptions in the safety analysis.

The main steam and feedwater systems do not provide a direct path from the reactor building atmosphere to the environment. Therefore, the Completion Time is reasonable, and provides for diagnosis and repair of many MSIV problems, thereby avoiding unnecessary shutdown.

Inoperable MSIVs that cannot be restored to OPERABLE status within the specified Completion Time, but are closed, must be verified on a periodic basis to be closed. This is necessary to ensure that the assumptions in the safety analysis remain valid. The 7 day Completion Time is reasonable in view of MSIV status indications available in the control room, and other administrative controls, to ensure these valves are in the closed position.

D.1 and D.2

If the Required Actions and associated Completion Times of Condition C are not met, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in MODE 4 within 24 hours. The allowed Completion Time is reasonable, based on operating experience, to reach the required unit conditions from MODE 3 conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.2.1

This SR verifies that the closure time of each MSIV is as specified in the Inservice Testing Program. The MSIV isolation time is assumed in the accident and reactor building analyses. This Surveillance is normally performed prior to returning the unit to power operation, e.g., during MODE 3, following a refueling outage, because the MSIVs should not be tested at power since even a part stroke exercise increases the risk of a valve closure with the unit generating power.

The Frequency for this SR is in accordance with the Inservice Testing Program.

This test is normally conducted in MODE 3, with the unit at operating temperature and pressure. This SR is modified by a Note that allows entry into and operation in MODE 3 prior to performing the SR. This allows delaying testing until MODE 3 in order to establish conditions consistent with those under which the acceptance criterion was generated.

SR 3.7.2.2

This SR verifies that each MSIV can close on an actual or simulated actuation signal. This Surveillance is normally performed upon returning the unit to operation following a refueling outage. The Frequency of MSIV testing is every 18 months. The 18 month Frequency for testing is based on the refueling cycle. Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency. Therefore, this Frequency is acceptable from a reliability standpoint.

This SR is modified by two Notes. The first Note allows entry into and operation in MODE 3 prior to performing the SR. This allows delaying testing until MODE 3 in order to establish conditions consistent with those under which the acceptance criterion was established.

SR 3.7.2.2 is also modified by a second Note which indicates that the automatic closure capability is not required to be met when SG pressure is < 750 psig. At < 750 psig, the main steam line isolation Function of EFIC may be disabled to prevent automatic actuation on low steam generator pressure during a unit shutdown.

REFERENCES

1. SAR, Section 14.2.

2. SAR, Section 7.1.4.

3. 10 CFR 50.36.

4. ASME, Boiler and Pressure Vessel Code, Section XI.

B 3.7 PLANT SYSTEMS

B 3.7.6 Q Condensate Storage Tank (QCST)

BASES

BACKGROUND

The condensate storage tank (QCST) provides a source of demineralized water to the steam generators for removing decay and sensible heat from the Reactor Coolant System (RCS). The QCST provides the preferred source of water to the Emergency Feedwater (EFW) System (LCO 3.7.5, "Emergency Feedwater (EFW) System").

Because the QCST is the normally aligned source to EFW, it is designed to withstand earthquakes and other natural phenomena, and a portion is protected from missiles that might be generated by natural phenomena. The QCST is designed as Seismic Category I to ensure availability of the initial EFW supply. Feedwater is also available from alternate sources.

A description of the QCST is found in the SAR, Section 10.4.8 (Ref. 1).

APPLICABLE SAFETY ANALYSES

The QCST provides the initial source of cooling water to remove decay heat and cool down the unit following any event with a loss of normal feedwater.

The T41B CST is seismically qualified and a portion of the tank is protected from tornado missiles. The protected volume of water in the tank can provide a source of EFW for both units for at least 30 minutes. Thirty minutes is adequate for the operators to manually switch the EFW suction alignment to the service water system (SWS), if required. The SWS provides the assured source of cooling water.

The QCST satisfies Criterion 4 of 10 CFR 50.36 (Ref. 2).

LCO

The protected volume of water in the tank can provide a source of emergency feedwater (EFW) for both units for at least 30 minutes. Thirty minutes is adequate for the operators to manually switch the EFW suction alignment to the service water system (SWS), if required. The SWS provides the assured source of cooling water.

The volume requirements for the CST are based on the EFW systems of both units being aligned to T41B simultaneously or only Unit 1 being aligned. The minimum volume requirements are sufficient to support several hours of cooling flow for both units. During this time, the need for EFW will be determined. Alignment to

available water sources will be performed as necessary to ensure adequate heat removal is maintained. The volume requirements are nominal values. In the conversion of the required volumes to indicated level, instrument uncertainty need not be applied.

APPLICABILITY

In MODES 1, 2, 3, and 4 when a steam generator is being relied upon for heat removal, the QCST is required to be OPERABLE.

In MODE 4 when a steam generator is not being relied upon for heat removal, and in MODES 5 and 6, the QCST is not required because the EFW System is not required.

ACTIONS

A.1 and A.2

As an alternative to unit shutdown, the OPERABILITY of the backup water supply should be verified within 4 hours and once every 12 hours thereafter. The OPERABILITY of the backup feedwater supply must include verification, by administrative means, of the OPERABILITY of the flow paths from the backup supply to the EFW pumps and availability of the required volume of water in the backup supply. The QCST must be restored to OPERABLE status within 7 days because the backup supply may be performing this function in addition to its normal functions. The 4 hour Completion Time is reasonable, based on operating experience, to verify the OPERABILITY of the backup water supply. Additionally, verifying the backup water supply every 12 hours is adequate to ensure the backup water supply continues to be available. The 7 day Completion Time is reasonable, based on an OPERABLE backup water supply being available, and the low probability of an event occurring during this time period, requiring the use of water from the QCST.

B.1 and B.2

If the Required Action and associated Completion Times are not met, the unit must be placed in a MODE in which the LCO does not apply, with the DHR System in operation. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 4, without reliance on steam generators for heat removal, within 24 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.6.1

This SR verifies that the QCST contains the required volume of cooling water. The 12 hour Frequency is based on operating experience and the need for operator awareness of unit evolutions that may affect the QCST inventory between checks. The 12 hour Frequency is considered adequate in view of other indications in the control room, including alarms, to alert the operator to abnormal deviations in QCST levels.

The volume requirements for the CST are based on the EFW systems of both units being aligned to T41B simultaneously or only Unit 1 being aligned. The minimum volume requirements are sufficient to support several hours of cooling flow for both units. During this time, the need for EFW will be determined. Alignment to available water sources will be performed as necessary to ensure adequate heat removal is maintained. The volume requirements are nominal values. In the conversion of the required volumes to indicated level, instrument uncertainty need not be applied.

REFERENCES

1. SAR, Section 10.4.8.

2. 10 CFR 50.36.

The onsite standby power source for each 4.16 kV ES bus is a dedicated DG. DGs 1 and 2 are dedicated to ES buses A3 and A4, respectively. A DG starts automatically on an applicable Engineered Safeguards Actuation System (ESAS) signal or on an ES bus degraded voltage or undervoltage signal (see LCO 3.3.5, "Engineered Safeguards Actuation System (ESAS) Instrumentation" and LCO 3.3.8, "Diesel Generator (DG) Loss of Power Start (LOPS)"). After the DG has started, it will automatically tie to its respective bus after offsite power is tripped as a consequence of ES bus undervoltage or degraded voltage, independent of or coincident with an ESAS signal. The DGs will also start and operate in the standby mode without tying to the ES bus on an ESAS signal alone. Following the trip of offsite power, an undervoltage signal strips nonpermanent loads from the ES bus. When the DG is tied to the ES bus, loads are then sequentially connected to their respective ES bus by the automatic load sequencing timers. The sequencing timers control the permissive and starting signals to motor breakers to prevent overloading the DG by automatic load application.

In the event of a loss of preferred power, the ES electrical loads are automatically connected to the DGs in sufficient time to provide for safe reactor shutdown and to mitigate the consequences of a concurrent Design Basis Accident (DBA) such as a loss of coolant accident (LOCA).

Certain required unit loads are returned to service in a predetermined sequence in order to prevent overloading the DG in the process. Within 1 minute after the initiating signal is received by the load sequencing timers, all loads needed to recover the unit or maintain it in a safe condition are returned to service.

Ratings for emergency DGs 1 and 2 satisfy the guidance of Regulatory Guide 1.9 (Ref. 3). The continuous service rating of each DG is 2600 kW with 10% overload permissible for up to 2 hours in any 24 hour period. However, the "intended service" rating provided by the manufacturer is 2750 kW. This is the value used in postulated DG loading evaluations (Ref. 2). The ES loads that are powered from the 4.16 kV ES buses are listed in Reference 2.

APPLICABLE SAFETY ANALYSES

The initial conditions of DBA and transient analyses in the SAR, Chapter 14 (Ref. 4), assume ES systems are OPERABLE. The AC electrical power sources are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ES systems so that the fuel, Reactor Coolant System (RCS), and reactor building design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, "Power Distribution Limits;" Section 3.4, "Reactor Coolant System (RCS);" and Section 3.6, "Reactor Building Systems."

The OPERABILITY of the AC electrical power sources is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This results in maintaining at least one train of the onsite or offsite AC sources OPERABLE during accident conditions that consider:

a. An assumed loss of all offsite power or all onsite AC power; and

b. A worst-case single failure.

In MODES 1 and 2, the AC sources satisfy Criterion 3 of 10 CFR 50.36 (Ref. 5). In MODES 3 and 4, the AC sources satisfy Criterion 4 of 10 CFR 50.36.

LCO

Two qualified circuits between the offsite transmission network and the onsite Class 1E Electrical Power Distribution System and separate and independent DGs for each ES train (emergency DGs 1 and 2) ensure availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an abnormality or a postulated DBA.

Qualified offsite circuits are those that are described in the SAR and are part of the licensing basis for the unit.

Each required offsite circuit must be capable of maintaining rated frequency and voltage, and accepting required loads during an accident, while connected to the ES buses.

The power sources for the two required offsite power circuits shall consist of:

a. Startup Transformer No. 1 and its 22 kV supply from the switchyard bus tie autotransformer, or the Unit Auxiliary Transformer and its supply from the switchyard bus tie autotransformer via the 22 kV overhead swing leads (alternate configuration of the Unit Auxiliary Transformer), and

b. Startup Transformer No. 2 and its supply from the 161 kV switchyard ring bus.

An offsite circuit includes the necessary breakers and equipment to properly align the circuit and transmit power from the transmission line source to a single 4160 V ES bus. The offsite power sources shall be capable of supplying 4160 V ES bus A3 via 4160 V bus A1 and 4160 V ES bus A4 via 4160 V bus A2. Either offsite source may be used to supply either ES bus. In this manner, along with the emergency DGs, each 4160 V ES bus is assured at least one offsite and one DG source of power. The inability of one offsite power source to supply one 4160 V ES bus does not render the offsite source inoperable as long as it remains capable of supplying the other 4160 V ES bus. However, when power to the ES bus is being supplied from the main generator via the Unit Auxiliary Transformer, automatic transfer capability to either Startup Transformer No. 1 or No. 2 is required to consider the offsite power source operable to the associated ES bus.

LCO 3.8.9 addresses the OPERABILITY of vital AC distribution systems, including 4160 V ES buses A3 and A4. From this respect, if power from an offsite source is verified available to the vital 4160 V ES buses (actively supplying power to the bus or appropriate switchgear and electrical components available to allow connection to the bus), then the offsite source is considered operable. Failures associated with A3 or A4, such as a loss of bus undervolatge protection, affect only bus operability and do not require the offsite power source to be considered inoperable. However, if bus A1 or A2 is not capable of supplying bus A3 or A4, respectively, one of the offsite circuits must be considered inoperable.

One required offsite source shall be capable of accepting emergency loads in an automatic transfer. Reference 1 requires one circuit to be available within a few seconds following a LOCA to assure that core cooling, reactor building integrity, and other vital safety functions are maintained. The other required offsite source may be configured for manual transfer. In the event Startup Transformer No. 2 is configured for automatic transfer, the selective load-shed features for automatic shedding of loads to avoid a degraded voltage condition shall be OPERABLE.

For the offsite AC sources, independence is maintained to the extent practical. An offsite source may be connected to more than one ES bus and not violate the independence criteria provided each OPERABLE required offsite source is capable of being aligned (manually or automatically, as appropriate) so that it is independent of the other required offsite source.

When the main generator is synchronized to the 500 kV system, AC power for the ES loads may be supplied from either the Unit Auxiliary Transformer, Startup Transformer No. 1, Startup Transformer No. 2, or a combination of these transformers concurrently sharing the load. Power from the Unit Auxiliary Transformer, when powered from the main generator, is not credited with meeting the requirements of LCO 3.8.1.a since it cannot function under all conditions (i.e., following a turbine trip) except when connected in the alternate configuration described above. However, powering the ES buses from the Unit Auxiliary Transformer is permitted during normal unit operation because of the automatic transfer capability to a startup transformer source.

Each DG (DG1 and DG2) must be capable of starting, accelerating to rated speed and voltage, and connecting to its respective ES bus on detection of bus undervoltage. This will be accomplished within 15 seconds. Each DG must also be capable of accepting required loads within the assumed loading sequence intervals, and continue to operate until offsite power can be restored to the ES buses.

Proper sequencing of loads, including tripping of non-essential loads, is a required function for DG OPERABILITY. Should the time intervals between two or more loads be reduced such that the interval is less than that assumed in the SAR, the associated diesel generator is considered to be inoperable. If one or more time delays is inoperable (i.e., the associated component fails to load) then the associated component is considered inoperable, and the appropriate Condition for that component is entered.

The AC sources in one train must be separate and independent (to the extent possible) of the AC sources in the other train. For the DGs, separation and independence are complete.

This LCO does not apply to the Alternate AC DG nor to the security DG.

APPLICABILITY

The AC sources are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of abnormalities or abnormal transients; and

b. Adequate core cooling is provided and reactor building OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

The AC power requirements for MODES 5 and 6 are addressed by the definition of OPERABILITY for each required supported load.

ACTIONS

A.1

To ensure a highly reliable power source remains with one offsite circuit inoperable, it is necessary to verify the OPERABILITY of the remaining required offsite circuit on a more frequent basis. Since the Required Action only specifies "perform," a failure of SR 3.8.1.1 acceptance criteria does not result in a Required Action being not met. However, if a second required circuit fails SR 3.8.1.1, the second offsite circuit is inoperable, and Condition C, for two offsite circuits inoperable, is entered.

The Completion Time provides for a prompt confirmation of the OPERABILITY of the remaining offsite circuit. This is considered to be acceptable because of other indications, which are available in the control room for loss of the remaining offsite circuit.

A.2

Required Action A.2, which only applies if the train cannot be powered from an offsite source, is intended to provide assurance that an event coincident with a single failure of the associated DG will not result in a complete loss of safety function of critical redundant required features. These features are powered from the redundant AC electrical power train.

The Completion Time for Required Action A.2 is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both:

a. The train has no offsite power available to supply its loads; and

b. A required feature on the other train is inoperable.

If at any time during the existence of Condition A (one offsite circuit inoperable) a redundant required feature subsequently becomes inoperable, this Completion Time begins to be tracked.

Discovering no offsite power to one train of the onsite Class 1E Electrical Power Distribution System coincident with one or more inoperable required support or supported features, or both, that are associated with the other train that has offsite power, results in starting the Completion Times for the Required Action. Twenty-four hours is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

The remaining OPERABLE offsite circuit and DGs are adequate to supply electrical power to both trains of the onsite Class 1E Distribution System. The 24 hour Completion Time takes into account the component OPERABILITY of the redundant counterpart to the inoperable required feature. Additionally, the 24 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

A.3

With one offsite circuit inoperable, the reliability of the offsite system is degraded, and the potential for a loss of offsite power is increased, with attendant potential for a challenge to the unit safety systems. In this Condition, however, the remaining OPERABLE offsite circuit and DGs are adequate to supply electrical power to the onsite Class 1E Distribution System.

The 72 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

The second Completion Time for Required Action A.3 establishes a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition A is entered while, for instance, a DG is inoperable and that DG is subsequently returned OPERABLE, the LCO may already have been not met for up to 7 days. This could lead to a total of 10 days, since initial failure to meet the LCO, to restore the offsite circuit. At this time, a DG could again become inoperable, the

circuit restored OPERABLE, and an additional 7 days (for a total of 17 days) allowed prior to complete restoration of the LCO. The 10 day Completion Time provides a limit on the time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The AND connector between the 72 hour and 10 day Completion Times means that both Completion Times apply simultaneously, and the more restrictive Completion Time must be met.

As in Required Action A.2, the Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time that the LCO was initially not met, instead of at the time Condition A was entered.

Required Action A.3 has been modified by a Note extending the allowable outage time for Startup Transformer No. 2 only, for up to 30 days. The 30-day allowance is permitted not more than once in any 10-year period, which is considered sufficient for proper maintenance of the transformer. The 30-day window should permit extensive preplanned preventative maintenance without placing either unit in an action statement of short duration and would allow both units to be operating during such maintenance. Because this allowance assumes parts are prestaged, appropriate personnel are available, and proper contingencies have been established, it is not intended to be used for an unexpected loss of the transformer. Pre-established contingencies will consider the projected stability of the offsite electrical grid, the atmospheric stability projected for the maintenance window, the ability to adequately control other ongoing plant maintenance activities that coincide with the window, projected flood levels, and the availability of all other power sources. Since a station blackout is the most affected event that could occur when power sources are inoperable, the steam driven emergency feedwater pump will also be maintained available during the evolution.

B.1

To ensure a highly reliable power source remains with an inoperable DG, it is necessary to verify the availability of the offsite circuits on a more frequent basis. Since the Required Action only specifies "perform," a failure of SR 3.8.1.1 acceptance criteria does not result in a Required Action being not met. However, if a circuit fails to pass SR 3.8.1.1, it is inoperable. Upon offsite circuit inoperability, additional Conditions and Required Actions must then be entered.

The Completion Time provides for a prompt confirmation of the OPERABILITY of the remaining offsite circuit. This is considered to be acceptable because of other indications, which are available in the control room for monitoring the status of the remaining offsite circuit.

B.2

Required Action B.2 is intended to provide assurance that a loss of offsite power, during the period that a DG is inoperable, does not result in a complete loss of safety function of critical systems. These features are designed with redundant safety related trains. Redundant required feature failures consist of inoperable features associated with a train, redundant to the train that has an inoperable DG.

The Completion Time for Required Action B.2 is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both:

a. An inoperable DG exists; and

b. A required feature on the other train is inoperable.

If at any time during the existence of this Condition (one DG inoperable) a required feature subsequently becomes inoperable, this Completion Time begins to be tracked.

Discovering one required DG inoperable coincident with one or more inoperable required support or supported features, or both, that are associated with the OPERABLE DG, results in starting the Completion Time for the Required Action. Four hours from the discovery of these events existing concurrently is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

In this Condition, the remaining OPERABLE DG and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. Thus, on a component basis, single-failure protection for the required feature's function may have been lost; however, function has not been lost. The 4 hour Completion Time takes into account the OPERABILITY of the redundant counterpart to the inoperable required feature. Additionally, the 4 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

B.3.1 and B.3.2

Required Action B.3.1 provides an allowance to avoid unnecessary testing of OPERABLE DG(s). If it can be determined that the cause of the inoperable DG does not exist on the OPERABLE DG, SR 3.8.1.2 does not have to be performed. If the cause of inoperability exists on the other DG, the other DG would be declared inoperable upon discovery and Condition E of LCO 3.8.1 would be entered. Once the failure is repaired, the common cause failure no longer exists and Required Action B.3.1 is satisfied. If the cause of the initial inoperable DG cannot be confirmed not to exist on the remaining DG, performance of SR 3.8.1.2 suffices to provide assurance of continued OPERABILITY of that DG.

In the event the inoperable DG is restored to OPERABLE status prior to completing either B.3.1 or B.3.2, the condition reporting program will continue to evaluate the common cause possibility. This continued evaluation, however, is no longer under the 24 hour constraint imposed while in Condition B.

According to Generic Letter 84-15 (Ref. 6), 24 hours is reasonable to confirm that the OPERABLE DG(s) is not affected by the same problem as the inoperable DG.

B.4

Operation may continue in Condition B for a period that should not exceed 7 days. In Condition B, the remaining OPERABLE DG and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. The 7 day Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

The second Completion Time for Required Action B.4 establishes a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, an offsite circuit is inoperable and that circuit is subsequently restored OPERABLE, the LCO may already have been not met for up to 72 hours. This could lead to a total of 10 days, since initial failure to meet the LCO, to restore the DG. At this time, an offsite circuit could again become inoperable, the DG restored OPERABLE, and an additional 72 hours (for a total of 13 days) allowed prior to complete restoration of the LCO. The 10 day Completion Time provides a limit on time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Condition A and Condition B are entered concurrently. The "AND" connector between the 7 day and 10 day Completion Times means that both Completion Times apply simultaneously, and the more restrictive Completion Time must be met.

As in Required Action B.2, the Completion Time allows for an exception to the normal "time zero" for beginning the allowed time "clock." This will result in establishing the "time zero" at the time that the LCO was initially not met, instead of at the time Condition B was entered.

C.1 and C.2

Required Action C.1, which applies when two offsite circuits are inoperable, is intended to provide assurance that an event with a coincident single failure will not result in a complete loss of redundant required safety functions. The Completion Time for this failure of redundant required features is reduced to 12 hours from that allowed for one train without offsite power (Required Action A.2). The rationale for the reduction to 12 hours is that a Completion Time of 24 hours is allowed for two required offsite circuits inoperable, based upon the assumption that two complete safety trains are OPERABLE. When a concurrent redundant required feature failure exists, this assumption is not the case, and a shorter Completion Time of 12 hours is appropriate. These features are powered from redundant AC safety trains.

The Completion Time for Required Action C.1 is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both:

a. All required offsite circuits are inoperable; and

b. A required feature is inoperable.

If at any time during the existence of Condition C (two offsite circuits inoperable) a required feature becomes inoperable, this Completion Time begins to be tracked. This level of degradation means that the offsite electrical power system does not have the capability to effect a safe shutdown and to mitigate the effects of an accident; however, the onsite AC sources have not been degraded. This level of degradation generally corresponds to a total loss of the immediately accessible offsite power sources.

Because of the normally high availability of the offsite sources, this level of degradation may appear to be more severe than other combinations of two AC sources inoperable that involve one or more DGs inoperable. However, two factors tend to decrease the severity of this level of degradation:

a. The configuration of the redundant AC electrical power system that remains available is not susceptible to a single bus or switching failure; and

b. The time required to detect and restore an unavailable offsite power source is generally much less than that required to detect and restore an unavailable onsite AC source.

With both of the required offsite circuits inoperable, sufficient onsite AC sources are available to maintain the unit in a safe shutdown condition in the event of a DBA or transient. In fact, a simultaneous loss of offsite AC sources, a LOCA, and a worst-case single failure were postulated as a part of the design basis in the safety analysis. Thus, the 24 hour Completion Time provides a period of time to effect restoration of one of the offsite circuits commensurate with the importance of maintaining an AC electrical power system capable of meeting its design criteria.

With the available offsite AC sources, two less than required by the LCO, operation may continue for 24 hours. If two offsite sources are restored within 24 hours, unrestricted operation may continue. If only one offsite source is restored within 24 hours, power operation would continue in accordance with Condition A.

D.1 and D.2

Pursuant to LCO 3.0.6, the Distribution System ACTIONS would not be entered even if all AC sources to it were inoperable resulting in de-energization. Therefore, the Required Actions of Condition D are modified by a Note to indicate that when Condition D is entered with no AC source to any train (one or more trains), the Conditions and Required Actions for LCO 3.8.6, "Distribution Systems - Operating," must be immediately entered. This allows Condition D to provide requirements for the loss of one offsite circuit and one DG without regard to whether a train is de-energized. LCO 3.8.6 provides the appropriate restrictions for a de-energized train.

In Condition D, individual redundancy is lost in both the offsite electrical power system and the onsite AC electrical power system. The 12 hour Completion Time takes into account the capacity and capability of the remaining AC sources, reasonable time for repairs, and the low probability of a DBA occurring during this period.

E.1

With Train A and Train B DGs inoperable, there are no remaining standby AC sources. Thus, with an assumed loss of offsite electrical power, insufficient standby AC sources are available to power the minimum required ES functions. Since the offsite electrical power system is the only source of AC power for this level of degradation, the risk associated with continued operation for a very short time could be less than that associated with an immediate controlled shutdown (the immediate shutdown could cause grid instability, which could result in a total loss of AC power). Since any inadvertent generator trip could also result in a total loss of offsite AC power, however, the time allowed for continued operation is severely restricted. The intent here is to avoid the risk associated with an immediate controlled shutdown and to minimize the risk associated with this level of degradation.

With both DGs inoperable, operation may continue for a period that should not exceed 2 hours.

F.1 and F.2

If the inoperable AC electrical power sources cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 12 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

G.1

Condition G corresponds to a level of degradation in which all redundancy in the AC electrical power supplies has been lost. At this severely degraded level, any further losses in the AC electrical power system will cause a loss of function. Therefore, no additional time is justified for continued operation. The unit is required by LCO 3.0.3 to commence a controlled shutdown.

SURVEILLANCE REQUIREMENTS

The AC sources are designed to permit inspection and testing of all important areas and features, especially those that have a standby function, in accordance with SAR, Section 1.4, GDC 18 (Ref. 7). Periodic component tests are supplemented by extensive functional tests during outages (under simulated accident conditions).

Where the SRs discussed herein specify "ready-to-load" a minimum output voltage of 3750 V (~90% of the nominal 4160 V output voltage) is applicable. This value allows for voltage drop to the terminals of 4000 V motors whose minimum operating voltage is specified as 90% or 3600 V. It also allows for voltage drops to motors and other equipment down through the 120 V level where minimum operating voltage is also usually specified as 90% of name plate rating. The required minimum frequency for loading of the DG is 58.8 Hz (derived from Safety Guide 9); however, this value is not routinely monitored to be within limit within 15 seconds. Meeting minimum frequency is expected prior to the DG voltage reaching the required minimum. This is administratively confirmed on an 18 month interval.

SR 3.8.1.1

This SR ensures proper circuit continuity for the offsite AC electrical power supply to the onsite distribution network and availability of offsite AC electrical power. The breaker alignment verifies that each breaker is in its correct position to ensure that distribution buses and loads are connected to their preferred power source, and that appropriate independence of offsite circuits is maintained. The 7 day Frequency is adequate since breaker position is not likely to change without the operator being aware of it and because its status is displayed in the control room.

SR 3.8.1.2

These SRs help to ensure the availability of the standby electrical power supply to mitigate DBAs and transients and to maintain the unit in a safe shutdown condition.

To minimize the wear on moving parts that do not get lubricated when the engine is not running, this SR is modified by a Note to indicate that DG starts for this Surveillance may be preceded by an engine prelube period and followed by a warmup period prior to loading.

For the purposes of SR 3.8.1.2 testing with application of the Note, the DGs are started from standby conditions. Standby conditions for a DG means that the diesel engine oil is being continuously circulated and temperature is being maintained consistent with manufacturer recommendations. The signal initiating the start of the DG is varied from one test to another (start with handswitch at control room panel and at DG local control panel) to verify all starting circuits are OPERABLE.

SR 3.8.1.2 requires that the DG starts from standby conditions and achieves "ready-to-load" conditions (i.e., minimum voltage) within 15 seconds. The 15 second start requirement supports the assumptions of the design basis LOCA analysis in the SAR, Chapter 14 (Ref. 4).

The 31 day Frequency provides adequate assurance of DG OPERABILITY, while minimizing degradation resulting from testing.

SR 3.8.1.3

This Surveillance verifies that the DGs are capable of synchronizing with the offsite electrical system and accepting full rated load. The load test is conducted at 90 to 100 percent of the continuous rating, which is considered to be 90 to 100 percent of the intended service rating, or ≥ 2475 kW and ≤ 2750 kW. These parameter values contain all necessary allowances for instrument uncertainty. No additional allowances for instrument uncertainty are required to be incorporated in the implementing procedures. A minimum run time of 60 minutes ensures stabilized engine temperatures, while minimizing the time that the DG is connected to the offsite source.

The 31 day Frequency for this Surveillance provides adequate assurance of DG OPERABILITY, while minimizing degradation resulting from testing.

This SR is modified by four Notes. Note 1 indicates that diesel engine runs for this Surveillance may include gradual loading, as recommended by the manufacturer, so that mechanical stress and wear on the diesel engine are minimized. Note 2 states that momentary transients (e.g., because of changing bus loads) do not invalidate this test. Note 3 indicates that this Surveillance should be conducted on only one DG at a time in order to avoid common cause failures that might result from offsite circuit or grid perturbations. Note 4 stipulates a prerequisite requirement for performance of this SR. A successful DG start must precede this test to credit satisfactory performance.

SR 3.8.1.4

This SR provides verification that the level of fuel oil in the engine mounted day tank is being properly maintained. The level is expressed as an equivalent volume in gallons, and is selected to ensure adequate fuel , when combined with the volume contained in one fuel oil storage tank, for not less than 3.5 days operation of one DG loaded to full capacity (Ref. 2).

The 31 day Frequency is adequate to assure that a sufficient supply of fuel oil is available, since low level alarms are provided and unit operators would be aware of any large uses of fuel oil during this period.

SR 3.8.1.5

Microbiological fouling is a major cause of fuel oil degradation. There are numerous bacteria that can grow in fuel oil and cause fouling, but all must have a water environment in order to survive. Removal of water from the fuel oil day [and engine mounted] tanks once every [31] days eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during DG operation. Water may come from any of several sources, including condensation, ground water, rain water, contaminated fuel oil, and from breakdown of the fuel oil by bacteria. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system. The Surveillance Frequencies are established by Regulatory Guide 1.137 (Ref. 10). This SR is for preventive maintenance. The presence of water does not necessarily represent failure of this SR, provided the accumulated water is removed during the performance of this Surveillance.

SR 3.8.1.6

This Surveillance demonstrates that each required fuel oil transfer pump operates and transfers fuel oil from its associated storage tank to its associated day tank. This is required to support continuous operation of standby power sources. This Surveillance provides assurance that the fuel oil transfer pump is OPERABLE, the fuel oil piping system is intact, and the fuel delivery piping is not obstructed.

The design of the fuel transfer systems is such that pumps operate automatically or must be started manually in order to maintain an adequate volume of fuel oil in the day tanks during DG monthly testing. Therefore, a 31 day Frequency is specified to correspond to the interval for DG testing.

SR 3.8.1.7

Transfer of each 4.16 kV ES bus power supply from the normal offsite circuit to the alternate offsite circuit demonstrates the OPERABILITY of the alternate circuit distribution network to power the shutdown loads. Reference 1 requires that only one of the two offsite power circuits be capable of automatic transfer. The second (alternate) circuit must be capable of manual transfer, as a minimum. Typically, Startup Transformer No. 1 is aligned for automatic transfer and Startup Transformer No. 2 is aligned to allow manual transfer. In this alignment, the Surveillance verifies the automatic transfer of loads to Startup Transformer No. 1 and the manual transfer of loads to Startup Transformer No. 2. In the event that Startup Transformer No. 2 is aligned for automatic transfer and Startup Transformer No. 1 is aligned for manual transfer, the Surveillance verifies the automatic transfer of loads to Startup Transformer No. 2 and the manual transfer of loads to Startup Transformer No. 1.

For Startup Transformer No. 2, this test also demonstrates the selective load shedding interlock function. (Note: This load shedding function is only required when Startup Transformer No. 2 is selected for automatic transfer.) These features provide protection of required equipment from a sustained degraded grid voltage situation.

The 18 month Frequency of the Surveillance takes into consideration the unit conditions required to perform the Surveillance (i.e., during refueling shutdown), and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note. The reason for the Note is that during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODES 1 or 2. Risk insights or deterministic methods may be used for this assessment.

SR 3.8.1.8

This Surveillance demonstrates the as designed operation of the standby power sources during loss of the offsite source. This test verifies all actions encountered from the loss of offsite power, including shedding of the non-essential loads and energization of the emergency buses and respective loads from the DG. It further demonstrates the capability of the DG to automatically achieve "ready-to-load" conditions (i.e., minimum required voltage) within the specified time.

The DG auto-start time of 15 seconds is derived from requirements of the accident analysis to respond to a design basis large break LOCA. The Surveillance should be continued for a minimum of 5 minutes in order to demonstrate that all starting transients have decayed and stability has been achieved.

The requirement to verify the connection and power supply of permanent and auto-connected loads, e.g., the running service water pump(s), is intended to satisfactorily show the relationship of these loads to the DG loading logic. In certain circumstances, many of these loads can not actually be connected or loaded without undue hardship or potential for undesired operation. In lieu of actual demonstration of connection and loading of loads during this test, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

If the component start time delays are outside of those assumed by the SAR, component OPERABILITY and DG OPERABILITY must be evaluated.

The Frequency of 18 months takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine oil continuously circulated and temperature maintained consistent with manufacturer recommendations.

SR 3.8.1.9

In the event of a DBA coincident with a loss of offsite power, the DGs are required to supply the necessary power to ES systems so that the fuel, RCS, and reactor building design limits are not exceeded.

This Surveillance demonstrates the DG operation, as discussed in the Bases for SR 3.8.1.7, during a loss of offsite power actuation test signal in conjunction with an ES actuation signal. This test is typically conducted by simulating an ESAS signal and either simultaneously or subsequently simulating a LOOP. In certain circumstances, many loads can not actually be connected or loaded without undue hardship or potential for undesired operation. For instance, DHR systems performing a DHR function are not desired to be interrupted from this mode of

operation. In lieu of actual demonstration of connection and loading of loads during this test, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

Should the time intervals between two or more loads be reduced such that the interval is less than that assumed in the SAR, the associated DG is conservatively considered to be inoperable unless an evaluation of the condition shows the loading of the DG, with the reduced time interval, to be acceptable. If one or more time delays is inoperable (i.e., the associated component fails to load) or the time interval between two or more loads is greater than assumed in the SAR, then the associated component is considered inoperable, and the appropriate Condition for that component is entered.

The Frequency of 18 months takes into consideration unit conditions required to perform the Surveillance and is intended to be consistent with an expected fuel cycle length of 18 months.

This SR is modified by a Note. The reason for the Note is to minimize wear and tear on the DGs during testing. For the purpose of this testing with application of the Note, the DGs are started from standby conditions, that is, with the engine oil continuously circulated and temperature maintained consistent with manufacturer recommendations for DGs.

REFERENCES

1. SAR, Section 1.4, GDC 17.

2. SAR, Chapter 8.

3. Regulatory Guide 1.9, "Selection, Design, and Qualification of Diesel Generator Units Used as Standby (Onsite) Electric Power Systems at Nuclear Power Plants," Rev. 3, July 1993.

4. SAR, Section 1.4, GDC 18.

5. SAR, Chapter 14.

6. 10 CFR 50.36.

7. Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," July 2, 1984 (0CNA078423).

8. Regulatory Guide 1.137, Rev. 1, October 1979.

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e. The unit, while in a shutdown condition, can not affect the power grid in a manner that would result in a loss of offsite power due to a turbine trip.

The shutdown Technical Specification requirements are designed to ensure that the unit has the capability to mitigate the consequences of certain postulated accidents. Worst case DBAs which are analyzed for operating MODES are generally viewed not to be a significant concern during shutdown MODES due to the lower energies involved. The Technical Specifications therefore require a lesser complement of electrical equipment to be available during shutdown than is required during operating MODES. More recent work completed on potential risks associated with shutdown, however, have found significant risk associated with certain shutdown evolutions. As a result, in addition to the requirements established in the Technical Specifications, ANO, through industry commitment, has adopted NUMARC 91-06, "Guidelines for Industry Actions to Assess Shutdown Management," as an industry initiative to manage shutdown tasks and associated electrical support to maintain risk at an acceptable low level. This may require the availability of additional equipment beyond that required by the shutdown Technical Specifications.

In MODES 5 and 6, the AC sources satisfy Criterion 4 of 10 CFR 50.36 (Ref. 6). During handling of irradiated fuel, the AC sources satisfy Criterion 3 of 10 CFR 50.36.

LCO

One offsite circuit capable of supplying the onsite Class 1E power distribution subsystem(s) of LCO 3.8.10, "Distribution Systems - Shutdown," ensures that all required loads are powered from offsite power. An OPERABLE DG, associated with a distribution system train required to be OPERABLE by LCO 3.8.10, ensures a diverse power source is available to provide electrical power support, assuming a loss of the offsite circuit. Together, OPERABILITY of the required offsite circuit and DG ensures the availability of sufficient AC sources to operate the unit in a safe manner and to mitigate the consequences of a postulated fuel handling accident.

The qualified offsite circuit must be capable of maintaining rated frequency and voltage, and accepting required loads during an accident, while connected to the Engineered Safeguards (ES) bus(es). Qualified offsite circuits are those that are described in the SAR and are part of the licensing basis for the unit.

One offsite circuit consists of startup transformer No. 1, its supply from the switchyard bus tie autotransformer, either the 4160 V bus A1 or A2, and the feeder breaker providing power to the required 4160 V ES bus(es). An alternative for this offsite circuit consists of the unit auxiliary transformer, its supply from the switchyard bus tie autotransformer and the overhead swing leads, either the 4160 V bus A1 or A2, and the feeder breaker providing power to the required 4160 V ES bus(es). A second offsite circuit consists of startup transformer No. 2, its supply from the 161 kV switchyard ring bus, either the 4160 V bus A1 or A2, and the feeder breaker providing power to the required 4160 V ES bus(es). Another alternative for the above described offsite circuits consists of the unit auxiliary transformer, its supply

Note 2 exempts the 15 second start acceptance criteria for SR 3.8.1.2. This allows the AAC DG power source, which does not have auto-start capability or start-time criteria, to be used in lieu of an emergency DG. In MODES 5 and 6, there is sufficient time to manually start a DG in the event the offsite power source is lost. The required DG must be capable of being started from standby conditions and achieving ready-to-load conditions. Although the time to reach ready-to-load conditions is not a part of the acceptance criteria, it is intended that for emergency DG tests, this time be trended to help determine if a condition exists that is degrading the starting capabilities of the DG.

Refer to the corresponding Bases for LCO 3.8.1 for a discussion of each SR.

REFERENCES

1. SAR, Chapter 8.

2. Regulatory Guide 1.9, "Selection, Design, and Qualification of Diesel Generator Units used as Standby (Onsite) Electric Power Systems at Nuclear Power Plants," Rev. 3, July 1993.

3. Calculation 86-E-0002-01.

4. 10 CFR 50.63(c)(iii)(2).

5. ANO-2 SAR Section 8.3.3.

6. 10 CFR 50.36.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.5 DC Sources - Shutdown

BASES

BACKGROUND

A description of the DC sources is provided in the Bases for LCO 3.8.4, "DC Sources - Operating."

APPLICABLE SAFETY ANALYSES

The DC electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching.

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the fuel handling accident and the requirements for the supported systems' OPERABILITY.

In general, when the unit is shutdown, the Technical Specifications requirements ensure that the unit has the capability to mitigate the consequences of postulated accidents. However, assuming a single failure and concurrent loss of all offsite or all onsite power is not required. The rationale for this is based on the fact that many Design Basis Accidents (DBAs) that are analyzed in MODES 1 and 2 have no specific analyses in MODES 3, 4, 5 and 6. Worst case bounding events are deemed not credible in MODES 5 and 6 because the energy contained within the reactor pressure boundary, reactor coolant temperature and pressure, and the corresponding stresses result in the probabilities of occurrence being significantly reduced or eliminated, and in minimal consequences. These deviations from DBA analysis assumptions and design requirements during shutdown conditions are allowed by the LCO for required systems.

The shutdown Technical Specification requirements are designed to ensure that the unit has the capability to mitigate the consequences of certain postulated accidents. Worst case DBAs which are analyzed for operating MODES are generally viewed not to be a significant concern during shutdown MODES due to the lower energies involved. The Technical Specifications therefore require a lesser complement of electrical equipment to be available during shutdown than is required during operating MODES. More recent work completed on potential risks associated with shutdown, however, have found significant risk associated with certain shutdown evolutions. As a result, in addition to the requirements established in the Technical Specifications, ANO, through industry commitment, has adopted NUMARC 91-06, "Guidelines for Industry Actions to Assess Shutdown Management," as an industry initiative to manage shutdown tasks and associated electrical support to maintain risk at an acceptable low level. This may require the availability of additional equipment beyond that required by the shutdown Technical Specifications.

In MODES 5 and 6, the DC sources satisfy Criterion 4 of 10 CFR 50.36 (Ref. 1). During handling of irradiated fuel, the DC sources satisfy Criterion 3 of 10 CFR 50.36.

LCO

The DC electrical power subsystems consisting of one battery, one battery charger, and the corresponding control equipment and interconnecting cabling within the train, are required to be OPERABLE to support the required train(s) of the distribution systems required OPERABLE by LCO 3.8.10, "Distribution Systems - Shutdown." This ensures the availability of sufficient DC electrical power sources to operate the unit in a safe manner and to mitigate the consequences of a fuel handling accident.

An OPERABLE DC electrical power subsystem requires the associated battery to be OPERABLE and connected to the associated DC bus and one of its respective chargers to be OPERABLE and capable of being connected to the associated DC bus.

APPLICABILITY

The DC electrical power sources required to be OPERABLE in MODES 5 and 6 and during movement of irradiated fuel assemblies in either the reactor building or fuel handling area, provide assurance that:

a. Required features to provide adequate decay heat removal are available for the irradiated fuel assemblies in the core;

b. Required features needed to mitigate a fuel handling accident in either the reactor building or fuel handling area are available;

c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in MODE 5 or 6.

The DC electrical power requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.4.

ACTIONS

LCO 3.0.3 is not applicable while in MODE 5 or 6. However, since irradiated fuel assembly movement can occur in MODE 1, 2, 3, or 4, the ACTIONS have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel assemblies while in MODE 5 or 6, LCO would not specify an action. If moving

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.7 Inverters – Operating

BASES

BACKGROUND

The inverters are the preferred source of power for the 120 VAC buses because of the stability and reliability they achieve. The function of the inverter is to provide AC electrical power to the bus. The inverters are normally powered from the 125 VDC Electrical Power System. The inverters provide an uninterruptible power source for the safety significant instrumentation and controls, including the Reactor Protection System (RPS), the Engineered Safeguards Actuation System (ESAS), and the Emergency Feedwater Initiation and Control (EFIC) system. There are two RPS/ESAS related inverters per train and an additional green train safety related inverter Y28 that supports some post accident monitoring instrumentation, decay heat removal system interlocks, and control circuitry for systems such as emergency feedwater (EFW) and presurizer pressure control. Additionally, there are two swing inverters (one per train) which provide backup service in the event that an RPS/ESAS related inverter is out of service. If the swing inverter is placed in service, requirements of independence and redundancy between trains are maintained. Specific details on inverters and their operating characteristics are found in SAR, Chapter 8 (Ref. 1).

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the SAR, Chapter 14 (Ref. 2), assume Engineered Safeguards systems are OPERABLE. The inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the safety significant instrumentation and controls so that the fuel, Reactor Coolant System, and reactor building design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, "Power Distribution Limits;" Section 3.4, "Reactor Coolant System (RCS);" and Section 3.6, "Reactor Building Systems."

The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and is based on meeting the design basis of the unit. This includes maintaining required AC vital buses OPERABLE during accident conditions that consider:

a. An assumed loss of all offsite AC electrical power or all onsite elecrtical power; and

b. A worst-case single failure.

Inverters are a part of the distribution system and, as such, satisfy Criterion 3 of 10 CFR 50.36 (Ref. 3) in MODES 1 and 2. In MODES 3 and 4, the inverters satisfy Criterion 4 of 10 CFR 50.36.

LCO

The inverters ensure the availability of AC electrical power for the instrumentation required to shut down the reactor and maintain it in a safe condition after an abnormality or a postulated DBA.

Maintaining the required inverters OPERABLE ensures that the redundancy incorporated into the design of the safety significant instrumentation and controls is maintained. The four RPS/ESAS related inverters (two per train) along with inverter Y28 ensure an uninterruptible supply of AC electrical power to the 120 VAC buses even if the 4.16 kV safety buses are de-energized.

OPERABLE inverters require the associated 120 VAC vital bus to be powered by the inverter with output voltage within tolerances, and power input to the inverter from a 125 VDC Electrical Power System with associated OPERABLE station battery.

This LCO is modified by a Note that allows one of the four RPS/ESAS related inverters to be disconnected from its associated DC bus for ≤ 2 hours to allow load transfer to or from a swing inverter, if the 120 VAC bus is powered from an alternate AC source during the period and the other three inverters are OPERABLE.

APPLICABILITY

The inverters are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of abnormalities; and

b. Adequate core cooling is provided, and reactor building OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

Inverter requirements for MODES 5 and 6 are addressed by the definition of OPERABILITY for each required supported load.

ACTIONS

A.1

With one of the four inverters required by LCO 3.8.7.a and LCO 3.8.7.b inoperable, the associated 120 VAC bus is automatically transferred to its alternate AC source and remains OPERABLE. In the event the automatic transfer fails and the associated 120 VAC bus is de-energized, the 120 VAC bus is considered to be inoperable. For this reason, a Note has been included in ACTION A requiring entry into the Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating." This ensures the bus is re-energized within 8 hours.

Required Action A.1 allows 24 hours to fix the inoperable inverter and return it to service. The 24-hour limit takes into consideration the time required to repair an inverter, the availability of a swing inverter, and the additional risk to which the unit is exposed because of the inverter inoperability. This must be balanced against the risk of an immediate shutdown, along with the potential challenges to safety systems such a shutdown might entail. When the 120 VAC bus is powered from its alternate AC source, it is relying upon interruptible AC electrical power sources (offsite and onsite). The uninterruptible inverter source to the 120 VAC buses is the preferred source for powering instrumentation trip setpoint devices.

B.1

With inverter Y28 inoperable, the associated 120 VAC bus C540 is automatically transferred to its alternate AC source and remains OPERABLE. In the event the automatic transfer fails and the associated 120 VAC bus is de-energized, the 120 VAC bus is considered to be inoperable. For this reason, a Note has been included in ACTION B requiring entry into the Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating." This ensures the bus is re-energized within 8 hours.

Required Action B.1 allows 72 hours to fix the inoperable inverter and return it to service. The 72-hour limit takes into consideration the time required to repair an inverter, the fact that Y28/C540 does not have a swing inverter, and the additional risk to which the unit is exposed because of the inverter inoperability. This must be balanced against the risk of an immediate shutdown, along with the potential challenges to safety systems such a shutdown might entail. When the 120 VAC bus is powered from its alternate AC source, it is relying upon interruptible AC electrical power sources (offsite and onsite). The uninterruptible inverter source to the 120 VAC bus is the preferred source for powering instrumentation and controls.

C.1

Because Y28 is powered from the green train, a loss of Y28 in conjunction with an inoperable red train inverter required by LCO 3.8.7.a may result in a loss of safety function if power is lost to their respective 120 VAC buses. Therefore, one of these inoperable inverters must be restored to OPERABLE status within 2 hours. The 2-hour restoration period is acceptable since it is unlikely that both Y28 and the inoperable red train inverter will fail to continue to supply their respective 120 VAC buses with power from the alternate AC source. In the unlikely event that both affected 120 VAC buses are de-energized, LCO 3.8.9 Required Action E.1 will require immediate entry into LCO 3.0.3 due to the likelihood that a loss of safety function has occurred.

D.1 and D.2

If the Required Actions and associated Completion Time are not met or if any two inverters required by LCO 3.8.7.a and LCO 3.8.7.b are inoperable, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 12 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.8.7.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and 120 VAC buses energized from the inverter. The verification of proper voltage and frequency output ensures that the required power is readily available for the instrumentation connected to the 120 VAC buses. The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions.

REFERENCES

1. SAR, Chapter 8.

2. SAR, Chapter 14.

3. 10 CFR 50.36.

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not to be a significant concern during shutdown MODES due to the lower energies involved. The Technical Specifications therefore require a lesser complement of electrical equipment to be available during shutdown than is required during operating MODES. More recent work completed on potential risks associated with shutdown, however, have found significant risk associated with certain shutdown evolutions. As a result, in addition to the requirements established in the Technical Specifications, ANO, through industry commitment, has adopted NUMARC 91-06, "Guidelines for Industry Actions to Assess Shutdown Management," as an industry initiative to manage shutdown tasks and associated electrical support to maintain risk at an acceptable low level. This may require the availability of additional equipment beyond that required by the shutdown Technical Specifications.

In MODES 5 and 6, the inverters are part of the distribution system and, as such, satisfy Criterion 4 of 10 CFR 50.36 (Ref. 1). During handling of irradiated fuel, the inverters satisfy Criterion 3 of 10 CFR 50.36.

LCO

The inverters provide an uninterruptible supply of AC electrical power to its 120 VAC vital bus even if the 4.16 kV safety buses are de-energized. This ensures the availability of sufficient inverter power sources to operate the unit in a safe manner and to mitigate the consequences of a postulated fuel handling accident.

An OPERABLE inverter must be supplied power from its associated Class 1E 125 VDC electrical power system, and supplying the associated AC vital bus with acceptable output AC voltage.

APPLICABILITY

The inverters required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies in either the reactor building or fuel handling area provide assurance that:

a. Systems to provide adequate decay heat removal are available for the irradiated fuel in the core;

b. Systems needed to mitigate a fuel handling accident are available;

c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in MODE 5 or 6.

Inverter requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.7.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.9 Distribution Systems – Operating

BASES

BACKGROUND

The onsite Class 1E AC, DC, and 120 VAC bus electrical power distribution systems are divided by train into two redundant and independent AC, DC, and 120 VAC bus electrical power distribution subsystems.

Each AC electrical power subsystem consists of an Engineered Safeguards (ES) 4.16 kV bus and 480 V buses. Each 4.16 kV ES bus has two offsite sources of power as well as a dedicated onsite diesel generator (DG) source as described in the Bases for LCO 3.8.1, "AC Sources - Operating." If all offsite sources are unavailable, the onsite emergency DG supplies power to the 4.16 kV ES bus. Control power for the 4.16 kV breakers is supplied from the Class 1E batteries.

The secondary AC electrical power distribution system for each train includes the safety related load centers and motor control centers shown in Table B 3.8.9-1. Motor control center B55 is fed from motor control center B56. These motor control centers are swing components, in that motor control center B56 may be energized from either load center B5 or load center B6. Normally, motor control center B56, and thus B55, are energized from load center B6. However, this alignment may be switched to energize these motor control centers from load center B5, if needed to support the configuration of the unit.

The 120 VAC distribution panels are arranged in two load groups per subsystem and are normally powered from the inverters. Upon loss of the DC supply, or in the event of an inverter failure, a static transfer switch automatically transfers the 120 VAC vital load to an ES motor control center, and its use is governed by LCO 3.8.7, "Inverters - Operating."

There are two independent 125 VDC electrical power distribution subsystems (one for each train).

The list of all required distribution buses is presented in Table B 3.8.9-1.

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the SAR, Chapter 14 (Ref. 1), assume ES systems are OPERABLE. The AC, DC, and 120 VAC bus electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ES systems so that the fuel, Reactor Coolant System, and reactor building design limits are not exceeded. These limits are discussed in more

detail in the Bases for Section 3.2, "Power Distribution Limits;" Section 3.4, "Reactor Coolant System (RCS);" and Section 3.6, "Reactor Building Systems."

The OPERABILITY of the AC, DC, and 120 VAC bus electrical power distribution systems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining power distribution systems OPERABLE during accident conditions that consider:

a. An assumed loss of all offsite power or all onsite AC electrical power, and

b. A worst-case single failure.

In MODES 1 and 2, the distribution systems satisfy Criterion 3 of 10 CFR 50.36 (Ref. 2). In MODES 3 and 4, the distribution systems satisfy Criterion 4 of 10 CFR 50.36.

LCO

The required power distribution subsystems listed in Table B 3.8.9-1 ensure the availability of AC, DC, and 120 VAC bus electrical power for the systems required to shut down the reactor and maintain it in a safe condition after abnormality or a postulated DBA. The AC, DC, and 120 VAC bus electrical power distribution subsystems are required to be OPERABLE.

Maintaining the AC, DC, and 120 VAC bus electrical power distribution subsystems OPERABLE ensures that the redundancy incorporated into the design of ES is not defeated. Therefore, a single failure within any system or within the electrical power distribution subsystems will not prevent safe shutdown of the reactor. OPERABLE AC electrical power distribution subsystems require the associated buses, load centers, and motor control centers to be energized to their proper voltages. OPERABLE DC electrical power distribution subsystems require the associated buses to be energized to their proper voltage from either the associated battery or charger. OPERABLE 120 VAC electrical power distribution subsystems require the associated distribution panels to be energized to their proper voltage from the associated inverter via inverted DC voltage or from its alternate AC source.

In addition, cross-tie breakers between redundant safety related AC, DC, and AC bus power distribution subsystems must be open. This prevents any electrical malfunction in any power distribution subsystem from propagating to the redundant subsystem that could cause the failure of a redundant subsystem and a loss of essential safety function(s). If any cross-tie breakers are closed, the affected redundant electrical power distribution subsystems are considered inoperable. This applies to the onsite, safety related redundant electrical power distribution subsystems. It does not, however, preclude redundant Class 1E 4.16 kV buses from being powered from the same offsite circuit.

APPLICABILITY

The electrical power distribution subsystems are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of abnormalities; and

b. Adequate core cooling is provided, and reactor building OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

Electrical power distribution subsystem requirements for MODES 5 and 6 are covered in the Bases for LCO 3.8.10, "Distribution Systems – Shutdown."

ACTIONS

A.1

With one or more required AC electrical power distribution subsystems inoperable, the remaining OPERABLE portions of the AC electrical power distribution subsystem(s) may be capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining power distribution subsystems could result in the minimum required ES functions not being supported. Therefore, the required AC buses, load centers, and motor control centers must be restored to OPERABLE status within 8 hours.

Condition A worst case scenario is one train without AC power (i.e., no offsite power to the train and the associated DG inoperable). In this Condition, the unit is more vulnerable to a complete loss of AC power. It is, therefore, imperative that the unit operator's attention be focused on minimizing the potential for loss of power to the remaining train by stabilizing the unit, and on restoring power to the affected train. The 8 hour time limit before requiring a unit shutdown in this Condition is acceptable because of:

a. The potential for decreased safety if the unit operator's attention is diverted from the evaluations and actions necessary to restore power to the affected train to the actions associated with taking the unit to shutdown within this time limit; and

b. The potential for an event in conjunction with a single failure of a redundant component in the train with AC power.

The second Completion Time for Required Action A.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO.

If Condition A is entered while, for instance, a DC bus is inoperable and subsequently restored OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 16 hours, since initial failure of the LCO, to restore the AC distribution system. At this time, a DC circuit could again become inoperable, and AC distribution restored OPERABLE. This could continue indefinitely.

The Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition A was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

B.1

With one or more 120 VAC bus electrical power distribution subsystems inoperable, the remaining OPERABLE portions of the 120 VAC bus subsystem(s) may be capable of supporting the minimum safety functions necessary to shut down the unit and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum ES functions not being supported. Therefore, the 120 VAC bus subsystem(s) must be restored to OPERABLE status within 8 hours by powering the affected bus(es) from the associated inverter via inverted DC or from its alternate AC source.

Condition B represents one or more 120 VAC bus subsystem(s) without power; potentially both the DC source and the associated alternate AC source are nonfunctioning. In this situation the unit is significantly more vulnerable to a complete loss of all un-interruptible power. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for loss of power to the remaining bus subsystem(s) and restoring power to the affected bus subsystem(s). The loss of any RS-panel requires entry into Condition B.

This 8 hour limit is more conservative than Completion Times allowed for the vast majority of components that are without adequate vital AC power. Taking exception to LCO 3.0.2 for components without adequate vital AC power, that would have the Required Action Completion Times shorter than 8 hours if declared inoperable, is acceptable because of:

a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) and not allowing stable operations to continue;

b. The potential for decreased safety by requiring entry into numerous applicable Conditions and Required Actions for components without adequate vital AC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and

c. The potential for an event in conjunction with a single failure of a redundant component.

The 8 hour Completion Time takes into account the importance to safety of restoring the 120 VAC bus subsystem(s) to OPERABLE status, the redundant capability afforded by the other OPERABLE bus subsystem, and the low probability of a DBA occurring during this period.

The second Completion Time for Required Action B.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 16 hours, since initial failure of the LCO, to restore the 120 VAC bus subsystem(s). At this time, an AC train could again become inoperable, and 120 VAC bus subsystem(s) restored to OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition B was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

C.1

With 120 VAC panel C540 inoperable, a portion of the instrumentation associated with green train equipment is lost. Because C540 is not a RPS or ESAS related panel and is limited in its effect on various system/component operabilities, it is not necessary to impose an 8-hour Completion Time for panel restoration. However, it is important to ensure that equipment affected by the loss of C540 is quickly identified and appropriate corrective actions taken. Therefore, Required Action C.1 requires entry into the appropriate Conditions and Required Actions associated with equipment affected by the loss of C540. The purpose for entry into these related specifications is discussed below.

LCO 3.3.11, "Emergency Feedwater Initiation and Control (EFIC) System Instrumentation," requires all associated instruments that are used to perform actuation or vector functions within the EFIC system to be OPERABLE. A loss of power to C540 will result in the green train SG level and pressure inputs from both SGs to fail to zero. The zero signals will result in a half trip of EFIC. Therefore, entry into LCO 3.3.11 Condition A is appropriate. Should an actual actuation occur while C540 is de-energized, the vector logic, receiving zero inputs from SG pressure instrumentation, will not isolate flow from the green EFW train to either SG upon a steam line break event. Therefore, entry into LCO 3.3.11 Condition C is also appropriate. However, both the EFIC actuation logic and the EFIC vector logic continue to function as designed, based on the inputs they are receiving. Because these logics continue to function and because LCO 3.3.11 Condition C provides an acceptable restoration period for instrumentation that affects the overall vector logic response, it is not necessary to enter the Conditions or Required Actions of LCO

3.3.13, "Emergency Feedwater Initiation and Control (EFIC) Logic" or LCO 3.3.14, "Emergency Feedwater Initiation and Control (EFIC) Vector Logic." Likewise, the EFW system remains functional, responding according to the inputs received from the actuation and vector logic subsystems. Therefore, entry into LCO 3.7.5, "Emergency Feedwater (EFW) System," is not required. The loss of power to C540 does not prevent manual control of the green EFW train and does not affect the OPERABILITY of the red EFW train.

LCO 3.3.15, "Post Accident Monitoring (PAM) Instrumentation," requires specific instrumentation to be available to the operators following an accident. The loss of C540 will result in the loss of one of the PAM-required RCS wide-range pressure and pressurizer level instruments. Therefore, entry into LCO 3.3.15 Condition A is appropriate upon loss of C540.

LCO 3.4.14, "RCS Pressure Isolation Valve (PIV) Leakage," requires the automatic closure interlock (ACI) associated with the decay heat removal pump RCS suction valves to be OPERABLE. A loss of C540 renders the ACI function inoperative. Therefore, entry into LCO 3.4.14 Condition B is appropriate.

Other functions and instrumentation are affected by the loss of C540. However, these additional affects do not alone result in a loss of any safety function or violate any technical specification other than those discussed above. Station procedures address these additional components and provide corrective action guidance where appropriate.

D.1

With one or more DC subsystems inoperable, the remaining OPERABLE portions of the DC electrical power distribution subsystems may be capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining DC electrical power distribution subsystem could result in the minimum required ES functions not being supported. Therefore, the DC buses must be restored to OPERABLE status within 8 hours by powering the bus from the associated battery or one of the two associated chargers.

Condition C represents one or more DC subsystem(s) without adequate DC power; potentially both with the battery significantly degraded and the associated charger nonfunctioning. In this situation, the unit is significantly more vulnerable to a complete loss of all DC power. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for loss of power to the remaining trains and restoring power to the affected train.

This 8 hour limit is more conservative than Completion Times allowed for the vast majority of components that are without power. Taking exception to LCO 3.0.2 for components without adequate DC power, which would have Required Action Completion Times shorter than 8 hours, is acceptable because of:

a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) while allowing stable operations to continue;

b. The potential for decreased safety by requiring entry into numerous applicable Conditions and Required Actions for components without DC power and not providing sufficient time for the operators to perform the necessary evaluations and actions to restore power to the affected train; and

c. The potential for an event in conjunction with a single failure of a redundant component.

The second Completion Time for Required Action C.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition C is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 16 hours, since initial failure of the LCO, to restore the DC distribution system. At this time, an AC train could again become inoperable and DC distribution restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition C was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

E.1 and E.2

If the inoperable distribution subsystem cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 12 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

F.1

Condition E corresponds to a level of degradation in the electrical distribution system that causes a required safety function to be lost. Therefore, no additional time is justified for continued operation. LCO 3.0.3 must be entered immediately to commence a controlled shutdown.

SURVEILLANCE REQUIREMENTS

SR 3.8.9.1

This Surveillance verifies that the required AC, DC, and 120 VAC bus electrical power distribution systems are functioning properly, with the correct circuit breaker alignment. The correct breaker alignment ensures the appropriate separation and independence of the electrical divisions is maintained. The 7 day Frequency takes into account the redundant capability of the AC, DC, and 120 VAC bus electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions.

REFERENCES

1. SAR, Chapter 14.

2. 10 CFR 50.36.

Table B 3.8.9-1 (page 1 of 1)
AC and DC Electrical Power Distribution Systems

TYPE	VOLTAGE	RED TRAIN	GREEN TRAIN
AC safety buses	4160 V	ES Bus A3	ES Bus A4
	480 V	Load Center B5	Load Center B6
	480 V	Motor Control Centers B51, B52, B53, B57	Motor Control Centers B61, B62, B63, B65, B56** and B55
DC buses	125 V	Bus D01	Bus D02
		Bus RA1	Bus RA2
		Distribution Panel D11	Distribution Panel D21
120 VAC distribution panels	120 V	Panel RS1	Panel RS2
		Panel RS3	Panel RS4
			Panel C540

* Each train of the AC and DC electrical power distribution systems is a subsystem.

** Swing bus (normally associated with Green Train). Bus B55 is powered from Bus B56.