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3.3 INSTRUMENTATION

3.3.6 Engineered Safeguards Protective System (ESPS) Manual Initiation

LCO 3.3.6 Two manual initiation channels of each one of the ESPS Functions below shall be OPERABLE:

a. High Pressure Injection, Reactor Building (RB) Non-Essential Isolation, Keowee Start, Load Shed and Standby Breaker Input, and Keowee Standby Bus Feeder Breaker Input (ES Channels 1 and 2);

b. Low Pressure Injection (ES Channels 3 and 4);

c. RB Cooling and RB Essential Isolation (ES Channels 5 and 6); and |

d. RB Spray (ES Channels 7 and 8).

APPLICABILITY: MODES 1 and 2,
MODES 3 and 4 when associated engineered safeguard equipment is required to be OPERABLE.

ACTIONS

-----NOTE-----
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more ESPS Functions with one channel inoperable.	A.1 Restore channel to OPERABLE status.	72 hours

(continued)

3.3 INSTRUMENTATION

3.3.16 Reactor Building (RB) Purge Isolation – High Radiation

LCO 3.3.16 One channel of Reactor Building Purge Isolation – High Radiation shall be OPERABLE.

APPLICABILITY: During movement of recently irradiated fuel assemblies within the containment.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One channel inoperable.	A.1 Place and maintain RB purge valves in closed positions.	Immediately
	<u>OR</u>	
	A.2 Suspend movement of recently irradiated fuel assemblies within the containment.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.16.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.16.2	Perform CHANNEL FUNCTIONAL TEST.	Once each refueling outage prior to movement of recently irradiated fuel assemblies within containment
SR 3.3.16.3	Perform CHANNEL CALIBRATION.	18 months

3.7 PLANT SYSTEMS

3.7.9 Control Room Ventilation System (CRVS) Booster Fans

LCO 3.7.9 Two CRVS Booster Fan trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4,
During movement of recently irradiated fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Control Room pressure ≤ 0.0 psig during operation of two CRVS Booster Fan trains.	A.1 Restore Control Room pressure to > 0.0 psig during operation of two CRVS Booster Fan trains.	30 days
B. One CRVS Booster Fan train inoperable for reasons other than Condition A.	B.1 Restore CRVS Booster Fan train to OPERABLE status.	-----------NOTE----------- An additional 96 hours is allowed when entering this condition for implementation of Control Room intake/booster fan modification. ------------------------------ 72 hours

(continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. Two CRVS Booster Fan trains inoperable for reasons other than Condition A.	C.1	Restore one CRVS Booster Fan train to OPERABLE status.	------------NOTE------------ An additional 48 hours is allowed when entering this condition for implementation of Control Room intake/booster fan modification. ------------------------------ 24 hours
D. Required Action and associated Completion Time not met in MODE 1, 2, 3, or 4.	D.1	Be in MODE 3.	12 hours
	AND		
	D.2	Be in MODE 5	36 hours
E. Required Action and associated Completion Time not met during movement of recently irradiated fuel assemblies.	E.1	Suspend movement of recently irradiated fuel assemblies.	Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.7.9.1	Operate each CRVS Booster Fan train for ≥ 1 hour.	92 days
SR 3.7.9.2	Perform required CRVS Booster Fan train filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.7.9.3	Verify two CRVS Booster Fan trains can maintain the Control Room at a positive pressure.	18 months

3.7 PLANT SYSTEMS

3.7.10 Not Used

3.7 PLANT SYSTEMS

3.7.16 Control Room Area Cooling Systems (CRACS)

LCO 3.7.16 Two CRACS trains shall be OPERABLE as follows:

a. Two trains of the Control Room Ventilation System (CRVS) shall be OPERABLE, and

b. Two trains of the Chilled Water (WC) System shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4,
During movement of recently irradiated fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CRVS train inoperable.	A.1 Restore CRVS train to OPERABLE status.	30 days
B. One WC train inoperable.	B.1 Restore WC train to OPERABLE status.	30 days
C. Control Room area air temperature not within limit.	---NOTE--- LCO 3.0.4 is not applicable. ------	
	C.1 Restore Control Room area air temperature within limit.	7 days

(continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. Required Action and associated Completion Time not met in MODE 1, 2, 3, or 4.	D.1	Be in MODE 3.	12 hours
	<u>AND</u>		
	D.2	Be in MODE 5.	36 hours
E. Required Action and associated Completion Time not met during movement of recently irradiated fuel assemblies.	E.1	Place OPERABLE CRACS train in operation.	Immediately
	<u>OR</u>		
	E.2	Suspend movement of recently irradiated fuel assemblies.	Immediately
F. Two CRVS trains inoperable during MODE 1, 2, 3, or 4. <u>OR</u> Two WC Trains inoperable during MODE 1,2,3, or 4.	F.1	Enter LCO 3.0.3.	Immediately
G. Two CRACS trains inoperable during movement of recently irradiated fuel assemblies.	G.1	Suspend movement of recently irradiated fuel assemblies.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.16.1	Verify temperature in Control Room and Cable Room is ≤ 80°F and temperature in Electrical Equipment Room is ≤ 85°F.	12 hours

3.7 PLANT SYSTEMS

3.7.17 Spent Fuel Pool Ventilation System (SFPVS)

LCO 3.7.17 Two SFPVS trains shall be OPERABLE.

APPLICABILITY: During movement of recently irradiated fuel assemblies in the spent fuel pool.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One SFPVS train inoperable.	A.1	Place OPERABLE SFPVS train in operation.	Immediately
	OR		
	A.2	Suspend movement of recently irradiated fuel assemblies in the spent fuel pool.	Immediately
B. Two SFPVS trains inoperable.	B.1	Suspend movement of recently irradiated fuel assemblies in the spent fuel pool.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.17.1	Operate each SFPVS train for ≥ 15 minutes.	Within 31 days prior to movement of recently irradiated fuel assemblies
SR 3.7.17.2	Perform required SFPVS filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required offsite source inoperable.	---NOTE--- Enter applicable Conditions and Required Actions of LCO 3.8.9, with required equipment de-energized as a result of Condition A.	
	A.1 Declare affected required feature(s) with no offsite power available inoperable.	Immediately
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend movement of recently irradiated fuel assemblies.	Immediately
	AND	
	A.2.3 Initiate action to suspend operations involving positive reactivity additions.	Immediately
	AND	
	A.2.4 Initiate action to restore required offsite power source to OPERABLE status.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One required emergency power source inoperable.	B.1	Suspend CORE ALTERATIONS.	Immediately
	AND		
	B.2	Suspend movement of recently irradiated fuel assemblies.	Immediately
	AND		
	B.3	Initiate action to suspend operations involving positive reactivity additions.	Immediately
	AND		
	B.4	Initiate action to restore required emergency power source to OPERABLE status.	Immediately

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources – Shutdown

LCO 3.8.4 125 VDC Vital I&C power source(s) shall be OPERABLE to support the 125 VDC Vital I&C power panelboard(s) required by LCO 3.8.9,"Distribution Systems – Shutdown" and shall include at least one of the unit's 125 VDC Vital I&C power sources.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required 125 VDC Vital I&C power sources inoperable.	A.1 Declare affected required feature(s) inoperable.	Immediately
	<u>OR</u>	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
	A.2.2 Suspend movement of recently irradiated fuel assemblies.	Immediately
	<u>AND</u>	
	A.2.3 Initiate action to suspend operations involving positive reactivity additions.	Immediately
	<u>AND</u>	

(continued)

3.8 ELECTRICAL POWER SYSTEMS

3.8.7 Vital Inverters – Shutdown

LCO 3.8.7 Vital Inverters shall be OPERABLE to support the onsite 120 VAC Vital Instrumentation power panelboard(s) required by LCO 3.8.9, "Distribution Systems – Shutdown."

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required vital inverters inoperable.	A.1 Declare affected required equipment inoperable.	Immediately
	<u>OR</u>	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
	A.2.2 Suspend movement of recently irradiated fuel assemblies.	Immediately
	<u>AND</u>	
	A.2.3 Initiate action to suspend operations involving positive reactivity additions.	Immediately
	<u>AND</u>	
	A.2.4 Initiate action to restore required inverters to OPERABLE status.	Immediately

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems – Shutdown

LCO 3.8.9 The necessary portion of main feeder buses, ES power strings, 125 VDC Vital I&C power panelboards, 230 kV Switchyard 125 VDC power panelboards and 120 VAC Vital Instrumentation power panelboards shall be OPERABLE to support equipment required to be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required main feeder buses, ES power strings, 125 VDC Vital I&C power panelboards, 230 kV Switchyard 125 VDC power panelboards or 120 VAC Vital Instrumentation power panelboards inoperable.	A.1 Declare associated supported required equipment inoperable.	Immediately
	<u>OR</u>	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
	A.2.2 Suspend movement of recently irradiated fuel assemblies.	Immediately
	<u>AND</u>	
	A.2.3 Initiate action to suspend operations involving positive reactivity additions.	Immediately
	<u>AND</u>	
		(continued)

3.9 REFUELING OPERATIONS

3.9.3 Containment Penetrations

LCO 3.9.3 The containment penetrations shall be in the following status:

a. The equipment hatch closed and held in place by a minimum of four bolts;

b. One door in each air lock closed; and

--------------------------------NOTE--------------------------
An emergency air lock door is not required to be closed when a temporary cover plate is installed.
----

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

1. closed by a manual, non-automatic power operated or automatic isolation valve, blind flange, or equivalent, or

2. capable of being closed by an OPERABLE Reactor Building Purge supply and exhaust isolation signal.

APPLICABILITY: During movement of recently irradiated fuel assemblies within containment.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more containment penetrations not in required status.	A.1 Suspend movement of recently irradiated fuel assemblies within containment.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.3.1	Verify each required containment penetration is in the required status.	7 days
SR 3.9.3.2	Verify each required Reactor Building Purge supply and exhaust isolation valve that is not locked, sealed or otherwise secured in the isolation position actuates to the isolation position on an actual or simulated high radiation actuation signal.	Once each refueling outage prior to movement of recently irradiated fuel assemblies within containment

3.9 REFUELING OPERATIONS

3.9.6 Fuel Transfer Canal Water Level

LCO 3.9.6 Fuel transfer canal water level shall be maintained ≥ 21.34 ft above the top of the reactor vessel flange.

APPLICABILITY: During movement of irradiated fuel assemblies within containment.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Fuel transfer canal water level not within limit.	A.1 Suspend movement of irradiated fuel assemblies within containment.	Immediately

5.5 Programs and Manuals

5.5.2 Containment Leakage Rate Testing Program (continued)

This program shall be in accordance with the guidelines contained in Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program," dated September 1995. Containment system visual examinations required by Regulatory Guide 1.163, Regulatory Position C.3 shall be performed as follows:

1. Accessible concrete surfaces and post-tensioning system component surfaces of the concrete containment shall be visually examined prior to initiating SR 3.6.1.1 Type A test. These visual examinations, or any portion thereof, shall be performed no earlier than 90 days prior to the start of refueling outages in which Type A tests will be performed. The validity of these visual examinations will be evaluated should any event or condition capable of affecting the integrity of the containment system occur between the completion of the visual examinations and the Type A test.

2. Accessible interior and exterior surfaces of metallic pressure retaining components of the containment system shall be visually examined at least three times every ten years, including during each shutdown for SR 3.6.1.1 Type A test, prior to initiating the Type A test.

Type B and C testing shall be implemented in the program in accordance with the requirements of 10 CFR 50, Appendix J, Option A.

The peak calculated containment internal pressure for the design basis loss of coolant accident, P_a, is 59 psig.

The maximum allowable containment leakage rate, L_a, at P_a, shall be 0.20% of the containment air weight per day.

Leakage rate acceptance criterion is:

a. Containment leakage rate acceptance criterion is $\leq 1.0\ L_a$. During the first unit startup following testing in accordance with this program, the leakage rate acceptance criteria are $\leq 0.60\ L_a$ for the Type B and Type C tests, and $\leq 0.75\ L_a$ for Type A tests;

The provisions of SR 3.0.3 are applicable to the Containment Leakage Rate Testing Program.

5.5 Programs and Manuals (continued)

5.5.11 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, which is required to initiate corrective action.

5.5.12 Ventilation Filter Testing Program (VFTP)

A program shall be established to implement the following required testing of filter ventilation systems at the frequencies specified in Regulatory Guide 1.52, Revision 2.

The VFTP is applicable to the Control Room Ventilation System (CRVS) Booster Fan Trains and the Spent Fuel Pool Ventilation System (SFPVS).

a. Demonstrate, for the CRVS Booster Fan Trains, that a DOP test of the HEPA filters shows ≥ 99.5% removal when tested in accordance with ANSI N510-1975 at the system design flow rate ± 10%.

b. Demonstrate, for the CRVS Booster Fan Trains, that a halogenated hydrocarbon test of the carbon adsorber shows ≥ 99% removal when tested in accordance with ANSI N510-1975 at the system design flow rate ± 10%.

5.5 Programs and Manuals

5.5.12 Ventilation Filter Testing Program (VFTP) (continued)

c. Demonstrate, for the CRVS Booster Fan Trains and SFPVS, that a laboratory test of a sample of the carbon adsorber shows ≥ 97.5% and 90% radioactive methyl iodide removal when tested in accordance with ASTM D3803-1989 (30°C, 95% RH), respectively.

d. Demonstrate, for the CRVS Booster Fan Trains, that the pressure drop across the pre-filter is ≤ 1 in. of water and the pressure drop across the HEPA filters is ≤ 2 in. of water at the system design flow rate ± 10%.

e. Demonstrate, for the SFPVS, that a dioctyl phthalate (DOP) test of the high efficiency particulate air (HEPA) filters shows ≥ 99% removal when tested in accordance with ANSI N510-1975 at the system design flow rate ± 10%.

f. Demonstrate, for the SFPVS, that a halogenated hydrocarbon test of the carbon adsorber shows ≥ 99% removal when tested in accordance with ANSI N510-1975 at the system design flow rate ± 10%.

The provisions of SR 3.0.2 and SR 3.0.3 are applicable to the VFTP test frequencies.

5.5.13 Explosive Gas and Storage Tank Radioactivity Monitoring Program

This program provides controls for potentially explosive gas mixtures contained in the waste gas holdup tanks and the quantity of radioactivity contained in waste gas holdup tanks, and the quantity of radioactivity contained in unprotected outdoor liquid storage tanks. The gaseous radioactivity quantities shall be determined. The liquid radwaste quantities shall be determined by analyzing a representative sample of the tank's contents at least once per 7 days when radioactive materials are being added to the tank.

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B 3.3 INSTRUMENTATION

B 3.3.5 Engineered Safeguards Protective System (ESPS) Analog Instrumentation

BASES

BACKGROUND

The ESPS initiates necessary safety systems, based on the values of selected unit Parameters, to protect against violating core design limits and to mitigate accidents.

ESPS actuates the following systems:

- High pressure injection (HPI);
- Low pressure injection (LPI);
- Reactor building (RB) cooling;
- RB Spray;
- RB Isolation; and
- Keowee Hydro Unit Emergency Start.

The ESPS operates in a distributed manner to initiate the appropriate systems. The ESPS does this by determining the need for actuation in each of three analog channels monitoring each actuation Parameter. Once the need for actuation is determined, the condition is transmitted to digital automatic actuation logic channels, which perform the two-out-of-three logic to determine the actuation of each end device. Each end device has its own automatic actuation logic, although all digital automatic actuation logic channels take their signals from the same bistable in each channel for each Parameter.

Four Parameters are used for actuation:

- Low Reactor Coolant System (RCS) Pressure;
- Low Low RCS Pressure;
- High RB Pressure; and
- High High RB Pressure.

BASES

BACKGROUND (continued)

LCO 3.3.5 covers only the analog instrumentation channels that measure these Parameters. These channels include all intervening equipment necessary to produce actuation before the measured process Parameter exceeds the limits assumed by the accident analysis. This includes sensors, bistable devices, operational bypass circuitry, and output relays. LCO 3.3.6, "Engineered Safeguards Protective System (ESPS) Manual Initiation," and LCO 3.3.7, "Engineered Safeguards Protective System (ESPS) Digital Automatic Actuation Logic Channels," provide requirements on the manual initiation and digital automatic actuation logic Functions.

The ESPS contains three analog channels. Each analog channel provides input to digital logic channels that initiate equipment with a two-out-of-three logic on each digital logic channel. Each analog channel includes inputs from one analog instrumentation channel of Low RCS Pressure, Low Low RCS Pressure, High RB Pressure, and High High RB Pressure. Digital automatic actuation logic channels combine the three analog channel trips to actuate the individual Engineered Safeguards (ES) components needed to initiate each ES System. Figure 7.5, UFSAR, Chapter 7 (Ref. 1), illustrates how analog instrumentation channel trips combine to cause digital logic channel trips.

The following matrix identifies the analog instrumentation (measurement) channels and the Digital Automatic Actuation Logic Channels actuated by each.

Digital Logic Channels	Actuated Systems/ Functions	RCS PRESS LOW	RCS PRESS LOW LOW	RB PRESS HIGH	RB PRESS HIGH HIGH
1 and 2	HPI and RB Non-Essential Isolation, Keowee Emergency Start, Load Shed and Standby Breaker Input, and Keowee Standby Bus Feeder Breaker Input	X		X	
3 and 4	LPI and RB Essential isolation		X	X	
5 and 6	RB Cooling and RB Essential Isolation			X	
7 and 8	RB Spray				X

The ES equipment is generally divided between the two redundant digital actuation logic channels. The division of the equipment between the two digital actuation logic channels is based on the equipment redundancy and

BASES

APPLICABLE SAFETY ANALYSES (continued)

Reactor Building Spray, Reactor Building Cooling, and Reactor Building Isolation

The ESPS actuation of the RB coolers and RB Spray have been credited in RB analysis for LOCAs, both for RB performance and equipment environmental qualification pressure and temperature envelope definition. Accident dose calculations have credited RB Isolation and RB Spray.

Keowee Hydro Unit Emergency Start

The ESPS initiated Keowee Hydro Unit Emergency Start has been included in the design to ensure that emergency power is available throughout the limiting LOCA scenarios.

The small break LOCA analyses assume a conservative 48 second delay time for the actuation of HPI and LPI in UFSAR, Chapter 15 (Ref. 4). The large break LOCA analyses assume LPI flow starts in 38 seconds while full LPI flow does not occur until 15 seconds later, or 53 seconds total (Ref. 4). This delay time includes allowances for Keowee Hydro Unit starting, Emergency Core Cooling Systems (ECCS) pump starts, and valve openings. 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 ESPS actuation for protection of the core temperature and containment pressure limits and for limiting off site dose levels following an accident. These include LOCA, and MSLB events that result in RCS inventory reduction or severe loss of RCS cooling.

The ESPS channels satisfy Criterion 3 of 10 CFR 50.36 (Ref. 5).

LCO

The LCO requires three analog channels of ESPS instrumentation for each Parameter in Table 3.3.5–1 to be OPERABLE in each ESPS digital automatic actuation logic channel. Failure of any instrument renders the affected analog channel(s) inoperable and reduces the reliability of the affected Functions.

BASES

APPLICABLE SAFETY ANALYSES (continued)

The ESPS manual initiation ensures that the control room operator can rapidly initiate ES Functions. The manual initiation trip Function is required as a backup to automatic trip functions and allows operators to initiate ESPS whenever any parameter is rapidly trending toward its trip setpoint.

The ESPS manual initiation functions satisfy Criterion 3 of 10 CFR 50.36 (Ref. 1).

LCO

Two ESPS manual initiation channels of each ESPS Function shall be OPERABLE whenever conditions exist that could require ES protection of the reactor or RB. Two OPERABLE channels ensure that no single random failure will prevent system level manual initiation of any ESPS Function. The ESPS manual initiation Function allows the operator to initiate protective action prior to automatic initiation or in the event the automatic initiation does not occur.

The required Function is provided by two associated channels as indicated in the following table:

Function	Associated Channels
HPI and RB Non-Essential Isolation, Keowee Emergency Start, Load Shed and Standby Breaker Input, and Keowee Standby Bus Feeder Breaker Input	1 & 2
LPI	3 & 4
RB Cooling and RB Essential isolation	5 & 6
RB Spray	7 & 8

APPLICABILITY

The ESPS manual initiation Functions shall be OPERABLE in MODES 1 and 2, and in MODES 3 and 4 when the associated engineered safeguard equipment is required to be OPERABLE. The manual initiation channels are required because ES Functions are designed to provide protection in these MODES. ESPS initiates systems that are either reconfigured for decay heat removal operation or disabled while in MODES 5 and 6. Accidents in these MODES are slow to develop and would be mitigated by manual operation of individual components. Adequate time is available to evaluate unit conditions and to respond by manually operating the ES components, if required.

BASES

BACKGROUND (continued)

Hydro Unit startup and loading, ECCS pump starts, and valve openings. Similarly, the reactor building (RB) Cooling, RB Isolation, and RB Spray have been analyzed with delays appropriate for the entire system.

The ESPS automatic initiation of Engineered Safeguards (ES) Functions to mitigate accident conditions is assumed in the accident analysis and is required to ensure that consequences of analyzed events do not exceed the accident analysis predictions. Automatically actuated features include HPI, LPI, RB Cooling, RB Spray, and RB Isolation.

APPLICABLE SAFETY ANALYSES

Accident analyses rely on automatic ESPS actuation for protection of the core and RB and for limiting off site dose levels following an accident. The digital automatic actuation logic is an integral part of the ESPS.

The ESPS digital automatic actuation logic channels satisfy Criterion 3 of 10 CFR 50.36 (Ref. 3).

LCO

The digital automatic actuation logic channels are required to be OPERABLE whenever conditions exist that could require ES protection of the reactor or the RB. This ensures automatic initiation of the ES required to mitigate the consequences of accidents.

The required Function is provided by two associated digital channels as indicated in the following table:

Function	Associated Channels
HPI and RB Non-Essential Isolation, Keowee Emergency Start, Load Shed and Standby Breaker Input, and Keowee Standby Bus Feeder Breaker Input	1 & 2
LPI and RB Essential isolation	3 & 4
RB Cooling and RB Essential isolation	5 & 6
RB Spray	7 & 8

B 3.3 INSTRUMENTATION

B 3.3.16 Reactor Building (RB) Purge Isolation–High Radiation

BASES

BACKGROUND

The RB Purge Isolation–High Radiation Function closes the RB purge valves. This action isolates the RB atmosphere from the environment to minimize releases of radioactivity in the event an accident occurs.

The radiation monitoring system measures the activity in a representative sample of air drawn in succession through a particulate sampler, an iodine sampler, and a gas sampler. The LCO addresses only the gas sampler portion of this system (RIA-45).

The trip setpoint is chosen sufficiently below hazardous radiation levels to ensure that the consequences of an accident will be acceptable, provided the unit is operated within the LCOs at the onset of an accident or transient and the equipment functions as designed.

The closure of the purge valves ensures the RB remains as a barrier to fission product release. There is no bypass for this function.

APPLICABLE SAFETY ANALYSES

During movement of irradiated fuel assemblies within containment, the most severe radiological consequences result from a fuel handling accident. The fuel handling accident is a postulated event that involves damage to irradiated fuel (Ref. 1). A minimum fuel transfer canal water level and the minimum decay time of 72 hours prior to movement of irradiated fuel assemblies from the reactor ensure that the release of fission product radioactivity subsequent to a fuel handling accident results in doses that are within the guideline values specified in 10 CFR 50.67. The design basis for fuel handling accidents has historically separated the radiological consequences from the containment capability. The NRC staff has treated the containment capability for fuel handling conditions as a logical part of the "primary success path" to mitigate fuel handling accidents, regardless of the assumptions used to calculate the radiological consequences of such accidents (Ref. 1).

The RB Purge Isolation System satisfies Criterion 3 of 10 CFR 50.36 (Ref. 2).

BASES (continued)

LCO

One channel of RB Purge Isolation-High Radiation instrumentation is required to be OPERABLE. OPERABILITY of the instrumentation includes proper operation of the sample pump. This LCO addresses only the gas sampler portion of the System.

APPLICABILITY

The RB purge isolation–high radiation instrumentation shall be OPERABLE whenever movement of recently irradiated fuel assemblies within the RB is taking place. These conditions are those under which the potential for fuel damage, and thus radiation release, is the greatest. While in MODES 1, 2, 3, and 4, the Purge Valve Isolation System does not need to be OPERABLE because the purge valves are required to be sealed closed. While in MODES 5 and 6, without fuel handling involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 72 hours) in progress, the Purge Valve Isolation System does not need to be OPERABLE because the potential for a radioactive release is minimized. The need to use the purge valves in MODES 5 and 6 is in preparation for entry. This capability is required to minimize doses for personnel entering the building and is independent of the automatic isolation capability.

ACTIONS

A.1, A.2.1, and A.2.2

Condition A applies to failure of the high radiation purge function during movement of recently irradiated fuel assemblies within the RB.

With one channel inoperable during movement of recently irradiated fuel assemblies within the RB, the RB purge valves must be closed, or movement of recently irradiated fuel assemblies within the RB must be suspended. Required Action A.1 accomplishes the function of the high radiation channel. Required Action A.2.1 and Required Action A.2.2 place the unit in a configuration in which purge isolation on high radiation is not required. The Completion Time of "Immediately" is consistent with the urgency associated with the loss of RB isolation capability under conditions in which the fuel handling accidents involving handling recently irradiated fuel are possible and the high radiation function provides the only automatic actions to mitigate radiation release.

SURVEILLANCE REQUIREMENTS

SR 3.3.16.1

SR 3.3.16.1 is the performance of the CHANNEL CHECK for the RB purge isolation–high radiation instrumentation once every 12 hours to ensure that a gross failure of instrumentation has not occurred. The CHANNEL CHECK is normally a comparison of the parameter indicated on the

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.16.1 (continued)

radiation monitoring instrumentation 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 two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. Performance of the CHANNEL CHECK helps to ensure that the instrumentation continues to operate properly between each CHANNEL CALIBRATION. The high radiation instrumentation should be compared to similar unit instruments located throughout the unit. If the radiation monitor uses keep alive sources or check sources OPERABLE from the control room, the CHANNEL CHECK should also note the detector's response to these sources.

Agreement criteria are based on a combination of the channel instrument uncertainties, including isolation, indication, and readability. 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. If the channels are within the criteria, it is an indication that the channels are OPERABLE. The 12 hour Frequency, about once every shift, is based on operating experience that demonstrates channel failure is rare. Additionally, control room alarms and annunciators are provided to alert the operator to various "trouble" conditions associated with the instrument.

SR 3.3.16.2

This SR requires the performance of a CHANNEL FUNCTIONAL TEST to ensure that the channel can perform its intended function. The frequency requires the isolation capability of the reactor building purge valves to be verified functional once each refueling outage prior to movement of recently irradiated fuel assemblies within containment. This ensures that this function is verified prior to recently irradiated fuel assembly handling within containment. This test verifies the capability of the instrumentation to provide the RB isolation.

SR 3.3.16.3

CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

The 18 month Frequency is based on engineering judgment and industry accepted practice.

BASES

LCO (continued)

The CRVS Booster Fan trains are considered OPERABLE when the individual components necessary to control operator exposure are OPERABLE in both trains. A CRVS Booster Fan train is considered OPERABLE when the associated:

a. Booster Fan is OPERABLE;

b. HEPA filter and carbon absorber are not excessively restricting flow, and are capable of performing their filtration functions; and

c. Ductwork, valves, and dampers are OPERABLE, and control room pressurization can be maintained with both trains operating.

In addition, the control room boundary, including the integrity of the walls, floors, ceilings, ductwork, and access doors, must be maintained within the assumptions of the design analysis.

Breaches (excluding the removal of system performance test port caps per testing procedures) in the CRVS, most commonly due to the opening of access doors, introduces the possibility of allowing unfiltered or unanalyzed concentrations of inleakage into the Control Room. This applies to breaches of the outside air filter trains, main air handling units and all ductwork outside the Control Room pressure boundary. Breaches are equivalent to two Booster Fan trains out of service.

APPLICABILITY

In MODES 1, 2, 3, and 4, the CRVS Booster Fan trains must be OPERABLE to reduce radiation dose to personnel in the control room during and following an accident.

During movement of recently irradiated fuel assemblies, the CRVS Booster Fan trains must be OPERABLE to cope with a release due to a fuel handling accident involving handling recently irradiated fuel. Due to radioactive decay, CRVS is only required to mitigate fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 72 hours).

ACTIONS

A.1

With the two CRVS Booster Fan trains incapable of pressurizing the control room, the capability to pressurize the control room must be restored within 30 days. In this Condition, the capability to minimize the radiation dose to personnel located in the control room during and after an accident is not assured. One or both CRVS Booster Fan trains may

BASES

ACTIONS

A.1 (continued)

be OPERABLE in this Condition. If one or both CRVS Booster Fans are simultaneously inoperable, the Completion Time for these separate Conditions is more limiting than the 30 day Completion Time for Action A.1. If OPERABLE the CRVS Booster Fan train(s) can provide some dose reduction. The 30 day Completion Time is based on the low probability of an accident occurring during the time period and the potential for OPERABLE CRVS Booster Fan trains to provide some dose reduction.

B.1

With one CRVS Booster Fan train inoperable for reasons other than Condition A, action must be taken to restore the train to OPERABLE status within 72 hours. In this Condition, the remaining OPERABLE CRVS Booster Fan train provides some dose reduction for personnel in the Control Room. The 72 hour Completion Time is based on the low probability of an accident occurring during this time period, and ability of the remaining train to provide some dose reduction.

A note is being added to allow for an additional 96 hours when entering this Condition for implementation of Control Room Intake/Booster Fan modification.

C.1

With the two CRVS Booster Fan trains inoperable for reasons other than Condition A, one train must be restored to OPERABLE status within 24 hours. In this Condition, the capability to minimize the radiation dose to personnel located in the Control Room during and after an accident is unavailable. The 24 hour Completion Time is based on the low probability of an accident occurring during this time period.

A note is being added to allow for an additional 48 hours when entering this Condition for implementation of Control Room Intake/Booster Fan modification.

D.1

If the inoperable CRVS Booster Fan trains cannot be restored to OPERABLE status within the required Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this

BASES

ACTIONS

D.1 (continued)

status, the unit must be placed in at least MODE 3 within 12 hours, and in 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.

E.1

During movement of recently irradiated fuel assemblies, when one or more CRVS trains are inoperable, action must be taken immediately to suspend activities that could release radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes the accident risk. This does not preclude the movement of fuel to a safe position.

SURVEILLANCE REQUIREMENTS

SR 3.7.9.1

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not severe, testing each train once every 92 days adequately checks this system. The trains need only be operated for ≥ one hour and all dampers verified to be OPERABLE to demonstrate the function of the system. This test includes an external visual inspection of the CRVS Booster Fan trains. The 92 day Frequency is based on the known reliability of the equipment.

SR 3.7.9.2

This SR verifies that the required CRVS Booster Fan train testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The CRVS Booster Fan train filter test frequencies are in accordance with Regulatory Guide 1.52 (Ref. 4). The VFTP includes testing HEPA filter performance and carbon adsorber efficiency. Specific test frequencies and additional information are discussed in detail in the VFTP.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.9.3

This SR verifies the integrity of the Control Room enclosure. The Control Room positive pressure, with respect to potentially contaminated adjacent areas, is periodically tested to verify that the CRVS Booster Fan trains are functioning properly. During the emergency mode of operation, the CRVS Booster Fan trains are designed to pressurize the Control Room to minimize unfiltered inleakage. The CRVS Booster Fan trains are designed to maintain this positive pressure with both trains in operation. The Frequency of 18 months is consistent with industry practice.

REFERENCES

1. UFSAR, Section 9.4.
2. UFSAR, Chapter 15.
3. 10 CFR 50.36.
4. Regulatory Guide 1.52, Rev. 2, March 1978.

B 3.7 PLANT SYSTEMS

B 3.7.10 Not Used

BASES (continued)

LCO (continued)

Inoperable for Unit 2. If both dampers close, an adequate flow path for OPERABILITY is maintained even if one of two motor operated dampers on Unit 2 fail closed. If the Unit 1 dampers fail closed, OPERABILITY is not affected for the AHU-35 failure scenario. OPERABILITY is not maintained if one or both of the fire dampers between cable rooms or equipment rooms is closed. Compensatory measures, such as opening the damper and posting a fire watch must be taken to maintain OPERABILITY.

The CRACS is considered OPERABLE when the individual components that are necessary to maintain control area temperature are OPERABLE in both trains of CRVS and WC System. Each CRVS train listed in Table B 3.7.16-1 includes the associated ductwork, instrumentation, and air handling unit, which includes the fan, fan motor, cooling coils, and isolation dampers. Each WC train consists of a chiller, chilled water pump, condenser service water pump, and associated controls. Although each chilled water pump is normally associated with, and aligned to, a specific chiller, any OPERABLE chilled water pump maybe aligned to any OPERABLE chiller to maintain one OPERABLE train when a component has been removed from service. The two redundant trains can include a temporarily installed full-capacity control area cooling train. Any temporary cooling train shall have a power source with availability equivalent to the source of the permanently installed train. A temporary cooling train power source with equivalent availability shall include procedural controls for:

1. Normal Auxiliary power (e.g. B4T-7) for normal operation.
2. Swapping to a Keowee backed power supply (e.g. 3TD-15) following a LOOP.

In addition, the CRACS must be OPERABLE to the extent that air circulation can be maintained.

APPLICABILITY

In MODES 1, 2, 3, 4, and during movement of recently irradiated fuel assemblies (i.e., fuel that has occupied part of a critical reactor core within the previous 72 hours), the CRACS must be OPERABLE to ensure that the control area temperature will not exceed equipment OPERABILITY requirements.

BASES

ACTIONS (continued)

D.1 and D.2

If the Required Actions and associated Completion Times of Conditions A, B, or C are not met in MODE 1, 2, 3, or 4, 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 at least MODE 3 within 12 hours, and in 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 without challenging unit systems.

E.1 and E.2

During movement of recently irradiated fuel, if the inoperable CRACS train cannot be restored to OPERABLE status within the required Completion Time, the OPERABLE CRACS train must be placed in operation immediately. This action ensures that the remaining train is OPERABLE, that no failures preventing actuation will occur, and that any active failure will be readily detected. An alternative to Required Action E.1 is to immediately suspend activities that could release radioactivity that might require the isolation of the control room. This places the unit in a condition that minimizes accident risk. This does not preclude the movement of fuel to a safe position.

F.1

If both CRVS trains or both WC trains are inoperable during MODE 1, 2, 3 or 4, the CRACS may not be capable of performing the intended function and the unit is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

G.1

During movement of recently irradiated fuel assemblies, with two CRACS trains inoperable, action must be taken to immediately suspend activities that could release radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes accident risk. This does not preclude the movement of fuel to a safe position.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.16.1

This SR verifies that the heat removal capability of the system is sufficient to maintain the temperature in the control room and cable room at or below 80°F and maintain the temperature in the electrical equipment room at or below 85°F. The temperature is determined by reading gauges in each area or computer points which are considered representative of the average area temperature. These temperature limits are based on operating history and are intended to provide an indication of degradation of the cooling systems. The limits are conservative with respect to equipment operability temperature limits. The values for the SR are values at which the system is removing sufficient heat to meet design requirements (i.e., OPERABLE) and sufficiently above the values associated with normal operation during hot weather. The temperature in the equipment room is typically slightly higher than the temperature in the control room or cable room. Because of that, a higher value is specified for this area. The 12 hour Frequency is appropriate since significant degradation of the CRACS is slow and is not expected over this time period.

REFERENCES

1. UFSAR, Section 3.11.5.
2. UFSAR, Section 9.4.1.

B 3.7 PLANT SYSTEMS

B 3.7.17 Spent Fuel Pool Ventilation System (SFPVS)

BASES

BACKGROUND

Ventilation air for the Spent Fuel Pool Area is supplied by an air handling unit which consists of roughing filters, steam heating coil, cooling coil supplied by low pressure service water, and a centrifugal fan. In the normal mode of operation, the air from the Spent Fuel Pool Area is exhausted directly to the unit vents by the general Auxiliary Building exhaust fans. The filtered exhaust system consists of a single filter train and two 100 percent capacity vane axial fans. The filter train utilized is the Reactor Building Purge Filter Train. The Unit 2 Reactor Building purge filter train is used for the combined Unit 1 and 2 Spent Fuel Pool Ventilation System, The Unit 3 Reactor Building purge filter train is used for the Unit 3 SFP Ventilation System. The filter train is comprised of prefilters, HEPA filters, and charcoal filters. To control the direction of air flow, i.e., to direct the air from the Fuel Pool Area to the Reactor Building Purge Filter Train, a series of pneumatic motor operated dampers are provided along with a crossover duct from the Fuel Pool to the filter train.

The SFPVS is discussed in the UFSAR, Section 9.4.2, (Ref. 1).

APPLICABLE SAFETY ANALYSES

The analysis of the limiting fuel handling accident, the cask drop accident, given in Reference 2, assumes that a certain number of fuel assemblies are damaged. The DBA analysis for the cask drop accident, does not assume operation of the SFPVS in order to meet the requirements of 10 CFR 50.67 (Ref. 4). These assumptions and the analysis are consistent with the guidance provided in Regulatory Guide 1.183 (Ref. 3).

The SFPVS does not satisfy the criteria in 10 CFR 50.36. The SFPVS is retained in this specification for ALARA purposes.

LCO

With the adoption of the alternate source term and the installation of various plant modifications, SFPVS is not credited in dose analysis calculations. Therefore, there are no specific operability requirements for this system.

BASES

LCO (continued)

An SFPVS train is considered OPERABLE when its associated:

1. Fan is OPERABLE;
2. Filter trains are intact; and
3. Ductwork and dampers are OPERABLE, and air flow can be maintained.

APPLICABILITY

During movement of recently irradiated fuel assemblies in the fuel handling area, the SFPVS shall be OPERABLE.

ACTIONS

A.1 and A.2

With one SFPVS train inoperable, the OPERABLE SFPVS train must be started immediately with its discharge through the associated reactor building purge filter or recently irradiated fuel movement in the spent fuel pool suspended. This action ensures that the remaining train is OPERABLE, and that any active failures will be readily detected.

If the system is not placed in operation, this action requires suspension of recently irradiated fuel movement, which precludes a fuel handling accident. This action does not preclude the movement of recently irradiated fuel assemblies to a safe position.

BASES

ACTIONS (continued)

B.1

When two trains of the SFPVS are inoperable during movement of recently irradiated fuel in the spent fuel pool, the unit must be placed in a condition in which the LCO does not apply. This Action involves immediately suspending movement of recently irradiated fuel assemblies in the spent fuel pool. This does not preclude the movement of recently irradiated fuel to a safe position.

SURVEILLANCE REQUIREMENTS

SR 3.7.17.1

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not severe, testing each train within 31 days prior to moving recently irradiated fuel assemblies provides an adequate check on this system. The system is no longer credited in dose analysis calculations and is not required to maintain 10 CFR 50.67 dose limits, but is required for ALARA purposes.

SR 3.7.17.2

This SR verifies that the required SFPVS testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The VFTP includes testing HEPA filter performance, charcoal adsorber efficiency, minimum system flow rate, and the physical properties of the activated charcoal (general use and following specific operations). Specific test frequencies and additional information are discussed in detail in the VFTP.

REFERENCES

1. UFSAR, Section 9.4.2.
2. UFSAR, Section 15.11.
3. Regulatory Guide 1.183.
4. 10 CFR 50.67.
5. Dose Calculations.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.2 AC Sources – Shutdown

BASES

BACKGROUND

A description of the AC sources, except AC sources utilizing transformer CT-5, is provided in the Bases for LCO 3.8.1, "AC Sources – Operating." An additional source of AC power is available either directly from the 100 kV Central Tie Substation or from the combustion turbines at Lee Steam Station via a 100 kV transmission line connected to Transformer CT-5. This single 100 kV circuit is connected to the 100 kV transmission system through the substation at Central, located eight miles from Oconee. The Central Substation is connected to Lee Steam Station twenty-two miles away through a similar 100 kV line. This line can either be isolated from the balance of the transmission system to supply emergency power to Oconee from Lee Steam Station, or offsite power can be supplied directly from the 100 kV system from the Central Tie Substation. When CT-5 is energized from the 100 kV system, this is an acceptable offsite source for Oconee Units in MODES 5 and 6. When CT-5 is energized from an OPERABLE Lee Combustion Turbine (LCT) and isolated from the balance of the transmission system, this source is an acceptable emergency power source.

Located at Lee Steam Station are three 44.1 MVA combustion turbines. One of these three combustion turbines can be started in one hour and connected to the 100 kV line. Transformer CT-5 is sized to carry the engineered safeguards auxiliaries of one unit plus the shutdown loads of the other two units.

APPLICABLE SAFETY ANALYSES

The OPERABILITY of the minimum AC sources during MODES 5 and 6 and during movement of recently 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 AC electrical power is provided to mitigate events postulated during shutdown, such as a fuel handling accident involving handling recently irradiated fuel. Due to radioactive decay, AC electrical power is only required to mitigate fuel handling accidents involving handling recently irradiated fuel

BASES

APPLICABLE SAFETY ANALYSES (continued)

(i.e., fuel that has occupied part of a critical reactor core within the previous 72 hours).

In general, when the unit is shut down, 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 accidents that are analyzed in MODES 1, 2, 3, and 4 have no specific analyses in MODES 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 accident analysis assumptions and design requirements during shutdown conditions are allowed by the LCO for required systems.

During MODES 1, 2, 3, and 4 various deviations from the analysis assumptions and design requirements are allowed within the Required Actions. This allowance is in recognition that certain testing and maintenance activities must be conducted provided an acceptable level of risk is not exceeded. During MODES 5 and 6, performance of a significant number of required testing and maintenance activities is also required. In MODES 5 and 6, the activities are generally planned and administratively controlled. Relaxations from MODE 1, 2, 3, and 4 LCO requirements are acceptable during shutdown MODES based on:

a. The fact that time in an outage is limited. This is a risk prudent goal as well as a utility economic consideration;

b. Requiring appropriate compensatory measures for certain conditions. These may include administrative controls, reliance on systems that do not necessarily meet typical design requirements applied to systems credited in operating MODE analyses, or both;

c. Prudent utility consideration of the risk associated with multiple activities that could affect multiple systems; and

d. Maintaining, to the extent practical, the ability to perform required functions (even if not meeting MODE 1, 2, 3, and 4 OPERABILITY requirements) with systems assumed to function during an event.

BASES

APPLICABLE SAFETY ANALYSES (continued)	In the event of an accident during shutdown, this LCO ensures the capability to support systems necessary to avoid immediate difficulty, assuming either a loss of all offsite power or a loss of all onsite emergency power sources and their associated emergency power paths. The AC sources satisfy Criterion 3 of the 10 CFR 50.36 (Ref. 1).
LCO	One offsite source capable of supplying the onsite power distribution system(s) of LCO 3.8.9, "Distribution Systems – Shutdown," ensures that all required loads are powered from offsite power. An OPERABLE emergency power source, associated with a distribution system required to be OPERABLE by LCO 3.8.9, ensures a diverse power source is available to provide electrical power support, assuming a loss of the offsite source. Together, OPERABILITY of the required offsite source and emergency power source ensure the availability of sufficient AC sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents involving handling recently irradiated fuel). The qualified offsite source must be capable of maintaining rated frequency and voltage, and accepting required loads during an accident, while connected to the main feeder bus(es). Qualified offsite source are those that are described in the UFSAR and are part of the licensing basis for the unit. An offsite source can be an offsite circuit available or connected through to the 230 kV switchyard to the startup transformer and to one main feeder bus. Additionally, the offsite source can be an offsite circuit available or connected though the 230 kV switchyard (525 kV switchyard for Unit 3) to a backcharged unit main step-up transformer and unit auxiliary transformer to one main feeder bus. Another alternative is the energized Central 100 kV switchyard available or connected through the 100 kV line and transformer CT-5 to one main feeder bus. In MODES 5 or 6 and during movement of irradiated fuel, a Lee Combustion Turbine (LCT) energizing one standby bus via an isolated power path to one main feeder bus can be utilized as an emergency power source. The LCT is required to provide power within limits of voltage and frequency using the 100 kV transmission line electrically separated from the system grid and offsite loads energizing one or more standby buses through transformer CT-5. The required number of energized standby buses is based upon the requirements of LCO 3.8.9, "Distribution System – Shutdown."

BASES

LCO (continued)

An OPERABLE KHU must be capable of starting, accelerating to rated speed and voltage, and connecting to the main feeder bus(es). The sequence must be capable of being accomplished within 23 seconds after a manual emergency start initiation signal. An emergency power source must be capable of accepting required loads and must continue to operate until offsite power can be restored to the main feeder buses.

This LCO is modified by three Notes. Note 1 indicates that a unit startup transformer may be shared with a unit in MODES 5 and 6. Note 2 indicates that the requirements of Specification 5.5.19, "Lee Combustion Turbine Testing Program," shall be met when a Lee Combustion Turbine (LCT) is used for the emergency power requirements. Note 3 indicates that the required emergency power source and the required offsite power source shall not be susceptible to a failure disabling both sources.

The required emergency power source and required offsite source cannot be susceptible to a failure disabling both sources. If the required offsite source is the 230 kV switchyard and the startup transformer energizing the required main feeder bus(es), the KHU and its required underground emergency power path are required to be OPERABLE since it is not subject to a failure, such as an inoperable startup transformer, which simultaneously disables the offsite source. If the Central switchyard is serving as the required offsite source through the CT-5 transformer with a power path through only one standby bus, the KHU and its required underground emergency power path cannot be used as the emergency power source if the power path is through the same standby bus since a single failure of a standby bus would disable both sources. Conversely, if an LCT is being used as an emergency power source, the required offsite source must be an offsite circuit available or connected through the startup transformer or a backcharged unit main step-up transformer and the unit auxiliary transformer.

APPLICABILITY

The AC sources required to be OPERABLE in MODES 5 and 6 and during movement of recently irradiated fuel assemblies provide assurance that:

a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel assemblies;

b. Systems needed to mitigate a fuel handling accident involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 72 hours) are available;

c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

BASES

APPLICABILITY (continued)

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

The AC power requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.1.

ACTIONS

A.1

An offsite source would be considered inoperable if it were not available to one required main feeder bus. Although two main feeder buses may be required by LCO 3.8.9, the one main feeder bus with offsite power available may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS and recently irradiated fuel movement. By the allowance of the option to declare features inoperable with no offsite power available, appropriate restrictions will be implemented in accordance with the affected required features LCO's ACTIONS.

A.2.1, A.2.2, A.2.3, A.2.4, B.1, B.2, B.3, and B.4

With the offsite source not available to all required features, the option would still exist to declare all required features inoperable. Since this option may involve undesired administrative efforts, the allowance for sufficiently conservative actions is made. With the required emergency power source inoperable, the minimum required diversity of AC power sources is not available. It is, therefore, required to suspend CORE ALTERATIONS, movement of recently irradiated fuel assemblies, and operations involving positive reactivity additions. The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory provided the required SDM is maintained.

Suspension of these activities does not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability or the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC sources and to continue this action until restoration is accomplished in order to provide the necessary AC power to the unit safety systems.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.4 DC Sources – Shutdown

BASES

BACKGROUND

A description of the 125 VDC Vital I&C sources is provided in the Bases for LCO 3.8.3, "DC Sources – Operating."

APPLICABLE SAFETY ANALYSES

The initial conditions of Accidents and transients analyses in the UFSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume that Engineered Safeguard (ES) systems are OPERABLE. The 125 VDC Vital I&C electrical power system provides normal and emergency DC electrical power for the emergency auxiliaries, and control and switching during all MODES of operation.

Although the 230 kV Switchyard 125 VDC Power System provides control power for circuit breaker operation in the 230 kV switchyard as well as DC power for degraded grid voltage protection circuits during all MODES of operation, no credit is taken for these functions in MODES 5 and 6.

The OPERABILITY of the 125 VDC Vital I&C sources is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum 125 VDC Vital I&C electrical power sources during MODES 5 and 6 and during movement of recently 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 involving handling recently irradiated fuel. Due to radioactive decay, DC electrical power is only required to mitigate fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 72 hours).

BASES (continued)

APPLICABLE SAFETY ANALYSIS (continued)

The 125 VDC Vital I&C sources satisfy Criterion 3 of 10CFR 50.36 (Ref. 3).

LCO

The 125 VDC Vital I&C electrical power sources, each source consisting of one battery, one battery charger, and the corresponding control equipment and interconnecting cabling within the source, are required to be OPERABLE to support required distribution systems required OPERABLE by LCO 3.8.9, "Distribution Systems – Shutdown" and shall include at least one of the unit's 125 VDC Vital I&C power sources. This ensures the availability of sufficient 125 VDC Vital I&C electrical 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 involving handling recently irradiated fuel).

APPLICABILITY

The 125 VDC Vital I&C electrical power sources required to be OPERABLE in MODES 5 and 6 and during movement of recently irradiated fuel assemblies, provide assurance that:

a. Required features to provide adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core;

b. Required features needed to mitigate a fuel handling accident involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 72 hours) are available;

c. Required features 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.

The 125 VDC Vital I&C electrical power requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.3.

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

If two or more 125 VDC Vital I&C panelboards are required by LCO 3.8.9, the remaining 125 VDC Vital I&C panelboards with 125 VDC Vital I&C power available may be capable of supporting sufficient systems to allow

BASES

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4 (continued)

continuation of CORE ALTERATIONS and fuel movement involving handling recently irradiated fuel. By allowing the option to declare required features inoperable with the associated 125 VDC Vital I&C power source(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCO ACTIONS. In many instances this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of recently irradiated fuel assemblies, and operations involving positive reactivity additions). The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory, provided the required SDM is maintained.

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required 125 VDC Vital I&C electrical power sources and to continue this action until restoration is accomplished in order to provide the necessary 125 VDC Vital I&C electrical power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required 125 VDC Vital I&C electrical power sources should be completed as quickly as possible in order to minimize the time during which the unit safety systems may be without sufficient power.

SURVEILLANCE REQUIREMENTS

SR 3.8.4.1

SR 3.8.4.1 requires performance of all Surveillances required by SR 3.8.3.1 through SR 3.8.3.6. Therefore, see the corresponding Bases for LCO 3.8.3 for a discussion of each SR.

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE 125 VDC Vital I&C sources from being discharged below their capability to provide the required power supply or otherwise rendered inoperable during the performance of SRs. It is the intent that these SRs must still be capable of being met, but actual performance is not required.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.7 Vital Inverters – Shutdown

BASES

BACKGROUND

A description of the inverters is provided in the Bases for LCO 3.8.6, "Inverters – Operating."

APPLICABLE SAFETY ANALYSES

The initial conditions of Accident and transient analyses in the UFSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume Engineered Safeguards systems are OPERABLE. The DC to AC inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the Reactor Protection System and Engineered Safeguards (ES) System instrumentation and controls so that the fuel, Reactor Coolant System, and containment design limits are not exceeded.

The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum inverters to each 120 VAC Vital Instrumentation panelboards during MODES 5 and 6 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 power is available to mitigate events postulated during shutdown, such as a fuel handling accident involving handling recently irradiated fuel. Due to radioactive decay, the inverters are only required to mitigate fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 72 hours).

The inverters were previously identified as part of the distribution system and, as such, satisfy Criterion 3 of 10 CFR 50.36 (Ref. 3).

BASES (continued)

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 a transient or accident. The battery powered inverters provide uninterruptible supply of AC electrical power to the 120 VAC Vital Instrumentation panelboards even if the 4.16 kV buses are de-energized. OPERABILITY of the inverters requires that the 120 VAC Vital Instrumentation panelboard 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).

APPLICABILITY

The inverters required to be OPERABLE in MODES 5 and 6, and during movement of recently irradiated fuel assemblies provide assurance that:

a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core;

b. Systems needed to mitigate a fuel handling accident involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 72 hours) 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.

Inverter requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.6.

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

If two or more 120 VAC Vital Instrumentation panelboards are required by LCO 3.8.9, "Distribution Systems – Shutdown," the remaining OPERABLE inverters may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement involving handling recently irradiated fuel, and operations with a potential for positive reactivity additions. The Required Action to suspend positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory, provided the required SDM is maintained. By the allowance of the option to declare required features inoperable with

BASES

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4 (continued)

the associated inverter(s) inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCOs' Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of recently irradiated fuel assemblies, and operations involving positive reactivity additions).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required inverters and to continue this action until restoration is accomplished in order to provide the necessary inverter power to the unit safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required inverters should be completed as quickly as possible in order to minimize the time the unit safety systems may be without power or powered from an alternate regulated voltage source.

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 Vital Instrumentation panelboards 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 Vital Instrumentation panelboards. 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. UFSAR, Chapter 6.
2. UFSAR, Chapter 15.
3. 10 CFR 50.36.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.9 Distribution Systems – Shutdown

BASES

BACKGROUND

A description of the AC, DC and AC vital electrical power distribution systems is provided in the Bases for LCO 3.8.8, "Distribution Systems – Operating."

APPLICABLE SAFETY ANALYSES

The initial conditions of accident and transient analyses in the UFSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume Engineered Safeguards (ES) systems are OPERABLE. The AC, DC, and AC vital 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 containment design limits are not exceeded.

The OPERABILITY of the AC, DC, and AC vital electrical power distribution systems is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum AC, DC, and AC vital electrical power distribution systems during MODES 5 and 6, and during movement of recently 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 power is provided to mitigate events postulated during shutdown, such as a fuel handling accident involving handling recently irradiated fuel. Due to radioactive decay, AC, DC, and AC vital bus electrical power is only required to mitigate fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 72 hours).

The AC and DC electrical power distribution systems satisfy Criterion 3 of 10 CFR 50.36 (Ref. 3).

BASES (continued)

LCO

Various combinations of portions of systems, equipment, and components are required OPERABLE by other LCOs, depending on the specific plant condition. Implicit in those requirements is the required OPERABILITY of necessary support required features. This LCO explicitly requires the portions of the electrical distribution system necessary to support OPERABILITY of required systems, equipment, and components – all specifically addressed in each LCO and implicitly required via the definition of OPERABILITY- be energized or available to be automatically energized by control logicduring a power source transfer.

Maintaining these portions of the distribution system as described above ensures the availability of sufficient power to operate the unit in a safe manner to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents involving handling recently irradiated fuel).

APPLICABILITY

The AC and DC electrical power distribution buses, ES power strings and panelboards required to be OPERABLE in MODES 5 and 6, and during movement of recently irradiated fuel assemblies, provide assurance that:

a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core;

b. Systems needed to mitigate a fuel handling accident accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 72 hours) 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.

The AC, DC, and AC vital electrical power distribution buses, ES power strings and panelboards requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.8.

BASES (continued)

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, A.2.4, and A.2.5

Although redundant required equipment may require redundant buses, ES power strings and panelboards of electrical power distribution systems to be OPERABLE, a reduced set of OPERABLE distribution buses, ES power strings and panelboards may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS and recently irradiated fuel movement. By allowing the option to declare required equipment associated with an inoperable distribution buses, ES power strings and panelboards inoperable, appropriate restrictions are implemented in accordance with the affected distribution buses, ES power strings and panelboards LCO's Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of recently irradiated fuel assemblies, and operations involving positive reactivity additions).

Suspension of these activities does not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC and DC electrical power distribution buses, ES power strings and panelboards and to continue this action until restoration is accomplished in order to provide the necessary power to the unit safety systems.

Notwithstanding performance of the above conservative Required Actions, a required decay heat removal (DHR) subsystem may be inoperable. In this case, Required Actions A.2.1 through A.2.4 do not adequately address the concerns relating to coolant circulation and heat removal. Pursuant to LCO 3.0.6, the DHR ACTIONS would not be entered. Therefore, Required Action A.2.5 is provided to direct declaring DHR inoperable, which results in taking the appropriate DHR actions.

The Completion Time of Immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required distribution buses, ES power strings and panelboards should be completed as quickly as possible in order to minimize the time the unit safety systems may be without power.

B 3.9 REFUELING OPERATIONS

B 3.9.3 Containment Penetrations

BASES

BACKGROUND

During movement of recently irradiated fuel assemblies within containment, a release of fission product radioactivity within containment will be restricted from escaping to the environment when the LCO requirements are met. In MODES 1, 2, 3, and 4, this is accomplished by maintaining containment OPERABLE as described in LCO 3.6.1, "Containment." In MODE 6, the potential for containment pressurization as a result of an accident is not likely; therefore, requirements to isolate the containment from the outside atmosphere can be less stringent. In order to make this distinction, the penetration requirements are referred to as "containment closure" rather than "containment OPERABILITY." Containment closure means that specified escape paths are closed or capable of being closed. Since there is no significant potential for containment pressurization, the Appendix J leakage criteria and tests are not required.

The containment serves to contain fission product radioactivity that may be released from the reactor core following an accident, such that offsite radiation exposures are maintained within the requirements of 10 CFR 50.67. Additionally, the containment provides radiation shielding from the fission products that may be present in the containment atmosphere following accident conditions.

The containment equipment hatch, which is part of the containment pressure boundary, provides a means for moving large equipment and components into and out of containment. During movement of recently irradiated fuel assemblies within containment, the equipment hatch must be held in place by at least four bolts. Good engineering practice dictates that the bolts required by this LCO be approximately equally spaced.

The containment air locks, which are also part of the containment pressure boundary, provide a means for personnel access during MODES 1, 2, 3, and 4 unit operation in accordance with LCO 3.6.2, "Containment Air Locks." Each air lock has a door at both ends: The doors are normally interlocked to prevent simultaneous opening when containment OPERABILITY is required. During periods of unit shutdown

BASES

BACKGROUND (continued)

when containment OPERABILITY is not required, the door interlock mechanism may be disabled, allowing both doors of an air lock to remain open for extended periods when frequent containment ingress and egress is necessary. During movement of recently irradiated fuel assemblies within containment, containment closure is required; therefore, the door interlock mechanism may remain disabled, but one air lock door must always remain closed. Placement of a temporary cover plate in the emergency air lock is an acceptable means for providing containment closure.

The temporary cover plate is installed and sealed against the inner emergency air lock door flange gasket. The temporary cover plate is visually inspected to ensure that no gaps exist. All cables, hoses and service air piping run through the sleeves on the temporary cover plate will also be installed and sealed. The sleeves will also be inspected to ensure that no gaps exist. Leak testing is not required prior to beginning fuel handling operations. Therefore, visual inspection of the temporary cover plate over the emergency air lock satisfies the requirement that the air lock be closed, which constitutes operability for this requirement.

The requirements on containment penetration closure ensure that a release of fission product radioactivity within containment will be restricted from escaping to the environment. The closure restrictions are sufficient to restrict fission product radioactivity release from containment due to a fuel handling accident involving handling recently irradiated fuel during refueling.

The Reactor Building Purge System includes a supply penetration and exhaust penetration. During MODES 1, 2, 3, and 4, two valves in each of the supply and exhaust penetrations are secured in the closed position. The system is not subject to a Specification in MODE 5.

In MODE 6, large air exchanges are necessary to support refueling operations. The purge system is used for this purpose, and two valves in each penetration flow path may be closed on a unit vent high radiation signal.

Other containment penetrations that provide direct access from containment atmosphere to outside atmosphere must be isolated on at least one side. Isolation may be achieved by a closed automatic isolation valve, non-automatic power operated valve, manual isolation valve, blind flange, or equivalent. Equivalent isolation methods may include use of a material that can provide a temporary, atmospheric pressure ventilation barrier for the containment penetration(s) during fuel movements involving handling recently irradiated fuel.

BASES (continued)

APPLICABLE SAFETY ANALYSES	During movement of recently irradiated fuel assemblies within containment, the most severe radiological consequences result from a fuel handling accident involving handling recently irradiated fuel. The fuel handling accident is a postulated event that involves damage to irradiated fuel (Ref. 2). A minimum fuel transfer canal water level in conjunction with the minimum decay time of 72 hours prior to irradiated fuel movement with or without containment closure capability ensure that the release of fission product radioactivity subsequent to a fuel handling accident results in doses that are within the guideline values specified in 10 CFR 50.67. The design basis for fuel handling accidents has historically separated the radiological consequences from the containment capability. The NRC staff has treated the containment capability for fuel handling conditions as a logical part of the "primary success path" to mitigate fuel handling accidents, irrespective of the assumptions used to calculate the radiological consequences of such accidents (Ref. 2). Containment penetrations satisfy Criterion 3 of 10 CFR 50.36.
LCO	This LCO reduces the consequences of a fuel handling accident involving handling recently irradiated fuel in containment by limiting the potential escape paths for fission product radioactivity from containment. The LCO requires any penetration providing direct access from the containment atmosphere to the outside atmosphere to be closed except for the OPERABLE containment purge and exhaust penetrations. For the OPERABLE containment purge and exhaust penetrations, this LCO ensures that these penetrations are isolable by the RB purge isolation signal. This LCO is modified by a note indicating that an emergency air lock door is not required to be closed when a temporary cover plate is installed.
APPLICABILITY	The containment penetration requirements are applicable during movement of recently irradiated fuel assemblies within containment because this is when there is a potential for the limiting fuel handling accident. In MODES 1, 2, 3, and 4, containment penetration requirements are addressed by LCO 3.6.1. In MODES 5 and 6, when movement of irradiated fuel assemblies within containment is not being conducted, the potential for a fuel handling accident does not exist. Additionally, due to radioactive decay, a fuel handling accident involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 72 hours) will result in doses that are well within the guideline values specified in 10 CFR 50.67 even

BASES (continued)

APPLICABILITY (continued)

without containment closure capability. Therefore, under these conditions no requirements are placed on containment penetration status.

ACTIONS

A.1

With the containment equipment hatch, air locks, or any containment penetration that provides direct access from the containment atmosphere to the outside atmosphere not in the required status, including the Containment Purge and Exhaust Isolation System not capable of automatic actuation when the purge and exhaust valves are open, the unit must be placed in a condition in which the isolation function is not needed. This is accomplished by immediately suspending movement of recently irradiated fuel assemblies within containment. Performance of these actions shall not preclude moving a component to a safe position.

SURVEILLANCE REQUIREMENTS

SR 3.9.3.1

This Surveillance demonstrates that each of the containment penetrations required to be in its closed position is in that position. Also the Surveillance will demonstrate that each open penetration's valve operator has motive power, which will ensure each valve is capable of being closed.

The Surveillance is performed every 7 days during the movement of recently irradiated fuel assemblies within the containment. The Surveillance interval is selected to be commensurate with the normal duration of time to complete fuel handling operations.

As such, this Surveillance ensures that a postulated fuel handling accident involving handling recently irradiated fuel that releases fission product radioactivity within the containment will not result in a release of significant fission product radioactivity to the environment.

SR 3.9.3.2

This Surveillance demonstrates that each containment purge supply and exhaust isolation valve that is not locked, sealed or otherwise secured in the isolation position actuates to its isolation position on an actual or simulated high radiation signal. The frequency requires the isolation capability of the reactor building purge valves to be verified functional once each refueling outage prior to movement of recently irradiated fuel assemblies within containment. This ensures that this function is

BASES

SURVEILLANCE REQUIREMENTS

SR 3.9.3.2 (continued)

verified prior to movement of recently irradiated fuel assemblies within containment. This Surveillance will ensure that the valves are capable of closing after a postulated fuel handling accident involving handling recently irradiated fuel to limit a release of fission product radioactivity from the containment.

REFERENCES

1. UFSAR, Section 15.11.

2. NRC letter to RG & E dated December 7, 1995, R.E. Ginna Nuclear Power Plant Conversion to Improved Standard Technical Specifications - Resolutions of Ginna Design Basis for Refueling Accidents.

3. Regulatory Guide 1.183, July 2000

B 3.9 REFUELING OPERATIONS

B 3.9.6 Fuel Transfer Canal Water Level

BASES

BACKGROUND

The movement of irradiated fuel assemblies within containment requires a minimum water level of 21.34 ft above the top of the reactor vessel flange. During refueling, this maintains sufficient water level in the fuel transfer canal, and the spent fuel pool. Sufficient water is necessary to retain iodine fission product activity in the water in the event of a fuel handling accident (Refs. 1 and 2). Sufficient iodine activity would be retained to limit offsite doses from the accident within 10 CFR 50.67 limits, as provided by the guidance of Reference 3.

APPLICABLE SAFETY ANALYSES

During movement of irradiated fuel assemblies, the water level in the fuel transfer canal is an initial condition design parameter in the analysis of the fuel handling accident in containment postulated by Regulatory Guide 1.183 (Ref. 1). Regulatory Guide 1.183, Appendix B provides guidance for evaluating the radiological consequences of a fuel handling accident in containment and the spent fuel pool building. The methodology stipulates that a minimum water level of 23 ft has been demonstrated to provide decontamination factors (DF) for the elemental and organic species are 500 and 1, respectively, giving an overall effective decontamination factor of 200 (i.e., 99.5% of the total iodine released from the damaged rods is retained by the water). This difference in decontamination factors for elemental (99.85%) and organic iodine (0.15%) species results in the iodine above the water being composed of 57% elemental and 43% organic species. If the depth of the water is different from 23 feet, the decontamination factor should be developed (Ref. 1)."

The fuel handling accident analysis inside containment is described in Reference 2. Since the minimum water level of 21.34 feet is less than 23 feet, the DF must be determined through calculations with comparable conservatism. An experimental test program described in WCAP-7828 (Ref. 4) evaluated the extent of removal of iodine released from a damaged irradiated fuel assembly. Using the analytical results from the test program described in WCAP-7828, with a water depth of 21.34 feet, a comparable overall effective DF of 183 was determined. With a minimum water level of 21.34 ft, and a minimum decay time of 72 hours prior to fuel handling, the analysis and test programs demonstrate that the iodine release due to a postulated fuel handling

BASES (continued)

APPLICABLE SAFETY ANALYSES (continued)	accident is adequately captured by the water, and offsite doses are maintained within allowable limits (Ref. 3). Fuel Transfer Canal water level satisfies Criterion 2 of 10 CFR 50.36
LCO	A minimum fuel transfer canal water level of 21.34 ft above the reactor vessel flange is required to ensure that the radiological consequences of a postulated fuel handling accident inside containment are within acceptable limits as provided by 10 CFR 50.67..
APPLICABILITY	LCO 3.9.6 is applicable when moving irradiated fuel assemblies within the containment. The LCO minimizes the possibility of a fuel handling accident in containment that is beyond the assumptions of the safety analysis. If irradiated fuel is not present in containment, there can be no significant radioactivity release as a result of a postulated fuel handling accident. Requirements for fuel handling accidents in the spent fuel pool are covered by LCO 3.7.11, "Fuel Storage Pool Water Level."
ACTIONS	A.1 With a water level of < 21.34 ft above the top of the reactor vessel flange, all operations involving movement of irradiated fuel assemblies shall be suspended immediately to ensure that a fuel handling accident cannot occur. The suspension of fuel movement shall not preclude completion of movement of a component to a safe position.
SURVEILLANCE REQUIREMENTS	SR 3.9.6.1 Verification of a minimum water level of 21.34 ft above the top of the reactor vessel flange ensures that the design basis for the postulated fuel handling accident analysis during refueling operations is met. Water at the required level above the top of the reactor vessel flange limits the consequences of damaged fuel rods that are postulated to result from a postulated fuel handling accident inside containment (Ref. 2). The Frequency of 24 hours is based on engineering judgment and is considered adequate in view of the large volume of water and the normal procedural controls of valve positions, which make significant unplanned level changes unlikely.

BASES (continued)

REFERENCES

1. Regulatory Guide 1.183, July 2000.
2. UFSAR Section 15.11.2.2.
3. 10 CFR 50.67.
4. WCAP-7828, December 1971