ATTACHMENT 2A TO C1099-08

TECHNICAL SPECIFICATIONS PAGES
MARKED TO SHOW PROPOSED CHANGES

REVISED PAGES
UNIT 1

3/4 1-16
3/4 3-21b
3/4 3-26b
3/4 3-33b
3/4 5-11
3/4 6-26
3/4 6-27
3/4 6-35

B 3/4 5-3
B 3/4 6-4

BORATED WATER SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.8 Each of the following borated water sources shall be OPERABLE:

a. A boric acid storage system and associated heat tracing with:

1. A minimum usable borated water volume of 5650 gallons,

2. Between 20,000 and 22,500 ppm of boron, and

3. A minimum solution temperature of 145°F.

b. The refueling water storage tank with:

1. A minimum contained volume of 350,000 375,500 gallons of water,

2. Between 2400 and 2600 ppm of boron, and

3. A minimum solution temperature of 70°F and a maximum solution temperature of 100°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With the boric acid storage system inoperable, restore the storage system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and borated to a SHUTDOWN MARGIN equivalent to at least 1% $\Delta k/k$ at 200°F; restore the boric acid storage system to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

b. With the refueling water storage tank inoperable, restore the tank to OPERABLE status within one hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.1.2.8 Each borated water source shall be demonstrated OPERABLE:

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
9. MANUAL					
a. Safety Injection (ECCS) Feedwater Isolation Reactor Trip (SI) Containment Isolation - Phase "A" Containment Purge and Exhaust Isolation Auxiliary Feedwater Pumps Essential Service Water System	2/train	1/train	2/train	1, 2, 3, 4	18
b. Containment Spray Containment Isolation - Phase "B" Containment Purge and Exhaust Isolation ~~Containment Air Recirculation Fan~~	1/train	1/train	1/train	1, 2, 3, 4	18
c. Containment Isolation - Phase "A" Containment Purge and Exhaust Isolation	1/train	1/train	1/train	1, 2, 3, 4	18
d. Steam Line Isolation	2/steam line (1 per train)	2/steam line (1 per train)	2/operating steam line (1 per train)	1, 2, 3	20
e. Containment Air Recirculation Fan	1/train	1/train	1/train	1, 2, 3, 4	18
10. CONTAINMENT AIR RECIRCULATION FAN					
a. Manual	See Functional Unit 9				
b. Automatic Actuation Logic	2	1	2	1, 2, 3	13
c. Containment Pressure - High	3	2	2	1, 2, 3	14*

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
9. Manual		
a. Safety Injection (ECCS)	N.A.	N.A.
Feedwater Isolation	N.A.	N.A.
Reactor Trip (SI)	N.A.	N.A.
Containment Isolation - Phase "A"	N.A.	N.A.
Containment Purge and Exhaust Isolation	N.A.	N.A.
Auxiliary Feedwater Pumps	N.A.	N.A.
Essential Service Water System	N.A.	N.A.
b. Containment Spray	N.A.	N.A.
Containment Isolation - Phase "B"	N.A.	N.A.
Containment Purge and Exhaust Isolation	N.A.	N.A.
~~Containment Air Recirculation Fan~~		
c. Containment Isolation - Phase "A"	N.A.	N.A.
Containment Purge and Exhaust Isolation	N.A.	N.A.
d. Steam Line Isolation	N.A.	N.A.
e. Containment Air Recirculation Fan	N.A.	N.A.
10. CONTAINMENT AIR RECIRCULATION FAN		
a. Manual	See Functional Unit 9	See Functional Unit 9
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c. Containment Pressure - High	Less than or equal to 1.1 psig	Less than or equal to 1.2 psig

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	TRIP ACTUATING DEVICE OPERATIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
9. Manual					
a. Safety Injection (ECCS) Feedwater Isolation Reactor Trip (SI) Containment Isolation - Phase "A" Containment Purge and Exhaust Isolation Auxiliary Feedwater Pumps Essential Service Water System	N.A.	N.A.	N.A.	R	1, 2, 3, 4
b. Containment Spray Containment Isolation - Phase "B" Containment Purge and Exhaust Isolation ~~Containment Air Recirculation Fan~~	N.A.	N.A.	N.A.	R	1, 2, 3, 4
c. Containment Isolation - Phase "A" Containment Purge and Exhaust Isolation	N.A.	N.A.	N.A.	R	1, 2, 3, 4
d. Steam Line Isolation	N.A.	N.A.	Q	R	1, 2, 3
e. Containment Air Recirculation Fan	N.A.	N.A.	N.A.	R	1, 2, 3, 4
10. CONTAINMENT AIR RECIRCULATION FAN					
a. Manual	See Functional Unit 9				
b. Automatic Actuation Logic	N.A.	N.A.	M(2)	N.A.	1, 2, 3
c. Containment Pressure - High	S	R	M(3)	N.A.	1, 2, 3

3/4.5.5 REFUELING WATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.5.5 The refueling water storage tank (RWST) shall be OPERABLE with:

a. A minimum contained volume of ~~350,000~~ 375,500 gallons of borated water.

b. Between 2400 and 2600 ppm of boron, and

c. A minimum water temperature of 70°F and a maximum water temperature of 100°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the refueling water storage tank inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.5.5 The RWST shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1. Verifying the contained borated water level in the tank, and

2. Verifying the boron concentration of the water.

b. At least once per 24 hours by verifying the RWST temperature.

3/4.6.5 ICE CONDENSER

ICE BED

LIMITING CONDITION FOR OPERATION

3.6.5.1 The ice bed shall be OPERABLE with:

a. The stored ice having boron concentration of at least 1800 ppm (the boron being in the form of sodium tetraborate), and a pH of 9.0 to 9.5 at 25°C,

b. Flow channels through the ice condenser,

c. A maximum ice bed temperature of ≤ 27°F,

d. ~~Each i~~Ice baskets containing at least ~~1333~~ 1144 lbs of ice (end-of-cycle), and

e. 1944 ice baskets.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the ice bed inoperable, restore the ice bed to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.5.1 The ice condenser shall be determined OPERABLE:

a. At least once per 12 hours by using the ice bed temperature monitoring system to verify that the maximum ice bed temperature is ≤ 27°F.

b. At least once per 18 months by:

1. Chemical analysis which verify that at least 9 representative samples of stored ice have a boron concentration of at least 1800 ppm (the boron being in the form of sodium tetraborate), and a pH of 9.0 to 9.5 at 25°C.

2. Weighing a representative sample of at least 144 ice baskets and verifying ~~that each~~ the baskets contains at least ~~1333~~ 1144 lbs of ice (end-of-cycle). The representative sample shall include 6 baskets from each of the 24 ice condenser bays and shall be constituted of one basket each from Radial Rows 1, 2, 4, 6, 8 and 9 (or from the same row of an adjacent bay if a basket from a designated row cannot be obtained for weighing) within each bay. If any basket is found to contain less than ~~1333~~ 1144 pounds of ice (end-of-cycle), a representative sample of 20 additional baskets from the same bay shall be weighed. The minimum average weight of ice from the 20 additional baskets and the discrepant basket shall not be less than ~~1333~~ 1144 pounds/basket (end-of-cycle) at a 95% level of confidence.

SURVEILLANCE REQUIREMENTS (Continued)

The ice condenser shall also be subdivided into 3 groups of baskets, as follows: Group 1 - bays 1 through 8, Group 2 - bays 9 through 16, and Group 3 - bays 17 through 24. The minimum average ice weight of the sample baskets from Radial Rows 1, 2, 4, 6, 8 and 9 in each group shall not be less than ~~1333~~ 1144 pounds/basket (end-of-cycle) at a 95% level of confidence.

The minimum total ice condenser ice weight at a 95% level of confidence shall be calculated using all ice basket weights determined during this weighing program and shall not be less than ~~2,590,000~~ 2,222,000 pounds (end-of-cycle).

3. Verifying, by a visual inspection of at least two flow passages per ice condenser bay, that the accumulation of frost or ice on the top deck floor grating, on the intermediate deck and on flow passages between ice baskets and past lattice frames is restricted to a nominal thickness of 3/8 inches. If one flow passage per bay is found to have an accumulation of frost or ice greater than this thickness, a representative sample of 20 additional flow passages from the same bay shall be visually inspected. If these additional flow passages are found acceptable, the surveillance program may proceed considering the single deficiency as unique and acceptable. More than one restricted flow passage per bay is evidence of abnormal degradation of the ice condenser.

c. At least once per 18 months by verifying, by a visual inspection, each ice condenser bay, that the accumulation of frost or ice on the lower inlet plenum support structures and turning vanes is restricted to a nominal thickness of 3/8 inches. An accumulation of frost and ice greater than this thickness is evidence of abnormal degradation of the ice condenser.

d. At least once per 40 months by lifting and visually inspecting the accessible portions of at least two ice baskets from each 1/3 of the ice condenser and verifying that the ice baskets are free of detrimental structural wear, cracks, corrosion or other damage. The ice baskets shall be raised at least 12 feet for this inspection.

CONTAINMENT AIR RECIRCULATION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.6.5.6 Two independent containment air recirculation systems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With one containment air recirculation system inoperable, restore the inoperable system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.5.6 Each containment air recirculation system shall be demonstrated OPERABLE at least once per 3 months on a STAGGERED TEST BASIS by:

a. Verifying that the return air fan starts on an auto-start signal after a ~~9 ± 1 minute~~ 120 ± 12 seconds delay, the motor operated valve in the suction line to the containment's lower compartment opens when the return air fan starts, and the return air fan operates for at least 15 minutes (applicable in MODES 1, 2, and 3 only),

b. Verifying that with the return air fan discharge backdraft damper locked closed and the fan motor energized, the static pressure between the fan discharge and the backdraft damper is ≥ 4.0 inches, water gauge,

c. Verifying that with the fan off, the return air fan damper opens when a force of ≤ 11 lbs is applied to the counterweight, and

d. ~~Verifying that the motor operated valve in the suction line to the containment's lower compartment opens after a 9 ± 1 minute delay.~~ Verifying that the return air fan can be manually started from the control room, and the motor operated valve in the suction line to the containment's lower compartment opens when the return air fan starts.

3/4.5.5 REFUELING WATER STORAGE TANK

The OPERABILITY of the RWST as part of the ECCS ensures that sufficient negative reactivity is injected into the core to counteract any positive increase in reactivity caused by RCS system cooldown, and ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. Reactor coolant system cooldown can be caused by inadvertent depressurization, a loss of coolant accident or a steam line rupture. Consistent with the applicable LOCA analyses, the limits on RWST minimum volume and boron concentration ensure that 1) when combined with water from melted ice, the RCS, and the accumulators, sufficient water is available within containment to permit recirculation cooling flow to the core, and 2) the reactor will remain subcritical in the cold condition following a LOCA assuming mixing of the RWST, RCS, ECCS water, andother sources of water that may eventually reside in the sump, with all control rods assumed to be out.

The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

The limits on contained water volume and boron concentration of the RWST also ensure a pH value of between 7.6 and 9.5 for the solution recirculated within containment after a LOCA. This pH band minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components.

The ECCS analyses to determine F_Q limits in Specifications 3.2.2 and 3.2.6 assumed a RWST water temperature of 70°F. This temperature value of the RWST water determines that of the spray water initially delivered to the containment following LOCA. It is one of the factors which determines the containment back-pressure in the ECCS analyses, performed in accordance with the provisions of 10 CFR 50.46 and Appendix K to 10 CFR 50.

The ECCS and containment integrity analyses assumed a maximum RWST water temperature above 100°F. Maintaining RWST water temperature at or below 100°F ensures the containment spray system will provide sufficient pressure suppression capability to limit the containment peak pressure transient to less than 12 psig, and that containment cooling will be maintained following a LOCA or steam line rupture inside containment.

3/4.6.5 ICE CONDENSER

The requirements associated with each of the components of the ice condenser ensure that the overall system will be available to provide sufficient pressure suppression capability to limit the containment peak pressure transient to less than 12 psig during LOCA conditions.

3/4.6.5.1 ICE BED

The OPERABILITY of the ice bed ensures that the required ice inventory will 1) be distributed evenly through the containment bays, 2) contain sufficient boron to preclude dilution of the containment sump following the LOCA, ~~and~~ 3) contain sufficient heat removal capability to condense the reactor system volume released during a LOCA, 4) contain sufficient water to maintain adequate sump inventory, and 5) result in a post-LOCA sump pH within the allowed range. These conditions are consistent with the assumptions used in the accident analyses.

~~The minimum weight figure of 1333 pounds of ice per basket contains a 5% conservative allowance for ice loss through sublimation. In the event that observed sublimation rates are equal to or lower than design predictions after three years of operation, the minimum ice baskets weight may be adjusted downward. In addition, the number of ice baskets required to be weighed each 18 months may be reduced after 3 years of operation if such a reduction is supported by observed sublimation data.~~

The ice, together with the containment spray, is adequate to absorb the initial blowdown of steam and water from a design basis accident and the additional heat loads that would enter containment during several hours following the initial blowdown. The additional heat loads would come from the residual heat in the reactor core, the hot piping and components, and the secondary system, including the steam generators.

Over the course of a fuel cycle, sublimation reduces the weight of ice in the ice condenser. For the ice condenser to be considered OPERABLE, the minimum as-found ice weight of 1144 pounds per ice basket, for those ice baskets selected for weighing per the surveillance requirements, must be present at the end of a fuel cycle. An instrument measurement error allowance is included in the required minimum ice basket weight. To account for loss due to sublimation, a conservative average ice bed sublimation of 10% over an eighteen-month period is used. The beginning-of-cycle, or as-left ice basket weight, is adjusted accordingly to assure the LCO limit will be met at the end of each fuel cycle.

3/4.6.5.2 ICE BED TEMPERATURE MONITORING SYSTEM

The OPERABILITY of the ice bed temperature monitoring system ensures that the capability is available for monitoring the ice temperature. In the event the monitoring system is inoperable, the ACTION requirements provide assurance that the ice bed heat removal capacity will be retained within the specified time limits.

ATTACHMENT 2B TO C1099-08

TECHNICAL SPECIFICATIONS PAGES
MARKED TO SHOW PROPOSED CHANGES

REVISED PAGES
UNIT 2

3/4 1-16
3/4 3-20
3/4 3-20a
3/4 3-25b
3/4 3-32
3/4 5-11
3/4 6-35
3/4 6-36
3/4 6-44

B 3/4 5-3
B 3/4 6-4

BORATED WATER SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.8 Each of the following borated water sources shall be OPERABLE:

a. A boric acid storage system and associated heat tracing with:

1. A minimum usable borated water volume of 5650 gallons,

2. Between 20,000 and 22,500 ppm of boron, and

3. A minimum solution temperature of 145°F.

b. The refueling water storage tank with:

1. A minimum contained volume of ~~350,000~~ 375,500 gallons of water,

2. Between 2400 and 2600 ppm of boron, and

3. A minimum solution temperature of 70°F and a maximum solution temperature of 100°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With the boric acid storage system inoperable, restore the storage system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and borated to a SHUTDOWN MARGIN equivalent to at least 1% $\Delta k/k$ at 200°F; restore the boric acid storage system to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

b. With the refueling water storage tank inoperable, restore the tank to OPERABLE status within one hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.1.2.8 Each borated water source shall be demonstrated OPERABLE:

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
7. TURBINE DRIVEN AUXILIARY FEEDWATER PUMPS					
a. Steam Generator Water Level -- Low-Low	3/Stm. Gen.	2/Stm. Gen. any 2 Stm. Gen.	2/Stm. Gen.	1, 2, 3	14*
b. Reactor Coolant Pump Bus Undervoltage	4-1/Bus	2	3	1, 2, 3	19*
8. LOSS OF POWER					
a. 4 kV Bus Loss of Voltage	3/Bus	2/Bus	2/Bus	1, 2, 3, 4	14*
b. 4 Kv Bus Degraded Voltage	3/Bus	2/Bus	2/Bus	1, 2, 3, 4	14*
9. MANUAL					
a. Safety Injection (ECCS) Feedwater Isolation Reactor Trip (SI) Containment Isolation - Phase "A" Containment Purge and Exhaust Isolation Auxiliary Feedwater Pumps Essential Service Water System	2/train	1/train	2/train	1, 2, 3, 4	18
b. Containment Spray Containment Isolation - Phase "B" Containment Purge and Exhaust Isolation ~~Containment Air Recirculation Fan~~	1/train	1/train	1/train	1, 2, 3, 4	18
c. Containment Isolation - Phase "A" Containment Purge and Exhaust Isolation	1/train	1/train	1/train	1, 2, 3, 4	18
d. Steam Line Isolation	2/steam line (1 per train)	2/steam line (1 per train)	2/operating steam line (1 per train)	1, 2, 3	20

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
e. Containment Air Recirculation Fan	1/train	1/train	1/train	1, 2, 3, 4	18
10. CONTAINMENT AIR RECIRCULATION FAN					
a. Manual	See Functional Unit 9				
b. Automatic Actuation Logic	2	1	2	1, 2, 3	13
c. Containment Pressure - High	3	2	2	1, 2, 3	14*

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
9. Manual		
a. Safety Injection (ECCS)	N.A.	N.A.
Feedwater Isolation	N.A.	N.A.
Reactor Trip (SI)	N.A.	N.A.
Containment Isolation - Phase "A"	N.A.	N.A.
Containment Purge and Exhaust Isolation	N.A.	N.A.
Auxiliary Feedwater Pumps	N.A.	N.A.
Essential Service Water System	N.A.	N.A.
b. Containment Spray	N.A.	N.A.
Containment Isolation - Phase "B"	N.A.	N.A.
Containment Purge and Exhaust Isolation	N.A.	N.A.
~~Containment Air Recirculation Fan~~		
c. Containment Isolation - Phase "A"	N.A.	N.A.
Containment Purge and Exhaust Isolation	N.A.	N.A.
d. Steam Line Isolation	N.A.	N.A.
e. Containment Air Recirculation Fan	N.A.	N.A.
10. CONTAINMENT AIR RECIRCULATION FAN		
a. Manual	See Functional Unit 9	
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c. Containment Pressure - High	Less than or equal to 1.1 psig	Less than or equal to 1.2 psig

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	TRIP ACTUATING DEVICE OPERATIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
7. TURBINE DRIVEN AUXILIARY FEEDWATER PUMPS					
a. Steam Generator Water Level--Low-Low	S	R	M	N.A.	1, 2, 3
b. Reactor Coolant Pump Bus Undervoltage	N.A.	R	M	N.A.	1, 2, 3
8. LOSS OF POWER					
a. 4 kv Bus Loss of Voltage	S	R	M	N.A.	1, 2, 3, 4
b. 4 kv Bus Degraded Voltage	S	R	M	N.A.	1, 2, 3, 4
9. Manual					
a. Safety Injection (ECCS) Feedwater Isolation Reactor Trip (SI) Containment Isolation - Phase "A" Containment Purge and Exhaust Isolation Auxiliary Feedwater Pumps Essential Service Water System	N.A.	N.A.	N.A.	R	1, 2, 3, 4
b. Containment Spray Containment Isolation - Phase "B" Containment Purge and Exhaust Isolation ~~Containment Air Recirculation Fan~~	N.A.	N.A.	N.A.	R	1, 2, 3, 4
c. Containment Isolation - Phase "A" Containment Purge and Exhaust Isolation	N.A.	N.A.	N.A.	R	1, 2, 3, 4
d. Steam Line Isolation	N.A.	N.A.	Q	R	1, 2, 3
e. Containment Air Recirculation Fan	N.A.	N.A.	N.A.	R	1, 2, 3, 4
10. CONTAINMENT AIR RECIRCULATION FAN					
a. Manual	See Functional Unit 9				
b. Automatic Actuation Logic	N.A.	N.A.	M(2)	N.A.	1, 2, 3
c. Containment Pressure - High	S	R	M(3)	N.A.	1, 2, 3

3/4.5.5 REFUELING WATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.5.5 The refueling water storage tank (RWST) shall be OPERABLE with:

a. A minimum contained volume of ~~350,000~~ 375,500 gallons of borated water.

b. Between 2400 and 2600 ppm of boron, and

c. A minimum water temperature of 70°F and a maximum water temperature of 100°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the refueling water storage tank inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.5.5 The RWST shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1. Verifying the contained borated water level in the tank, and

2. Verifying the boron concentration of the water.

b. At least once per 24 hours by verifying the RWST temperature.

3/4.6.5 ICE CONDENSER

ICE BED

LIMITING CONDITION FOR OPERATION

3.6.5.1 The ice bed shall be OPERABLE with:

a. The stored ice having boron concentration of at least 1800 ppm (the boron being in the form of sodium tetraborate), and a pH of 9.0 to 9.5 at 25°C,

b. Flow channels through the ice condenser,

c. A maximum ice bed temperature of ≤ 27°F,

d. ~~Each i~~Ice baskets containing at least ~~1333~~ 1144 lbs of ice (end-of-cycle), and

e. 1944 ice baskets.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the ice bed inoperable, restore the ice bed to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.5.1 The ice condenser shall be determined OPERABLE:

a. At least once per 12 hours by using the ice bed temperature monitoring system to verify that the maximum ice bed temperature is ≤ 27°F.

b. At least once per 18 months by:

1. Chemical analysis which verify that at least 9 representative samples of stored ice have a boron concentration of at least 1800 ppm (the boron being in the form of sodium tetraborate), and a pH of 9.0 to 9.5 at 25°C.

2. Weighing a representative sample of at least 144 ice baskets and verifying ~~that each~~ the baskets contains at least ~~1333~~ 1144 lbs of ice (end-of-cycle). The representative sample shall include 6 baskets from each of the 24 ice condenser bays and shall be constituted of one basket each from Radial Rows 1, 2, 4, 6, 8 and 9 (or from the same row of an adjacent bay if a basket from a designated row cannot be obtained for weighing) within each bay. If any basket is found to contain less than ~~1333~~ 1144 pounds of ice (end-of-cycle), a representative sample of 20 additional baskets from the same bay shall be weighed. The minimum average weight of ice from the 20 additional baskets and the discrepant basket shall not be less than ~~1333~~ 1144 pounds/basket (end-of-cycle) at a 95% level of confidence.

SURVEILLANCE REQUIREMENTS (Continued)

The ice condenser shall also be subdivided into 3 groups of baskets, as follows: Group 1 - bays 1 through 8, Group 2 - bays 9 through 16, and Group 3 - bays 17 through 24. The minimum average ice weight of the sample baskets from Radial Rows 1, 2, 4, 6, 8 and 9 in each group shall not be less than ~~1333~~ 1144 pounds/basket (end-of-cycle) at a 95% level of confidence.

The minimum total ice condenser ice weight at a 95% level of confidence shall be calculated using all ice basket weights determined during this weighing program and shall not be less than ~~2,590,000~~ 2,222,000 pounds (end-of-cycle).

3. Verifying, by a visual inspection of at least two flow passages per ice condenser bay, that the accumulation of frost or ice on the top deck floor grating, on the intermediate deck and on flow passages between ice baskets and past lattice frames is restricted to a nominal thickness of 3/8 inches. If one flow passage per bay is found to have an accumulation of frost or ice greater than this thickness, a representative sample of 20 additional flow passages from the same bay shall be visually inspected. If these additional flow passages are found acceptable, the surveillance program may proceed considering the single deficiency as unique and acceptable. More than one restricted flow passage per bay is evidence of abnormal degradation of the ice condenser.

c. At least once per 18 months by verifying, by a visual inspection, each ice condenser bay, that the accumulation of frost or ice on the lower inlet plenum support structures and turning vanes is restricted to a nominal thickness of 3/8 inches. An accumulation of frost and ice greater than this thickness is evidence of abnormal degradation of the ice condenser.

d. At least once per 40 months by lifting and visually inspecting the accessible portions of at least two ice baskets from each 1/3 of the ice condenser and verifying that the ice baskets are free of detrimental structural wear, cracks, corrosion or other damage. The ice baskets shall be raised at least 12 feet for this inspection.

CONTAINMENT AIR RECIRCULATION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.6.5.6 Two independent containment air recirculation systems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With one containment air recirculation system inoperable, restore the inoperable system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.5.6 Each containment air recirculation system shall be demonstrated OPERABLE at least once per 3 months on a STAGGERED TEST BASIS by:

a. Verifying that the return air fan starts on an auto-start signal after a ~~9 ± 1 minute~~ 120 ± 12 seconds delay, the motor operated valve in the suction line to the containment's lower compartment opens when the return air fan starts, and the return air fan operates for at least 15 minutes (applicable in MODES 1, 2, and 3 only),

b. Verifying that with the return air fan discharge backdraft damper locked closed and the fan motor energized, the static pressure between the fan discharge and the backdraft damper is ≥ 4.0 inches, water gauge,

c. Verifying that with the fan off, the return air fan damper opens when a force of ≤ 11 lbs is applied to the counterweight, and

d. ~~Verifying that the motor operated valve in the suction line to the containment's lower compartment opens after a 9 ± 1 minute delay.~~ Verifying that the return air fan can be manually started from the control room, and the motor operated valve in the suction line to the containment's lower compartment opens when the return air fan starts.

3/4.5.5 REFUELING WATER STORAGE TANK

The OPERABILITY of the RWST as part of the ECCS ensures that sufficient negative reactivity is injected into the core to counteract any positive increase in reactivity caused by RCS system cooldown, and ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. Reactor coolant system cooldown can be caused by inadvertent depressurization, a LOCA or a steam line rupture. Consistent with the applicable LOCA analyses, the limits on RWST minimum volume and boron concentration ensure that 1) when combined with water from melted ice, the RCS, and the accumulators, sufficient water is available within containment to permit recirculation cooling flow to the core, and 2) the reactor will remain subcritical in the cold condition following a LOCA assuming mixing of the RWST, RCS, ECCS water, and other sources of water that may eventually reside in the sump, with all control rods assumed to be out.

The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

The limits on contained water volume and boron concentration of the RWST also ensure a pH value of between 7.6 and 9.5 for the solution recirculated within containment after a LOCA. This pH band minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components.

The ECCS analyses to determine F_Q limits in Specifications 3.2.2 and 3.2.6 assumed a RWST water temperature of 70°F. This temperature value of the RWST water determines that of the spray water initially delivered to the containment following LOCA. It is one of the factors which determines the containment back-pressure in the ECCS analyses, performed in accordance with the provisions of 10 CFR 50.46 and Appendix K to 10 CFR 50.

The ECCS and containment integrity analyses assumed a maximum RWST water temperature above 100°F. Maintaining RWST water temperature at or below 100°F ensures the containment spray system will provide sufficient pressure suppression capability to limit the containment peak pressure transient to less than 12 psig, and that containment cooling will be maintained following a LOCA or steam line rupture inside containment.

3/4.6.4 COMBUSTIBLE GAS CONTROL

The OPERABILITY of the equipment and systems required for the detection and control of hydrogen gas ensures that this equipment will be available to maintain the hydrogen concentration within containment below its flammable limit during post-LOCA conditions. Either recombiner unit is capable of controlling the expected hydrogen generation associated with: 1) zirconium-water reactions; 2) radiolytic decomposition of water; and 3) corrosion of metals within containment. These hydrogen control systems are consistent with the recommendations of Regulatory Guide 1.7, "Control of Combustible Gas Concentrations in Containment Following a LOCA," March 1971.

The acceptance criterion of 10,000 ohms is based on the test being performed with the heater element at an ambient temperature, but can be conservatively applied when the heater element is at a temperature above ambient.

3/4.6.5 ICE CONDENSER

The requirements associated with each of the components of the ice condenser ensure that the overall system will be available to provide sufficient pressure suppression capability to limit the containment peak pressure transient to less than 12 psig during LOCA conditions.

3/4.6.5.1 ICE BED

The OPERABILITY of the ice bed ensures that the required ice inventory will 1) be distributed evenly through the containment bays, 2) contain sufficient boron to preclude dilution of the containment sump following the LOCA, ~~and~~ 3) contain sufficient heat removal capability to condense the reactor system volume released during a LOCA, 4) contain sufficient water to maintain adequate sump inventory, and 5) result in a post-LOCA sump pH within the allowed range. These conditions are consistent with the assumptions used in the accident analyses.

~~The minimum weight figure of 1333 pounds of ice per basket contains a 5% conservative allowance for ice loss through sublimation. In the event that observed sublimation rates are equal to or lower than design predictions after three years of operation, the minimum ice baskets weight may be adjusted downward. In addition, the number of ice baskets required to be weighed each 18 months may be reduced after 3 years of operation if such a reduction is supported by observed sublimation data.~~

The ice, together with the containment spray, is adequate to absorb the initial blowdown of steam and water from a design basis accident and the additional heat loads that would enter containment during several hours following the initial blowdown. The additional heat loads would come from the residual heat in the reactor core, the hot piping and components, and the secondary system, including the steam generators.

Over the course of a fuel cycle, sublimation reduces the weight of ice in the ice condenser. For the ice condenser to be considered OPERABLE, the minimum as-found ice weight of 1144 pounds per ice basket, for those ice baskets selected for weighing per the surveillance requirements, must be present at the end of a fuel cycle. An instrument measurement error allowance is included in the required minimum ice basket weight. To account for loss due to sublimation, a conservative average ice bed sublimation of 10% over an eighteen-month period is used. The beginning-of-cycle, or as-left ice basket weight, is adjusted accordingly to assure the LCO limit willbe met at the end of each fuel cycle.

3/4.6.5.2 ICE BED TEMPERATURE MONITORING SYSTEM

The OPERABILITY of the ice bed temperature monitoring system ensures that the capability is available for monitoring the ice temperature. In the event the monitoring system is inoperable, the ACTION requirements provide assurance that the ice bed heat removal capacity will be retained within the specified time limits.

ATTACHMENT 3A TO C1099-08

PROPOSED TECHNICAL SPECIFICATIONS PAGES

REVISED PAGES
UNIT 1

3/4 1-16
3/4 3-21b
3/4 3-26b
3/4 3-33b
3/4 5-11
3/4 6-26
3/4 6-27
3/4 6-35

B 3/4 5-3
B 3/4 6-4

BORATED WATER SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.8 Each of the following borated water sources shall be OPERABLE:

a. A boric acid storage system and associated heat tracing with:

1. A minimum usable borated water volume of 5650 gallons,

2. Between 20,000 and 22,500 ppm of boron, and

3. A minimum solution temperature of 145°F.

b. The refueling water storage tank with:

1. A minimum contained volume of 375,500 gallons of water,

2. Between 2400 and 2600 ppm of boron, and

3. A minimum solution temperature of 70°F and a maximum solution temperature of 100°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With the boric acid storage system inoperable, restore the storage system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and borated to a SHUTDOWN MARGIN equivalent to at least 1% $\Delta k/k$ at 200°F; restore the boric acid storage system to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

b. With the refueling water storage tank inoperable, restore the tank to OPERABLE status within one hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.1.2.8 Each borated water source shall be demonstrated OPERABLE:

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
9. MANUAL					
a. Safety Injection (ECCS) Feedwater Isolation Reactor Trip (SI) Containment Isolation - Phase "A" Containment Purge and Exhaust Isolation Auxiliary Feedwater Pumps Essential Service Water System	2/train	1/train	2/train	1, 2, 3, 4	18
b. Containment Spray Containment Isolation - Phase "B" Containment Purge and Exhaust Isolation	1/train	1/train	1/train	1, 2, 3, 4	18
c. Containment Isolation - Phase "A" Containment Purge and Exhaust Isolation	1/train	1/train	1/train	1, 2, 3, 4	18
d. Steam Line Isolation	2/steam line (1 per train)	2/steam line (1 per train)	2/operating steam line (1 per train)	1, 2, 3	20
e. Containment Air Recirculation Fan	1/train	1/train	1/train	1, 2, 3, 4	18
10. CONTAINMENT AIR RECIRCULATION FAN					
a. Manual	See Functional Unit 9				
b. Automatic Actuation Logic	2	1	2	1, 2, 3	13
c. Containment Pressure - High	3	2	2	1, 2, 3	14*

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
9. Manual		
a. Safety Injection (ECCS)	N.A.	N.A.
Feedwater Isolation	N.A.	N.A.
Reactor Trip (SI)	N.A.	N.A.
Containment Isolation - Phase "A"	N.A.	N.A.
Containment Purge and Exhaust Isolation	N.A.	N.A.
Auxiliary Feedwater Pumps	N.A.	N.A.
Essential Service Water System	N.A.	N.A.
b. Containment Spray	N.A.	N.A.
Containment Isolation - Phase "B"	N.A.	N.A.
Containment Purge and Exhaust Isolation	N.A.	N.A.
c. Containment Isolation - Phase "A"	N.A.	N.A.
Containment Purge and Exhaust Isolation	N.A.	N.A.
d. Steam Line Isolation	N.A.	N.A.
e. Containment Air Recirculation Fan	N.A.	N.A.
10. CONTAINMENT AIR RECIRCULATION FAN		
a. Manual	------------------------------ See Functional Unit 9 ----------------------------	
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c. Containment Pressure - High	Less than or equal to 1.1 psig	Less than or equal to 1.2 psig

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	TRIP ACTUATING DEVICE OPERATIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
9. Manual					
a. Safety Injection (ECCS) Feedwater Isolation Reactor Trip (SI) Containment Isolation - Phase "A" Containment Purge and Exhaust Isolation Auxiliary Feedwater Pumps Essential Service Water System	N.A.	N.A.	N.A.	R	1, 2, 3, 4
b. Containment Spray Containment Isolation - Phase "B" Containment Purge and Exhaust Isolation	N.A.	N.A.	N.A.	R	1, 2, 3, 4
c. Containment Isolation - Phase "A" Containment Purge and Exhaust Isolation	N.A.	N.A.	N.A.	R	1, 2, 3, 4
d. Steam Line Isolation	N.A.	N.A.	Q	R	1, 2, 3
e. Containment Air Recirculation Fan	N.A.	N.A.	N.A.	R	1, 2, 3, 4
10. CONTAINMENT AIR RECIRCULATION FAN					
a. Manual	See Functional Unit 9				
b. Automatic Actuation Logic	N.A.	N.A.	M(2)	N.A.	1, 2, 3
c. Containment Pressure - High	S	R	M(3)	N.A.	1, 2, 3

3/4.5.5 REFUELING WATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.5.5 The refueling water storage tank (RWST) shall be OPERABLE with:

a. A minimum contained volume of 375,500 gallons of borated water.

b. Between 2400 and 2600 ppm of boron, and

c. A minimum water temperature of 70°F and a maximum water temperature of 100°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the refueling water storage tank inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.5.5 The RWST shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1. Verifying the contained borated water level in the tank, and

2. Verifying the boron concentration of the water.

b. At least once per 24 hours by verifying the RWST temperature.

3/4.6.5 ICE CONDENSER

ICE BED

LIMITING CONDITION FOR OPERATION

3.6.5.1 The ice bed shall be OPERABLE with:

a. The stored ice having boron concentration of at least 1800 ppm (the boron being in the form of sodium tetraborate), and a pH of 9.0 to 9.5 at 25°C,

b. Flow channels through the ice condenser,

c. A maximum ice bed temperature of ≤ 27°F,

d. Ice baskets containing at least 1144 lbs of ice (end-of-cycle), and

e. 1944 ice baskets.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the ice bed inoperable, restore the ice bed to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.5.1 The ice condenser shall be determined OPERABLE:

a. At least once per 12 hours by using the ice bed temperature monitoring system to verify that the maximum ice bed temperature is ≤ 27°F.

b. At least once per 18 months by:

1. Chemical analysis which verify that at least 9 representative samples of stored ice have a boron concentration of at least 1800 ppm (the boron being in the form of sodium tetraborate), and a pH of 9.0 to 9.5 at 25°C.

2. Weighing a representative sample of at least 144 ice baskets and verifying the baskets contain at least 1144 lbs of ice (end-of-cycle). The representative sample shall include 6 baskets from each of the 24 ice condenser bays and shall be constituted of one basket each from Radial Rows 1, 2, 4, 6, 8 and 9 (or from the same row of an adjacent bay if a basket from a designated row cannot be obtained for weighing) within each bay. If any basket is found to contain less than 1144 pounds of ice (end-of-cycle), a representative sample of 20 additional baskets from the same bay shall be weighed. The minimum average weight of ice from the 20 additional baskets and the discrepant basket shall not be less than 1144 pounds/basket (end-of-cycle) at a 95% level of confidence.

SURVEILLANCE REQUIREMENTS (Continued)

The ice condenser shall also be subdivided into 3 groups of baskets, as follows: Group 1 - bays 1 through 8, Group 2 - bays 9 through 16, and Group 3 - bays 17 through 24. The minimum average ice weight of the sample baskets from Radial Rows 1, 2, 4, 6, 8 and 9 in each group shall not be less than 1144 pounds/basket (end-of-cycle) at a 95% level of confidence.

The minimum total ice condenser ice weight at a 95% level of confidence shall be calculated using all ice basket weights determined during this weighing program and shall not be less than 2,222,000 pounds (end-of-cycle).

3. Verifying, by a visual inspection of at least two flow passages per ice condenser bay, that the accumulation of frost or ice on the top deck floor grating, on the intermediate deck and on flow passages between ice baskets and past lattice frames is restricted to a nominal thickness of 3/8 inches. If one flow passage per bay is found to have an accumulation of frost or ice greater than this thickness, a representative sample of 20 additional flow passages from the same bay shall be visually inspected. If these additional flow passages are found acceptable, the surveillance program may proceed considering the single deficiency as unique and acceptable. More than one restricted flow passage per bay is evidence of abnormal degradation of the ice condenser.

c. At least once per 18 months by verifying, by a visual inspection, each ice condenser bay, that the accumulation of frost or ice on the lower inlet plenum support structures and turning vanes is restricted to a nominal thickness of 3/8 inches. An accumulation of frost and ice greater than this thickness is evidence of abnormal degradation of the ice condenser.

d. At least once per 40 months by lifting and visually inspecting the accessible portions of at least two ice baskets from each 1/3 of the ice condenser and verifying that the ice baskets are free of detrimental structural wear, cracks, corrosion or other damage. The ice baskets shall be raised at least 12 feet for this inspection.

CONTAINMENT AIR RECIRCULATION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.6.5.6 Two independent containment air recirculation systems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With one containment air recirculation system inoperable, restore the inoperable system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.5.6 Each containment air recirculation system shall be demonstrated OPERABLE at least once per 3 months on a STAGGERED TEST BASIS by:

a. Verifying that the return air fan starts on an auto-start signal after a 120 ± 12 seconds delay, the motor operated valve in the suction line to the containment's lower compartment opens when the return air fan starts, and the return air fan operates for at least 15 minutes (applicable in MODES 1, 2, and 3 only),

b. Verifying that with the return air fan discharge backdraft damper locked closed and the fan motor energized, the static pressure between the fan discharge and the backdraft damper is ≥ 4.0 inches, water gauge,

c. Verifying that with the fan off, the return air fan damper opens when a force of ≤ 11 lbs is applied to the counterweight, and

d. Verifying that the return air fan can be manually started from the control room, and the motor operated valve in the suction line to the containment's lower compartment opens when the return air fan starts.

3/4.5.5 REFUELING WATER STORAGE TANK

The OPERABILITY of the RWST as part of the ECCS ensures that sufficient negative reactivity is injected into the core to counteract any positive increase in reactivity caused by RCS system cooldown, and ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. Reactor coolant system cooldown can be caused by inadvertent depressurization, a loss of coolant accident or a steam line rupture. Consistent with the applicable LOCA analyses, the limits on RWST minimum volume and boron concentration ensure that 1) when combined with water from melted ice, the RCS, and the accumulators, sufficient water is available within containment to permit recirculation cooling flow to the core, and 2) the reactor will remain subcritical in the cold condition following a LOCA assuming mixing of the RWST, RCS, ECCS water, and other sources of water that may eventually reside in the sump, with all control rods assumed to be out.

The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

The limits on contained water volume and boron concentration of the RWST also ensure a pH value of between 7.6 and 9.5 for the solution recirculated within containment after a LOCA. This pH band minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components.

The ECCS analyses to determine F_Q limits in Specifications 3.2.2 and 3.2.6 assumed a RWST water temperature of 70°F. This temperature value of the RWST water determines that of the spray water initially delivered to the containment following LOCA. It is one of the factors which determines the containment back-pressure in the ECCS analyses, performed in accordance with the provisions of 10 CFR 50.46 and Appendix K to 10 CFR 50.

The ECCS and containment integrity analyses assumed a maximum RWST water temperature above 100°F. Maintaining RWST water temperature at or below 100°F ensures the containment spray system will provide sufficient pressure suppression capability to limit the containment peak pressure transient to less than 12 psig, and that containment cooling will be maintained following a LOCA or steam line rupture inside containment.

3/4.6.5 ICE CONDENSER

The requirements associated with each of the components of the ice condenser ensure that the overall system will be available to provide sufficient pressure suppression capability to limit the containment peak pressure transient to less than 12 psig during LOCA conditions.

3/4.6.5.1 ICE BED

The OPERABILITY of the ice bed ensures that the required ice inventory will 1) be distributed evenly through the containment bays, 2) contain sufficient boron to preclude dilution of the containment sump following the LOCA, 3) contain sufficient heat removal capability to condense the reactor system volume released during a LOCA, 4) contain sufficient water to maintain adequate sump inventory, and 5) result in a post-LOCA sump pH within the allowed range. These conditions are consistent with the assumptions used in the accident analyses.

The ice, together with the containment spray, is adequate to absorb the initial blowdown of steam and water from a design basis accident and the additional heat loads that would enter containment during several hours following the initial blowdown. The additional heat loads would come from the residual heat in the reactor core, the hot piping and components, and the secondary system, including the steam generators.

Over the course of a fuel cycle, sublimation reduces the weight of ice in the ice condenser. For the ice condenser to be considered OPERABLE, the minimum as-found ice weight of 1144 pounds per ice basket, for those ice baskets selected for weighing per the surveillance requirements, must be present at the end of a fuel cycle. An instrument measurement error allowance is included in the required minimum ice basket weight. To account for loss due to sublimation, a conservative average ice bed sublimation of 10% over an eighteen-month period is used. The beginning-of-cycle, or as-left ice basket weight, is adjusted accordingly to assure the LCO limit will be met at the end of each fuel cycle.

3/4.6.5.2 ICE BED TEMPERATURE MONITORING SYSTEM

The OPERABILITY of the ice bed temperature monitoring system ensures that the capability is available for monitoring the ice temperature. In the event the monitoring system is inoperable, the ACTION requirements provide assurance that the ice bed heat removal capacity will be retained within the specified time limits.

ATTACHMENT 3B TO C1099-08

PROPOSED TECHNICAL SPECIFICATIONS PAGES

REVISED PAGES
UNIT 2

3/4 1-16
3/4 3-20
3/4 3-20a
3/4 3-25b
3/4 3-32
3/4 5-11
3/4 6-35
3/4 6-36
3/4 6-44

B 3/4 5-3
B 3/4 6-4

BORATED WATER SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.8 Each of the following borated water sources shall be OPERABLE:

a. A boric acid storage system and associated heat tracing with:

1. A minimum usable borated water volume of 5650 gallons,

2. Between 20,000 and 22,500 ppm of boron, and

3. A minimum solution temperature of 145°F.

b. The refueling water storage tank with:

1. A minimum contained volume of 375,500 gallons of water,

2. Between 2400 and 2600 ppm of boron, and

3. A minimum solution temperature of 70°F and a maximum solution temperature of 100°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With the boric acid storage system inoperable, restore the storage system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and borated to a SHUTDOWN MARGIN equivalent to at least 1% Δk/k at 200°F; restore the boric acid storage system to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

b. With the refueling water storage tank inoperable, restore the tank to OPERABLE status within one hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.1.2.8 Each borated water source shall be demonstrated OPERABLE:

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
7. TURBINE DRIVEN AUXILIARY FEEDWATER PUMPS					
a. Steam Generator Water Level -- Low-Low	3/Stm. Gen.	2/Stm. Gen. any 2 Stm. Gen.	2/Stm. Gen.	1, 2, 3	14*
b. Reactor Coolant Pump Bus Undervoltage	4-1/Bus	2	3	1, 2, 3	19*
8. LOSS OF POWER					
a. 4 kV Bus Loss of Voltage	3/Bus	2/Bus	2/Bus	1, 2, 3, 4	14*
b. 4 Kv Bus Degraded Voltage	3/Bus	2/Bus	2/Bus	1, 2, 3, 4	14*
9. MANUAL					
a. Safety Injection (ECCS) Feedwater Isolation Reactor Trip (SI) Containment Isolation - Phase "A" Containment Purge and Exhaust Isolation Auxiliary Feedwater Pumps Essential Service Water System	2/train	1/train	2/train	1, 2, 3, 4	18
b. Containment Spray Containment Isolation - Phase "B" Containment Purge and Exhaust Isolation	1/train	1/train	1/train	1, 2, 3, 4	18
c. Containment Isolation - Phase "A" Containment Purge and Exhaust Isolation	1/train	1/train	1/train	1, 2, 3, 4	18
d. Steam Line Isolation	2/steam line (1 per train)	2/steam line (1 per train)	2/operating steam line (1 per train)	1, 2, 3	20

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
e. Containment Air Recirculation Fan	1/train	1/train	1/train	1, 2, 3, 4	18
10. CONTAINMENT AIR RECIRCULATION FAN					
a. Manual	---------- See Functional Unit 9 ----------				
b. Automatic Actuation Logic	2	1	2	1, 2, 3	13
c. Containment Pressure - High	3	2	2	1, 2, 3	14*

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
9. Manual		
a. Safety Injection (ECCS)	N.A.	N.A.
Feedwater Isolation	N.A.	N.A.
Reactor Trip (SI)	N.A.	N.A.
Containment Isolation - Phase "A"	N.A.	N.A.
Containment Purge and Exhaust Isolation	N.A.	N.A.
Auxiliary Feedwater Pumps	N.A.	N.A.
Essential Service Water System	N.A.	N.A.
b. Containment Spray	N.A.	N.A.
Containment Isolation - Phase "B"	N.A.	N.A.
Containment Purge and Exhaust Isolation	N.A.	N.A.
c. Containment Isolation - Phase "A"	N.A.	N.A.
Containment Purge and Exhaust Isolation	N.A.	N.A.
d. Steam Line Isolation	N.A.	N.A.
e. Containment Air Recirculation Fan	N.A.	N.A.
10. CONTAINMENT AIR RECIRCULATION FAN		
a. Manual	------------------------------ See Functional Unit 9 ------------------------------	
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c. Containment Pressure - High	Less than or equal to 1.1 psig	Less than or equal to 1.2 psig

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	TRIP ACTUATING DEVICE OPERATIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
7. TURBINE DRIVEN AUXILIARY FEEDWATER PUMPS					
a. Steam Generator Water Level-- Low-Low	S	R	M	N.A.	1, 2, 3
b. Reactor Coolant Pump Bus Undervoltage	N.A.	R	M	N.A.	1, 2, 3
8. LOSS OF POWER					
a. 4 kv Bus Loss of Voltage	S	R	M	N.A.	1, 2, 3, 4
b. 4 kv Bus Degraded Voltage	S	R	M	N.A.	1, 2, 3, 4
9. Manual					
a. Safety Injection (ECCS) Feedwater Isolation Reactor Trip (SI) Containment Isolation - Phase "A" Containment Purge and Exhaust Isolation Auxiliary Feedwater Pumps Essential Service Water System	N.A.	N.A.	N.A.	R	1, 2, 3, 4
b. Containment Spray Containment Isolation - Phase "B" Containment Purge and Exhaust Isolation	N.A.	N.A.	N.A.	R	1, 2, 3, 4
c. Containment Isolation - Phase "A" Containment Purge and Exhaust Isolation	N.A.	N.A.	N.A.	R	1, 2, 3, 4
d. Steam Line Isolation	N.A.	N.A.	Q	R	1, 2, 3
e. Containment Air Recirculation Fan	N.A.	N.A.	N.A.	R	1, 2, 3, 4
10. CONTAINMENT AIR RECIRCULATION FAN					
a. Manual	See Functional Unit 9				
b. Automatic Actuation Logic	N.A.	N.A.	M(2)	N.A.	1, 2, 3
c. Containment Pressure - High	S	R	M(3)	N.A.	1, 2, 3

3/4.5.5 REFUELING WATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.5.5 The refueling water storage tank (RWST) shall be OPERABLE with:

a. A minimum contained volume of 375,500 gallons of borated water.

b. Between 2400 and 2600 ppm of boron, and

c. A minimum water temperature of 70°F and a maximum water temperature of 100°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the refueling water storage tank inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.5.5 The RWST shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1. Verifying the contained borated water level in the tank, and

2. Verifying the boron concentration of the water.

b. At least once per 24 hours by verifying the RWST temperature.

3/4.6.5 ICE CONDENSER

ICE BED

LIMITING CONDITION FOR OPERATION

3.6.5.1 The ice bed shall be OPERABLE with:

a. The stored ice having boron concentration of at least 1800 ppm (the boron being in the form of sodium.tetraborate), and a pH of 9.0 to 9.5 at 25°C,

b. Flow channels through the ice condenser,

c. A maximum ice bed temperature of ≤ 27°F,

d. Ice baskets containing at least 1144 lbs of ice (end-of-cycle), and

e. 1944 ice baskets.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the ice bed inoperable, restore the ice bed to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.5.1 The ice condenser shall be determined OPERABLE:

a. At least once per 12 hours by using the ice bed temperature monitoring system to verify that the maximum ice bed temperature is ≤ 27°F.

b. At least once per 18 months by:

1. Chemical analysis which verify that at least 9 representative samples of stored ice have a boron concentration of at least 1800 ppm (the boron being in the form of sodium tetraborate), and a pH of 9.0 to 9.5 at 25°C.

2. Weighing a representative sample of at least 144 ice baskets and verifying the baskets contain at least 1144 lbs of ice (end-of-cycle). The representative sample shall include 6 baskets from each of the 24 ice condenser bays and shall be constituted of one basket each from Radial Rows 1, 2, 4, 6, 8 and 9 (or from the same row of an adjacent bay if a basket from a designated row cannot be obtained for weighing) within each bay. If any basket is found to contain less than 1144 pounds of ice (end-of-cycle), a representative sample of 20 additional baskets from the same bay shall be weighed. The minimum average weight of ice from the 20 additional baskets and the discrepant basket shall not be less than 1144 pounds/basket (end-of-cycle) at a 95% level of confidence.

SURVEILLANCE REQUIREMENTS (Continued)

The ice condenser shall also be subdivided into 3 groups of baskets, as follows: Group 1 - bays 1 through 8, Group 2 - bays 9 through 16, and Group 3 - bays 17 through 24. The minimum average ice weight of the sample baskets from Radial Rows 1, 2, 4, 6, 8 and 9 in each group shall not be less than 1144 pounds/basket (end-of-cycle) at a 95% level of confidence.

The minimum total ice condenser ice weight at a 95% level of confidence shall be calculated using all ice basket weights determined during this weighing program and shall not be less than 2,222,000 pounds (end-of-cycle).

3. Verifying, by a visual inspection of at least two flow passages per ice condenser bay, that the accumulation of frost or ice on the top deck floor grating, on the intermediate deck and on flow passages between ice baskets and past lattice frames is restricted to a nominal thickness of 3/8 inches. If one flow passage per bay is found to have an accumulation of frost or ice greater than this thickness, a representative sample of 20 additional flow passages from the same bay shall be visually inspected. If these additional flow passages are found acceptable, the surveillance program may proceed considering the single deficiency as unique and acceptable. More than one restricted flow passage per bay is evidence of abnormal degradation of the ice condenser.

c. At least once per 18 months by verifying, by a visual inspection, each ice condenser bay, that the accumulation of frost or ice on the lower inlet plenum support structures and turning vanes is restricted to a nominal thickness of 3/8 inches. An accumulation of frost and ice greater than this thickness is evidence of abnormal degradation of the ice condenser.

d. At least once per 40 months by lifting and visually inspecting the accessible portions of at least two ice baskets from each 1/3 of the ice condenser and verifying that the ice baskets are free of detrimental structural wear, cracks, corrosion or other damage. The ice baskets shall be raised at least 12 feet for this inspection.

CONTAINMENT AIR RECIRCULATION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.6.5.6 Two independent containment air recirculation systems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With one containment air recirculation system inoperable, restore the inoperable system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.5.6 Each containment air recirculation system shall be demonstrated OPERABLE at least once per 3 months on a STAGGERED TEST BASIS by:

a. Verifying that the return air fan starts on an auto-start signal after a 120 ± 12 seconds delay, the motor operated valve in the suction line to the containment's lower compartment opens when the return air fan starts, and the return air fan operates for at least 15 minutes (applicable in MODES 1, 2, and 3 only),

b. Verifying that with the return air fan discharge backdraft damper locked closed and the fan motor energized, the static pressure between the fan discharge and the backdraft damper is ≥ 4.0 inches, water gauge,

c. Verifying that with the fan off, the return air fan damper opens when a force of ≤ 11 lbs is applied to the counterweight, and

d. Verifying that the return air fan can be manually started from the control room, and the motor operated valve in the suction line to the containment's lower compartment opens when the return air fan starts.

3/4.5.5 REFUELING WATER STORAGE TANK

The OPERABILITY of the RWST as part of the ECCS ensures that sufficient negative reactivity is injected into the core to counteract any positive increase in reactivity caused by RCS system cooldown, and ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. Reactor coolant system cooldown can be caused by inadvertent depressurization, a LOCA or a steam line rupture. Consistent with the applicable LOCA analyses, the limits on RWST minimum volume and boron concentration ensure that 1) when combined with water from melted ice, the RCS, and the accumulators, sufficient water is available within containment to permit recirculation cooling flow to the core, and 2) the reactor will remain subcritical in the cold condition following a LOCA assuming mixing of the RWST, RCS, ECCS water, and other sources of water that may eventually reside in the sump, with all control rods assumed to be out.

The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

The limits on contained water volume and boron concentration of the RWST also ensure a pH value of between 7.6 and 9.5 for the solution recirculated within containment after a LOCA. This pH band minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components.

The ECCS analyses to determine F_Q limits in Specifications 3.2.2 and 3.2.6 assumed a RWST water temperature of 70°F. This temperature value of the RWST water determines that of the spray water initially delivered to the containment following LOCA. It is one of the factors which determines the containment back-pressure in the ECCS analyses, performed in accordance with the provisions of 10 CFR 50.46 and Appendix K to 10 CFR 50.

The ECCS and containment integrity analyses assumed a maximum RWST water temperature above 100°F. Maintaining RWST water temperature at or below 100°F ensures the containment spray system will provide sufficient pressure suppression capability to limit the containment peak pressure transient to less than 12 psig, and that containment cooling will be maintained following a LOCA or steam line rupture inside containment.

3/4.6.4 COMBUSTIBLE GAS CONTROL

The OPERABILITY of the equipment and systems required for the detection and control of hydrogen gas ensures that this equipment will be available to maintain the hydrogen concentration within containment below its flammable limit during post-LOCA conditions. Either recombiner unit is capable of controlling the expected hydrogen generation associated with: 1) zirconium-water reactions; 2) radiolytic decomposition of water; and 3) corrosion of metals within containment. These hydrogen control systems are consistent with the recommendations of Regulatory Guide 1.7, "Control of Combustible Gas Concentrations in Containment Following a LOCA," March 1971.

The acceptance criterion of 10,000 ohms is based on the test being performed with the heater element at an ambient temperature, but can be conservatively applied when the heater element is at a temperature above ambient.

3/4.6.5 ICE CONDENSER

The requirements associated with each of the components of the ice condenser ensure that the overall system will be available to provide sufficient pressure suppression capability to limit the containment peak pressure transient to less than 12 psig during LOCA conditions.

3/4.6.5.1 ICE BED

The OPERABILITY of the ice bed ensures that the required ice inventory will 1) be distributed evenly through the containment bays, 2) contain sufficient boron to preclude dilution of the containment sump following the LOCA, 3) contain sufficient heat removal capability to condense the reactor system volume released during a LOCA, 4) contain sufficient water to maintain adequate sump inventory, and 5) result in a post-LOCA sump pH within the allowed range. These conditions are consistent with the assumptions used in the accident analyses.

The ice, together with the containment spray, is adequate to absorb the initial blowdown of steam and water from a design basis accident and the additional heat loads that would enter containment during several hours following the initial blowdown. The additional heat loads would come from the residual heat in the reactor core, the hot piping and components, and the secondary system, including the steam generators.

Over the course of a fuel cycle, sublimation reduces the weight of ice in the ice condenser. For the ice condenser to be considered OPERABLE, the minimum as-found ice weight of 1144 pounds per ice basket, for those ice baskets selected for weighing per the surveillance requirements, must be present at the end of a fuel cycle. An instrument measurement error allowance is included in the required minimum ice basket weight. To account for loss due to sublimation, a conservative average ice bed sublimation of 10% over an eighteen-month period is used. The beginning-of-cycle, or as-left ice basket weight, is adjusted accordingly to assure the LCO limit will be met at the end of each fuel cycle.

3/4.6.5.2 ICE BED TEMPERATURE MONITORING SYSTEM

The OPERABILITY of the ice bed temperature monitoring system ensures that the capability is available for monitoring the ice temperature. In the event the monitoring system is inoperable, the ACTION requirements provide assurance that the ice bed heat removal capacity will be retained within the specified time limits.

ATTACHMENT 4 TO C1099-08

NO SIGNIFICANT HAZARDS CONSIDERATION EVALUATION

Indiana Michigan Power Company (I&M) has evaluated this proposed amendment and determined that it does not involve a significant hazard. According to 10 CFR 50.92(c), a proposed amendment to an operating license does not involve a significant hazard if operation of the facility in accordance with the proposed amendment would not:

1. involve a significant increase in the probability of occurrence or consequences of an accident previously evaluated;

2. create the possibility of a new or different kind of accident from any previously analyzed; or

3. involve a significant reduction in a margin of safety.

The proposed request would revise Technical Specifications (T/S) related to better ensuring sufficient water inventory in the containment recirculation sump during and following switchover to cold leg recirculation following a postulated loss-of-coolant accident (LOCA). Switchover to cold leg recirculation involves realigning the suction source for the emergency core cooling system (ECCS) and containment spray system (CTS) pumps from the refueling water storage tank (RWST) to the containment recirculation sump.

I&M has determined that, for certain small break LOCA scenarios, there may not be sufficient containment recirculation sump water inventory to support continued operation of the ECCS and CTS pumps during and following switchover to cold leg recirculation. The cause of this deficiency includes design features of the internal lower containment compartments that cause significant amounts of water to be diverted from, and not to be made available to, the containment recirculation sump.

A combination of physical plant modifications, new analyses of containment recirculation sump inventory, and resultant changes to the accident analyses are necessary to ensure sufficient water inventory in the containment recirculation sump. The planned modifications result in increasing the amount of water delivered to the reactor coolant system (RCS) and containment following a LOCA, and increasing the amount of ice melt from the ice condenser during the early stages of a LOCA. New containment recirculation sump inventory analyses have been performed that reflect the planned modifications and verify sufficient inventory is available in the containment recirculation sump following a LOCA after implementation of the proposed changes. Finally, the accident analyses have been evaluated, and revised as necessary, to reflect the planned modifications and proposed T/S. These planned modifications and analyses result in the following proposed changes to the T/S.

The required RWST contained inventory is being increased to address the new minimum deliverable borated water volume used in the containment recirculation sump water inventory

analyses and accident analyses. In addition, a conservative maximum RWST solution temperature is being added to the existing T/S to ensure the value used in the accident analyses remains bounding.

The engineered safety features actuation system (ESFAS) initiating signal and time delay to start the containment air recirculation/hydrogen skimmer (CEQ) fans and open associated valves are being revised to maximize the resultant ice condenser ice melt rate following a LOCA. This assures sufficient containment recirculation sump water inventory following a small break LOCA.

The minimum required ice weight in the ice condenser is being revised to reflect the amount of ice used in the containment recirculation sump water inventory analyses and accident analyses. The associated T/S Bases will be revised to state that the minimum ice weight is required as an "as-found" condition with an appropriate margin to account for uncertainties in weighing of the ice baskets. Previous provisions in the T/S Bases will also be deleted that allowed reducing the minimum required ice weight or number of ice baskets to be weighed based on operating experience data.

The determination that the criteria set forth in 10 CFR 50.92 are met for this amendment request is indicated below.

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

The proposed T/S changes are a result of the planned modifications being performed to ensure the original design basis functional capability of the containment recirculation sump. These planned modifications, and the associated changes to input assumptions of related safety analyses, do not result in a condition where the material and construction standards that were applicable prior to the changes are altered. The integrity of safety-related systems, structures, and components is maintained within the limits previously approved. The planned modifications to the facility do not create any new initiators for any accident, nor do they create any new credible limiting single failure, nor do they result in any event previously deemed incredible being made credible. The existing separation of the control and protection functions for the reactor core and fuel, reactor coolant system, and the containment and containment systems are not adversely affected. In addition, the functional requirements of safety-related systems, structures, and components, which are related to accident mitigation, have not been altered.

The proposed T/S changes increasing the minimum RWST contained inventory have no impact on the initiation of an accident. The RWST is used to mitigate the consequences of an accident. There are no new failure modes involving the RWST that could differently initiate any of the previously evaluated accidents. This is because the RWST is located outside containment in an

area where it is not credible for a failure of the RWST to affect the reactor core and fuel, reactor coolant system, and the containment and containment systems.

The proposed T/S changes reflect planned modifications to the ESFAS actuation logic and to the time delay for starting of the CEQ fans, and opening of the component cooling water supply and return valves and hydrogen skimmer valves to the CEQ fans. The proposed changes have no impact on the initiation of an accident. The planned modifications do not introduce any new failure modes for the CEQ fans or associated valves.

The proposed T/S changes reflect the minimum ice weight used in the existing analyses of containment recirculation sump inventory and the associated analyses, plus an allowance for weighing uncertainty. The proposed changes have no impact on the initiation of an accident.

Therefore, the probability of an accident previously evaluated will not be increased by these changes.

The proposed T/S changes, and the associated modifications being performed, will ensure the capability of the containment recirculation sump, and the containment structures, systems, and components, to meet the original design basis requirements for the facility. The proposed changes will ensure that the minimum required water inventory is maintained in the containment recirculation sump at levels sufficient to prevent vortexing in the sump. Therefore, the original evaluation of the consequences of previously evaluated accidents as described in the Donald C. Cook Nuclear Plant (CNP) Updated Final Safety Analysis Report (UFSAR) will not be affected.

The proposed T/S changes do not affect the integrity of the fuel assembly or reactor internals, or any fission product barrier, such that their function in the control of radiological consequences is affected. In addition, the response of safety-related systems to mitigate previously evaluated accidents as described in the CNP UFSAR, will not be adversely affected or prevented. There is no effect on the assumptions previously made in the radiological consequence evaluations, and mitigation of the radiological consequences of the accidents described in the CNP UFSAR is not affected as further described below. The accident analyses performed to determine the effects of a LOCA demonstrate that decay heat is removed, and long-term core cooling is assured with these changes. As a result, design basis accident analyses affected by these T/S changes remain valid with the incorporation of the revised accident analyses input assumptions. Therefore, the consequences of an accident previously evaluated will not be increased by these changes.

The proposed T/S changes for the RWST do not increase the consequences of any previously evaluated accident. Increasing the minimum deliverable RWST volume of water provides assurance that the ECCS and CTS are capable of performing their design basis functions to mitigate the consequences of a LOCA or main steam line break (MSLB) by ensuring adequate containment recirculation sump inventory.

The proposed T/S changes for the CEQ fans and valves do not increase the consequences of any previously evaluated accident. The design basis functions of the CEQ fans and valves in maintaining containment integrity following a LOCA or MSLB continue to be met. In addition, the proposed change provides additional assurance that the ECCS and CTS remain capable of performing their design basis functions in mitigating the consequences of a LOCA or MSLB by ensuring adequate containment recirculation sump inventory. The planned modification to shorten the time delay for the CEQ fans and valves will delay initiation of CTS for a small break LOCA. Delaying CTS initiation results in a period when any fission products released from the reactor core due to possible fuel damage are not absorbed by CTS and held in solution in the containment recirculation sump. However, a small break LOCA does not result in reactor fuel damage of the magnitude that would increase offsite dose because of the lack of fission product removal by CTS. For a large break LOCA involving the possibility of more significant fuel damage, there will be no discernable delay in CTS initiation because of the proposed T/S changes. Therefore, the consequences of a LOCA will not be increased by the proposed T/S changes.

The proposed T/S changes for the ice condenser ice weight do not increase the consequences of a LOCA or MSLB. The minimum end-of-cycle ice weight is consistent with the assumptions in the accident analyses. Additional ice is loaded into the ice baskets based on sublimation of 10% over an eighteen-month period so that the minimum ice weight of 1132 pounds is available at the end of each operating cycle. At other times throughout the cycle, there is additional margin because the ice that is assumed to sublime later in the cycle is still in the ice basket. The 1% weighing allowance provides additional assurance that the actual weight of ice meets the analyses requirement of 1132 pounds.

Therefore, the probability of occurrence or the consequences of accidents previously evaluated are not increased.

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

Sufficient containment recirculation sump inventory is necessary during the mitigation of both MSLB and LOCA events. The proposed T/S changes do not create the possibility of any other type of accident. The proposed T/S changes are a result of the planned modifications being performed to ensure the original design basis functional capability of the containment recirculation sump. These planned modifications, and the associated changes to input assumptions of related safety analyses, do not result in a condition where the material and construction standards that were applicable prior to the changes are altered. The integrity of safety-related systems, structures, and components is maintained within the limits previously approved.

The planned modifications to the facility do not create any new initiators for any accident, nor do they create any new credible limiting single failure, nor do they result in any event previously deemed incredible being made credible. The existing separation of the control and protection functions for the reactor core and fuel, reactor coolant system, and the containment and containment systems are not adversely impacted. In addition, the functional requirements of safety-related systems, structures, and components, which are related to accident mitigation, have not been altered.

The proposed T/S changes for the RWST cannot create the possibility of an accident. There are no failure modes involving the RWST that could initiate an accident. This is because the RWST is located outside containment in an area where it is not credible for a failure of the RWST to affect the reactor core and fuel, reactor coolant system, and the containment and containment systems.

The proposed T/S changes for the CEQ fans and valves cannot create the possibility of an accident. The changes do not introduce any new failure modes for the CEQ fans or associated valves. Operation of the CEQ fans and valves cannot initiate an accident.

The proposed T/S changes for the ice condenser ice weight cannot create the possibility of an accident. The ice condenser has no function during normal operation. It is a passive system that functions after an accident has already occurred. The proposed T/S changes to the ice weight do not alter any other physical characteristics of the ice condenser, nor does it change the function of the ice condenser. The proposed ice weights are less than the maximum weight supported by the structural analyses for the ice baskets. No new failure mechanisms are introduced by this change.

Therefore, it is concluded that the change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

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

The margin of safety pertinent to the proposed T/S changes includes providing assurance that emergency core cooling, containment cooling and pressure suppression, and containment spray functional requirements will be met following a design basis accident, specifically for LOCA or MSLB events. Assurance of minimum required containment recirculation sump inventory during and following switchover of suction for the ECCS and CTS pumps from the RWST to the containment recirculation sump provides this assurance.

The planned modifications have no adverse effect on the availability, operability, or functional performance of the safety-related systems, structures, and components required for mitigating the effects of design basis accidents. In fact, these planned modifications are intended to ensure the original design basis functional capabilities of the containment recirculation sump, and other

containment systems, structures, and components, to support ECCS, ice condenser, and CTS operation, and to ensure that the containment structure and systems provide an effective fission product barrier. However, the planned modifications do require changes to the T/S, but they do not prevent the performance of any surveillance requirement currently specified in the CNP T/S.

The proposed T/S changes for the RWST provide assurance that sufficient water is available to support the ECCS and CTS in performance of their design basis functions to mitigate the consequences of a LOCA or MSLB. Therefore, the margin of safety provided by the ECCS and CTS associated with containment integrity and with assurance of post-LOCA long-term core cooling is preserved by these proposed changes.

The proposed T/S changes for the CEQ fans and valves provide assurance that the original design basis functional capabilities of the containment are preserved. In addition, by increasing ice melt rate in the early stages of a small break LOCA, the design basis functions of the ECCS and CTS during and after switchover to cold leg recirculation are preserved. Finally, the changes to containment pressure response resulting from starting the CEQ fans and opening the associated valves earlier in a LOCA than in previous analyses do not result in a reduction in the capability of ECCS during the reactor vessel reflood period. Therefore, the margin to safety provided by the CEQ fans and valves associated with containment integrity, assurance of post-LOCA long-term core cooling, and ECCS performance is preserved by these proposed changes.

The proposed T/S changes for the ice condenser ice weight provides assurance that the ice condenser will provide sufficient pressure suppression capability to limit the containment peak pressure transient to less than the design limit and will contain sufficient heat removal capability to condense the RCS volume released during a LOCA. The proposed T/S changes maintain the appropriate distribution of ice through the containment bays. The required concentration of sodium tetraborate in the ice bed is not changed. There is sufficient boron in the ice bed to ensure adequate boron concentration in the containment recirculation sump following a LOCA when combined with the water inventory from the RWST, RCS leakage, and safety injection accumulators. The increase in the allowance for ice sublimation does not reduce the margin of safety. The original allowance was conservatively estimated to be 10% over an eighteen-month period. There was no operating ice condenser plant data for determining actual sublimation at the time that allowance was made. Since that time, actual data obtained has demonstrated that 10% is a reasonable, bounding value. Stating the ice weight requirement as an end-of-cycle value does not impact the margin of safety because the allowance for sublimation will be verified during the as-found weighing of the ice baskets.

Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

In summary, based upon the above evaluation, I&M has concluded that the proposed amendment involves no significant hazards consideration.

ATTACHMENT 5 TO C1099-08

ENVIRONMENTAL ASSESSMENT

Indiana Michigan Power Company (I&M) has evaluated this license amendment request against the criteria for identification of licensing and regulatory actions requiring environmental assessment in accordance with 10 CFR 51.21. I&M has determined that this license amendment request meets the criteria for a categorical exclusion set forth in 10 CFR 51.22(c)(9). This determination is based on the fact that this change is being proposed as an amendment to a license issued pursuant to 10 CFR 50 that changes a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or that changes an inspection or a surveillance requirement, and the amendment meets the following specific criteria.

(i) The amendment involves no significant hazards consideration.

As demonstrated in Attachment 4, this proposed amendment does not involve significant hazards consideration.

(ii) There is no significant change in the types or significant increase in the amounts of any effluent that may be released offsite.

The proposed amendment involves changes to the facility affecting systems, structures, and components that do not interface with any of the radioactive and non-radioactive effluent processing and control systems. These physical changes to the facility do not result in the generation of any additional radioactive or non-radioactive effluents. In addition, the proposed changes to the Technical Specifications (T/S) have no impact on any of the radioactive and non-radioactive effluent processing and control systems. Therefore, there will be no significant change in the types or significant increase in the amounts of any effluents released offsite.

(iii) There is no significant increase in individual or cumulative occupational radiation exposure.

The proposed changes will not result in significant changes in the operation or configuration of the facility. There will be no change in the level of controls or methodology used for processing of radioactive effluents or handling of solid radioactive waste, nor will the proposal result in any change in the normal radiation levels within the plant. Therefore, there will be no significant increase in individual or cumulative occupational radiation exposure resulting from this change.

ATTACHMENT 6 TO C1099-08

DESCRIPTION AND RESOLUTION OF CONTAINMENT RECIRCULATION SUMP WATER INVENTORY ISSUE

During a loss-of-coolant accident (LOCA), water is released from the reactor coolant system (RCS) to the containment. To ensure adequate cooling of the reactor core, water is injected from the refueling water storage tank (RWST) to the RCS using the emergency core cooling system (ECCS) pumps and from the safety injection accumulators. In addition, the containment spray system (CTS) pumps spray water from the RWST into containment to remove heat, reduce containment pressures, and remove iodine released from the reactor core from the containment atmosphere. When the RWST water inventory reaches a predetermined level, the suction source for the ECCS and CTS pumps is realigned from the RWST to the containment recirculation sump. This is commonly referred to as switchover to cold leg recirculation.

It has been determined that, for certain small break LOCA scenarios, there may not be sufficient containment recirculation sump water inventory to support continued operation of the ECCS and CTS pumps during and following switchover to cold leg recirculation. The cause of this deficiency includes design features of the internal lower containment compartments that cause significant amounts of water to be diverted from, and not to be made available to, the containment recirculation sump. A further description of the technical issues involved with this deficiency, including the original design basis of the containment recirculation sump and the circumstances leading to the discovery and resolution of these issues, is provided below.

Original Containment Recirculation Sump Design Basis

In the original design of Donald C. Cook Nuclear Plant (CNP) Units 1 and 2, the adequacy of the containment recirculation sump to provide suction to the ECCS and CTS pumps was demonstrated through a series of tests. These demonstration tests were conducted by Alden Research Laboratory (ARL), and the ARL report, "Hydraulic Model Investigation of Vortexing and Swirl Within a Reactor Containment Recirculation Sump; Donald C. Cook Nuclear Power Station," was submitted to the Nuclear Regulatory Commission (NRC) by letter AEP:NRC:00112, dated December 20, 1978.

The ARL report included testing for various plate blockage schemes at the containment recirculation sump entrance and included empirical head loss data at the containment recirculation sump screen, at the equivalent minimum water level of elevation 602'-10". Containment recirculation sump screen blockage of up to 50% at maximum flow rates was modeled during the tests. The model tests were conducted at maximum designed ECCS pump and CTS pump flow rates for two-train operation (15,400 gpm total, or 7,700 gpm per containment recirculation sump outlet pipe). The potential for vortices to exist for containment water levels lower than elevation 602'-10" was neither confirmed, nor precluded, by the ARL model tests. In addition, the beneficial effects of ECCS pump and CTS pump flow rates less

than maximum design flow rates were not evaluated for impact on vortex formation during the ARL model tests.

Identification of Containment Recirculation Sump Water Inventory Issue

In August 1997, a concern was identified involving the lack of dynamic analyses to demonstrate sufficient containment recirculation sump water inventory following switchover to cold leg recirculation for small break LOCA events. On September 8, 1997, it was confirmed that sufficient containment recirculation sump water inventory may not be assured for small break LOCA events. Therefore, both Unit 1 and Unit 2 entered Technical Specification (T/S) 3.0.3 due to both trains of ECCS and CTS being inoperable. An Unusual Event (UE) was officially declared at 2000 hours on September 8, 1997. The shutdown was uneventful, both units entered Mode 5, Cold Shutdown, on September 10, 1997, and the UE was terminated.

Following shutdown, Condition Report (CR) 97-02472 was initiated on September 13, 1997, stating that the design basis for the containment crane wall, as it relates to containment floodup calculations, could not be reproduced. The incomplete design basis pertained to the degree that the containment crane wall is assumed to communicate water between the RCS loop compartment and the pipe annulus region.

Licensee Event Report (LER) 50-315/97-017-00 (Unit 1) and LER 50-316/97-005-00 (Unit 2), were submitted on October 8, 1997. The LERs described the concern of insufficient inventory of water in the containment recirculation sump as a condition outside of the CNP design basis that resulted in a required shutdown under the T/S. On November 17, 1997, follow-up LER 50-315/97-017-01 (Unit 1) and LER 50-316/97-005-01 (Unit 2) were submitted. As further stated in the LERs, the root cause of this event was determined to be lack of thorough review. The previously performed engineering reviews did not evaluate the impact of flow diversions into the inactive sump regions of the containment.

On September 19, 1997, the NRC issued Confirmatory Action Letter (CAL) No. RIII-97-011. CAL Item 1, "Recirculation Sump Inventory/Containment Dead Ended Compartments," required Indiana Michigan Power Company (I&M) to perform "analyses ... to demonstrate that the recirculation sump level is adequate to prevent vortexing, or [to make] appropriate modifications" prior to restart of any CNP unit.

The strategy to resolve CAL Item 1 included performing analyses using the MAAP4 (Modular Accident Analysis Program, Version 4) computer code to dynamically calculate ice condenser ice melt. In addition to taking credit for ice condenser ice melt, leakage from the RCS, and safety injection accumulator inventory, was credited in the analyses to provide additional water inventory over that provided by the RWST alone. The original CNP licensing basis analyses were based on determining water inventory in the containment recirculation sump using RWST minimum deliverable volume only.

On October 21, 1997, I&M submitted letter AEP:NRC:0900L, "Request for Exigent Technical Specification Amendment, Technical Specification 3/4.6.5 Ice Weight and Surveillance Requirement and Technical Specification 3/4.5.5 Basis Refueling Water Storage Tank Change." This submittal requested approval for increasing the required minimum ice condenser ice weight to support the new containment recirculation sump inventory analyses. The submittal also provided the results of the analyses for determining the water inventory in the containment recirculation sump using MAAP4, and crediting water inventory from the RWST, ice condenser ice melt, RCS leakage, and safety injection accumulators.

On January 2, 1998, the NRC issued Amendment No. 220 to Facility Operating License No. DPR-58 and Amendment No. 204 to Facility Operating License No. DPR-74 for CNP Units 1 and 2, respectively. These amendments approved the increase in both the minimum required ice weight per ice basket and the total minimum required ice weight. In addition, the T/S Bases were revised to resolve the unreviewed safety question related to taking credit for ice melt, leakage from the RCS, and safety injection accumulator inventory when determining adequate containment recirculation sump inventory.

In letter AEP:NRC:1260GQ, "Withdrawal of Response to Issue No. 1 of the NRC Confirmatory Action Letter of September 19, 1997, RIII-97-011," dated March 17, 1999, I&M withdrew previous responses to CAL Item 1. This was because of the identification of potentially nonconservative assumptions used in the previous analyses provided. In letter AEP:NRC:1260GH, "Enforcement Actions 98-150, 98-151, 98-152 and 98-186 – Reply to Notice of Violation Dated October 13, 1998," dated March 19, 1999, I&M committed to reevaluating the analyses used to resolve the CAL Item 1 concerns. This submittal requests approval of T/S changes required to implement the revised analyses associated with resolution of CAL Item 1.

Planned Modifications to Resolve Containment Recirculation Sump Issue

I&M has determined that physical plant modifications are necessary to ensure sufficient containment recirculation sump water inventory. The planned modifications are being implemented in accordance with the requirements of 10 CFR 50.59, and NRC approval of these modifications is not anticipated to be required. However, they are described in this submittal to assist in the review of the proposed T/S changes. These design changes include the following:

1. Available RWST contained inventory will be increased by modifying the RWST overflow line to increase the overflow level, and increasing the span of the RWST level instrumentation. This will provide approximately 25,500 gallons additional minimum deliverable volume. The planned modifications preserve existing operator margins to the RWST overflow level, RWST minimum vortexing level, and the required net positive suction head level for the ECCS pumps and the CTS pumps.

2. The actuation signal for the containment air recirculation/hydrogen skimmer (CEQ) fans will be changed from containment pressure - high-high to containment pressure - high, and the time delay for the CEQ fan start will be reduced from 9 ± 1 minutes to 120 ± 12 seconds. This increases the flow of steam and air through the ice condenser during the early stages of a small break LOCA, increasing resultant ice melt and ensuring earlier hydrogen mixing and circulation.

   This modification will also change the actuation signal of the component cooling water supply and return valves for the CEQ fan motors from containment pressure - high-high to containment pressure - high with no time delay. The hydrogen skimmer valves providing suction to the CEQ fans from the lower containment compartments open when the CEQ fans are started, and therefore will open upon a containment pressure - high signal with a time delay of 120 ± 12 seconds.

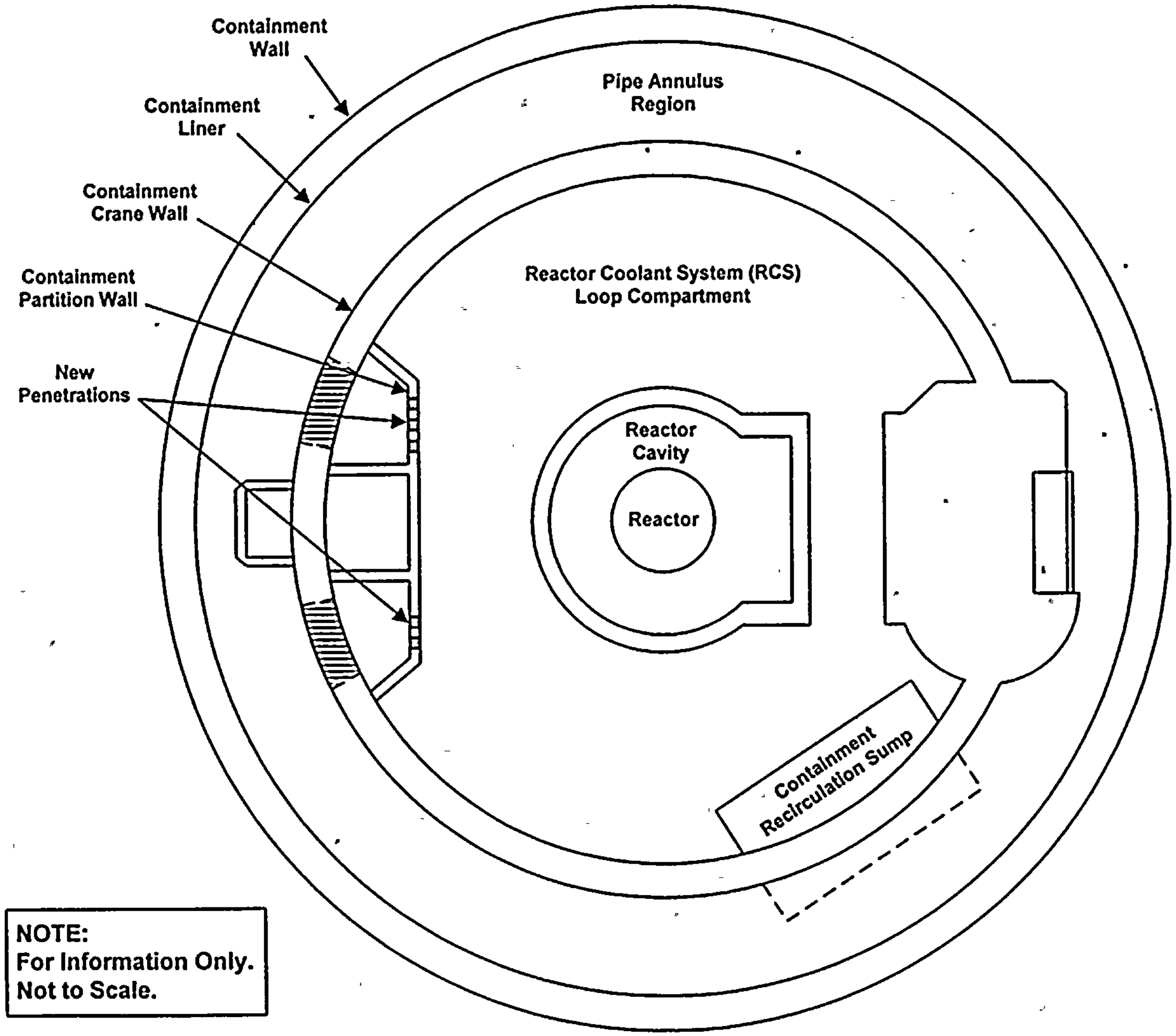
3. Penetrations will be made in a containment partition wall separating the pipe annulus region from the RCS loop compartment to allow water to freely flow between the areas (see Figure 1). Therefore, any water entering the pipe annulus region will be available to the containment recirculation sump.

4. The containment water level instrumentation will be improved to provide operators with a more accurate level indication during and following switchover to cold leg recirculation.

<u>Analyses to Resolve Containment Recirculation Sump Issue</u>

I&M has determined that specific analyses are necessary to demonstrate sufficient containment recirculation sump water inventory. The analyses address the planned modifications described above, associated changes to the accident analyses input assumptions, and the existing design features of the plant. The analyses performed are described in Attachments 7 through 10. The analyses demonstrate that the proposed T/S changes ensure sufficient water inventory in the containment recirculation sump, and form the basis for requesting approval of these changes.

Figure 1 - Containment Layout at Elevation 598'-9.375"



ATTACHMENT 7 TO C1099-08

FAUSKE & ASSOCIATES, INCORPORATED

FAI/99-77, "CONTAINMENT SUMP LEVEL EVALUATION
FOR THE D.C. COOK PLANT"