ATTACHMENT B

PROPOSED CHANGES TO APPENDIX A TECHNICAL SPECIFICATIONS FOR FACILITY OPERATING LICENSES NPF-72 AND NPF-77

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ZNLD/2038/14

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

SECTION PAGE

SHUTDOWN MARGIN - $T_{avg} \leq 200°F$

LIMITING CONDITION FOR OPERATION

3.1.1.2 The SHUTDOWN MARGIN sha l be greater than or equal to ~~1%~~ 3 Δk/k.

APPLICABILITY: MODE 5.

ACTION:

REPLACE WITH INSERT #1

~~With the SHUTDOWN MARGIN less than 1% Δk/k, immediately initiate and continue boration at greater than or equal to 30 gpm of a solution containing greater than or equal to 7000 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.~~

SURVEILLANCE REQUIREMENTS

4.1.1.2 The SHUTDOWN MARGIN shall be determined to be greater than or equal to 1% Δk/k.

a. Within 1 hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable. If the inoperable control rod(s) is immovable or untrippable, the SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s); and

b. At least once per 24 hours by consideration of the following factors:

   1) Reactor Coolant System boron concentration,

   2) Control rod position,

   3) Reactor Coolant System average temperature,

   4) Fuel burnup based on gross thermal energy generation,

   5) Xenon concentration, and

   6) Samarium concentration.

BORON DILUTION PROTECTION SYSTEM

LIMITING CONDITION FOR OPERATION

3.1.2.7 Two independent Boron Dilution Protection System (BDPS) subsystems shall be OPERABLE.*

APPLICABILITY: MODES 3, 4, and 5.

ACTION:

a. With one BDPS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or within the next hour, and at least once every 31 days thereafter, verify valves CV-111B, CV-8428, CV-8439, CV-8441, and CV-8435 are closed and secured in position.**

b. With both BDPS subsystems inoperable, within 1 hour, and at least once every 12 hours thereafter:

   1. Verify valves CV-111B, CV-8428, CV-8439, CV-8441, and CV-8435 are closed and secured in position**, and

   2. Verify compliance with the SHUTDOWN MARGIN requirements of Specification 3.1.1.1 or 3.1.1.2, as applicable.

* The BDPS Flux Doubling signals may be blocked during reactor startup.

** These valves may be opened on an intermittent basis under administrative control when required to support plant evolutions.

SURVEILLANCE REQUIREMENTS

4.1.2.7 Each BDPS subsystem shall be demonstrated OPERABLE:

a. At least once per 12 hours by:

1. Verifying that its associated nuclear instrumentation source range detector is OPERABLE and indicating greater than or equal to 10 counts per second,

2. Verifying that all reactor coolant loop stop isolation valves are open, and

3. Verifying that at least one reactor coolant pump is in operation.

b. At least once per 31 days by verifying that each valve (manual, power-operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

c. At least once per 92 days by verifying that the BDPS Alarm Setpoint is less than or equal to an increase of twice the count rate within a 10-minute period.

d. At least once per 18 months when shutdown by verifying that on a simulated BDPS Flux Doubling test signal valves CV-112D and CV-112E open and valves CV-112B and CV-112C close in less than or equal to 30 seconds.

TABLE 3.3-1

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
1. Manual Reactor Trip	2	1	2	1, 2	1
	2	1	2	3*, 4*, 5*	10
2. Power Range, Neutron Flux					
a. High Setpoint	4	2	3	1, 2	2#
b. Low Setpoint	4	2	3	1###, 2	2#
3. Power Range, Neutron Flux High Positive Rate	4	2	3	1, 2	2#
4. Power Range, Neutron Flux, High Negative Rate	4	2	3	1, 2	2#
5. Intermediate Range, Neutron Flux	2	1	2	1###, 2	3
6. Source Range, Neutron Flux					
a. Startup	2	1	2	2##**	4
b. Shutdown	2	1	2	3, 4, 5	5
7. Overtemperature ΔT	4	2	3	1, 2	6#
8. Overpower ΔT	4	2	3	1, 2	6#
9. Pressurizer Pressure-Low (Above P-7)	4	2	3	1	6#***

TABLE 3.3-1 (Continued)

TABLE NOTATIONS

*With the Reactor Trip System breakers in the closed position and the Control Rod Drive System capable of rod withdrawal.

~~**The boron dilution flux doubling signals may be blocked during reactor startup.~~

***These channels also provide inputs to ESFAS. The Action Statement for the channels in Table 3.3-3 is more conservative and, therefore, controlling.

#The provisions of Specification 3.0.4 are not applicable.

##Below the P-6 (Intermediate Range Neutron Flux Interlock) Setpoint.

###Below the P-10 (Low Setpoint Power Range Neutron Flux Interlock) Setpoint.

@Whenever the Reactor Trip Bypass Breakers are racked in and closed for bypassing a Reactor Trip Breaker.

ACTION STATEMENTS

ACTION 1 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or be in HOT STANDBY within the next 6 hours.

ACTION 2 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours;

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1; and

c. Either, THERMAL POWER is restricted to less than or equal to 75% of RATED THERMAL POWER and the Power Range Neutron Flux Trip Setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER within 4 hours; or, the QUADRANT POWER TILT RATIO is monitored at least once per 12 hours per Specification 4.2.4.2.

ACTION 3 - With the number of channels OPERABLE one less than the Minimum Channels OPERABLE requirement and with the THERMAL POWER level:

a. Below the P-6 (Intermediate Range Neutron Flux Interlock) Setpoint, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above the P-6 Setpoint; and

b. Above the P-6 (Intermediate Range Neutron Flux Interlock) Setpoint but below 10% of RATED THERMAL POWER, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above 10% of RATED THERMAL POWER.

TABLE 4.3-1

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	ANALOG CHANNEL OPERATIONAL TEST	TRIP ACTUATING DEVICE OPERATIONAL TEST	ACTUATION LOGIC TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
1. Manual Reactor Trip	N.A.	N.A.	N.A.	R(14)	N.A.	1, 2, 3*, 4*, 5*
2. Power Range, Neutron Flux						
a. High Setpoint	S	D(2, 4), M(3, 4) Q(4, 6), R(4, 5a)#	Q	N.A.	N.A.	1, 2
b. Low Setpoint	S	R(4)#	Q	N.A.	N.A.	1###, 2
3. Power Range, Neutron Flux, High Positive Rate	N.A.	R(4)#	Q	N.A.	N.A.	1, 2
4. Power Range, Neutron Flux, High Negative Rate	N.A.	R(4)#	Q	N.A.	N.A.	1, 2
5. Intermediate Range, Neutron Flux	S	R(4, 5a)#	Q	N.A.	N.A.	1###, 2
6. Source Range, Neutron Flux	S	R(4, 5b~~, 12~~)#	Q(9)	N.A.	N.A.	2##, 3, 4, 5
7. Overtemperature ΔT	S	R(13)#	Q	N.A.	N.A.	1, 2
8. Overpower ΔT	S	R#	Q	N.A.	N.A.	1, 2
9. Pressurizer Pressure-Low (Above P-7)	S	R#	Q**	N.A.	N.A.	1
10. Pressurizer Pressure-High	S	R#	Q	N.A.	N.A.	1, 2
11. Pressurizer Water Level-High (Above P-7)	S	R#	Q	N.A.	N.A.	

TABLE 4.3-1 (Continued)

TABLE NOTATIONS

*With the Reactor Trip System breakers closed and the Control Rod Drive System capable of rod withdrawal.

**These channels also provide inputs to ESFAS. The Operational Test Frequency for these channels in Table 4.3-2 is more conservative and, therefore, controlling.

#The specified 18 month interval may be extended to 32 months for cycle 1 only.

##Below P-6 (Intermediate Range Neutron Flux Interlock) Setpoint.

###Below P-10 (Low Setpoint Power Range Neutron Flux Interlock) Setpoint.

(1) If not performed in previous 7 days.

(2) Comparison of calorimetric to excore power indication above 15% of RATED THERMAL POWER. Adjust excore channel gains consistent with calorimetric power if absolute difference is greater than 2%. The provisions of Specification 4.0.4 are not applicable for entry into MODE 2 or 1.

(3) Single point comparison of incore to excore AXIAL FLUX DIFFERENCE above 15% of RATED THERMAL POWER. Recalibrate if the absolute difference is greater than or equal to 3%. The provisions of Specification 4.0.4 are not applicable for entry into MODE 2 or 1.

(4) Neutron detectors may be excluded from CHANNEL CALIBRATION.

(5a) Initial plateau curves shall be measured for each detector. Subsequent plateau curves shall be obtained, evaluated and compared to the initial curves. For the Intermediate Range and Power Range Neutron Flux channels the provisions of Specification 4.0.4 are not applicable for entry into MODE 2 or 1.

(5b) With the high voltage setting varied as recommended by the manufacturer, an initial discriminator bias curve shall be measured for each detector. Subsequent discriminator bias curves shall be obtained, evaluated and compared to the initial curves.

(6) Incore - Excore Calibration, above 75% of RATED THERMAL POWER. The provisions of Specification 4.0.4 are not applicable for entry into MODE 2 or 1.

(7) Each train shall be tested at least every 62 days on a STAGGERED TEST BASIS.

(8) With power greater than or equal to the interlock Setpoint the required ANALOG CHANNEL OPERATIONAL TEST shall consist of verifying that the interlock is in the required state by observing the permissive annunciator window.

(9) Surveillance in MODES 3*, 4*, and 5* shall also include verification that permissives P-6 and P-10 are in their required state for existing plant conditions by observation of the permissive annunciator window. ~~Surveillance shall include verification of the Boron Dilution Alarm Setpoint of less than or equal to an increase of twice the count rate within a 10-minute period.~~

(10) Setpoint verification is not applicable.

TABLE 4.3-1 (Continued)

TABLE NOTATIONS

(11) The TRIP ACTUATING DEVICE OPERATIONAL TEST shall be performed such that each train is tested at least every 62 days on a STAGGERED TEST BASIS and following maintenance or adjustment of the Reactor Trip Breakers and shall include independent verification of the OPERABILITY of the Undervoltage and Shut Trip Attachments of the Reactor Trip Breakers.

(12) Not used. ~~At least once per 18 months during shutdown verify that on a simulated Boron Dilution Doubling test signal CVCS valves 112D and E open and 112B and C close within 30 seconds.~~

(13) CHANNEL CALIBRATION shall include the RTD bypass loops flow rate.

(14) Verify that the appropriate signals reach the Undervoltage and Shunt Trip relays, for both the Reactor Trip and Bypass Breakers from the Manual Trip Switches. Initial performance of this surveillance requirement is to be completed prior to the Startup following the Unit 1 Cycle 1 Refuel Outage.

(15) Manual Shunt Trip prior to the Reactor Trip Bypass Breaker being racked in and closed by bypassing a Reactor Trip Breaker.

(16) Automatic undervoltage trip. Initial performance of this surveillance requirement is to be completed prior to the startup following the Unit 1 Cycle 1 Refuel Outage.

3/4.1 REACTIVITY CONTROL SYSTEMS

BASES

3/4.1.1 BORATION CONTROL

3/4.1.1.1 and 3/4.1.1.2 SHUTDOWN MARGIN

A sufficient SHUTDOWN MARGIN ensures that: (1) the reactor can be made subcritical from all operating conditions, (2) the reactivity transients associated with postulated accident conditions are controllable within acceptable limits, and (3) the reactor will be maintained sufficiently subcritical to preclude inadvertent criticality in the shutdown condition.

SHUTDOWN MARGIN requirements vary throughout core life as a function of fuel depletion, RCS boron concentration, and RCS T_{avg}. The most restrictive condition occurs at EOL, with T_{avg} at no load operating temperature, and is associated with a postulated steam line break accident and resulting uncontrolled RCS cooldown. In the analysis of this accident, a minimum SHUTDOWN MARGIN of 1.3% $\Delta k/k$ is required to control the reactivity transient. Accordingly, the SHUTDOWN MARGIN requirement is based upon this limiting condition and is consistent with FSAR safety analysis assumptions. With T_{avg} less than 200°F, the reactivity transients resulting from a postulated steam line break cooldown are minimal and a 1% $\Delta k/k$ SHUTDOWN MARGIN provides adequate protection.

ADD INSERT #2

~~The OPERABILITY of the four charging pump suction valves ensures adequate capability for negative reactivity insertion to prevent a transient caused by the uncontrolled dilution of the RCS. The functioning of the valves precludes the necessity of operator action to prevent further dilution by terminating flow to the charging pumps from possible unborated water sources and initiating flow from the RWST. Actions taken by the microprocessor if the neutron count rat is doubled will prevent return to criticality in these MODES.~~

3/4.1.1.3 MODERATOR TEMPERATURE COEFFICIENT

The limitations on moderator temperature coefficient (MTC) are provided to ensure that the value of this coefficient remains within the limiting condition assumed in the FSAR accident and transient analyses.

The MTC values of this specification are applicable to a specific set of plant conditions; accordingly, verification of MTC values at conditions other than those explicitly stated will require extrapolation to those conditions in order to permit an accurate comparison.

BORATION SYSTEMS (Continued)

A Boric Acid Storage System level of 40% ensures that there is a volume of greater than or equal to 15,780 gallons available. A RWST level of 89% ensures that there is a volume of greater than or equal to 395,000 gallons available.

With the RCS temperature below 350°F, one Boron Injection System is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the additional restrictions prohibiting CORE ALTERATIONS and positive reactivity changes in the event the single Boron Injection System becomes inoperable.

The limitation for a maximum of one centrifugal charging pump to be OPERABLE and the Surveillance Requirement to verify all charging pumps except the required OPERABLE pump to be inoperable below 330°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single PORV or an RHR Suction valve.

The boron capability required below 200°F is sufficient to provide a SHUTDOWN MARGIN of 1% $\Delta k/k$ after xenon decay and cooldown from 200°F to 140°F. This condition requires either 2,652 gallons of 7000-ppm borated water from the boric acid storage tanks or 11,840 gallons of 2000-ppm borated water from the refueling water storage tank (RWST). A Boric Acid Storage System level of 7% ensures there is a volume of greater than or equal to 2652 gallons available. An RWST level of 9% ensures there is a volume of greater than or equal to 38,740 gallons available.

The contained water volume limits include allowance for water not available because of discharge line location and other physical characteristics.

The limits on contained water volume and boron concentration of the RWST also ensure a pH value of between 8.5 and 11.0 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 OPERABILITY of one Boron Injection System during REFUELING ensures that this system is available for reactivity control while in MODE 6.

Add Insert #3 →

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

The specifications of this section ensure that: (1) acceptable power distribution limits are maintained, (2) the minimum SHUTDOWN MARGIN is maintained, and (3) the potential effects of rod misalignment on associated accident analyses are limited. OPERABILITY of the control rod position indicators is required to determine control rod positions and thereby ensure compliance with the control rod alignment and insertion limits. Verification that the Digital Rod Position Indicator agrees with the demanded position within ±12 steps at 24, 48, 120, and 228 steps withdrawn for the Control Banks and

Insert #1

Specification 3.1.1.2 (Page 3/4 1-3)

a. With the SHUTDOWN MARGIN less than 1.3% Δk/k declare both Boron Dilution Protection System subsystems inoperable and apply Specification 3.1.2.7.b.

b. With the SHUTDOWN MARGIN less than 1% Δk/k, immediately initiate and continue boration at greater than or equal to 30 gpm of a solution containing greater than or equal to 7000 ppm boron or equivalent until the SHUTDOWN MARGIN is restored to greater than or equal to 1% Δk/k.

Insert #2

Bases for Specifications 3/4.1.1.1 and 3/4.1.1.2 (Page B 3/4 1-1)

provided that boration dilution paths are isolated. A 1.3% Δk/k SHUTDOWN MARGIN is required to ensure the OPERABILITY of the automatic Boron Dilution Protection System

Insert #3

Bases for Specification 3/4.1.2 (Page B 3/4 1-3)

The OPERABILITY of the automatic Boron Dilution Protection System ensures adequate capability for negative reactivity insertion to prevent a transient caused by the uncontrolled dilution of the RCS in MODES 3, 4, and 5. The functioning of the system precludes the necessity of operator action to prevent further dilution by terminating flow to the charging pump(s) from possible unborated water sources and initiating flow from the RWST. The most restrictive condition occurs shortly after beginning of life when the critical boron concentration is highest, and a 205 gpm dilution flowrate provides the maximum positive reactivity addition rate. One reactor coolant pump in operation with all reactor coolant loop stop isolation valves open reduces the reactivity addition rate by mixing the dilution through all four reactor coolant loops. A minimum count rate of ten counts per second minimizes the impact of the uncertainties asociated with the source range nuclear instrumentation. In the analysis of this accident, a minimum SHUTDOWN MARGIN of 1.3% Δk/k is required to control the reactivity transient. Actions taken by the microprocessor if the neutron count rate is doubled will prevent return to criticality in these MODES.

SHUTDOWN MARGIN - $T_{avg} \leq 200°F$

LIMITING CONDITION FOR OPERATION

3.1.1.2 The SHUTDOWN MARGIN shall be greater than or equal to ~~1%~~ 1.3 Δk/k.

APPLICABILITY: MODE 5.

ACTION:

See Insert 1 ~~With the SHUTDOWN MARGIN less than 1% Δk/k, immediately initiate and continue boration at greater than or equal to 30 gpm of a solution containing greater than or equal to 7000 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.~~

SURVEILLANCE REQUIREMENTS

4.1.1.2 The SHUTDOWN MARGIN shall be determined to be greater than or equal to 1% Δk/k:

a. Within 1 hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable. If the inoperable control rod(s) is immovable or untrippable, the SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s); and

b. At least once per 24 hours by consideration of the following factors:

1) Reactor Coolant System boron concentration,

2) Control rod position,

3) Reactor Coolant System average temperature,

4) Fuel burnup based on gross thermal energy generation,

5) Xenon concentration, and

6) Samarium concentration.

BORON DILUTION PROTECTION SYSTEM

LIMITING CONDITION FOR OPERATION

3.1.2.7 Two independent Boron Dilution Protection System (BDPS) subsystems shall be OPERABLE.*

APPLICABILITY: MODES 3, 4, and 5.

ACTION:

a. With one BDPS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or within the next hour, and at least once every 31 days thereafter, verify valves CV-111B, CV-8428, CV-8439, CV-8441, and CV-8435 are closed and secured in position.**

b. With both BDPS subsystems inoperable, within 1 hour, and at least once every 12 hours thereafter:

   1. Verify valves CV-111B, CV-8428, CV-8439, CV-8441, and CV-8435 are closed and secured in position**, and

   2. Verify compliance with the SHUTDOWN MARGIN requirements of Specification 3.1.1.1 or 3.1.1.2, as applicable.

* The BDPS Flux Doubling signals may be blocked during reactor startup.

** These valves may be opened on an intermittent basis under administrative control when required to support plant evolutions.

SURVEILLANCE REQUIREMENTS

4.1.2.7 Each BDPS subsystem shall be demonstrated OPERABLE:

a. At least once per 12 hours by:

   1. Verifying that its associated nuclear instrumentation source range detector is OPERABLE and indicating greater than or equal to 10 counts per second,

   2. Verifying that all reactor coolant loop stop isolation valves are open, and

   3. Verifying that at least one reactor coolant pump is in operation.

b. At least once per 31 days by verifying that each valve (manual, power-operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

c. At least once per 92 days by verifying that the BDPS Alarm Setpoint is less than or equal to an increase of twice the count rate within a 10-minute period.

d. At least once per 18 months when shutdown by verifying that on a simulated BDPS Flux Doubling test signal valves CV-112D and CV-112E open and valves CV-112B and CV-112C close in less than or equal to 30 seconds.

TABLE 3.3-1

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
1. Manual Reactor Trip	2	1	2	1, 2	1
	2	1	2	3*, 4*, 5*	10
2. Power Range, Neutron Flux					
a. High Setpoint	4	2	3	1, 2	2#
b. Low Setpoint	4	2	3	1###, 2	2#
3. Power Range, Neutron Flux High Positive Rate	4	2	3	1, 2	2#
4. Power Range, Neutron Flux, High Negative Rate	4	2	3	1, 2	2#
5. Intermediate Range, Neutron Flux	2	1	2	1###, 2	3
6. Source Range, Neutron Flux					
a. Startup	2	1	2	2##**	4
b. Shutdown	2	1	2	3, 4, 5	5
7. Overtemperature ΔT	4	2	3	1, 2	6#
8. Overpower ΔT	4	2	3	1, 2	6#
9. Pressurizer Pressure-Low (Above P-7)	4	2	3	1	6#***

TABLE 3.3-1 (Continued)

TABLE NOTATIONS

*With the Reactor Trip System breakers in the closed position and the Control Rod Drive System capable of rod withdrawal.

~~**The boron dilution flux doubling signals may be blocked during reactor startup.~~

***These channels also provide inputs to ESFAS. The Action Statement for the channels in Table 3.3-3 is more conservative and, therefore, controlling.

#The provisions of Specification 3.0.4 are not applicable.

##Below the P-6 (Intermediate Range Neutron Flux Interlock) Setpoint.

###Below the P-10 (Low Setpoint Power Range Neutron Flux Interlock) Setpoint.

@Whenever the Reactor Trip Bypass Breakers are racked in and closed for bypassing a Reactor Trip Breaker.

ACTION STATEMENTS

ACTION 1 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or be in HOT STANDBY within the next 6 hours.

ACTION 2 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours;

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1; and

c. Either, THERMAL POWER is restricted to less than or equal to 75% of RATED THERMAL POWER and the Power Range Neutron Flux Trip Setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER within 4 hours; or, the QUADRANT POWER TILT RATIO is monitored at least once per 12 hours per Specification 4.2.4.2.

ACTION 3 - With the number of channels OPERABLE one less than the Minimum Channels OPERABLE requirement and with the THERMAL POWER level:

a. Below the P-6 (Intermediate Range Neutron Flux Interlock) Setpoint, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above the P-6 Setpoint; and

b. Above the P-6 (Intermediate Range Neutron Flux Interlock) Setpoint but below 10% of RATED THERMAL POWER, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above 10% of RATED THERMAL POWER.

TABLE 4.3-1

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	ANALOG CHANNEL OPERATIONAL TEST	TRIP ACTUATING DEVICE OPERATIONAL TEST	ACTUATION LOGIC TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
1. Manual Reactor Trip	N.A.	N.A.	N.A.	R(14)	N.A.	1, 2, 3*, 4*, 5*
2. Power Range, Neutron Flux						
a. High Setpoint	S	D(2, 4), M(3, 4), Q(4, 6), R(4, 5a)#	Q	N.A.	N.A.	1, 2
b. Low Setpoint	S	R(4)#	Q	N.A.	N.A.	1###, 2
3. Power Range, Neutron Flux, High Positive Rate	N.A.	R(4)#	Q	N.A.	N.A.	1, 2
4. Power Range, Neutron Flux, High Negative Rate	N.A.	R(4)#	Q	N.A.	N.A.	1, 2
5. Intermediate Range, Neutron Flux	S	R(4, 5a)#	Q	N.A.	N.A.	1###, 2
6. Source Range, Neutron Flux	S	R(4, 5b, ~~12~~)#	Q(9)	N.A.	N.A.	2##, 3, 4, 5
7. Overtemperature ΔT	S	R(13)#	Q	N.A.	N.A.	1, 2
8. Overpower ΔT	S	R#	Q	N.A.	N.A.	1, 2
9. Pressurizer Pressure-Low (Above P-7)	S	R#	Q**	N.A.	N.A.	1
10. Pressurizer Pressure-High	S	R#	Q	N.A.	N.A.	1, 2
11. Pressurizer Water Level-High (Above P-7)	S	R#	Q	N.A.	N.A.	1

TABLE 4.3-1 (Continued)

TABLE NOTATIONS

*With the Reactor Trip System breakers closed and the Control Rod Drive System capable of rod withdrawal.

**These channels also provide inputs to ESFAS. The Operational Test Frequency for these channels in Table 4.3-2 is more conservative and, therefore, controlling.

***A Reactor trip on Turbine trip is enabled above P-7 (10%) until the modification is implemented which enables Reactor trip on Turbine trip above P-8 (30%).

#The specified 18 month interval may be extended to 32 months for Cycle 1 only.

##Below P-6 (Intermediate Range Neutron Flux Interlock) Setpoint.

###Below P-10 (Low Setpoint Power Range Neutron Flux Interlock) Setpoint.

(1) If not performed in previous 7 days.

(2) Comparison of calorimetric to excore power indication above 15% of RATED THERMAL POWER. Adjust excore channel gains consistent with calorimetric power if absolute difference is greater than 2%. The provisions of Specification 4.0.4 are not applicable for entry into MODE 2 or 1.

(3) Single point comparison of incore to excore AXIAL FLUX DIFFERENCE above 15% of RATED THERMAL POWER. Recalibrate if the absolute difference is greater than or equal to 3%. The provisions of Specification 4.0.4 are not applicable for entry into MODE 2 or 1.

(4) Neutron detectors may be excluded from CHANNEL CALIBRATION.

(5a) Initial plateau curves shall be measured for each detector. Subsequent plateau curves shall be obtained, evaluated and compared to the initial curves. For the Intermediate Range and Power Range Neutron Flux channels the provisions of Specification 4.0.4 are not applicable for entry into MODE 2 or 1.

(5b) With the high voltage setting varied as recommended by the manufacturer, an initial discriminator bias curve shall be measured for each detector. Subsequent discriminator bias curves shall be obtained, evaluated and compared to the initial curves.

(6) Incore - Excore Calibration, above 75% of RATED THERMAL POWER. The provisions of Specification 4.0.4 are not applicable for entry into MODE 2 or 1.

(7) Each train shall be tested at least every 62 days on a STAGGERED TEST BASIS.

(8) With power greater than or equal to the interlock Setpoint the required ANALOG CHANNEL OPERATIONAL TEST shall consist of verifying that the interlock is in the required state by observing the permissive annunciator window.

(9) Surveillance in MODES 3*, 4*, and 5* shall also include verification that permissives P-6 and P-10 are in their required state for existing plant conditions by observation of the permissive annunciator window. ~~Surveillance shall include verification of the Boron Dilution Alarm Setpoint of less than or equal to an increase of twice the count rate within a 10-minute period.~~

TABLE 4.3-1 (Continued)

TABLE NOTATIONS

(10) Setpoint verification is not applicable.

(11) The TRIP ACTUATING DEVICE OPERATIONAL TEST shall be performed such that each train is tested at least every 62 days on a STAGGERED TEST BASIS and following maintenance or adjustment of the Reactor Trip Breakers and shall include independent verification of the OPERABILITY of the Undervoltage and Shunt Trip Attachments of the Reactor Trip Breakers.

(12) Not used. ~~At least once per 18 months during shutdown verify that on a simulated Boron Dilution Doubling test signal CVCS valves 112D and E open and 112B and C close within 30 seconds.~~

(13) CHANNEL CALIBRATION shall include the RTD bypass loops flow rate.

(14) Verify that the appropriate signals reach the Undervoltage and Shunt Trip Relays, for both the Reactor Trip and Bypass Breakers from the Manual Trip Switches. Initial performance of this surveillance requirement for the Reactor Trip Bypass Breakers is to be completed prior to the startup following the third refueling outage for Unit 1 and the second refueling outage for Unit 2.

(15) Manual Shunt Trip prior to the Reactor Trip Bypass Breaker being racked in and closed for bypassing a Reactor Trip Breaker.

(16) Automatic Undervoltage trip. Initial performance of this surveillance requirement is to be completed prior to the startup following the third refueling outage for Unit 1 and the second refueling outage for Unit 2.

3/4.1.1 BORATION CONTROL

3/4.1.1.1 and 3/4.1.1.2 SHUTDOWN MARGIN

A sufficient SHUTDOWN MARGIN ensures that: (1) the reactor can be made subcritical from all operating conditions, (2) the reactivity transients associated with postulated accident conditions are controllable within acceptable limits, and (3) the reactor will be maintained sufficiently subcritical to preclude inadvertent criticality in the shutdown condition.

SHUTDOWN MARGIN requirements vary throughout core life as a function of fuel depletion, RCS boron concentration, and RCS T_{avg}. The most restrictive condition occurs at EOL, with T_{avg} at no load operating temperature, and is associated with a postulated steam line break accident and resulting uncontrolled RCS cooldown. In the analysis of this accident, a minimum SHUTDOWN MARGIN of 1.3% Δk/k is required to control the reactivity transient. Accordingly, the SHUTDOWN MARGIN requirement is based upon this limiting condition and is consistent with FSAR safety analysis assumptions. With T_{avg} less than 200°F, the reactivity transients resulting from a postulated steam line break cooldown are minimal and a 1% Δk/k SHUTDOWN MARGIN provides adequate protection*

Insert 2

~~The OPERABILITY of the four charging pump suction valves ensures adequate capability for negative reactivity insertion to prevent a transient caused by the uncontrolled dilution of the RCS. The functioning of the valves precludes the necessity of operator action to prevent further dilution by terminating flow to the charging pumps from possible unborated water sources and initiating flow from the RWST. Actions taken by the microprocessor if the neutron count rate is doubled will prevent return to criticality in these MODES.~~

3/4.1.1.3 MODERATOR TEMPERATURE COEFFICIENT

The limitations on moderator temperature coefficient (MTC) are provided to ensure that the value of this coefficient remains within the limiting condition assumed in the FSAR accident and transient analyses.

The MTC values of this specification are applicable to a specific set of plant conditions; accordingly, verification of MTC values at conditions other than those explicitly stated will require extrapolation to those conditions in order to permit an accurate comparison.

BORATION SYSTEMS (Continued)

A Boric Acid Storage System level of 40% ensures that there is a volume of greater than or equal to 15,780 gallons available. A RWST level of 89% ensures that there is a volume of greater than or equal to 395,000 gallons available.

With the RCS temperature below 350°F, one Boron Injection System is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the additional restrictions prohibiting CORE ALTERATIONS and positive reactivity changes in the event the single Boron Injection System becomes inoperable.

The limitation for a maximum of one centrifugal charging pump to be OPERABLE and the Surveillance Requirement to verify all charging pumps except the required OPERABLE pump to be inoperable below 330°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single PORV or an RHR Suction valve.

The boron capability required below 200°F is sufficient to provide a SHUTDOWN MARGIN of 1% Δk/k after xenon decay and cooldown from 200°F to 140°F. This condition requires either 2,652 gallons of 7000-ppm borated water from the boric acid storage tanks or 11,840 gallons of 2000-ppm borated water from the refueling water storage tank (RWST). A Boric Acid Storage System level of 7% ensures there is a volume of greater than or equal to 2652 gallons available. An RWST level of 9% ensures there is a volume of greater than or equal to 38,740 gallons available.

The contained water volume limits include allowance for water not available because of discharge line location and other physical characteristics.

The limits on contained water volume and boron concentration of the RWST also ensure a pH value of between 8.5 and 11.0 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 OPERABILITY of one Boron Injection System during REFUELING ensures that this system is available for reactivity control while in MODE 6.

Insert 3

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

The specifications of this section ensure that: (1) acceptable power distribution limits are maintained, (2) the minimum SHUTDOWN MARGIN is maintained, and (3) the potential effects of rod misalignment on associated accident analyses are limited. OPERABILITY of the control rod position indicators is required to determine control rod positions and thereby ensure compliance with the control rod alignment and insertion limits. Verification that the Digital Rod Position Indicator agrees with the demanded position within ±12 steps at 24, 48, 120, and 228 steps withdrawn for the Control Banks and

Insert #1

Specification 3.1.1.2 (Page 3/4 1-3)

a. With the SHUTDOWN MARGIN less than 1.3% Δk/k declare both Boron Dilution Protection System subsystems inoperable and apply Specification 3.1.2.7.b

b. With the SHUTDOWN MARGIN less than 1% Δk/k, immediately initiate and continue boration at greater than or equal to 30 gpm of a solution containing greater than or equal to 7000 ppm boron or equivalent until the SHUTDOWN MARGIN is restored to greater than or equal to 1% Δk/k.

Insert #2

Bases for Specifications 3/4.1.1.1 and 3/4.1.1.2 (Page B 3/4 1-1)

provided that boration dilution paths are isolated. A 1.3% Δk/k SHUTDOWN MARGIN is required to ensure the OPERABILITY of the automatic Boron Dilution Protection System

Insert #3

Bases for Specification 3/4.1.2 (Page B 3/4 1-3)

The OPERABILITY of the automatic Boron Dilution Protection System ensures adequate capability for negative reactivity insertion to prevent a transient caused by the uncontrolled dilution of the RCS in MODES 3, 4, and 5. The functioning of the system precludes the necessity of operator action to prevent further dilution by terminating flow to the charging pump(s) from possible unborated water sources and initiating flow from the RWST. The most restrictive condition occurs shortly after beginning of life when the critical boron concentration is highest, and a 205 gpm dilution flowrate provides the maximum positive reactivity addition rate. One reactor coolant pump in operation with all reactor coolant loop stop isolation valves open reduces the reactivity addition rate by mixing the dilution through all four reactor coolant loops. A minimum count rate of ten counts per second minimizes the impact of the uncertainties asociated with the source range nuclear instrumentation. In the analysis of this accident, a minimum SHUTDOWN MARGIN of 1.3% Δk/k is required to control the reactivity transient. Actions taken by the microprocessor if the neutron count rate is doubled will prevent return to criticality in these MODES.

ATTACHMENT C

EVALUATION OF SIGNIFICANT HAZARDS CONSIDERATIONS

I. INTRODUCTION

Commonwealth Edison Company (CECo) and Westinghouse Energy Systems have re-analyzed the consequences of an inadvertent boron dilution accident in HOT STANDBY, HOT SHUTDOWN, and COLD SHUTDOWN. The analysis performed demonstrates with reasonable confidence that the Boron Dilution Protection System (BDPS) can successfully detect an inadvertent dilution, actuate the required valves, and inject 2000 parts per million (ppm) boric acid into the reactor, and restore the SHUTDOWN MARGIN prior to an inadvertent criticality. The inputs and assumptions of the analysis conservatively bound all applicable plant conditions as required by the Standard Review Plan (SRP) NUREG-0800, Section 15.4.6, Revision 1. The results of the analysis satisfy the acceptance criteria of the Section 15.4.6 by demonstrating that the BDPS can successfully mitigate criticality.

Administrative controls of dilution flowpaths required by the amended Technical Specifications ACTION Statements provide sufficient margin to ensure that an inadvertent dilution will not eliminate the plant SHUTDOWN MARGIN for conditions not protected by an OPERABLE BDPS. These administrative controls have been implemented at Byron and Braidwood.

The re-analysis serves to technically justify the increase of the safety analysis limit for the most limiting COLD SHUTDOWN critical boron concentration. Additionally, the re-analysis incorporates changes to inputs to disposition deficiencies in current licensing basis analysis.

II. Analysis Changes

Several inputs and assumptions were revised in the analysis:

Limiting Critical Boron Concentration: This value was increased from 1050 ppm to 1300 ppm in order to bound actual critical boron concentrations predicted for Byron and Braidwood candidate core designs. Since this change adversely affects the results of the analysis, the minimum required SHUTDOWN MARGIN and assumed reactor coolant system volume were revised to recover the lost margin.

Setpoint Uncertainty: A setpoint uncertainty was incorporated to disposition a deficiency in the current licensing basis analysis. This uncertainty does not result in any change to the setpoint in the plant, but its incorporation into the analysis adversely affects the results of the analysis. Since this incorporation adversely affects the results of the analysis, the minimum required SHUTDOWN MARGIN and assumed reactor coolant system volume were revised to recover the lost margin.

Inverse Count Rate Ratio (ICRR) Curve: The analysis utilizes a predicted response curve which represents a bounding source range nuclear instrumentation response to a boron dilution. The curve from the current licensing basis was replaced with a curve measured during Braidwood Unit 1 Cycle 3 startup testing. This change was made to disposition a deficiency in the current licensing basis analysis. Since this incorporation adversely affects the results of the analysis, the minimum required SHUTDOWN MARGIN and assumed reactor coolant system volume were revised to recover the lost margin.

SHUTDOWN MARGIN: The COLD SHUTDOWN SHUTDOWN MARGIN was increased from 1.0% $\Delta k/k$ to 1.3% $\Delta k/k$. The increase in SHUTDOWN MARGIN provides substantial benefit to the analysis and provides additional real margin in the plant.

Reactor Coolant System Volume: Conservatively small volumes were credited throughout the analysis. However, credit was taken for the full inventory of the reactor coolant system including the loops and steam generator tubes when the reactor coolant pumps are in service and the Loop Stop Isolation Valves are open. Credit for the additional volumes provided a benefit to the analysis.

III. Evaluation

CECo has evaluated this proposed amendment and determined that it involves no significant hazards considerations. According to 10 CFR 50.92(c), a proposed amendment to an operating license involves no significant hazards considerations if operation of the facility in accordance with the proposed amendment would not:

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

2. Create the possibility of a new or different kind of accident from any accident previously evaluated; or

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

CECo has reviewed the SRP, the Byron/Braidwood Updated Final Safety Analysis Report (UFSAR), and Byron/Braidwood Technical Specifications and concludes that the results and assumptions for the analysis of an inadvertent boron dilution in HOT STANDBY, HOT SHUTDOWN, and COLD SHUTDOWN are acceptable.

This amendment will not result in an increase of the probability of occurrence of an accident. The initiating event of an inadvertent dilution is the failure of a component or operator error which results in the decrease of the boron concentration in the reactor coolant system. This amendment does not increase that probability. Isolation of dilution flowpaths is required when automatic protection is not available. This isolation requirement reduces the probability of a dilution.

The amendment will not result in an increase of the consequences of an accident. Analysis has demonstrated that the automatic protection provided by BDPS prevents the reactor from achieving criticality due to an inadvertent dilution. Fuel damage and pressure boundary failure is precluded by maintaining the reactor sub-critical.

This amendment will not result in an increase in the probability of a malfunction of equipment important to safety. The amendment does not modify any component or system or modify any operating procedure which would adversely affect the operation of a component or system important to safety.

This amendment does not create the possibility of an accident of a different type than any previously evaluated accident in the UFSAR. The changes to the operation of equipment required to control reactor coolant system boron concentration do not affect the ability to increase reactor coolant system inventory or boron concentration as required by Technical Specifications and accident analysis. No credit is taken in any accident analysis for the flowpaths which have been isolated as a result of the administrative controls prescribed by the ACTION Statements of the amended Technical Specifications. The administrative controls do not result in a new type of transient which would result in a change in reactor coolant system inventory or heat removal, nor do these controls result in a reactivity anomaly.

This amendment does not create the possibility of a component or system malfunction of a different type than any previously evaluated accident in the UFSAR. The changes to the operation of equipment required to control reactor coolant system boron concentration do not affect the ability to increase reactor coolant system inventory or boron concentration as required by Technical Specifications and accident analysis. No credit is taken in any accident analysis for the flowpaths which have been isolated as a result of the administrative controls prescribed by the action statements of the amended specifications. The amendment does not modify any component or system or modify any operating procedures which would adversely affect the operation of a component or system important to safety.

This amendment does not reduce the margin of safety as defined in the Bases for any Technical Specification. The administrative controls over dilution flowpaths, the revised ICRR Curve, the inclusion of the estimated setpoint uncertainty, and the increase in SHUTDOWN MARGIN adequately compensate for the increase in the critical boron concentration safety analysis limit and the potential loss of conservatism due to the deficiencies in the ICRR and setpoint uncertainty assumptions in the current licensing basis. The analysis demonstrates that the BDPS can successfully detect a dilution, isolate the source of the dilution, and restore plant SHUTDOWN MARGIN before fuel design limits or pressure boundary limits are exceeded. The acceptance criteria is met by demonstrating that criticality is not achieved.

IV. Conclusion

The results of Commonwealth Edison's evaluations with respect to the provision of 10CFR50.92 demonstrate that the changes to the analysis for an inadvertent boron dilution in HOT STANDBY, HOT SHUTDOWN, and COLD SHUTDOWN do not involve a significant safety hazard.

ATTACHMENT D

ENVIRONMENTAL ASSESSMENT STATEMENT

Commonwealth Edison Company (CECo) has evaluated the proposed amendment against the criteria for and identification of licensing and regulatory actions requiring environmental assessment in accordance with 10CFR51.22(c)(9).

The proposed change alters the operation of the Boron Dilution Protection System (BDPS). The change involves adding administrative controls to compensate for nonconservatisms identified in the safety analysis. BDPS is used to mitigate transients that result in a decrease in the reactor coolant system boron concentration. BDPS prevents inadvertant criticality and precludes fuel damage. This change assures that the BDPS will perform its required safety function. This change does not involve radioactive effluent releases or personnel exposure. All changes proposed by this request can be modified or cancelled without impact to the environment. Therefore, this change will not result in any irreversible consequences.

The proposed change does not involve a significant hazards consideration as discussed in Attachment C to this letter. Also, this proposed amendment will not involve significant changes in the types or amounts of any radioactive effluents nor does it affect any of the permitted release paths. In addition, this change does not involve a significant increase in individual or cumulative occupational exposure. Therefore, this change meets the categorical exclusion permitted by 10CFR51.22(c)(9).