Tennessee Valley Authority, Post Office Box 2000, Soddy-Daisy, Tennessee 37379

February 4, 2000

TVA-SQN-TS-99-14 10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

Gentlemen:

In the Matter of	)	Docket Nos. 50-327
Tennessee Valley Authority	)	50-328

SEQUOYAH NUCLEAR PLANT (SQN) - UNITS 1 AND 2 - TECHNICAL SPECIFICATION (TS) CHANGE NO. 99-14, "COLD LEG ACCUMULATOR (CLA) VOLUME AND PRESSURE LIMIT CHANGE"

In accordance with the provisions of 10 CFR 50.4 and 50.90, TVA is submitting a request for an amendment to SQN's Licenses DPR-77 and 79 to change the TSs and TSs bases for Units 1 and 2. The proposed change revises Limiting Conditions for Operation 3.5.1.1.b and 3.5.1.1.d. The change revises the CLA volume and pressure limits based on instrumentation changes, instrument inaccuracies, and instrumentation tap locations. These changes were identified as a result of the Operating Experience Program.

TVA has determined that there are no significant hazards considerations associated with the proposed change and that the change is exempt from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9). The SQN Plant Operations Review Committee and the SQN Nuclear Safety Review Board have reviewed this proposed change and determined that operation of SQN Units 1 and 2, in accordance with the proposed change, will not endanger the health and safety of the public. Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter to the Tennessee State Department of Public Health.

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10 CFR 50.91(b)(1), TVA is sending a copy of this letter to the Tennessee State Department of Public Health.

Enclosure 1 to this letter provides the description and evaluation of the proposed change. This includes TVA's determination that the proposed change does not involve a significant hazards consideration, and is exempt from environmental review. Enclosure 2 contains copies of the appropriate TS pages from Units 1 and 2 marked up to show the proposed change. Enclosure 3 forwards the revised TS pages for Units 1 and 2 which incorporate the proposed change.

TVA requests that the revised TS be made effective within 45 days of NRC approval. If you have any questions about this change, please telephone me at (423) 843-7170 or J. D. Smith at (423) 843-6672.

Sincerely,

Pedro Salas
Licensing and Industry Affairs Manager

Subscribed and sworn to before me
on this 4th day of February, 2000

Brenda L. Coffman
Notary Public

My Commission Expires October 9, 2002

Enclosures
cc: See page 3

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ENCLOSURE 1

TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 AND 2
DOCKET NOS. 327 AND 328

PROPOSED TECHNICAL SPECIFICATION (TS) CHANGE 99-14
DESCRIPTION AND EVALUATION OF THE PROPOSED CHANGE

I. DESCRIPTION OF THE PROPOSED CHANGE

TVA proposes a change to the current requirements for the cold leg accumulator (CLA) volume and pressure operating limits as follows:

1. Units 1 and 2 Limiting Condition for Operation (LCO) 3.5.1.1(b), to decrease the upper operating limit for borated water volume from 8094 gallons of borated water to 7960 gallons of borated water, and

2. Units 1 and 2 LCO 3.5.1.1(d), to change the operating pressure limits from 600 pounds per square inch gauge (psig) (lower) and 683 psig (upper) to 624 psig and 668 psig, respectively.

The TS bases is also being changed to reflect the basis for the above CLA parameters.

II. REASON FOR THE PROPOSED CHANGE

During an evaluation of an industry issue related to instrument uncertainty, it was determined that the SQN TS values for the operating limits on CLA volume and pressure did not include instrument uncertainties. The lack of instrument uncertainties precluded the treatment of the values as nominal which resulted in a nonconformance in site implementing instructions. Additional reviews revealed that the upper tap location prevents full use of the CLA volume analysis margin, therefore, the instrument loop scaling is being changed to facilitate accuracy and human factors. Administrative controls have been established, in accordance with Administrative Letter 98-10, to provide an interim means of limiting CLA volume and pressure. This proposed change establishes new operating limits for Units 1 and 2 TSs based on instrument uncertainties and instrumentation tap locations.

III. SAFETY ANALYSIS

The cold leg injection accumulators are pressure vessels filled with borated water and pressurized with nitrogen gas. During normal operation, each accumulator is isolated from the reactor coolant system (RCS) by two check valves in series. Should the RCS pressure fall below the accumulator pressure, the check valves open and borated water is forced into the RCS. One accumulator is attached to each of the cold legs of the RCS. Mechanical operation of the swing-disc check valves is the only action required to open the injection path from the accumulators to the core via the cold leg.

As previously discussed, the TS accumulator values for pressure and volume, when considering the most limiting upper instrumentation tap location and instrument uncertainties, require a more limiting band of operation. The addition of instrument uncertainty to the control room indicated parameters reduces the allowable operating range and increases the operator effort required to maintain accumulator operability. To compensate for the decreased operational flexibility, the safety analysis limits for accumulator volume and pressure have been optimized to partially offset the operating range reduction resulting from inclusion of instrumentation uncertainties and accounting for the instrument tap location.

A sensitivity analysis using the NRC approved SQN large break loss-of-coolant accident evaluation model was performed for a revised safety analysis accumulator pressure range of 600 psig to 723 psig and a accumulator contained volume range of 7515 gallons to 8194 gallons. The sensitivity analysis was composed of four analytical cases which address the combinations of accumulator pressure and contained volume. For each case, peak fuel cladding temperatures were generated for 3 fuel elevations (including the limiting elevation for the present analysis) to assure that worst-case results were obtained. Based upon sensitivity calculations performed using the SQN plant-specific evaluation model, the increased accumulator pressure and volume safety analysis limits resulted in a 23 degree Fahrenheit increase in the calculated peak fuel cladding temperature. The emergency core cooling system (ECCS) acceptance criteria continue to be met for each fuel type with the accumulator safety analysis limits and the associated proposed operational limits. The accumulator level and pressure evaluation are documented in Framatome Cogema Fuel letter (FPM-98-553) to TVA dated November 17, 1998.

To further reduce the impact of including instrument uncertainties, we elected to upgrade the present analog indicators to digital. The methodology used to determine the new operating limits is based on ISA-S67.04, 1982 "Setpoints for Nuclear Safety-Related Instrumentation used in Nuclear Power Plants" and ISA-RP-67.04 Part II-1994, "Methodologies for the determination of Setpoints for Nuclear Safety-Related Instrumentation." The evaluation to establish the new setpoints are in Demonstrated Accuracy Calculations 1-LT-63-119 and 1-PT-63-106.

To determine the new upper volume operating limit, we utilized the most limiting upper instrumentation tap location on the cold leg accumulators. The most limiting tap location is at approximately 8033 gallons. Utilizing the uncertainty calculation methodology described above the new upper operating volume is 7960 gallons. The current lower operating volume, including instrument uncertainty, is conservative and does not need to be changed.

To determine the new operating pressure limits we utilized the safety limit and digital instrument uncertainty. The upper pressure safety limit is 683 psig. The lower pressure safety limit is 600 psig. Utilizing the uncertainty calculation methodology described above, the new upper operating pressure is 668 psig and the lower operating pressure is 624 psig.

Therefore, based on the methodologies used to determine the new CLA operating limits, the cold leg accumulators will provide sufficient volume at the required pressure to perform their safety function.

IV. NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

TVA has concluded that operation of SQN Units 1 and 2, in accordance with the proposed change to the technical specifications, does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91(a)(1), of the three standards set forth in 10 CFR 50.92(c).

A. <u>The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.</u>

The capability of the accumulators to perform their safety function is not affected by this change. All components and system functional requirements remain the same. There are no new sequences of events which would increase the probability of an accident

analyzed in the Final Safety Analysis Report (FSAR). Therefore, the proposed activity does not increase the probability of an accident previously evaluated in the FSAR. The fuel cladding peak temperature established by the ECCS evaluation model remains below 2200 degrees Fahrenheit for a loss-of-coolant accident (LOCA). As such, the assumptions on fuel failure and isotope release post-LOCA do not change from the information presented in the FSAR.

B. **The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.**

The primary function of the CLAs is in the event of a large break LOCA to support accident mitigation. CLAs are not a contributor to events that could generate accidents. The CLA system volume capability bounds this change in operational limits and the system is not physically changing. Therefore, the proposed activity does not create a possibility for an accident of a different type than any evaluated previously.

C. **The proposed amendment does not involve a significant reduction in a margin of safety.**

The safety function provided by the CLAs is to inject core cooling water into the reactor coolant system when system pressure decreases below a predetermined value during a LOCA. The timing (function of pressure) and amount (function of volume) of cooling water is modeled in the ECCS evaluation model. The proposed changes to the accumulator operational limits have been evaluated using the Sequoyah plant specific ECCS model. The evaluation shows an increase in the peak fuel cladding temperature from 2162 degrees Fahrenheit to 2185 degrees Fahrenheit. The results confirm that existing LOCA safety analysis acceptance criteria (established by 10 CFR 50.46) continue to be met for the revised accumulator limits. The safety analysis acceptance criteria continues to be met with the revised limits. The 23 degree increase in the peak fuel cladding temperature associated with accumulator operation is not a significant reduction in the margin of safety.

V. ENVIRONMENTAL IMPACT CONSIDERATION

The proposed change does not involve a significant hazards consideration, a significant change in the types of or significant increase in the amounts of any effluents that may be released offsite, or a significant increase in individual or cumulative occupational radiation exposure. Therefore, the proposed change meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental assessment of the proposed change is not required.

ENCLOSURE 2

TENNESSEE VALLEY AUTHORITY
SEQUOYAH PLANT (SQN)
UNITS 1 AND 2

PROPOSED TECHNICAL SPECIFICATION (TS) CHANGE
MARKED PAGES

I. AFFECTED PAGE LIST

Unit 1

3/4 5-1
B 3/4 5-1

Unit 2

3/4 5-1
B 3/4 5-1

II. MARKED PAGES

See attached.

3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3/4.5.1 ACCUMULATORS

COLD LEG INJECTION ACCUMULATORS

LIMITING CONDITION FOR OPERATION

3.5.1.1 Each cold leg injection accumulator shall be OPERABLE with:

a. The isolation valve open,

b. A contained borated water volume of between 7615 and 7960 ~~8094~~ gallons of borated water,

c. Between 2400 and 2700 ppm of boron,

d. A nitrogen cover-pressure of between 624 ~~600~~ and 668 ~~683~~ psig, and

e. Power removed from isolation valve when RCS pressure is above 2000 psig.

APPLICABILITY: MODES 1, 2 and 3.*

ACTION:

a. With one cold leg injection accumulator inoperable, except as a result of boron concentration not within limits, restore the inoperable accumulator to OPERABLE status within one hour or be in at least HOT STANDBY within the next 6 hours and reduce pressurizer pressure to 1000 psig or less within the following 6 hours.

b. With one cold leg injection accumulator inoperable due to the boron concentration not within limits, restore boron concentration to within limits within 72 hours or be in at least HOT STANDBY within the next 6 hours and reduce pressurizer pressure to 1000 psig or less within the following 6 hours.

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*Pressurizer pressure above 1000 psig.

BASES

3/4.5.1 ACCUMULATORS

The OPERABILITY of each cold leg injection accumulator ensures that a sufficient volume of borated water will be immediately forced into the reactor core in the event that the RCS pressure falls below the specified pressure of the accumulators. For the cold leg injection accumulators, this condition occurs in the event of a large or small rupture.

and volume

The limits on accumulator volume, boron concentration and pressure ensure that the assumptions used for accumulator injection in the safety analysis are met. The limits in the specification for accumulator nitrogen cover pressure are ~~analysis~~ limits and ~~do not~~ include instrument uncertainty. ~~The cold leg accumulator volume (level) values in the limiting condition for operation, TS 4.5.1, are the operating limits. The a~~nalysis limits bound the operational limits with instrument uncertainty applied. The minimum boron concentration ensures that the reactor core will remain subcritical during the post-LOCA (loss of coolant accident) recirculation phase based upon the cold leg accumulators' contribution to the post-LOCA sump mixture concentration.

The accumulator power operated isolation valves are considered to be "operating bypasses" in the context IEEE Std. 279-1971, which requires that bypasses of a protective function be removed automatically whenever permissive conditions are not met. In addition, as these accumulator isolation valves fail to meet single failure criteria, removal of power to the valves is required.

The limits for operation with an accumulator inoperable for any reason except boron concentration not within limits minimizes the time exposure of the plant to a LOCA event occurring concurrent with failure of an additional accumulator which may result in unacceptable peak cladding temperatures. Under these conditions, the full capability of one accumulator is not available and prompt action is required to place the reactor in a mode where this capability is not required. For an accumulator inoperable due to boron concentration not within limits, the limits for operation allow 72 hours to return boron concentration to within limits. This is based on the availability of ECCS water not being affected and an insignificant effect on core subcriticality during reflood because boiling of ECCS water in the core concentrates boron in the saturated liquid.

3/4.5.2 and 3/4.5.3 ECCS SUBSYSTEMS

The OPERABILITY of two independent ECCS subsystems ensures that sufficient emergency core cooling capability will be available in the event of a LOCA assuming the loss of one subsystem through any single failure consideration. Either subsystem operating in conjunction with the accumulators is capable of supplying sufficient core cooling to limit the peak cladding temperatures within acceptable limits for all postulated break sizes ranging from the double ended break of the largest RCS cold leg pipe downward. In addition, each ECCS subsystem provides long term core cooling capability in the recirculation mode during the accident recovery period.

3/4.5 EMERGENCY CORE COOLING SYSTEMS

3/4.5.1 ACCUMULATORS

COLD LEG INJECTION ACCUMULATORS

LIMITING CONDITION FOR OPERATION

3.5.1.1 Each cold leg injection accumulator shall be OPERABLE with:

a. The isolation valve open,

b. A containedborated water volume of between 7615 and ~~8094~~ 7960 gallons dforated water,

c. Between 2400 and 2700ppm of boron,

d. A nitrogen cover-pressure of between ~~600~~ 624 and ~~683~~ 668 psig, and

e. Power removed from isolation valve when RCS pressure is above 2000 psig.

APPLICABILITY: MODES 1, 2 and 3.*

ACTION:

a. With one cold leg injectin accumulator inoperable, except as a result of boron concentration not within limits, restore the inoperable accumulator to OPERABLE status within one hour or be in at least HOT STANDBY within the next 6 hours and reduce pressurizer pressure to 1000 psig or less within the following 6 hours.

b. With one cold leg injection accumulator inoperable due to the boron concentration not within limits, restore boron concentration to within limits within 72 hours or be in at least HOT STANDBY within the next 6 hours and reduce pressurizer pressure to 1000 psig or less within the following 6 hours.

*Pressurizer pressure above 1000 psig.

3/4.5.1 ACCUMULATORS

The OPERABILITY of each cold leg injection accumulator ensures that a sufficient volume of borated water will be immediately forced into the reactor core in the event the RCS pressure falls below the pressure of the accumulators. For the cold leg injection accumulators this condition occurs in the event of a large or small rupture.

and volume

operating

The limits on accumulator volume, boron concentration and pressure ensure that the assumptions used for accumulator injection in the safety analysis are met. The limits in the specification for accumulator nitrogen cover pressure are analysis limits ~~and do not~~ include instrument uncertainty. The cold leg ~~accumulator volume (level) values in the limiting condition for operation, TS 3/4.5.1, are the operating limits. The analysis limits bound the~~ operational limits with instrument uncertainty applied. The minimum boron concentration ensures that the reactor core will remain subcritical during the post-LOCA (loss of coolant accident) recirculation phase based upon the cold accumulators' contribution to the post-LOCA sump mixture concentration.

The accumulator power operated isolation valves are considered to be "operating bypasses" in the context of IEEE Std. 279-1971, which requires that bypasses of a protective function be removed automatically whenever permissive conditions are not met. In addition, as these accumulator isolation valves fail to meet single failure criteria, removal of power to the valves is required.

The limits for operation with an accumulator inoperable for any reason except boron concentration not within limits minimizes the time exposure of the plant to a LOCA event occurring concurrent with failure of an additional accumulator which may result in unacceptable peak cladding temperatures. Under these conditions, the full capability of one accumulator is not available and prompt action is required to place the reactor in a mode where this capability is not required. For an accumulator inoperable due to boron concentration not within limits, the limits for operation allow 72 hours to return boron concentration to within limits. This is based on the availability of ECCS water not being affected and an insignificant effect on core subcriticality during reflood because boiling of ECCS water in the core concentrates boron in the saturated liquid.

3/4.5.2 and 3/4.5.3 ECCS SUBSYSTEMS

The OPERABILITY of two independent ECCS subsystems ensures that sufficient emergency core cooling capability will be available in the event of a LOCA assuming the loss of one subsystem through any single failure consideration. Either subsystem operating in conjunction with the accumulators is capable of supplying sufficient core cooling to limit the peak cladding temperatures within acceptable limits for all postulated break sizes ranging from the double ended break of the largest RCS cold leg pipe downward. In addition, each ECCS subsystem provides long term core cooling capability in the recirculation mode during the accident recovery period.

With the RCS temperature below 350°F, one OPERABLE ECCS subsystem is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the limited core cooling requirements.

ENCLOSURE 3

TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 AND 2

PROPOSED TECHNICAL SPECIFICATION (TS) CHANGE
REVISED PAGES

I. AFFECTED PAGE LIST

Unit 1

3/4 5-1
B 3/4 5-1

Unit 2

3/4 5-1
B 3/4 5-1

II. REVISED PAGES

See attached.

3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3/4.5.1 ACCUMULATORS

COLD LEG INJECTION ACCUMULATORS

LIMITING CONDITION FOR OPERATION

3.5.1.1 Each cold leg injection accumulator shall be OPERABLE with:

a. The isolation valve open,

b. A contained borated water volume of between 7615 and 7960 gallons of borated water,

c. Between 2400 and 2700 ppm of boron, R144

d. A nitrogen cover-pressure of between 624 and 668 psig, and

e. Power removed from isolation valve when RCS pressure is above 2000 psig.

APPLICABILITY: MODES 1, 2 and 3.* R196

ACTION:

a. With one cold leg injection accumulator inoperable, except as a result of boron concentration not within limits, restore the inoperable accumulator to OPERABLE status within one hour or be in at least HOT STANDBY within the next 6 hours and reduce pressurizer pressure to 1000 psig or less within the following 6 hours.

b. With one cold leg injection accumulator inoperable due to the boron concentration not within limits, restore boron concentration to within limits within 72 hours or be in at least HOT STANDBY within the next 6 hours and reduce pressurizer pressure to 1000 psig or less within the following 6 hours.

*Pressurizer pressure above 1000 psig.

3/4.5 EMERGENCY CORE COOLING SYSTEMS

BASES

3/4.5.1 ACCUMULATORS

The OPERABILITY of each cold leg injection accumulator ensures that a sufficient volume of borated water will be immediately forced into the reactor core in the event that the RCS pressure falls below the specified pressure of the accumulators. For the cold leg injection accumulators, this condition occurs in the event of a large or small rupture. R144 R144

The limits on accumulator volume, boron concentration and pressure ensure that the assumptions used for accumulator injection in the safety analysis are met. The limits in the specification for accumulator nitrogen cover pressure and volume are operating limits and include instrument uncertainty. The analysis limits bound the operational limits with instrument uncertainty applied. The minimum boron concentration ensures that the reactor core will remain subcritical during the post-LOCA (loss of coolant accident) recirculation phase based upon the cold leg accumulators' contribution to the post-LOCA sump mixture concentration. R159

The accumulator power operated isolation valves are considered to be "operating bypasses" in the context of IEEE Std. 279-1971, which requires that bypasses of a protective function be removed automatically whenever permissive conditions are not met. In addition, as these accumulator isolation valves fail to meet single failure criteria, removal of power to the valves is required.

The limits for operation with an accumulator inoperable for any reason except boron concentration not within limits minimizes the time exposure of the plant to a LOCA event occurring concurrent with failure of an additional accumulator which may result in unacceptable peak cladding temperatures. Under these conditions, the full capability of one accumulator is not available and prompt action is required to place the reactor in a mode where this capability is not required. For an accumulator inoperable due to boron concentration not within limits, the limits for operation allow 72 hours to return boron concentration to within limits. This is based on the availability of ECCS water not being affected and an insignificant effect on core subcriticality during reflood because boiling of ECCS water in the core concentrates boron in the saturated liquid. R196

3/4.5.2 and 3/4.5.3 ECCS SUBSYSTEMS

The OPERABILITY of two independent ECCS subsystems ensures that sufficient emergency core cooling capability will be available in the event of a LOCA assuming the loss of one subsystem through any single failure consideration. Either subsystem operating in conjunction with the accumulators is capable of supplying sufficient core cooling to limit the peak cladding temperatures within acceptable limits for all postulated break sizes ranging from the double ended break of the largest RCS cold leg pipe downward. In addition, each ECCS subsystem provides long term core cooling capability in the recirculation mode during the accident recovery period.

3/4.5 EMERGENCY CORE COOLING SYSTEMS

3/4.5.1 ACCUMULATORS

COLD LEG INJECTION ACCUMULATORS

LIMITING CONDITION FOR OPERATION

3.5.1.1 Each cold leg injection accumulator shall be OPERABLE with:

a. The isolation valve open,

b. A contained borated water volume of between 7615 and 7960 gallons of borated water,

c. Between 2400 and 2700 ppm of boron,

d. A nitrogen cover-pressure of between 624 and 668 psig, and

e. Power removed from isolation valve when RCS pressure is above 2000 psig.

APPLICABILITY: MODES 1, 2 and 3.*

R184

ACTION:

a. With one cold leg injection accumulator inoperable, except as a result of boron concentration not within limits, restore the inoperable accumulator to OPERABLE status within one hour or be in at least HOT STANDBY within the next 6 hours and reduce pressurizer pressure to 1000 psig or less within the following 6 hours.

b. With one cold leg injection accumulator inoperable due to the boron concentration not within limits, restore boron concentration to within limits within 72 hours or be in at least HOT STANDBY within the next 6 hours and reduce pressurizer pressure to 1000 psig or less within the following 6 hours.

*Pressurizer pressure above 1000 psig.

3/4.5.1 ACCUMULATORS

The OPERABILITY of each cold leg injection accumulator ensures that a sufficient volume of borated water will be immediately forced into the reactor core in the event the RCS pressure falls below the pressure of the accumulators. For the cold leg injection accumulators this condition occurs in the event of a large or small rupture. R131

The limits on accumulator volume, boron concentration and pressure ensure that the assumptions used for accumulator injection in the safety analysis are met. The limits in the specification for accumulator nitrogen cover pressure and volume are operating limits and include instrument uncertainty. The analysis limits bound the operational limits with instrument uncertainty applied. The minimum boron concentration ensures that the reactor core will remain subcritical during the post-LOCA (loss of coolant accident) recirculation phase based upon the cold accumulators' contribution to the post-LOCA sump mixture concentration. R131 BR-14 BR-3

The accumulator power operated isolation valves are considered to be "operating bypasses" in the context of IEEE Std. 279-1971, which requires that bypasses of a protective function be removed automatically whenever permissive conditions are not met. In addition, as these accumulator isolation valves fail to meet single failure criteria, removal of power to the valves is required.

The limits for operation with an accumulator inoperable for any reason except boron concentration not within limits minimizes the time exposure of the plant to a LOCA event occurring concurrent with failure of an additional accumulator which may result in unacceptable peak cladding temperatures. Under these conditions, the full capability of one accumulator is not available and prompt action is required to place the reactor in a mode where this capability is not required. For an accumulator inoperable due to boron concentration not within limits, the limits for operation allow 72 hours to return boron concentration to within limits. This is based on the availability of ECCS water not being affected and an insignificant effect on core subcriticality during reflood because boiling of ECCS water in the core concentrates boron in the saturated liquid. R184

3/4.5.2 and 3/4.5.3 ECCS SUBSYSTEMS

The OPERABILITY of two independent ECCS subsystems ensures that sufficient emergency core cooling capability will be available in the event of a LOCA assuming the loss of one subsystem through any single failure consideration. Either subsystem operating in conjunction with the accumulators is capable of supplying sufficient core cooling to limit the peak cladding temperatures within acceptable limits for all postulated break sizes ranging from the double ended break of the largest RCS cold leg pipe downward. In addition, each ECCS subsystem provides long term core cooling capability in the recirculation mode during the accident recovery period.

With the RCS temperature below 350°F, one OPERABLE ECCS subsystem is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the limited core cooling requirements.