your energy partner
OPPD
Omaha Public Power District

444 South 16th Street Mall
Omaha NE 68102-2247

October 8, 2002
LIC-02-0097

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

References: 1. Docket No. 50-285
2. CEOG Report CE NPSD-995, "Joint Applications Report for Low Pressure Safety Injection System AOT Extension," dated May 1995

SUBJECT: Fort Calhoun Station Unit No. 1 License Amendment Request, "Low Pressure Safety Injection System Allowed Outage Time"

Pursuant to 10 CFR 50.90, Omaha Public Power District (OPPD) hereby proposes to change the Technical Specification definitions of allowed outage time for a single train of the low pressure safety injection system. The proposed change is based on the Reference Combustion Engineering Owners Group (CEOG) topical report CE NPSD-995. This amendment, when approved, will permit Fort Calhoun Station (FCS) to extend the Allowed Outage Time for a single Low Pressure Safety Injection (LPSI) train from the existing 24 hours (LCO 2.3) to seven (7) days.

The proposed Technical Specification change has been evaluated in accordance with 10 CFR 50.91(a)(1) using criteria in 10 CFR 50.92(c); it has been determined that this change involves no significant hazards considerations. The bases for these determinations, information supporting the change, a no significant hazards consideration, and an environmental consideration are included in the attached submittal.

This proposed amendment is risk-informed and includes information in accordance with Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," and Regulatory Guide 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications."

Attachment 1 provides the No Significant Hazards Evaluation and the technical bases for this requested change to the Technical Specifications. Attachment 2 contains a marked-up and clean version reflecting the requested Technical Specification and Basis changes is provided in Attachment 3.

A001

OPPD requests approval of the proposed amendment by May 15, 2003, to support scheduling implementation before the next refueling outage. OPPD requests 60 to implement this amendment. No commitments are made to the NRC in this letter.

I declare under penalty of perjury that the foregoing is true and correct. (Executed on October 8, 2002)

If you have any questions or require additional information, please contact Dr. R. L. Jaworski at (402) 533-6833.

Sincerely,

D. J. Bannister
Manager – Fort Calhoun Station

DJB/RRL/rrl

Attachments:
1. Fort Calhoun Station's Evaluation
2. Markup of Technical Specification Pages
3. Proposed Technical Specification Pages

c: E. W. Merschoff, NRC Regional Administrator, Region IV
A. B. Wang, NRC Project Manager
J. G. Kramer, NRC Senior Resident Inspector
Division Administrator - Public Health Assurance, State of Nebraska
Winston & Strawn

ATTACHMENT 1

Fort Calhoun Station's Evaluation for Amendment of Operating License

Fort Calhoun Station's Evaluation for Amendment of Operating License

1.0 INTRODUCTION

This letter is a request to amend Operating License DPR-40 for Fort Calhoun Station Unit No. 1.

The proposed amendment requests to change the Technical Specification definitions of allowed outage time for a single train of the low pressure safety injection system. The proposed change is based on the Reference Combustion Engineering Owners Group topical report CE NPSD-995. This amendment, when approved, will permit Fort Calhoun Station (FCS) to extend the Allowed Outage Time for a single Low Pressure Safety Injection (LPSI) train from the existing 24 hours (LCO 2.3) to seven (7) days.

2.0 DESCRIPTION OF PROPOSED AMENDMENT

Fort Calhoun Station, Unit 1 proposes to change the Technical Specification (TS) condition given in Section 2.0 (Limiting Condition for Operation), sub-section 2.3 (Emergency Core Cooling System), item 2 (Modification of Minimum Requirements) sub-item (a) to increase the allowed outage time for a single low pressure safety injection train from 24 hours to seven (7) days.

The above change is consistent with the allowed outage time in Combustion Engineering Owners Group (CEOG) topical report, "Joint Applications Report for Low Pressure Safety Injection System AOT Extension" (CE NPSD-995). Staff approval of other licensee requests to extend the allowed outage time for a single LPSI train is illustrated by the precedents listed below.

Additionally, the basis section of Section 2.3 is being updated at this time to reflect these changes and a previous change describing the justification for the quantity of water required in the safety injection and refueling water (SIRW) tank.

3.0 BACKGROUND

The Emergency Core Cooling System (ECCS) is designed to provide inventory to the reactor coolant system in the unlikely event of a Loss of Coolant Accident (LOCA). Low pressure safety injection pumps supplement the reactor coolant system inventory addition

provided by the safety injection tanks and aid in ensuring core cooling during the early stages of a large break LOCA. The ECCS limits fuel damage to maintain a coolable core geometry, limits the cladding metal-water reaction, removes the energy generated in the core, and maintains the core subcritical during the extended period of time following a LOCA. These functional requirements are accomplished through the use of redundant active and passive ECCS injection subsystems.

The low pressure safety injection pumps are also used to circulate reactor coolant during shutdown to remove residual and decay heat. There are two pumps, either of which can circulate sufficient water to keep the temperature rise through the core to less than the full power value with the reactor shutdown at the end of core life.

The LOCA analysis confirms adequate core cooling for the break spectrum up to and including a double-ended break of the primary coolant piping, assuming the design basis safety injection capability as described in the Updated Safety Analysis Report (USAR). Specifically, the USAR analysis assumes that although the entire contents of all four safety injection tanks are assumed to be available for emergency core cooling, the contents of one of the tanks is assumed to be lost through the breach in the reactor coolant system. Furthermore, of the three high-pressure safety injection pumps and the two low-pressure safety injection pumps, it is assumed that only one high pressure pump and one low pressure pump operate during either a large- or small-break accident; and also that 25% of their combined discharge flow is lost from the reactor coolant system out of the break.

4.0 REGULATORY REQUIREMENTS & GUIDANCE

The proposed Technical Specifications Section 2.3(2) satisfies the regulatory requirements for equipment required for low pressure safety injection 10 CFR Part 50 Appendix A, "General Design Criteria for Nuclear Power Plants" and FCS specific design criteria USAR Appendix G, "Responses to 70 Criteria."

5.0 TECHNICAL ANALYSIS

The basis for the proposed change to FCS TS 2.3(2) is contained in CE NPSD-995 and supplemental analyses provided herein.

This proposed amendment is risk-informed and includes information in accordance with Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," and Regulatory Guide 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications."

6.0 REGULATORY ANALYSIS

Fort Calhoun has Technical Specifications that currently allow one low pressure safety injection train to be out of service for 24 hours. A technical basis for extending this allowed outage time (AOT) to seven (7) days for all plants in the CEOG fleet (including FCS) is presented in CE NPSD-995. The calculations presented at that time were based on Revision 1 of the OPPD FCS Probabilistic Safety Analysis (PSA). FCS is currently using Revision 5 to the PSA. Revision 5 reflects the current plant configuration and includes many updates resulting from the OPPD PSA peer review. A revised set of PSA parameters were generated using the evaluation methods described in CE NPSD-995 to demonstrate the applicability of CE NPSD-995 results to FCS. These methods are consistent with the requirements of RG 1.177. Results of the updated analysis are summarized in Tables 1 and 2.

As can be seen from the Table 1, the results of the analyses are consistent with the evaluations performed in CE NPSD-995. These analyses confirm that the change in core damage frequency (CDF) is small and that the Single AOT Risk is well below the RG 1.177 goal of 5.0E-07 (see Table 1). Since the LPSI train is used to respond to low pressure scenarios such as those discussed in CE NPSD-995, the increased AOT for a single LPSI train will have a negligible impact on the Large Early Release Frequency (LERF). This is confirmed by PSA assessments which calculate that the associated incremental Large Early Release probability is less than the RG 1.177 goal of 5.0E-08 (see Table 2).

It should also be noted that the proposed change does not alter, degrade, or prevent actions described or assumed in any accident analysis. It will not change any assumptions previously made in evaluating radiological consequences or affect any fission product barriers, nor does it increase any challenges to safety systems. Therefore, the proposed change does not increase or have any impact on the consequences of events described and evaluated in Chapter 14 of the Fort Calhoun USAR.

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Table 1
CDF Impact of LPSI Train AOT Extension at Fort Calhoun

PARAMETER	LPSI Train Out of Service for Corrective Maintenance	LPSI Train Out of Service for Preventive Maintenance
LPSI System Success Criteria	1 of 2	1 of 2
Current AOT, days	1	1
Proposed AOT, days	7	7
Conditional CDF, per year (1 LPSI Train Unavailable)	1.396E-05	1.350E-05
Conditional CDF, per year (LPSI Equipment not out for test or maintenance)	1.338E-05	1.338E-05
Increase in CDF, per year	5.800E-07	1.200E-07
Single AOT Risk (Current Full AOT)*	1.589E-09	3.288E-10
Single AOT Risk (Proposed Full AOT)*	1.112E-08	2.301E-09
Downtime Frequency (events/yr/train)	0.33	1.5
Yearly AOT Risk (Current full AOT), per year	1.049E-09	9.863E-10
Yearly AOT Risk (Proposed full AOT), per year	7.341E-09	6.904E-09
Mean Duration (hrs/event)	24	112
Single AOT Risk (Mean Duration)*	1.589E-09	1.534E-09
Yearly AOT Risk (Mean Duration) per year	1.049E-09	4.063E-09
Average CDF (Current Full AOT), per year	1.338E-05	
Average CDF (Proposed Full AOT), per year	1.339E-05	

* Incremental risk of equipment inoperability. Single AOT risk is a dimensionless parameter (probability) calculated as ($CDF_{CSS/OOS}$ -CDF_B)*(Time component OOS)

Table 2
LERF Impact of LPSI Train AOT Extension at Fort Calhoun

PARAMETER	LPSI Train Out of Service for Corrective Maintenance	LPSI Train Out of Service for Preventive Maintenance
LPSI System Success Criteria	1 of 2	1 of 2
Current AOT, days	1	1
Proposed AOT, days	7	7
Conditional LERF, per year (1 LPSI Train Unavailable)	2.660E-06	2.636E-06
Conditional LERF, per year (LPSI Equipment not out for test or maintenance)	2.636E-06	2.636E-06
Increase in LERF, per year	2.400E-08	<1.0E-10
Single AOT Risk (Current Full AOT)*	<1.0E-10	<1.0E-10
Single AOT Risk (Proposed Full AOT)*	4.603E-10	<1.0E-10
Downtime Frequency (events/yr/train)	0.33	1.5
Yearly AOT Risk (Current Full AOT), per year	<1.0E-10	<1.0E-10
Yearly AOT Risk (Proposed Full AOT), per year	3.038E-10	<1.0E-10
Mean Duration (hrs/event)	24	112
Single AOT Risk (Mean Duration)*	<1.0E-10	<1.0E-10
Yearly AOT Risk (Mean Duration), per year	<1.0E-10	<1.0E-10

7.0 NO SIGNIFICANT HAZARDS CONSIDERATION

Omaha Public Power District has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

   Response: No.

   The allowed outage time is not an initiator of any previously evaluated accident. The proposed change to the allowed outage time for a single LPSI train will not prevent the safety systems from performing their accident mitigation function as assumed in the safety analysis.

   Therefore, this change does not involve a significant increase in the probability or consequences of any accident previously evaluated.

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

   Response: No.

   The proposed change only affects the technical specifications and does not involve a physical change to the plant. Modifications will not be made to existing components nor will any new or different types of equipment be installed. The proposed change modifies the allowed outage time for a single LPSI train from 24 hours to 7 days for the purpose of performing preventive or corrective maintenance, or surveillance testing. Actions will be taken to ensure the increase in LPSI allowed outage time is incorporated appropriately into plant procedures.

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

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

   Response: No.

   The proposed change modifies the allowed outage time for a single LPSI train to permit necessary ECCS maintenance or testing to be performed in a measured, deliberate fashion. Results of an integrated assessment of the overall plant risk

associated with the adoption of the proposed AOT extension show a negligible increase in plant risk. The increase in allowed outage time will also permit more efficient and more safely managed plant operations and can help reduce the risk associated with changing plant operating modes.

An evaluation of the impact of extending the AOT for a single LPSI train on plant risk was performed for the conditions of the plant being at power. While at power, the incremental conditional core damage frequency (ICCDF) was determined to be 1.396E-05 per year, with a 5.80E-07 per year incremental increase in the core damage frequency attributed to extending the allowed outage time from 24 hours to seven days.

A sensitivity analysis was performed to identify the impact on core damage probability over a seven day interval that results from performing maintenance on one LPSI train while in a shutdown mode. Results of this study show that even small improvements in LPSI train reliability will produce a decrease in core damage probability, thus the net impact of performing LPSI train preventive maintenance while at power is risk-beneficial.

The unavailability of one LPSI train resulted in a large early release frequency of 2.636E-06 per year, with a 2.40E-08 per year incremental conditional large early release frequency (ICLERF) attributed to extending the allowed outage time from 24 hours to seven days.

Therefore, this technical specification change does not involve a significant reduction in the margin of safety.

Based on the above, Omaha Public Power District concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified. It is concluded that the overall plant impact of increasing the allowed outage time for one LPSI train from 24 hours to seven days will be risk beneficial.

8.0 ENVIRONMENTAL CONSIDERATION

Based on the above considerations, the proposed amendment does not involve and will not result in a condition which significantly alters the impact of Fort Calhoun Station on the environment. Thus, the proposed changes meet the eligibility criteria for categorical exclusion set forth in 10 CFR Part 51.22(c)(9), and, pursuant to 10 CFR Part 51.22(b), no environmental assessment need be prepared.

9.0 PRECEDENTS

Similar amendment requests to extend the allowed outage time for a single LPSI train have been approved for a number of nuclear plants, including the following facilities:

Facility	Amendment	Approval Date	Accession
Palisades	191	October 2, 2000	ML003756143
St. Lucie 1,2	164, 106	February 15, 2000	ML003685645
Palo Verde 1,2,3	124	February 1, 2000	ML003678906
Waterford 3	164	May 25, 2000	ML003719144

10.0 REFERENCES

10.1 Title 10, Code of Federal Regulations, Part 50, Appendix A

10.2 CEOG Report CE NPSD-995, "Joint Applications Report for Low Pressure Safety Injection System AOT Extension," dated May 1995

10.3 FCS USAR Appendix G, "Responses to 70 Criteria"

10.4 Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis"

10.5 Regulatory Guide 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications"

ATTACHMENT 2

Markup of Technical Specification Pages

2.0 LIMITING CONDITIONS FOR OPERATION
2.3 Emergency Core Cooling System

Applicability

Applies to the operating status of the emergency core cooling system.

Objective

To assure operability of equipment required to remove decay heat from the core.

Specifications

(1) Minimum Requirements

The reactor shall not be made critical unless all of the following conditions are met:

a. The SIRW tank contains not less than 283,000 gallons of water with a boron concentration of at least the refueling boron concentration at a temperature not less than 50°F.

b. One means of temperature indication (local) of the SIRW tank is operable.

c. All four safety injection tanks are operable and pressurized to at least 240 psig with a tank level of at least 116.2 inches (67%) and a maximum level of 128.1 inches (74%) with refueling boron concentration.

d. One level and one pressure instrument is operable on each safety injection tank.

e. One low-pressure safety injection ~~pump~~ train is operable on each associated 4,160 V engineered safety feature bus.

f. One high-pressure safety injection pump is operable on each associated 4,160 V engineered safety feature bus.

g. Both shutdown heat exchangers are operable.

h. Piping and valves shall be operable to provide two flow paths from the SIRW tank to the reactor coolant system.

i. All valves, piping and interlocks associated with the above components and required to function during accident conditions are operable. HCV-2914, 2934, 2974, and 2954 shall have power removed from the motor operators by locking open the circuit breakers in the power supply lines to the valve motor operators. FCV-326 shall be locked open.

2.0 LIMITING CONDITIONS FOR OPERATION
2.3 Emergency Core Cooling System (Continued)

(2) Modification of Minimum Requirements

During power operation, the Minimum Requirements may be modified to allow one of the following conditions to be true at any one time. If the system is not restored to meet the minimum requirements within the time period specified below, the reactor shall be placed in a hot shutdown condition within 12 hours. If the minimum requirements are not met within an additional 48 hours the reactor shall be placed in a cold shutdown condition within 24 hours.

a. One low-pressure safety injection ~~pump~~ train may be inoperable provided the ~~pump~~ train is restored to operable status within ~~24 hours~~ seven (7) days.

b. One high-pressure safety injection pump may be inoperable provided the pump is restored to operable status within 24 hours.

c. One shutdown heat exchanger may be inoperable for a period of no more than 24 hours.

d. Any valves, interlocks or piping directly associated with one of the above components and required to function during accident conditions shall be deemed to be part of that component and shall meet the same requirements as listed for that component.

e. Any valve, interlock or piping associated with the safety injection and shutdown cooling system which is not covered under d. above but which is required to function during accident conditions may be inoperable for a period of no more than 24 hours.

f. One safety injection tank may be inoperable for reasons other than g. or h. below for a period of no more than 24 hours.

g. Level and/or pressure instrumentation on one safety injection tank may be inoperable for a period of 72 hours.

h. One safety injection tank may be inoperable due to boron concentration not within limits for a period of no more than 72 hours.

i. Components in excess of those allowed by Conditions a, b, d, and e may be inoperable provided they are returned to operable status within 1hour when performing the quarterly recirculation actuation logic channel functional test (Table 3-2 item 20) under administrative controls. This allowance applies only to the remaining portion of Cycle 20 and all of cycle 21.

2.0 LIMITING CONDITIONS FOR OPERATION

2.3 Emergency Core Cooling System (Continued)

The USAR Loss of Coolant Accident analysis assumes a minimum SIRW tank inventory of 250,000 gallons has been pumped from the SIRW tank when recirculation begins. Technical specification 2.3(1) requires that the SIRW tank contains a minimum of 283,000 gallons of usable water. This additional volume over that assumed in the USAR analysis provides sufficient margin to account for instrument uncertainty. The SIRW tank contains water containing a boron concentration of at least the refueling boron concentration. This is sufficient boron concentration to provide a shutdown margin of 5%, including allowances for uncertainties, with all control rods withdrawn and a new core at a temperature of 68°F.[2]

The limits for the safety injection tank pressure and volume assure the required amount of water injection during an accident and are based on values used for the accident analyses. The minimum 116.2 inch level corresponds to a volume of 825 ft 3 and the maximum 128.1 inch level corresponds to a volume of 895.5 ft^3. Prior to the time the reactor is brought critical, the valving of the safety injection system must be checked for correct alignment and appropriate valves locked. Since the system is used for shutdown cooling, the valving will be changed and must be properly aligned prior to start-up of the reactor.

The operable status of the various systems and components is to be demonstrated by periodic tests. A large fraction of these tests will be performed while the reactor is operating in the power range.

If a component is found to be inoperable, it will be possible in most cases to effect repairs and restore the system to full operability within a relatively short time. For a single component to be inoperable does not negate the ability of the system to perform its function. If it develops that the inoperable component is not repaired within the specified allowable time period, or a second component in the same or related system is found to be inoperable, the reactor will initially be put in the hot shutdown condition to provide for reduction of cooling requirements after a postulated loss-of-coolant accident. This will also permit improved access for repairs in some cases. After a limited time in hot shutdown, if the malfunction(s) is not corrected, the reactor will be placed in the cold shutdown condition utilizing normal shutdown and cooldown procedures. In the cold shutdown condition, release of fission products or damage of the fuel elements is not considered possible.

The plant operating procedures will require immediate action to effect repairs of an inoperable component and therefore in most cases repairs will be completed in less than the specified allowable repair times. The limiting times to repair are intended to assure that operability of the component will be restored promptly and yet allow sufficient time to effect repairs using safe and proper procedures.

The time allowed to repair a safety injection tank is based on the deterministic and probabilistic analyses of Reference (8). ~~CE NPSD-994, "CEOG Joint Applications Report for Safety Injection Tank AOT/SIT Extension," May 1995.~~ The time allowed to repair a LPSI train is based on the deterministic and probabilistic analyses of Reference (9). These analyses concluded that the overall risk impact of the completion times are either risk-beneficial or risk neutral. The requirement for core cooling in case of postulated loss-of-coolant accident while in the hot shutdown condition is significantly reduced below the requirements for a postulated loss-of-coolant accident during power operation. Putting the reactor in the hot shutdown condition reduces the consequences of a loss-of-coolant accident and also allows more free access to some of the engineered safeguards components in order to effect repairs.

Failure to complete repairs within 48 hours of going to the hot shutdown condition is considered indicative of a requirement for major maintenance and, therefore, in such a case, the reactor is to be put into the cold shutdown condition.

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.3 Emergency Core Cooling System (Continued)

Components in excess of those allowed by Conditions a, b, d, and e may be inoperable provided they are returned to operable status within 1 hour when performing the quarterly recirculation actuation logic channel functional test (Table 3-2 item 20) under administrative controls. This allowance applies only to the remaining portion of Cycle 20 and all of Cycle 21. This prevents violating Technical Specifications or necessitating a unit shutdown due to inability to perform the quarterly recirculation actuation logic channel functional test. These administrative controls consist of stationing three dedicated operators at the Engineered Safeguards Features (ESF) panel controls in the control room. In this way, the following conditions are maintained and actions can be rapidly performed should a valid ESF actuation occur:

- the appropriate Safety Injection Refueling Water Tank (SIRWT) to Safety Injection (SI) and Containment Spray (CS) pumps suction valve control switch is maintained in the OPEN position (spring-return switch),
- the appropriate SI and CS pumps to SIRWT recirculation minimum flow valve control switch is maintained in the OPEN position (spring-return switch),
- the appropriate Recirculation Actuation Signal (RAS) lockout relays and initiating signal can be rapidly reset,
- the appropriate SI and CS pumps to SIRWT recirculation minimum flow valve control switch can be rapidly returned to the AUTO position,
- the appropriate SIRWT to SI and CS pumps suction valve control switch can be rapidly returned to the AUTO position, and
- the appropriate Containment Sump to SI and CS pumps suction valve control switch can be rapidly returned to the AUTO position.

The appropriate SI and CS pumps to SIRWT recirculation minimum flow valve control switch and the appropriate SIRWT to SI and CS pumps suction valve control switch are held in the OPEN position during the test to enhance the reliability of the appropriate SI and CS pumps by maintaining the associated valves open.

References

(1) USAR, Section 14.15.1
(2) USAR, Section 6.2.3.1
(3) USAR, Section 14.15.3
(4) USAR, Appendix K
(5) Omaha Public Power District's Submittal, December 1, 1976
(6) Technical Specification 2.1.2, Figure 2-1B
(7) USAR, Section 4.4.3
(8) CE NPSD-994, "CEOG Joint Applications Report for Safety Injection Tank AOT/SIT Extension," May 1995.
(9) CE NPSD-995, "CEOG Joint Applications Report for Low Pressure Safety Injection System AOT Extension," May 1995.

ATTACHMENT 3

Proposed Technical Specification Pages

2.0 LIMITING CONDITIONS FOR OPERATION
2.3 Emergency Core Cooling System

Applicability

Applies to the operating status of the emergency core cooling system.

Objective

To assure operability of equipment required to remove decay heat from the core.

Specifications

(1) Minimum Requirements

The reactor shall not be made critical unless all of the following conditions are met:

a. The SIRW tank contains not less than 283,000 gallons of water with a boron concentration of at least the refueling boron concentration at a temperature not less than 50°F.

b. One means of temperature indication (local) of the SIRW tank is operable.

c. All four safety injection tanks are operable and pressurized to at least 240 psig with a tank level of at least 116.2 inches (67%) and a maximum level of 128.1 inches (74%) with refueling boron concentration.

d. One level and one pressure instrument is operable on each safety injection tank.

e. One low-pressure safety injection train is operable on each associated 4,160 V engineered safety feature bus.

f. One high-pressure safety injection pump is operable on each associated 4,160 V engineered safety feature bus.

g. Both shutdown heat exchangers are operable.

h. Piping and valves shall be operable to provide two flow paths from the SIRW tank to the reactor coolant system.

i. All valves, piping and interlocks associated with the above components and required to function during accident conditions are operable. HCV-2914, 2934, 2974, and 2954 shall have power removed from the motor operators by locking open the circuit breakers in the power supply lines to the valve motor operators. FCV-326 shall be locked open.

2.0 LIMITING CONDITIONS FOR OPERATION
2.3 Emergency Core Cooling System (Continued)

(2) Modification of Minimum Requirements

During power operation, the Minimum Requirements may be modified to allow one of the following conditions to be true at any one time. If the system is not restored to meet the minimum requirements within the time period specified below, the reactor shall be placed in a hot shutdown condition within 12 hours. If the minimum requirements are not met within an additional 48 hours the reactor shall be placed in a cold shutdown condition within 24 hours.

a. One low-pressure safety injection train may be inoperable provided the train is restored to operable status within seven (7) days.

f. One high-pressure safety injection pump may be inoperable provided the pump is restored to operable status within 24 hours.

g. One shutdown heat exchanger may be inoperable for a period of no more than 24 hours.

h. Any valves, interlocks or piping directly associated with one of the above components and required to function during accident conditions shall be deemed to be part of that component and shall meet the same requirements as listed for that component.

i. Any valve, interlock or piping associated with the safety injection and shutdown cooling system which is not covered under d. above but which is required to function during accident conditions may be inoperable for a period of no more than 24 hours.

f. One safety injection tank may be inoperable for reasons other than g. or h. below for a period of no more than 24 hours.

g. Level and/or pressure instrumentation on one safety injection tank may be inoperable for a period of 72 hours.

j. One safety injection tank may be inoperable due to boron concentration not within limits for a period of no more than 72 hours.

k. Components in excess of those allowed by Conditions a, b, d, and e may be inoperable provided they are returned to operable status within 1hour when performing the quarterly recirculation actuation logic channel functional test (Table 3-2 item 20) under administrative controls. This allowance applies only to the remaining portion of Cycle 20 and all of cycle 21.

2.0 LIMITING CONDITIONS FOR OPERATION

2.3 Emergency Core Cooling System (Continued)

The USAR Loss of Coolant Accident analysis assumes a minimum SIRW tank inventory of 250,000 gallons has been pumped from the SIRW tank when recirculation begins. Technical specification 2.3(1) requires that the SIRW tank contains a minimum of 283,000 gallons of usable water. This additional volume over that assumed in the USAR analysis provides sufficient margin to account for instrument uncertainty. The SIRW tank contains water containing a boron concentration of at least the refueling boron concentration. This is sufficient boron concentration to provide a shutdown margin of 5%, including allowances for uncertainties, with all control rods withdrawn and a new core at a temperature of 68°F.[(2)]

The limits for the safety injection tank pressure and volume assure the required amount of water injection during an accident and are based on values used for the accident analyses. The minimum 116.2 inch level corresponds to a volume of 825 ft 3 and the maximum 128.1 inch level corresponds to a volume of 895.5 ft^3. Prior to the time the reactor is brought critical, the valving of the safety injection system must be checked for correct alignment and appropriate valves locked. Since the system is used for shutdown cooling, the valving will be changed and must be properly aligned prior to start-up of the reactor.

The operable status of the various systems and components is to be demonstrated by periodic tests. A large fraction of these tests will be performed while the reactor is operating in the power range.

If a component is found to be inoperable, it will be possible in most cases to effect repairs and restore the system to full operability within a relatively short time. For a single component to be inoperable does not negate the ability of the system to perform its function. If it develops that the inoperable component is not repaired within the specified allowable time period, or a second component in the same or related system is found to be inoperable, the reactor will initially be put in the hot shutdown condition to provide for reduction of cooling requirements after a postulated loss-of-coolant accident. This will also permit improved access for repairs in some cases. After a limited time in hot shutdown, if the malfunction(s) is not corrected, the reactor will be placed in the cold shutdown condition utilizing normal shutdown and cooldown procedures. In the cold shutdown condition, release of fission products or damage of the fuel elements is not considered possible.

The plant operating procedures will require immediate action to effect repairs of an inoperable component and therefore in most cases repairs will be completed in less than the specified allowable repair times. The limiting times to repair are intended to assure that operability of the component will be restored promptly and yet allow sufficient time to effect repairs using safe and proper procedures.

The time allowed to repair a safety injection tank is based on the deterministic and probabilistic analyses of Reference (8). The time allowed to repair a LPSI train is based on the deterministic and probabilistic analyses of Reference (9). These analyses concluded that the overall risk impact of the completion times are either risk-beneficial or risk neutral. The requirement for core cooling in case of postulated loss-of-coolant accident while in the hot shutdown condition is significantly reduced below the requirements for a postulated loss-of-coolant accident during power operation. Putting the reactor in the hot shutdown condition reduces the consequences of a loss-of-coolant accident and also allows more free access to some of the engineered safeguards components in order to effect repairs.

Failure to complete repairs within 48 hours of going to the hot shutdown condition is considered indicative of a requirement for major maintenance and, therefore, in such a case, the reactor is to be put into the cold shutdown condition.