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Exelon Nuclear

10 CFR 50.90

RS-01-033

March 1, 2001

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

Dresden Nuclear Power Station, Units 2 and 3
Facility Operating License Nos. DPR-19 and DPR-25
NRC Docket Nos. 50-237 and 50-249

Quad Cities Nuclear Power Station, Units 1 and 2
Facility Operating License Nos. DPR-29 and DPR-30
NRC Docket Nos. 50-254 and 50-265

Subject: Supplement to GE-14 Fuel License Amendment Request

References: (1) Letter from R.M. Krich (Commonwealth Edison Company) to U.S. NRC, "Request for Technical Specifications Changes, Transition to General Electric Fuel," dated September 29, 2000

(2) Letter from R.M. Krich (Commonwealth Edison Company) to U.S. NRC, "Request for License Amendment for Power Uprate Operation," dated December 27, 2000

(3) Letter from J.S. Perry (Commonwealth Edison Company) to U.S. NRC, "Evaluation of Methods to Address ECCS Flow and Pressure Measurement Uncertainties," dated March 21, 1997

Pursuant to 10 CFR 50.90, "Application for amendment of license or construction permit," Exelon Generation Company (EGC), LLC, formerly Commonwealth Edison (ComEd) Company, is requesting additional changes to the Technical Specifications (TS), relative to the changes requested in Reference 1 for the Dresden Nuclear Power Station (DNPS), Units 2 and 3, and the Quad Cities Nuclear Power Station (QCNPS), Units 1 and 2. In Reference 1, ComEd submitted a TS amendment request for DNPS and QCNPS to support a change in fuel vendors from Siemens Power Corporation (SPC) to General Electric (GE) and a transition to GE-14 fuel. That amendment request proposed changes associated with the change in analysis methodology associated with the change in fuel types and fuel vendors.

In Reference 2, ComEd submitted proposed changes to the Operating License and TS for DNPS and QCNPS to increase the Rated Thermal Power (RTP) to 2957 Megawatts-thermal (MWt) as part of an Extended Power Uprate (EPU). The safety analyses

A001

performed in support of the EPU were based on an equilibrium core of GE-14 fuel to support the fuel transition described above.

The results of the safety analyses for the EPU and GE-14 fuel transition indicate that additional TS changes relative to Reference 1 are required related to the operability requirements for the Automatic Depressurization System (ADS) function for both DNPS and QCNPS. Additionally, changes are required to the Emergency Core Cooling System (ECCS) surveillance requirements for DNPS. While these changes are associated with both the fuel transition and the EPU, EGC has determined that these changes are appropriate to include in the TS amendment request associated with the fuel transition. This is because the analyses do not specifically separate the effects of the fuel transition and the EPU. An evaluation shows that a significant portion of the effects are due to the fuel transition. Thus, it is necessary to request that these proposed changes be approved to support the fuel transition. The potential for these additional requested changes for the fuel transition was recognized and discussed in routine teleconferences with Mr. L.W. Rossbach and at a meeting with the NRC on November 16, 2000. This fuel transition is anticipated to occur during the DNPS Unit 2 refueling outage, currently scheduled for October 2001, and the QCNPS Unit 2 refueling outage, currently scheduled for February 2002.

The proposed changes include the following.

- Increasing the number of required ADS valves from four to five.

- Revising of the required action associated with the condition when the High Pressure Coolant Injection (HPCI) System is inoperable and one low pressure ECCS injection/spray subsystem is inoperable.

- Adding a surveillance to allow crediting the use of the ADS function of the Target Rock safety/relief valve.

- Revising the Low Pressure Coolant Injection (LPCI) pump flow measurement surveillance requirements to test flow rates for a two pump combination, instead of the current three pump combination. This change is requested for DNPS only, since the QCNPS surveillance requirement currently tests a two pump combination.

In addition, in support of the fuel transition, DNPS is revising a previous commitment made to the NRC related to the treatment of flow and pressure measurement uncertainty for ECCS pumps in the analyses for the Loss of Coolant Accident (LOCA). This commitment is discussed in Reference 3.

In Reference 3, ComEd stated that DNPS will address ECCS pump flow and pressure measurement uncertainty by taking a flow penalty in the LOCA analysis required by 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors." As part of the transition to GE as a fuel vendor, and as described in Reference 1, the NRC-approved GE methodology (i.e., SAFER/GESTR) is being used to perform the LOCA analysis for DNPS. This methodology explicitly calls for the use of required TS pump flows as inputs to the LOCA analysis, without adjustment for uncertainty. This is a standard practice for Boiling Water Reactors

(BWRs) using the SAFER/GESTR methodology. As a result, the previous DNPS commitment documented in Reference 3 regarding the treatment of uncertainty is no longer applicable.

This supplement to the Reference 1 amendment request contains separate enclosures DNPS and QCNPS. Each enclosure is subdivided as follows.

1. Attachment A contains a detailed description of the additional proposed changes necessary for operation with GE-14 fuel.
2. Attachment B provides the proposed markups to the TS.
3. Attachment C provides the information supporting a finding of no significant hazards consideration in accordance with 10 CFR 50.92(c), "Issuance of Amendment."
4. Attachment D provides information supporting an Environmental Assessment.

The proposed changes have been reviewed by the Plant Operations Review Committees and the Nuclear Safety Review Boards at DNPS and QCNPS in accordance with the Quality Assurance Program.

EGC is notifying the State of Illinois of this license amendment request by transmitting a copy of this letter and its attachments to the designated State Official.

EGC requests that these proposed changes be approved for DNPS by September 14, 2001, in order to support core reload with GE-14 fuel during the DNPS Unit 2 refueling outage which is currently scheduled to begin October 20, 2001. For QCNPS, EGC requests approval by January 4, 2002, in order to support core reload with GE-14 fuel during the QCNPS Unit 1 refueling outage which is currently scheduled to begin February 2, 2002.

Should you have any questions related to this request, please contact Mr. Allan R. Haeger at (630) 663 6645.

Respectfully,

R.M. Krich
Director – Licensing
Mid-West Regional Operating Group

Attachments:

Affidavit
Enclosure 1: Dresden Nuclear Power Station
Attachment A: Description and Summary Safety Analysis for Proposed Changes
Attachment B: Marked-Up TS Pages for Proposed Changes
Attachment C: Information Supporting a Finding of No Significant Hazards Consideration
Attachment D: Information Supporting an Environmental Assessment

Enclosure 2: Quad Cities Nuclear Power Station
Attachment A: Description and Summary Safety Analysis for Proposed Changes
Attachment B: Marked-Up TS Pages for Proposed Changes
Attachment C: Information Supporting a Finding of No Significant Hazards Consideration
Attachment D: Information Supporting an Environmental Assessment

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Dresden Nuclear Power Station
NRC Senior Resident Inspector – Quad Cities Nuclear Power Station
Office of Nuclear Facility Safety – Illinois Department of Nuclear Safety

STATE OF ILLINOIS	)	
COUNTY OF DUPAGE	)	
IN THE MATTER OF:	)	
EXELON GENERATION COMPANY, LLC	)	**Docket Numbers**
DRESDEN NUCLEAR POWER STATION - Units 2 and 3	)	**50-237 and 50-249**
QUAD CITIES NUCLEAR POWER STATION – Units 1 and 2	)	**50-254 and 50-265**

SUBJECT: SUPPLEMENT TO GE-14 FUEL LICENSE AMENDMENT REQUEST

AFFIDAVIT

I affirm that the content of this transmittal is true and correct to the best of my knowledge, information and belief.

R. M. Krich
Director - Licensing
Mid-West Regional Operating Group

Subscribed and sworn to before me, a Notary Public in and

for the State above named, this 28th day of

February, 2001

Notary Public

" OFFICIAL SEAL "
Timothy A. Byam
Notary Public, State of Illinois
My Commission Expires 11/24/2001

ENCLOSURE 1

ATTACHMENTS A - D
Supplement to GE14 Fuel License Amendment Request for
Dresden Nuclear Power Station, Units 2 and 3

ENCLOSURE 1 - ATTACHMENT A
Supplement to GE-14 Fuel License Amendment Request for
Dresden Nuclear Power Station, Units 2 and 3

DESCRIPTION AND SUMMARY SAFETY ANALYSIS
FOR PROPOSED CHANGES

A. SUMMARY OF PROPOSED CHANGES

Pursuant to 10 CFR 50.90, "Application for amendment of license or construction permit," Exelon Generation Company (EGC), LLC is requesting additional changes to various Technical Specifications (TS) relative to the changes requested in Reference I.1 for Dresden Nuclear Power Station (DNPS), Units 2 and 3. The requested changes involve the requirements for operability of the Automatic Depressurization System (ADS) valves.

In Reference I.1, Commonwealth Edison (ComEd) Company, now EGC, submitted a TS amendment request for the DNPS to support a change in fuel vendors from Siemens Power Corporation (SPC) to General Electric (GE) and a transition to GE-14 fuel. This amendment request proposed changes associated with the change in analysis methodology due to the change in fuel types and fuel vendors.

In Reference I.2, ComEd submitted proposed changes to the Operating License and TS for DNPS to increase the Rated Thermal Power (RTP) by approximately 17% as part of an Extended Power Uprate (EPU). The safety analyses performed in support of the EPU were based on an equilibrium core of GE-14 fuel to support the fuel transition described above.

The results of the safety analyses for the EPU and GE-14 fuel transition indicate that additional TS changes relative to Reference I.1 are required related to the operability requirements for the ADS function. While these proposed changes are associated with both the fuel transition and the EPU, EGC has determined that these changes are appropriate to include in the TS amendment request associated with the fuel transition. This is because the analyses do not specifically separate the effects of the fuel transition and the EPU. An evaluation determined that a significant portion of the effects are due to the fuel transition. Thus, it is necessary to request that these changes be approved to support the fuel transition, which is anticipated to occur during the DNPS Unit 2 refueling outage, currently scheduled for October 2001.

The proposed changes involve the following.

- Increasing the number of required ADS valves from four to five.
- Revising the required action associated with the condition when the High Pressure Coolant Injection (HPCI) System is inoperable and one low pressure Emergency Core Cooling System (ECCS) injection/spray subsystem is inoperable.
- Revising the Low Pressure Coolant Injection (LPCI) pump flow rate surveillance to include two pumps instead of three.
- Adding a surveillance to allow crediting the use of the ADS relief function of the Target Rock safety/relief valve.

DNPS has submitted a TS amendment request (Reference I.3) for conversion to the Improved Technical Specifications (ITS). In anticipation of approval of that request, this request for amendment is based on the format of the ITS. In addition, the affected sections of the Current Technical Specifications (CTS) are noted.

B. DESCRIPTION OF THE CURRENT REQUIREMENTS

TS Section 3.5.1, "Emergency Core Cooling System - Operating"

Limiting Condition for Operation (LCO) 3.5.1 states that "Each ECCS injection/spray subsystem and the Automatic Depressurization System (ADS) function of four relief valves shall be OPERABLE."

Condition G requires that with the HPCI System inoperable and either one low pressure ECCS injection/spray subsystem inoperable or if Condition C (i.e., one LPCI pump on each subsystem inoperable) has been entered, either the HPCI System or the low pressure ECCS injection/spray subsystem must be restored to operable status within 72 hours.

Condition I requires that if the action and associated completion time of Conditions F, G or H has not been met or if two or more ADS valves are inoperable then the reactor must be in Mode 3 within 12 hours and reactor steam dome pressure must be reduced to $\leq$ 150 psig within 36 hours.

Surveillance Requirement (SR) 3.5.1.5 requires that three LPCI pumps develop a flow rate of $\geq$ 14,500 gpm against a test line pressure corresponding to a reactor pressure of $\geq$ 20 psig.

CTS Section 3.5.A, "Emergency Core Cooling System – Operating," defines similar LCOs and surveillance requirements. The CTS requirement for the ADS system includes five relief valves and the CTS action time for the equivalent of ITS Conditions G above is 14 days. These items were revised as part of the proposed conversion to the ITS.

C. BASES FOR THE CURRENT REQUIREMENTS

TS Section 3.5.1, "Emergency Core Cooling System - Operating"

For a small break Loss of Coolant Accident (LOCA), HPCI failure is the most severe failure. In the analysis of events requiring ADS operation, it is assumed that only three of the five ADS valves operate. Therefore, four ADS valves are required to be operable.

For Condition G, with the HPCI System inoperable in addition to any one low pressure ECCS injection/spray subsystem being inoperable, adequate core cooling is ensured by the operability of the ADS and the remaining low-pressure ECCS subsystems.

For Condition I, with the required action or associated completion time of Conditions F,G, or H not met, the ability of the ECCS system to mitigate a small break LOCA is reduced and the plant must be brought to a condition in which the LCO does not apply. To achieve this status, the plant must be brought to at least Mode 3 within 12 hours and reactor steam dome pressure must be reduced to ≤ 150 psig within 36 hours.

For SR 3.5.1.5, the performance requirements of the low-pressure ECCS pumps are determined through application of 10 CFR 50, "Domestic Licensing of Production and Utilization Facilities," Appendix K, "ECCS Evaluation Models," and are bounded by the requirements of the SR. This periodic surveillance is performed to verify that the ECCS pumps will develop the flow rates required by the respective analyses. The flow rates ensure that adequate core cooling is provided to satisfy the acceptance criteria of 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors."

D. NEED FOR REVISION OF THE REQUIREMENTS

TS Section 3.5.1, "Emergency Core Cooling System - Operating"

For a small break LOCA, HPCI failure is the most severe failure. In the analysis of events requiring ADS operation while using GE-14 fuel, it is assumed that all five ADS valves operate. The existing requirement that four valves be operable must be revised to ensure operation within the assumptions of the accident analysis. The fifth ADS valve is a Target Rock dual-function safety/relief valve. This valve was previously not qualified for use to satisfy the ADS requirement in accordance with NUREG-0737, "Clarification of TMI Action Plan Requirements", Task II.K.3.28, "Verify Qualification of Accumulators on Automatic Depressurization System." To use this valve to satisfy the ADS requirement, an additional surveillance is proposed. The surveillance will verify that the accumulator leakage will not compromise the ability of the valve to operate for a minimum of five cycles for at least 30 minutes following the postulated event.

The bases for the required action for Condition G states that if the HPCI system and one low-pressure ECCS subsystem are inoperable, the ADS and the remaining low-pressure ECCS subsystems will be capable of ensuring adequate core cooling. With the introduction of GE-14 fuel, the LOCA analyses show that, for small break LOCAs of 0.1 ft^2, a failure of two ECCS subsystems subsystems such as HPCI and a low pressure ECCS injection/spray subsystem does not provide adequate core cooling to meet all of the required acceptance criteria. Consequently, the actions to be taken should these conditions arise must be revised to require entry into TS 3.0.3, which requires reactor shutdown.

The required action for Condition I states that if the required action and associated completion times of Conditions F,G, or H are not met, the reactor must be in Mode 3 within 12 hours and steam dome pressure must be reduced to ≤ 150 psig within 36 hours. The required action and completion time for Condition G is being revised as discussed above. This will result in revising the reference to Condition G as it is described in Condition I.

SR 3.5.1.5 requires demonstration of the ability of three LPCI pumps to provide 14,500 gpm against a test line pressure corresponding to a reactor pressure of at least 20 psig. The assumptions associated with the ECCS-LOCA analyses as part of the transition to GE-14 fuel include the ability of two LPCI pumps to provide at least 9,000 gpm against a test line pressure corresponding to a reactor pressure of at least 20 psig. Since the TS provide the surveillance requirements necessary to demonstrate compliance with the assumptions of the safety analyses, this SR should be revised to reflect this assumption.

E. DESCRIPTION OF THE PROPOSED CHANGES

Unless otherwise stated, the affected TS sections are the same for Unit 2 and Unit 3.

TS Section 3.5.1, "Emergency Core Cooling System - Operating"

The number of ADS valves required to be operable is increased from four to five to include the relief function of the Target Rock safety/relief valve such that LCO 3.5.1 states, "Each ECCS injection/spray subsystem and the Automatic Depressurization System (ADS) function of five relief valves shall be Operable."

Condition G is deleted entirely.

Condition I is revised to remove reference to the condition described by condition G.

Condition J is revised to include the condition removed from Condition G.

SR 3.5.1.5 is revised to verify that two LPCI pumps develop of flow rate of ≥ 9000 gpm against a test line pressure corresponding to a reactor pressure of ≥ 20 psig.

A new surveillance is proposed to verify that the Target Rock safety/relief valve accumulator leakage is less than or equal to 0.75 standard cubic feet per hour at least once every 24 months

F. SUMMARY SAFETY ANALYSIS OF THE PROPOSED CHANGES

TS Section 3.5.1, "Emergency Core Cooling System - Operating"

The proposed change increases the number of required ADS relief valves from four to five. The ADS consists of four electromatic relief valves and one safety/relief valve. The ADS is designed to provide depressurization of the Reactor Coolant System (RCS) during a small break LOCA if HPCI fails. For a small break LOCA, HPCI failure is the most severe failure. In the analysis of events requiring ADS operation, it is assumed that all five ADS valves operate. These analyses were performed in support of EGC's request to transition to GE-14 fuel and increase the licensed power level of DNPS as described in Reference I.2. The results of the analysis demonstrate that, with HPCI failure, the five ADS valves and the remaining operable ECCS subsystems provide the capability to adequately cool the core and prevent fuel damage. For current rated thermal power level with SPC fuel, the LOCA analyses show that with HPCI failure, three

ADS valves and the remaining operable ECCS subsystems provide adequate core cooling. The TS requirement to maintain four ADS valves operable represents an allowance for an additional single failure of an ADS valve beyond the assumed HPCI failure. With an assumed failure of the HPCI system, there is no requirement to assume an additional single failure of an ADS valve. Thus five ADS valves are adequate for core cooling.

Condition G, in which HPCI is inoperable and one low pressure ECCS injection/spray subsystem is inoperable was previously evaluated in accident analyses for DNPS. With the introduction of GE-14 fuel, the LOCA analyses show that, for small break LOCAs of 0.1 ft^2, a failure of two ECCS subsystems such as HPCI and a low pressure ECCS injection/spray subsystem does not provide adequate core cooling to meet all of the required acceptance criteria. Consequently, the required actions for this condition must be changed to require entry into TS 3.0.3.

Condition H, in which one ADS valve is inoperable has been analyzed for the transition to GE-14 fuel. The results indicate that with the remaining ADS valves and the ECCS systems operable, including the HPCI system, the small break LOCA is successfully mitigated. Thus, the required actions associated with Condition H continue to be appropriate.

In accordance with the assumptions of the LOCA analysis, the current requirement verifies that three LPCI pumps develop a flow rate of at least 14,500 gpm against a test line pressure corresponding to a reactor pressure of at least 20 psig. This analysis assumes a failure of one LPCI pump. In this case, the remaining three pumps together with ADS or HPCI provide the capability to adequately cool the core for the full spectrum of pipe breaks associated with the postulated LOCA. To support the transition to GE-14 fuel, new ECCS-LOCA analyses are required. The new SAFER/GESTR analysis associated with the introduction of GE-14 fuel uses NRC accepted 10 CFR 50, Appendix K worst case single failure assumptions. Of the analyses that involve the operation of LPCI, the most limiting single failure case requires a minimum of two LPCI pumps providing 9000 gpm total flow against a reactor vessel pressure of 20 psig. The revised surveillance requirement will demonstrate that the assumptions associated with the analysis continue to be met.

To provide five ADS relief valves, the ADS relief function of the Target Rock safety/relief valve must be operable. This valve was previously not qualified for use to satisfy the ADS guideline in accordance with NUREG-0737, Task II.K.3.28. However, the piping and supports from the accumulator to the Target Rock valves were seismically qualified, and spring-loaded ball check valves were installed in the pneumatic supply lines to minimize leakage from the valve accumulator. To use this valve to satisfy the ADS requirement, an additional surveillance is proposed to verify that the accumulator leakage for the Target Rock safety/relief valve is less than or equal to 0.75 standard cubic feet per hour. This will ensure that the valve can operate for a minimum of five cycles for at least 30 minutes following the postulated event, assuming no air makeup is available to the accumulator.

The capability to operate for five cycles is adequate to ensure successful depressurization for the following reasons. First, the assumption of five valve cycles is

conservative. The small break LOCA response requires the valve to open only once initially to depressurize the reactor. Second, subsequent maintenance of low-pressure conditions is adequately ensured by the remaining four electromatic relief valves. Third, the five cycle capability was verified with containment pressure near atmospheric pressure. This is equivalent to achieving two valve cycles at 70% of containment design pressure. Two valve cycles are still adequate for depressurization capability. The 70% of design pressure bounds the pressures that would be expected for small break LOCAs.

The 30-minute time is adequate to depressurize the reactor following a small break LOCA. The longest operability period required for the accumulator for DNPS is during an event which does not pressurize the drywell (e.g., a transient, outside containment line break, or stuck-open relief valve) with failure of high-pressure makeup. In this case, ADS operation is initiated by the 8.5-minute timer on sustained low reactor level. Even assuming a degraded event in which manual operator action is necessary to initiate ADS, a 30-minute time period is a conservative bounding value to use for the Target Rock accumulator operability period.

The 24 month surveillance interval for accumulator leakage is justified based on the following. The accumulators were provided with pipe restraints and the accumulator check valves were provided with soft seats to minimize leakage in response to Inspection and Enforcement (IE) Bulletin 80-01, "Operability of ADS Valve Pneumatic Supply." This test interval is consistent with the test interval approved for the Pilgrim Nuclear Power Station in Reference I.4.

G. IMPACT ON PREVIOUS SUBMITTALS

All submittals currently under review by the NRC were evaluated to determine the impact of this submittal. The following submittals are associated with this request for amendment.

- By letter dated September 29, 2000 (Reference I.1), DNPS submitted a request to amend the TS in response to an anticipated transition to GE-14 fuel. This request is a supplement to the referenced request for amendment.

No other submittals currently under review by the NRC are affected by the information presented in this revision to the license amendment request.

H. SCHEDULE REQUIREMENTS

As requested in the original submittal, EGC plans to begin reloading with GE-14 fuel during the next Unit 2 refueling outage, scheduled for October 20, 2001. Therefore, EGC requests that the proposed changes be approved by September 14, 2001.

I. REFERENCES

1. Letter from R. M. Krich (ComEd) to U.S. NRC, "Request for Technical Specifications Change, Transition to General Electric Fuel," dated September 29, 2000

2. Letter from R. M. Krich (ComEd) to U.S. NRC, "Request for Technical Specifications Changes for Dresden Nuclear Power Station, Units 2 and 3 and Quad Cities Nuclear Power Station, Units 1 and 2, to Allow Operation at Uprated Power Levels," dated December 27, 2000

3. Letter from R. M. Krich (ComEd) to U.S. NRC, "Request for Technical Specifications Changes for Dresden Nuclear Power Station, Units 2 and 3, LaSalle County Station, Units 1 and 2, and Quad Cities Nuclear Power Station, Units 1 and 2, to Implement Improved Standard Technical Specifications," dated March 3, 2000

4. Letter from U.S. NRC to W.D. Harrington (Boston Edison), "NUREG-0737, Item II.K.3.28," dated December 23, 1985.

ENCLOSURE 1 - ATTACHMENT B
Supplement to GE-14 Fuel License Amendment Request for
Dresden Nuclear Power Station, Units 2 and 3

MARKED-UP TS PAGES FOR PROPOSED CHANGES

The marked-up Technical Specifications are provided in the following pages. The marked-up bases pages are also provided for reference.

REVISED PAGES

3.5.1-1
3.5.1-2
3.5.1-3
3.5.1-4
3.5.1-6

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS) AND ISOLATION CONDENSER (IC) SYSTEM

3.5.1 ECCS–Operating

LCO 3.5.1 Each ECCS injection/spray subsystem and the Automatic Depressurization System (ADS) function of ~~four~~ five relief valves shall be OPERABLE.

APPLICABILITY: MODE 1,
MODES 2 and 3, except high pressure coolant injection (HPCI) and ADS valves are not required to be OPERABLE with reactor steam dome pressure ≤ 150 psig.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Low Pressure Coolant Injection (LPCI) pump inoperable.	A.1 Restore LPCI pump to OPERABLE status.	30 days
B. One LPCI subsystem inoperable for reasons other than Condition A. OR One Core Spray subsystem inoperable.	B.1 Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	7 days
C. One LPCI pump in each subsystem inoperable.	C.1 Restore one LPCI pump to OPERABLE status.	7 days

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Two LPCI subsystems inoperable for reasons other than Condition C.	D.1 Restore one LPCI subsystem to OPERABLE status.	72 hours
E. Required Action and associated Completion Time of Condition A, B, C, or D not met.	E.1 Be in MODE 3. AND E.2 Be in MODE 4.	12 hours 36 hours
F. HPCI System inoperable.	F.1 Verify by administrative means IC System is OPERABLE. AND F.2 Restore HPCI System to OPERABLE status.	Immediately 14 days
G. HPCI System inoperable. AND One low pressure ECCS injection/spray subsystem is inoperable or Condition C entered.	G.1 Restore HPCI System to OPERABLE status. OR G.2 Restore low pressure ECCS injection/spray subsystem(s) to OPERABLE status.	72 hours 72 hours
G H. One required ADS valve inoperable.	G H.1 Restore ADS valve to OPERABLE status.	14 days

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
H X. Required Action and associated Completion Time of Condition F or G. or H not met. OR Two or more required ADS valves inoperable.	H X.1 Be in MODE 3. AND H X.2 Reduce reactor steam dome pressure to ≤ 150 psig.	12 hours 36 hours
I X. Two or more low pressure ECCS injection/spray subsystems inoperable for reasons other than Condition C or D. OR HPCI System and one or more required ADS valves inoperable. OR One or more low pressure ECCS injection/spray subsystems inoperable and one or more required ADS valves inoperable.	I X.1 Enter LCO 3.0.3.	Immediately

Insert 3.5.1-3

Insert 3.5.1-3

OR

HPCI System inoperable and either one low pressure ECCS injection/spray subsystem is inoperable or Condition C entered.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.1.1	Verify, for each ECCS injection/spray subsystem, the piping is filled with water from the pump discharge valve to the injection valve.	31 days
SR 3.5.1.2	Verify each ECCS injection/spray subsystem manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days
SR 3.5.1.3	Verify correct breaker alignment to the LPCI swing bus.	31 days
SR 3.5.1.4	Verify each recirculation pump discharge valve cycles through one complete cycle of full travel or is de-energized in the closed position.	In accordance with the Inservice Testing Program
SR 3.5.1.5	Verify the following ECCS pumps develop the specified flow rate against a test line pressure corresponding to the specified reactor pressure. SYSTEM / FLOW RATE / NO. OF PUMPS / TEST LINE PRESSURE CORRESPONDING TO A REACTOR PRESSURE OF Core Spray: ≥ 4500 gpm / 1 / ≥ 90 psig LPCI: ≥ ~~14,500~~ 9000 gpm / ~~2~~ 2 / ≥ 20 psig	In accordance with the Inservice Testing Program

(continued)

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.5.1.10	----------NOTE---------- Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. ---------- Verify each required ADS valve opens when manually actuated.	24 months
SR 3.5.1.11	Verify automatic transfer capability of the LPCI swing bus power supply from the normal source to the backup source.	24 months
SR 3.5.1.12	Verify that the leakage on the Target Rock safety/relief valve accumulator is ≤0.75 standard cubic feet per hour.	24 months

Note: There are no changes on this page. This page is provided for continuity only.

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS) AND ISOLATION CONDENSER (IC) SYSTEM

B 3.5.1 ECCS – Operating

BASES

BACKGROUND

The ECCS is designed, in conjunction with the primary and secondary containment, to limit the release of radioactive materials to the environment following a loss of coolant accident (LOCA). The ECCS uses two independent methods (flooding and spraying) to cool the core during a LOCA. The ECCS network consists of the High Pressure Coolant Injection (HPCI) System, the Core Spray (CS) System, the Low Pressure Coolant Injection (LPCI) System, and the Automatic Depressurization System (ADS). The suppression pool provides the required source of water for the ECCS. Although no credit is taken in the safety analyses for the contaminated condensate storage tank (CCST), it is capable of providing a source of water for the HPCI, LPCI and CS systems.

On receipt of an initiation signal, ECCS pumps automatically start; the system aligns and the pumps inject water, taken either from the CCST or suppression pool, into the Reactor Coolant System (RCS) as RCS pressure is overcome by the discharge pressure of the ECCS pumps. Although the system is initiated, ADS action is delayed, allowing the operator to interrupt the timed sequence if the system is not needed. The HPCI pump discharge pressure almost immediately exceeds that of the RCS, and the pump injects coolant into the vessel to cool the core. If the break is small, the HPCI System will maintain coolant inventory as well as vessel level while the RCS is still pressurized. If HPCI fails, it is backed up by ADS in combination with LPCI and CS. In this event, the ADS timed sequence would be allowed to time out and open the relief valves and safety/relief valve (S/RV) depressurizing the RCS, thus allowing the LPCI and CS to overcome RCS pressure and inject coolant into the vessel. If the break is large, RCS pressure initially drops rapidly and the LPCI and CS cool the core.

Water from the break returns to the suppression pool where it is used again and again. Water in the suppression pool is circulated through a heat exchanger cooled by the Containment Cooling Service Water System. Depending on the

(continued)

BASES

BACKGROUND (continued)

location and size of the break, portions of the ECCS may be ineffective; however,the overall design is effective in cooling the core regardless of the size or location of the piping break.

The combined operation of all ECCS subsystems are designed to ensure that no single active component failure will prevent automatic initiation and successful operation of the minimum required ECCS equipment.

The CS System (Ref. 1) is composed of two independent subsystems. Each subsystem consists of a motor driven pump, a spray sparger above the core, and piping and valves to transfer water from the suppression pool to the sparger. The CS System is designed to provide cooling to the reactor core when reactor pressure is low. Upon receipt of an initiation signal, the CS pumps in both subsystems are automatically started immediately when normal AC power is available and approximately 14 seconds after emergency power is available. When the RPV pressure drops sufficiently, CS System flow to the RPV begins. A full flow test line is provided to route water from and to the suppression pool to allow testing of the CS System without spraying water in the RPV.

The LPCI System is composed of two LPCI subsystems (loops) (Ref. 2). Each subsystem consists of two motor driven pumps and piping and valves to transfer water from the suppression pool to the RPV via the selected recirculation loop. The two LPCI subsystems are interconnected via the two, normally open, LPCI System cross-tie valves. The LPCI System is equipped with a loop select logic that determines which, if any, of the recirculation loops has been broken and selects the non-broken loop for injection. If neither loop is determined to be broken, then "B" recirculation loop is selected for injection. The LPCI System cross-tie valves must be open to support OPERABILITY of both LPCI subsystems. Similarly, the LPCI swing bus is required to be energized to support both LPCI subsystems. Therefore, with the LPCI cross-tie valves not full open, or the LPCI swing bus not energized, both LPCI subsystems must be considered inoperable. The LPCI subsystems are designed to provide core cooling at low RPV pressure. Upon receipt of an initiation signal, all four LPCI pumps are automatically

(continued)

BASES

BACKGROUND (continued)

started (simultaneously and immediately when normal AC power is available, and sequentially, with A and C pumps after approximately 4 seconds and B and D pumps after approximately 9 seconds, when emergency AC power is available). LPCI System valves are automatically positioned to ensure the proper flow path for water from the suppression pool to inject into the selected recirculation loop. When the RPV pressure drops sufficiently, the LPCI flow to the RPV, via the selected recirculation loop, begins. The water then enters the reactor through the jet pumps. Full flow test lines are provided for each LPCI subsystem to route water from and to the suppression pool, to allow testing of the LPCI pumps without injecting water into the RPV. These test lines also provide suppression pool cooling capability, as described in LCO 3.6.2.3, "Suppression Pool Cooling."

The HPCI System (Ref. 3) consists of a steam driven turbine pump unit, piping, and valves to provide steam to the turbine, as well as piping and valves to transfer water from the suction source to the core via the feedwater system line, where the coolant is distributed within the RPV through the feedwater sparger. Suction piping for the system is provided from the CCST and the suppression pool. Pump suction for HPCI is normally aligned to the CCST source to minimize injection of suppression pool water into the RPV. However, if the CCST water supply is low, or if the suppression pool level is high, an automatic transfer to the suppression pool water source ensures a water supply for continuous operation of the HPCI System. The steam supply to the HPCI turbine is piped from the reactor vessel.

The HPCI System is designed to provide core cooling for a wide range of reactor pressures (150 psig to 1120 psig). Upon receipt of an initiation signal, the HPCI turbine stop valve and turbine steam supply valve open simultaneously and the turbine accelerates to a specified speed. As the HPCI flow increases, the turbine control valves are automatically adjusted to maintain design flow. Exhaust steam from the HPCI turbine is discharged to the suppression pool. A full flow test line is provided to route water from and to the CCST to allow testing of the HPCI System during normal operation without injecting water into the RPV.

(continued)

BASES

BACKGROUND (continued)

The ECCS pumps are provided with minimum flow bypass lines, which discharge to the suppression pool. The valves in these lines automatically open or remain open to prevent pump damage due to overheating when other discharge line valves are closed. To ensure rapid delivery of water to the RPV and to minimize water hammer effects, all ECCS pump discharge lines are filled with water. The LPCI and CS System discharge lines are kept full of water using a "keep fill" system (jockey pump system). The HPCI System is normally aligned to the CCST. The height of water in the CCST is sufficient to maintain the piping full of water up to the first isolation valve. When the HPCI System is aligned to the suppression pool the "keep fill" system must be aligned to the HPCI discharge line.

The ADS (Ref. 4) consists of 5 valves (4 relief valves and one S/RV). It is designed to provide depressurization of the RCS during a small break LOCA if HPCI fails or is unable to maintain required water level in the RPV. ADS operation reduces the RPV pressure to within the operating pressure range of the low pressure ECCS subsystems (CS and LPCI), so that these subsystems can provide coolant inventory makeup. The S/RV used for automatic depressurization is equipped with one air accumulator and associated inlet check valve. The accumulator provides the pneumatic power to actuate the valve. However, ~~the~~ S/RV is not credited in the safety analysis since qualification of ~~the~~ accumulator ~~for~~ this valve ~~to~~ perform the ADS ~~function~~ has not ~~been~~ demonstrated (~~Ref.~~ 5).

APPLICABLE SAFETY ANALYSES

The ECCS performance is evaluated for the entire spectrum of break sizes for a postulated LOCA. The accidents for which ECCS operation is required are presented in References 05 and 06. The required analyses and assumptions are defined in Reference 07. The results of these analyses are also described in Reference 08.

This LCO helps to ensure that the following acceptance criteria for the ECCS, established by 10 CFR 50.46 (Ref. 10), will be met following a LOCA, assuming the worst case single active component failure in the ECCS:

a. Maximum fuel element cladding temperature is ≤ 2200°F;

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

b. Maximum cladding oxidation is ≤ 0.17 times the total cladding thickness before oxidation;

c. Maximum hydrogen generation from a zirconium water reaction is ≤ 0.01 times the hypothetical amount that would be generated if all of the metal in the cladding surrounding the fuel, excluding the cladding surrounding the plenum volume, were to react;

d. The core is maintained in a coolable geometry; and

e. Adequate long term cooling capability is maintained.

The limiting single failures are discussed in Reference 17. For a large discharge pipe break LOCA, failure of the ~~LPCI~~ 125 V battery valve on the unbroken recirculation loop is considered the most severe failure. ~~For a small break LOCA, HPCI failure is the most severe failure.~~ In the analysis of events requiring ADS operation, it is assumed that only three of the five ADS valves operate. Therefore, four ADS valves are required to be OPERABLE to meet single failure criteria. The remaining OPERABLE ECCS subsystems provide the capability to adequately cool the core and prevent excessive fuel damage.

Replace with insert B 3.5.1-5

The ECCS satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

Each ECCS injection/spray subsystem and ~~four electromatic~~ five ADS valves are required to be OPERABLE. ~~The S/RV can not be used to satisfy the ADS requirement.~~ The ECCS injection/spray subsystems are defined as the two CS subsystems, the two LPCI subsystems, and one HPCI System. The low pressure ECCS injection/spray subsystems are defined as the two CS subsystems and the two LPCI subsystems.

With less than the required number of ECCS subsystems OPERABLE, the potential exists that during a limiting design basis LOCA concurrent with the worst case single failure, the limits specified in Reference 10 could be exceeded. All ECCS subsystems must therefore be OPERABLE to satisfy the single failure criterion required by Reference 10. 9 9

(continued)

Insert B 3.5.1-5

For a small break LOCA, HPCI failure is the most severe failure. In the analysis of events with HPCI failure, all five ADS valves and the low pressure ECCS injection/spray systems are assumed to operate. In the analysis of events with one ADS valve inoperable, HPCI and the low pressure ECCS injection/spray systems are assumed to operate.

BASES (continued)

APPLICABILITY

All ECCS subsystems are required to be OPERABLE during MODES 1, 2, and 3, when there is considerable energy in the reactor core and core cooling would be required to prevent fuel damage in the event of a break in the primary system piping. In MODES 2 and 3, when reactor steam dome pressure is $\leq$ 150 psig, ADS and HPCI are not required to be OPERABLE because the low pressure ECCS subsystems can provide sufficient flow below this pressure. ECCS requirements for MODES 4 and 5 are specified in LCO 3.5.2, "ECCS – Shutdown."

ACTIONS

A.1

If any one LPCI pump is inoperable, the inoperable pump must be restored to OPERABLE status within 30 days. In this Condition, the remaining OPERABLE pumps provide adequate core cooling during a LOCA. However, overall ECCS reliability is reduced, because a single failure in one of the remaining OPERABLE LPCI subsystems, concurrent with a LOCA, may result in the LPCI subsystems not being able to perform their intended safety function. The 30 day Completion Time is based on a reliability study cited in Reference [11] that evaluated the impact on ECCS availability, assuming various components and subsystems were taken out of service. The results were used to calculate the average availability of ECCS equipment needed to mitigate the consequences of a LOCA as a function of allowable repair times (i.e., Completion Times).

10

B.1

If a LPCI subsystem is inoperable for reasons other than Condition A or a CS subsystem is inoperable, the inoperable low pressure ECCS injection/spray subsystem must be restored to OPERABLE status within 7 days. In this Condition, the remaining OPERABLE subsystems provide adequate core cooling during a LOCA. However, overall ECCS reliability is reduced, because a single failure in one of the remaining OPERABLE subsystems, concurrent with a LOCA, may result in the ECCS not being able to perform its intended safety function. The 7 day Completion Time is based on a reliability study (Ref. [11]) that evaluated the impact on ECCS availability, assuming various components and

10

(continued)

BASES

ACTIONS

B.1 (continued)

subsystems were taken out of service. The results were used to calculate the average availability of ECCS equipment needed to mitigate the consequences of a LOCA as a function of allowed outage times (i.e., Completion Times).

C.1

If one LPCI pump in each subsystem is inoperable, one LPCI pump must be restored to OPERABLE status within 7 days. In this Condition, the remaining OPERABLE ECCS subsystems provide adequate core cooling during a LOCA. However, overall ECCS reliability is reduced because a single failure in one of the remaining OPERABLE ECCS subsystems, concurrent with a LOCA, may result in the ECCS not being able to perform its intended safety function. The 7 day Completion Time is based on a reliability study (Ref. 11) that evaluated the impact on ECCS availability, assuming various components and subsystems were taken out of service. The results were used to calculate the average availability of ECCS equipment needed to mitigate the consequences of a LOCA as a function of allowed outage times (i.e., Completion Times). 10

D.1

If two LPCI subsystems are inoperable for reasons other than Condition C, one inoperable subsystem must be restored to OPERABLE status within 72 hours. In this Condition, the remaining OPERABLE CS subsystems provide adequate core cooling during a LOCA. However, overall ECCS reliability is reduced, because a single failure in one of the remaining CS subsystems, concurrent with a LOCA, may result in ECCS not being able to perform its intended safety function. The 72 hour Completion Time is based on a reliability study cited in Reference 11 that evaluated the impact on ECCS availability, assuming various components and subsystems were taken out of service. The results were used to calculate the average availability of ECCS equipment needed to mitigate the consequences of a LOCA as a function of allowable repair times (i.e., Completion Times). 10

(continued)

BASES

ACTIONS (continued)

E.1 and E.2

If any Required Action and associated Completion Time of Condition A, B, C, or D is not met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

F.1 and F.2

If the HPCI System is inoperable and the IC System is verified to be OPERABLE, the HPCI System must be restored to OPERABLE status within 14 days. In this Condition, adequate core cooling is ensured by the OPERABILITY of the redundant and diverse low pressure ECCS injection/spray subsystems in conjunction with ADS. Also, the IC System will automatically provide core cooling at most reactor operating pressures. Verification of IC OPERABILITY is therefore required immediately when HPCI is inoperable. This may be performed as an administrative check by examining logs or other information to determine if IC is out of service for maintenance or other reasons. It does not mean to perform the Surveillances needed to demonstrate the OPERABILITY of the IC System. If the OPERABILITY of the IC System cannot be verified, however, Condition I must be immediately entered. In the event of component failures concurrent with a design basis LOCA, there is a potential, depending on the specific failures, that the minimum required ECCS equipment will not be available. A 14 day Completion Time is based on a reliability study cited in Reference 11 and has been found to be acceptable through operating experience.

G.1 and G.2

If any one low pressure ECCS injection/spray subsystem, or one LPCI pump in both LPCI subsystems, is inoperable in addition to an inoperable HPCI System, the inoperable low pressure ECCS injection/spray subsystem(s) or the HPCI System must be restored to OPERABLE status within 72 hours.

(continued)

BASES

ACTIONS

G.1 and G.2 (continued)

In this Condition, adequate core cooling is ensured by the OPERABILITY of the ADS and the remaining low pressure ECCS subsystems. However, the overall ECCS reliability is significantly reduced because a single failure in one of the remaining OPERABLE subsystems concurrent with a design basis LOCA may result in the ECCS not being able to perform its intended safety function. Since both a high pressure system (HPCI) and a low pressure subsystem(s) are inoperable, a more restrictive Completion Time of 72 hours is required to restore either the HPCI System or the low pressure ECCS injection/spray subsystem(s) to OPERABLE status. This Completion Time is based on a reliability study cited in Reference 11 and has been found to be acceptable through operating experience.

G.1

The LCO requires five ADS valves to be OPERABLE in order to provide the ADS function. Reference 12 contains the results of an analysis that evaluated the effect of two ADS valves being out of service. Per this analysis, operation of only three ADS valves will provide the required depressurization. However, overall reliability of the ADS is reduced, because a single failure in the OPERABLE ADS valves could result in a reduction in depressurization capability. Therefore, operation is only allowed for a limited time. The 14 day Completion Time is based on a reliability study cited in Reference 10 and has been found to be acceptable through operating experience.

With one ADS valve out of service, the

H.1 and H.2

If any Required Action and associated Completion Time of Condition F, G, or H or G is not met, or if two or more required ADS valves are inoperable, the plant must be brought to a condition in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours and reactor steam dome pressure reduced to ≤ 150 psig within 36 hours. The allowed Completion Times

(continued)

BASES

ACTIONS

H H
A.1 and A.2 (continued)

are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

I
A.1

When multiple ECCS subsystems are inoperable, as stated in Condition A, I the plant is in a condition outside of the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

SURVEILLANCE REQUIREMENTS

SR 3.5.1.1

The flow path piping has the potential to develop voids and pockets of entrained air. Maintaining the pump discharge lines of the HPCI System, CS System, and LPCI subsystems full of water ensures that the ECCS will perform properly, injecting its full capacity into the RCS upon demand. This will also prevent a water hammer following an ECCS initiation signal. One acceptable method of ensuring that the lines are full is to vent at the high points. The 31 day Frequency is based on the gradual nature of void buildup in the ECCS piping, the procedural controls governing system operation, and operating experience.

SR 3.5.1.2

Verifying the correct alignment for manual, power operated, and automatic valves in the ECCS flow paths provides assurance that the proper flow paths will exist for ECCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position since these were verified to be in the correct position prior to locking, sealing, or securing. A valve that receives an initiation signal is allowed to be in a nonaccident position provided the valve will automatically reposition in the proper stroke time. This SR does not require any testing or valve manipulation; rather, it involves verification that

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.1.2 (continued)

those valves capable of potentially being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves. For the HPCI System, this SR also includes the steam flow path for the turbine and the flow controller position.

The 31 day Frequency of this SR was derived from the Inservice Testing Program requirements for performing valve testing at least once every 92 days. The Frequency of 31 days is further justified because the valves are operated under procedural control and because improper valve position would only affect a single subsystem. This Frequency has been shown to be acceptable through operating experience.

SR 3.5.1.3

Verification every 31 days of the correct breaker alignment to the LPCI swing bus demonstrates that the AC electrical power is available to ensure proper operation of the associated LPCI injection valves and the recirculation pump discharge valves. The 31 day Frequency has been found acceptable based on engineering judgment and operating experience.

SR 3.5.1.4

Cycling the recirculation pump discharge valves through one complete cycle of full travel demonstrates that the valves are mechanically OPERABLE and will close when required.

Upon initiation of an automatic LPCI subsystem injection signal, these valves are required to be closed to ensure full LPCI subsystem flow injection in the reactor via the recirculation jet pumps. De-energizing the valve in the closed position will also ensure the proper flow path for the LPCI subsystem. Acceptable methods of de-energizing the valve include de-energizing breaker control power, racking out the breaker or removing the breaker.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.1.4 (continued)

The Frequency of this SR is in accordance with the Inservice Testing Program. If any recirculation pump discharge valve is inoperable and in the open position, both LPCI subsystems must be declared inoperable.

SR 3.5.1.5, SR 3.5.1.6, and SR 3.5.1.7

The performance requirements of the low pressure ECCS pumps are determined through application of the 10 CFR 50, Appendix K criteria (Ref. 7) and are bounded by the requirements of SR 3.5.1.5. This periodic Surveillance is performed (in accordance with the ASME Code, Section XI, requirements for the ECCS pumps) to verify that the ECCS pumps will develop the flow rates required by the respective analyses. The low pressure ECCS pump flow rates ensure that adequate core cooling is provided to satisfy the acceptance criteria of Reference 1. The pump flow rates are verified against a test line pressure or system head equivalent to the RPV pressure expected during a LOCA. The total system pump outlet pressure is adequate to overcome the elevation head pressure between the pump suction and the vessel discharge, the piping friction losses, and RPV pressure present during a LOCA. These values have been established analytically.

The flow tests for the HPCI System are performed at two different pressure ranges such that system capability to provide rated flow against a system head corresponding to reactor pressure is tested at both the higher and lower operating ranges of the system. The required system head should overcome the RPV pressure and associated discharge line losses. Adequate reactor steam pressure must be available to perform these tests. Additionally, adequate steam flow must be passing through the main turbine or turbine bypass valves to continue to control reactor pressure when the HPCI System diverts steam flow. Therefore, sufficient time is allowed after adequate pressure and flow are achieved to perform these tests. Reactor steam pressure must be $\geq$ 920 psig to perform SR 3.5.1.6 and $\geq$ 150 psig to perform SR 3.5.1.7. Adequate steam flow is represented by at least 2 turbine bypass

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.1.5, SR 3.5.1.6, and SR 3.5.1.7 (continued)

valves open, or total steam flow $\geq 10^6$ lb/hr. Reactor startup is allowed prior to performing the low pressure Surveillance test because the reactor pressure is low and the time allowed to satisfactorily perform the Surveillance test is short. The reactor pressure is allowed to be increased to normal operating pressure since it is assumed that the low pressure test has been satisfactorily completed and there is no indication or reason to believe that HPCI is inoperable.

Therefore, SR 3.5.1.6 and SR 3.5.1.7 are modified by Notes that state the Surveillances are not required to be performed until 12 hours after the reactor steam pressure and flow are adequate to perform the test. The 12 hours allowed for performing the flow test after the required pressure and flow are reached is sufficient to achieve stable conditions for testing and provides reasonable time to complete the SRs.

The Frequency for SR 3.5.1.5 and SR 3.5.1.6 is in accordance with the Inservice Testing Program requirements. The 24 month Frequency for SR 3.5.1.7 is based on the need to perform the Surveillance under the conditions that apply during a startup from a plant outage. Operating experience has shown that these components usually pass the SR when performed at the 24 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.5.1.8

The ECCS subsystems are required to actuate automatically to perform their design functions. This Surveillance verifies that, with a required system initiation signal (actual or simulated), the automatic initiation logic of HPCI, CS, and LPCI will cause the systems or subsystems to operate as designed, including actuation of the system throughout its emergency operating sequence, automatic pump startup and actuation of all automatic valves to their required positions. This SR also ensures that the HPCI System will automatically restart on an RPV low–low water level signal

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.1.8 (continued)

received subsequent to an RPV high water level trip and that the HPCI suction is automatically transferred from the CCST to the suppression pool on high suppression pool water level or low CCST water level. The LOGIC SYSTEM FUNCTIONAL TEST performed in LCO 3.3.5.1 overlaps this Surveillance to provide complete testing of the assumed safety function.

The 24 month Frequency is based on the need to perform the Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power.

Operating experience has shown that these components usually pass the SR when performed at the 24 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note that excludes vessel injection/spray during the Surveillance. Since all active components are testable and full flow can be demonstrated by recirculation through the test line, coolant injection into the RPV is not required during the Surveillance.

SR 3.5.1.9

The ADS designated valves are required to actuate automatically upon receipt of specific initiation signals. A system functional test is performed to demonstrate that the mechanical portions of the ADS function (i.e., solenoids) operate as designed when initiated either by an actual or simulated initiation signal, causing proper actuation of all the required components. SR 3.5.1.10 and the LOGIC SYSTEM FUNCTIONAL TEST performed in LCO 3.3.5.1 overlap this Surveillance to provide complete testing of the assumed safety function.

The 24 month Frequency is based on the need to perform the Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.1.9 (continued)

Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the SR when performed at the 24 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note that excludes valve actuation since the valves are individually tested in accordance with SR 3.5.1.10.

SR 3.5.1.10

A manual actuation of each ADS valve is performed to verify that the valve and solenoid are functioning properly and that no blockage exists in the valve discharge lines. This is demonstrated by the response of the turbine control or bypass valve or by a change in the measured flow or by any other method suitable to verify steam flow. Adequate reactor steam dome pressure must be available to perform this test to avoid damaging the valve. Also, adequate steam flow must be passing through the main turbine or turbine bypass valves to continue to control reactor pressure when the ADS valves divert steam flow upon opening. Sufficient time is therefore allowed after the required pressure and flow are achieved to perform this SR. Adequate pressure at which this SR is to be performed is 300 psig (the pressure recommended by the valve manufacturer). Adequate steam flow is represented by at least 2 turbine bypass valves open. Reactor startup is allowed prior to performing this SR because valve OPERABILITY and the setpoints for overpressure protection are verified, per ASME requirements, prior to valve installation. Therefore, this SR is modified by a Note that states the Surveillance is not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. The 12 hours allowed for manual actuation after the required pressure is reached is sufficient to achieve stable conditions and provides adequate time to complete the Surveillance. SR 3.5.1.9 and the LOGIC SYSTEM FUNCTIONAL TEST performed in LCO 3.3.5.1 overlap this Surveillance to provide complete testing of the assumed safety function.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.1.10 (continued)

The Frequency of 24 months is based on the need to perform the Surveillance under the conditions that apply just prior to or during a startup from a plant outage. Operating experience has shown that these components usually pass the SR when performed at the 24 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.5.1.11

The LPCI System injection valves and recirculation pump discharge valves are powered from the LPCI swing bus, which must be energized after a single failure, including loss of power from the normal source to the swing bus. Therefore, the automatic transfer capability from the normal power source to the backup power source must be verified to ensure the automatic capability to detect loss of normal power and initiate an automatic transfer to the swing bus backup power source. Verification of this capability every 24 months ensures that AC electrical power is available for proper operation of the associated LPCI injection valves and recirculation pump valves. The swing bus automatic transfer scheme must be OPERABLE for both LPCI subsystems to be OPERABLE. The Frequency of 24 months is based on the need to perform the Surveillance under the conditions that apply during a startup from a plant outage. Operating experience has shown that the components usually pass the SR when performed at the 24 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

INSERT B 3.5.1-16

REFERENCES

1. UFSAR, Section 6.3.2.1.
2. UFSAR, Section 6.3.2.2.
3. UFSAR, Section 6.3.2.3.
4. UFSAR, Section 6.3.2.4.

(continued)

Insert B 3.5.1-16

SR 3.5.1.12

In order to credit the ADS function of the Target Rock safety/relief valve, the valve must be qualified in accordance with NUREG-0737, "Clarification of TMI Action Plan Requirements," Task II.K.3.28. The piping and supports from the accumulator to the Target Rock valves are seismically qualified, and spring-loaded ball check valves are installed in the pneumatic supply lines to minimize leakage from the valve accumulator. The surveillance requirement verifies that the accumulator leakage for the Target Rock safety/relief valve is less than or equal to 0.75 standard cubic feet per hour. This will ensure that the valve can operate for a minimum of five cycles for at least 30 minutes following the postulated event, assuming no air makeup is available to the accumulator.

The 30-minute operating time is adequate to ensure successful depressurization for the following reasons. First, the assumption of 5 valve cycles is conservative. The small break LOCA response requires the valve to open only once initially to depressurize the reactor. Second, the analyses show that the 30-minute time is adequate to depressurize the reactor following a small break LOCA. Third, subsequent maintenance of low-pressure conditions is adequately ensured by the remaining four electromatic relief valves.

BASES

REFERENCES (continued)

5. Letter from J.A. Zwolinski (NRC) to D.L. Farrar (Commonwealth Edison Company), "Resolution of NUREG-0737 Item II.K.3.28, Verify Qualification of Accumulators on Automatic Depressurization Valves," dated June 16, 1986.

5[6]. UFSAR, Section 15.6.4.

6[7]. UFSAR, Section 15.6.5.

7[8]. 10 CFR 50, Appendix K.

8[9]. UFSAR, Section 6.3.3.

9[10]. 10 CFR 50.46.

10[11]. Memorandum from R.L. Baer (NRC) to V. Stello, Jr. (NRC), "Recommended Interim Revisions to LCOs for ECCS Components," December 1, 1975.

12. EMF-97-025(P) Revision 1, LOCA Break Spectrum for Dresden Unit 2 and 3, dated May 30, 1997.

ENCLOSURE 1 - ATTACHMENT C
Supplement to GE-14 Fuel License Amendment Request for
Dresden Nuclear Power Station, Units 2 and 3

INFORMATION SUPPORTING A FINDING OF
NO SIGNIFICANT HAZARDS CONSIDERATION

According to 10CFR50.92(c), "Issuance of amendment," a proposed amendment to an operating license involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not:

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

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

Involve a significant reduction in a margin of safety.

In support of this determination, an evaluation of each of the three criteria set forth in 10CFR50.92 is provided below regarding the proposed license amendment.

Overview

Exelon Generation Company (EGC), LLC, previously Commonwealth Edison (ComEd) Company, is requesting changes to the Technical Specifications (TS) for Dresden Nuclear Power Station (DNPS), Units 2 and 3. These changes are needed to support a change in fuel vendors from Siemens Power Corporation to General Electric (GE). These changes are in addition to the changes submitted in a letter from R.M. Krich (ComEd) to U.S. NRC, "Request for Technical Specifications Changes, Transition to General Electric Fuel," dated September 29, 2000. The additional changes associated with this request involve the following.

- Increasing the number of required Automatic Depressurization System (ADS) Valves that are required to be operable from four to five.

- Removing the allowance to continue operating for 72 hours if the High Pressure Coolant Spay (HPCI) System is inoperable and one low pressure Emergency Core Cooling System (ECCS) injection/spray subsystem is inoperable.

- Revising an existing surveillance to verify the flow capabilities of two Low Pressure Coolant Injection (LPCI) pumps instead of three.

- Adding a new surveillance for the Target Rock safety/relief valve accumulator.

The proposed TS changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

The proposed changes do not affect the initiators of analyzed events or the assumed mitigation of accident or transient events. Analyzed events are initiated by the failure of plant structures, systems or components. The proposed changes do not impact the condition or performance of these structures, systems or components. Consequences of analyzed events are the result of the plant being operated within assumed parameters at the onset of

any events. The evaluations supporting the transition to GE fuel revealed that the current Technical Specification (TS) Limiting Condition for Operation (LCO) and conditions must be revised to place additional limitations on equipment to ensure that the plant is operated within the assumptions of the safety analyses. With the additional limitations, the analyses demonstrate that all of the acceptance criteria continue to be met. As a result, the changes do not involve a significant increase in the probability of consequences of an accident previously evaluated.

The proposed TS changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

The proposed changes do not involve a physical alteration of the facility or change the normal facility operation. No new or different equipment is being installed and no installed equipment is being removed. There is no alteration to the parameters within which the plant is normally operated or in the setpoints that initiate protective or mitigative actions. Consequently, no new failure modes are introduced and the changes therefore do not increase the possibility of a new or different kind of accident from any previously evaluated.

The proposed TS changes do not involve a significant reduction in a margin of safety.

Margin of safety is established through the design of the plant structures, systems and components, the parameters within which the plant is operated, and the establishment of setpoints for the actuation of equipment relied upon to respond to an event. The proposed changes do not impact the condition or performance of structures, systems or components relied upon for accident mitigation or any safety analysis assumptions. The changes reflect a reduction in redundancy in the capability of the Automatic Depressurization System (ADS), However, the proposed changes impose more restrictive requirements on operation to ensure that all of the accident analyses continue to meet acceptance criteria. Therefore the proposed changes do not involve a significant reduction in margin of safety.

Conclusion

The proposed changes, which involve increased operating restrictions associated with the Emergency Core Cooling System (ECCS), do not involve a Significant Hazards Consideration.

ENCLOSURE 1 - ATTACHMENT D
Supplement to GE-14 Fuel License Amendment Request for
Dresden Nuclear Power Station, Units 2 and 3

INFORMATION SUPPORTING AN ENVIRONMENTAL ASSESSMENT

Exelon Generation Company (EGC) has evaluated this proposed change against the criteria for identification of licensing and regulatory actions requiring environmental assessment in accordance with 10 CFR 51.21, "Criteria for and identification of licensing and regulatory actions requiring environmental assessments." EGC has determined that this proposed change meets the criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9), "Criterion for categorical exclusion; identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review," and as such, has determined that no irreversible consequences exist in accordance with 10 CFR 50.92(b), "Issuance of amendment." This determination is based on the fact that this change is being proposed as an amendment to a license issued pursuant to 10 CFR 50, "Domestic Licensing of Production and Utilization Facilities," which changes a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, "Standards for Protection Against Radiation," or that changes an inspection or a surveillance requirement, and the amendment meets the following specific criteria.

(i) The amendment involves no significant hazards consideration.

As demonstrated in Attachment C, the proposed changes do not involve any significant hazards considerations.

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

The proposed change is limited to a series of additional operating restrictions associated with the Emergency Core Cooling Systems (ECCS). The change does not allow for an increase in the unit power level, does not increase the production, nor alter the flow path or method of disposal of radioactive waste or byproducts. Therefore, the proposed change does not affect actual unit effluents.

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

The proposed changes will not result in changes in the operation or configuration of the facility. There will be no change in the level of controls or methodology used for processing radioactive effluents or handling of solid radioactive waste. The proposed changes will not result in any change in the normal radiation levels within the plant. Therefore, there will be no increase in individual or cumulative occupational radiation exposure resulting from this change.

ENCLOSURE 2

ATTACHMENTS A - D
Supplement to GE14 Fuel License Amendment Request for
Quad Cities Nuclear Power Station, Units 1 and 2

ENCLOSURE 2 - ATTACHMENT A
Supplement to GE-14 Fuel License Amendment Request for
Quad Cities Nuclear Power Station, Units 1 and 2

DESCRIPTION AND SUMMARY SAFETY ANALYSIS
FOR PROPOSED CHANGES

A. SUMMARY OF PROPOSED CHANGES

Pursuant to 10 CFR 50.90, "Application for amendment of license or construction permit," Exelon Generation Company (EGC), LLC is requesting additional changes to various Technical Specifications (TS) relative to the changes requested in Reference I.1 for Quad Cities Nuclear Power Station (QCNPS), Units 1 and 2. The requested changes involve the requirements for operability of the Automatic Depressurization System (ADS) valves.

In Reference I.1, Commonwealth Edison (ComEd) Company, now EGC, submitted a TS amendment request for the QCNPS to support a change in fuel vendors from Siemens Power Corporation (SPC) to General Electric (GE) and a transition to GE-14 fuel. This amendment request proposed changes associated with the change in analysis methodology due to the change in fuel types and fuel vendors.

In Reference I.2, ComEd submitted proposed changes to the Operating License and TS for QCNPS to increase the Rated Thermal Power (RTP) by approximately 17% as part of an Extended Power Uprate (EPU). The safety analyses performed in support of the EPU were based on an equilibrium core of GE-14 fuel to support the fuel transition described above.

The results of the safety analyses for the EPU and GE-14 fuel transition indicate that additional TS changes relative to Reference I.1 are required related to the operability requirements for the ADS function. While these proposed changes are associated with both the fuel transition and the EPU, EGC has determined that these changes are appropriate to include in the TS amendment request associated with the fuel transition. This is because the analyses do not specifically separate the effects of the fuel transition and the EPU. An evaluation determined that a significant portion of the effects are due to the fuel transition. Thus, it is necessary to request that these changes be approved to support the fuel transition, which is anticipated to occur during the QCNPS Unit 2 refueling outage, currently scheduled for February 2002.

The proposed changes involve the following.

- Increasing the number of required ADS valves from four to five.

- Revising the required action associated with the condition when the High Pressure Coolant Injection (HPCI) System is inoperable and one low pressure Emergency Core Cooling System (ECCS) injection/spray subsystem is inoperable.

- Adding a surveillance to allow crediting the use of the ADS relief function of the Target Rock safety/relief valve.

QCNPS has submitted a TS amendment request (Reference I.3) for conversion to the Improved Technical Specifications (ITS). In anticipation of approval of that request, this

request for amendment is based on the format of the ITS. In addition, the affected sections of the Current Technical Specifications (CTS) are also noted.

B. DESCRIPTION OF THE CURRENT REQUIREMENTS

TS Section 3.5.1, "Emergency Core Cooling System - Operating"

Limiting Condition for Operation (LCO) 3.5.1 states that "Each ECCS injection/spray subsystem and the Automatic Depressurization System (ADS) function of four relief valves shall be OPERABLE."

Condition G requires that with the HPCI System inoperable and either one low pressure ECCS injection/spray subsystem inoperable or if Condition C (i.e., one LPCI pump on each subsystem inoperable) has been entered, either the HPCI System or the low pressure ECCS injection/spray subsystem must be restored to operable status within 72 hours.

Condition I requires that if the action and associated completion time of Conditions F, G or H has not been met or if two or more ADS valves are inoperable then the reactor must be in Mode 3 within 12 hours and reactor steam dome pressure must be reduced to $\leq$ 150 psig within 36 hours.

CTS Section 3.5.A, "Emergency Core Cooling System – Operating," defines similar LCOs. The CTS requirement for the ADS system includes five relief valves and the CTS action time for the equivalent of ITS Conditions G above is 14 days. These items were revised as part of the proposed conversion to the ITS.

C. BASES FOR THE CURRENT REQUIREMENTS

TS Section 3.5.1, "Emergency Core Cooling System - Operating"

For a small break Loss of Coolant Accident (LOCA), HPCI failure is the most severe failure. In the analysis of events requiring ADS operation, it is assumed that only three of the five ADS valves operate. Therefore, four ADS valves are required to be operable.

For Condition G, with the HPCI System inoperable in addition to any one low pressure ECCS injection/spray subsystem being inoperable, adequate core cooling is ensured by the operability of the ADS and the remaining low-pressure ECCS subsystems.

For Condition I, with the required action and associated completion times of Conditions F,G, or H are not met, the ability of the ECCS system to mitigate a small break LOCA is reduced and the plant must be brought to a condition in which the LCO does not apply. To achieve this status, the plant must be brought to at least Mode 3 within 12 hours and reactor steam dome pressure must be reduced to $\leq$ 150 psig within 36 hours.

D. NEED FOR REVISION OF THE REQUIREMENTS

TS Section 3.5.1, "Emergency Core Cooling System - Operating"

For a small break LOCA, HPCI failure is the most severe failure. In the analysis of events requiring ADS operation while using GE-14 fuel, it is assumed that all five ADS valves operate. The existing requirement that four valves be operable must be revised to ensure operation within the assumptions of the accident analysis. The fifth ADS valve is a Target Rock dual-function safety/relief valve. This valve was previously not qualified for use to satisfy the ADS requirement in accordance with NUREG-0737, "Clarification of TMI Action Plan Requirements", Task II.K.3.28, "Verify Qualification of Accumulators on Automatic Depressurization System." To use this valve to satisfy the ADS requirement, an additional surveillance is proposed. The surveillance will verify that the accumulator leakage will not compromise the ability of the valve to operate for a minimum of five cycles for at least 30 minutes following the postulated event.

The bases for the required action for Condition G states that if the HPCI system and one low pressure ECCS subsystem are inoperable, the ADS and the remaining low pressure ECCS subsystems will be capable of ensuring adequate core cooling. With the introduction of GE-14 fuel, the LOCA analyses show that, for small break LOCAs of 0.1 ft^2, a failure of two ECCS subsystems subsystems such as HPCI and a low pressure ECCS injection/spray subsystem does not provide adequate core cooling to meet all of the required acceptance criteria. Consequently, the actions to be taken should these conditions arise must be revised to require entry into TS 3.0.3, which requires reactor shutdown.

The required action for Condition I states that if the required action and associated completion times of Conditions F,G, or H are not met, the reactor must be in Mode 3 within 12 hours and steam dome pressure must be reduced to $\leq$ 150 psig within 36 hours. The required action and completion time for Condition G is being revised as discussed above. This will result in revising the reference to Condition G as it is described in Condition I.

E. DESCRIPTION OF THE PROPOSED CHANGES

Unless otherwise stated, the affected TS sections are the same for Unit 1 and Unit 2.

TS Section 3.5.1, "Emergency Core Cooling System - Operating"

Increase the number of ADS valves required to be operable from four to five to include the relief function of the Target Rock safety/relief valve such that LCO 3.5.1 states, "Each ECCS injection/spray subsystem and the Automatic Depressurization System (ADS) function of five relief valves shall be Operable."

Condition G is deleted entirely.

Condition I is revised to remove reference to the condition described in Condition G.

Condition J is revised to include the conditions removed from Condition G and Condition I.

A new surveillance is proposed to verify that the Target Rock safety/relief valve accumulator leakage is less than or equal to 0.75 standard cubic feet per hour at least once every 24 months.

F. SUMMARY SAFETY ANALYSIS OF THE PROPOSED CHANGES

TS Section 3.5.1, "Emergency Core Cooling System - Operating"

The proposed change increases the number of required ADS relief valves from four to five. The ADS consists of four electromatic relief valves and one safety/relief valve. The ADS is designed to provide depressurization of the Reactor Coolant System (RCS) during a small break LOCA if HPCI fails. For a small break LOCA, HPCI failure is the most severe failure. In the analysis of events requiring ADS operation, it is assumed that all five ADS valves operate. These analyses were performed in support of ComEd's request to transition to GE-14 fuel and increase the licensed power level of QCNPS as described in Reference I.2. The results of the analysis demonstrate that, with HPCI failure, the five ADS valves and the remaining operable ECCS subsystems provide the capability to adequately cool the core and prevent fuel damage. For current rated thermal power level with SPC fuel, the LOCA analyses show that with HPCI failure, three ADS valves and the remaining operable ECCS subsystems provide adequate core cooling. The TS requirement to maintain four ADS valves operable represents a conservative allowance for an additional single failure of an ADS valve beyond the assumed HPCI failure. With an assumed failure of the HPCI system, there is no requirement to assume an additional single failure of an ADS valve. Thus five ADS valves are adequate to provide core cooling.

Condition G, in which HPCI is inoperable and one low pressure ECCS injection/spray subsystem is inoperable was previously evaluated. With the introduction of GE-14 fuel, the LOCA analyses show that, for small break LOCAs of 0.1 ft^2, a failure of two ECCS subsystems subsystems such as HPCI and a low pressure ECCS injection/spray subsystem does not provide adequate core cooling to meet all of the required acceptance criteria. Consequently, the required actions for this condition must be changed to require entry into TS 3.0.3.

Condition H, in which one ADS valve is inoperable has been analyzed for the transition to GE-14 fuel. The results indicate that with the remaining ADS valves and the ECCS systems operable, including the HPCI system, the small break LOCA is successfully mitigated. Thus, the required actions associated with Condition H continue to be appropriate.

To provide five ADS relief valves, the ADS relief function of the Target Rock safety/relief valve must be operable. This valve was previously not qualified for use to satisfy the ADS guideline in accordance with NUREG-0737, Task II.K.3.28. However, the piping and supports from the accumulators to the Target Rock valves were seismically qualified, and spring-loaded ball check valves were installed in the pneumatic supply

lines to minimize leakage from the valve accumulator. To use this valve to satisfy the ADS requirement, an additional surveillance is proposed to verify that the accumulator leakage for the Target Rock safety/relief valve is less than or equal to 0.75 standard cubic feet per hour. This will ensure that the valve can operate for a minimum of five cycles for at least 30 minutes following the postulated event, assuming no air makeup is available to the accumulator.

The capability to operate for five cycles is adequate to ensure successful depressurization for the following reasons. First, the assumption of five valve cycles is conservative. The small break LOCA response requires the valve to open only once initially to depressurize the reactor. Second, subsequent maintenance of low-pressure conditions is adequately ensured by the remaining four electromatic relief valves. Third, the five cycle capability was verified with containment pressure near atmospheric pressure. This is equivalent to achieving two valve cycles at 70% of containment design pressure. Two valve cycles are still adequate for depressurization capability. The 70% of design pressure bounds the pressures that would be expected for small break LOCAs.

The 30-minute time is adequate to depressurize the reactor following a small break LOCA. The longest operability period required for the accumulator for QCNPS is during an event which does not pressurize the drywell (e.g., a transient, outside containment line break, or stuck-open relief valve) with failure of high-pressure makeup. In this case, ADS operation is initiated by the 8.5-minute timer on sustained low reactor level. Even assuming a degraded event in which manual operator action is necessary to initiate ADS, a 30-minute time period is a conservative bounding value to use for the Target Rock accumulator operability period.

The 24 month surveillance interval for accumulator leakage is justified based on the following. The accumulators were provided with pipe restraints and the accumulator check valves were provided with soft seats to minimize leakage in response to Inspection and Enforcement (IE) Bulletin 80-01, "Operability of ADS Valve Pneumatic Supply." This test interval is consistent with the test interval approved for the Pilgrim Nuclear Power Station in Reference I.4.

G. IMPACT ON PREVIOUS SUBMITTALS

All submittals currently under review by the NRC were evaluated to determine the impact of this submittal. The following submittals are associated with this request for amendment.

- By letter dated September 29, 2000 (Reference I.1), QCNPS submitted a request to amend the TS in response to an anticipated transition to GE-14 fuel. This request is a supplement to the referenced request for amendment.

No other submittals currently under review by the NRC are affected by the information presented in this revision to the license amendment request.

H. SCHEDULE REQUIREMENTS

ComEd plans to begin reloading with GE-14 fuel during the next QCNPS Unit 2 refueling outage, scheduled for February 2, 2002. Therefore, ComEd requests that the proposed changes be approved prior to January 1, 2002.

I. REFERENCES

1. Letter from R. M. Krich (ComEd) to U.S. NRC, "Request for Technical Specifications Change, Transition to General Electric Fuel," dated September 29, 2000

2. Letter from R. M. Krich (ComEd) to U.S. NRC, "Request for Technical Specifications Changes for Dresden Nuclear Power Station, Units 2 and 3 and Quad Cities Nuclear Power Station, Units 1 and 2, to Allow Operation at Uprated Power Levels," dated December 27, 2000

3. Letter from R. M. Krich (ComEd) to U.S. NRC, "Request for Technical Specifications Changes for Dresden Nuclear Power Station, Units 2 and 3, LaSalle County Station, Units 1 and 2, and Quad Cities Nuclear Power Station, Units 1 and 2, to Implement Improved Standard Technical Specifications," dated March 3, 2000

4. Letter from U.S. NRC to W.D. Harrington (Boston Edison), "NUREG-0737, Item II.K.3.28," dated December 23, 1985

ENCLOSURE 2 - ATTACHMENT B
Supplement to GE-14 Fuel License Amendment Request for
Quad Cities Nuclear Power Station, Units 1 and 2

MARKED-UP TS PAGES FOR PROPOSED CHANGES

The marked-up Technical Specifications are provided in the following pages. The marked-up bases pages are also provided for reference.

REVISED PAGES

3.5.1-1
3.5.1-2
3.5.1-3
3.5.1-6

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS) AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM

3.5.1 ECCS—Operating

LCO 3.5.1 Each ECCS injection/spray subsystem and the Automatic Depressurization System (ADS) function of ~~four~~ five relief valves shall be OPERABLE.

APPLICABILITY: MODE 1,
MODES 2 and 3, except high pressure coolant injection (HPCI) and ADS valves are not required to be OPERABLE with reactor steam dome pressure ≤ 150 psig.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Low Pressure Coolant Injection (LPCI) pump inoperable.	A.1 Restore LPCI pump to OPERABLE status.	30 days
B. One LPCI subsystem inoperable for reasons other than Condition A. OR One Core Spray subsystem inoperable.	B.1 Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	7 days
C. One LPCI pump in each subsystem inoperable.	C.1 Restore one LPCI pump to OPERABLE status.	7 days

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Two LPCI subsystems inoperable for reasons other than Condition C.	D.1 Restore one LPCI subsystem to OPERABLE status.	72 hours
E. Required Action and associated Completion Time of Condition A, B, C, or D not met.	E.1 Be in MODE 3. AND E.2 Be in MODE 4.	12 hours 36 hours
F. HPCI System inoperable.	F.1 Verify by administrative means RCIC System is OPERABLE. AND F.2 Restore HPCI System to OPERABLE status.	Immediately 14 days
G. HPCI System inoperable. AND One low pressure ECCS injection/spray subsystem is inoperable or Condition C entered.	G.1 Restore HPCI System to OPERABLE status. OR G.2 Restore low pressure ECCS injection/spray subsystem(s) to OPERABLE status.	72 hours 72 hours
G. One required ADS valve inoperable.	G.1 Restore ADS valve to OPERABLE status.	14 days

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
H/I. Required Action and associated Completion Time of Condition F, or G, ~~or H~~ not met. OR Two or more ~~required~~ 2 ADS valves inoperable.	H/I.1 Be in MODE 3. AND H/I.2 Reduce reactor steam dome pressure to ≤ 150 psig.	12 hours 36 hours
I/J. Two or more low pressure ECCS injection/spray subsystems inoperable for reasons other than Condition C or D. OR HPCI System and one or more ~~required~~ 2 ADS valves inoperable. OR One or more low pressure ECCS injection/spray subsystems inoperable and one or more ~~required~~ 2 ADS valves inoperable.	I/J.1 Enter LCO 3.0.3.	Immediately

Insert 3.5.1-3

Insert 3.5.1-3

OR

HPCI System inoperable and either one low pressure ECCS injection/spray subsystem is inoperable or Condition C entered.

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.5.1.8	----------NOTE---------- Vessel injection/spray may be excluded. ---------- Verify each ECCS injection/spray subsystem actuates on an actual or simulated automatic initiation signal.	24 months
SR 3.5.1.9	----------NOTE---------- Valve actuation may be excluded. ---------- Verify the ADS actuates on an actual or simulated automatic initiation signal.	24 months
SR 3.5.1.10	----------NOTE---------- Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. ---------- Verify each required ADS valve opens when manually actuated.	24 months
SR 3.5.1.11	Verify automatic transfer capability of the LPCI swing bus power supply from the normal source to the backup source.	24 months
SR 3.5.1.12	Verify that the leakage on the Target Rock safety/relief valve accumulator is ≤0.75 standard cubic feet per hour.	24 months

Note: There are no changes on this page. This page is provided for continuity only.

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS) AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM

B 3.5.1 ECCS – Operating

BASES

BACKGROUND

The ECCS is designed, in conjunction with the primary and secondary containment, to limit the release of radioactive materials to the environment following a loss of coolant accident (LOCA). The ECCS uses two independent methods (flooding and spraying) to cool the core during a LOCA. The ECCS network consists of the High Pressure Coolant Injection (HPCI) System, the Core Spray (CS) System, the low pressure coolant injection (LPCI) mode of the Residual Heat Removal (RHR) System, and the Automatic Depressurization System (ADS). The suppression pool provides the required source of water for the ECCS. Although no credit is taken in the safety analyses for the contaminated condensate storage tank (CCST), it is capable of providing a source of water for the HPCI, LPCI and CS systems.

On receipt of an initiation signal, ECCS pumps automatically start; the system aligns and the pumps inject water, taken either from the CCST or suppression pool, into the Reactor Coolant System (RCS) as RCS pressure is overcome by the discharge pressure of the ECCS pumps. Although the system is initiated, ADS action is delayed, allowing the operator to interrupt the timed sequence if the system is not needed. The HPCI pump discharge pressure almost immediately exceeds that of the RCS, and the pump injects coolant into the vessel to cool the core. If the break is small, the HPCI System will maintain coolant inventory as well as vessel level while the RCS is still pressurized. If HPCI fails, it is backed up by ADS in combination with LPCI and CS. In this event, the ADS timed sequence would be allowed to time out and open the relief valves and safety/relief valve (S/RV) depressurizing the RCS, thus allowing the LPCI and CS to overcome RCS pressure and inject coolant into the vessel. If the break is large, RCS pressure initially drops rapidly and the LPCI and CS cool the core.

Water from the break returns to the suppression pool where it is used again and again. Water in the suppression pool is circulated through a heat exchanger cooled by the RHR Service Water System. Depending on the location and size

(continued)

BASES

BACKGROUND (continued)

of the break, portions of the ECCS may be ineffective; however,the overall design is effective in cooling the core regardless of the size or location of the piping break.

The combined operation of all ECCS subsystems are designed to ensure that no single active component failure will prevent automatic initiation and successful operation of the minimum required ECCS equipment.

The CS System (Ref. 1) is composed of two independent subsystems. Each subsystem consists of a motor driven pump, a spray sparger above the core, and piping and valves to transfer water from the suppression pool to the sparger. The CS System is designed to provide cooling to the reactor core when reactor pressure is low. Upon receipt of an initiation signal, the CS pumps in both subsystems are automatically started immediately when normal AC power is available and approximately 13 seconds after emergency power is available. When the RPV pressure drops sufficiently, CS System flow to the RPV begins. A full flow test line is provided to route water from and to the suppression pool to allow testing of the CS System without spraying water in the RPV.

LPCI is an independent operating mode of the RHR System. There are two LPCI subsystems (Ref. 2), each consisting of two motor driven pumps and piping and valves to transfer water from the suppression pool to the RPV via the selected recirculation loop. The LPCI System is equipped with a loop select logic that determines which, if any, of the recirculation loops has been broken and selects the non-broken loop for injection. If neither loop is determined to be broken, then "B" recirculation loop is selected for injection. The LPCI System cross-tie valves must be open to support OPERABILITY of both LPCI subsystems. Similarly, the LPCI swing bus is required to be energized to support both LPCI subsystems. Therefore, with the LPCI cross-tie valves not full open, or the LPCI swing bus not energized, both LPCI subsystems must be considered inoperable. The LPCI subsystems are designed to provide core cooling at low RPV pressure. Upon receipt of an initiation signal, all four LPCI pumps are automatically started (B and D pumps immediately when normal AC power is available and in approximately 8 seconds after emergency AC power is available, and A and C pumps immediately when

(continued)

BASES

BACKGROUND (continued)

normal AC power is available and in approximately 3 seconds after emergency AC power is available). RHR System valves in the LPCI flow path are automatically positioned to ensure the proper flow path for water from the suppression pool to inject into the selected recirculation loop. When the RPV pressure drops sufficiently, the LPCI flow to the RPV, via the selected recirculation loop, begins. The water then enters the reactor through the jet pumps. Full flow test lines are provided for each LPCI subsystem to route water from and to the suppression pool, to allow testing of the LPCI pumps without injecting water into the RPV. These test lines also provide suppression pool cooling capability, as described in LCO 3.6.2.3, "RHR Suppression Pool Cooling."

The HPCI System (Ref. 3) consists of a steam driven turbine pump unit, piping, and valves to provide steam to the turbine, as well as piping and valves to transfer water from the suction source to the core via the feedwater system line, where the coolant is distributed within the RPV through the feedwater sparger. Suction piping for the system is provided from the CCST and the suppression pool. Pump suction for HPCI is normally aligned to the CCST source to minimize injection of suppression pool water into the RPV. However, if the CCST water supply is low, or if the suppression pool level is high, an automatic transfer to the suppression pool water source ensures a water supply for continuous operation of the HPCI System. The steam supply to the HPCI turbine is piped from a main steam line upstream of the associated inboard main steam isolation valve.

The HPCI System is designed to provide core cooling for a wide range of reactor pressures (150 psig to 1120 psig). Upon receipt of an initiation signal, the HPCI turbine stop valve and turbine steam supply valve open simultaneously and the turbine accelerates to a specified speed. As the HPCI flow increases, the turbine control valve is automatically adjusted to maintain design flow. Exhaust steam from the HPCI turbine is discharged to the suppression pool. A full flow test line is provided to route water from and to the CCST to allow testing of the HPCI System during normal operation without injecting water into the RPV.

(continued)

BASES

BACKGROUND (continued)

The ECCS pumps are provided with minimum flow bypass lines, which discharge to the suppression pool. The valves in these lines automatically open or remain open to prevent pump damage due to overheating when other discharge line valves are closed. To ensure rapid delivery of water to the RPV and to minimize water hammer effects, all ECCS pump discharge lines are filled with water. The LPCI and CS System discharge lines are kept full of water using a "keep fill" system (jockey pump system). The HPCI System is normally aligned to the CCST. The height of water in the CCST is sufficient to maintain the piping full of water up to the first closed isolation valve in the discharge piping. The relative height of the feedwater line connection for HPCI is such that the water in the feedwater lines keeps the remaining portion of the HPCI discharge line full of water. Therefore, HPCI does not require a "keep fill" system.

The ADS (Ref. 4) consists of 5 valves (4 relief valves and one S/RV). It is designed to provide depressurization of the RCS during a small break LOCA if HPCI fails or is unable to maintain required water level in the RPV. ADS operation reduces the RPV pressure to within the operating pressure range of the low pressure ECCS subsystems (CS and LPCI), so that these subsystems can provide coolant inventory makeup. The S/RV used for automatic depressurization is equipped with one air accumulator and associated inlet check valve. The accumulator provides the pneumatic power to actuate the valve. However, the S/RV is not credited in the safety analysis since qualification of the accumulator for this valve to perform the ADS function has not been demonstrated (Ref. 5).

APPLICABLE SAFETY ANALYSES

The ECCS performance is evaluated for the entire spectrum of break sizes for a postulated LOCA. The accidents for which ECCS operation is required are presented in References 05 and 06. The required analyses and assumptions are defined in Reference 07. The results of these analyses are also described in Reference 08.

This LCO helps to ensure that the following acceptance criteria for the ECCS, established by 10 CFR 50.46 (Ref. 10), will be met following a LOCA, assuming the worst case single active component failure in the ECCS:

a. Maximum fuel element cladding temperature is ≤ 2200°F;

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

b. Maximum cladding oxidation is ≤ 0.17 times the total cladding thickness before oxidation;

c. Maximum hydrogen generation from a zirconium water reaction is ≤ 0.01 times the hypothetical amount that would be generated if all of the metal in the cladding surrounding the fuel, excluding the cladding surrounding the plenum volume, were to react;

d. The core is maintained in a coolable geometry; and

e. Adequate long term cooling capability is maintained.

The limiting single failures are discussed in Reference 8. For GE fuel, the recirculation suction line break with 125 VDC battery failure is considered the most limiting break/failure combination. In addition, to the 125 VDC battery failure, HPCI was assumed to fail to be consistent with generic analyses performed for the BWR 3/4 design generic analysis. For Siemens fuel, the recirculation suction line break with a failure of the entire LPCI System is considered the most limiting break/failure combination. For a small break LOCA, HPCI failure is the most severe failure. In the analysis of events requiring ADS operation, it is assumed that only three of the five ADS valves operate. Therefore, four ADS valves are required to be OPERABLE to meet single failure criteria. The remaining OPERABLE ECCS subsystems provide the capability to adequately cool the core and prevent excessive fuel damage.

Replace with insert B 3.5.1-5

The ECCS satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

Each ECCS injection/spray subsystem and ~~four~~ five ADS relief valves are required to be OPERABLE. ~~The S/RV can not be used to satisfy the ADS requirement.~~ The ECCS injection/spray subsystems are defined as the two CS subsystems, the two LPCI subsystems, and one HPCI System. The low pressure ECCS injection/spray subsystems are defined as the two CS subsystems and the two LPCI subsystems.

With less than the required number of ECCS subsystems OPERABLE, the potential exists that during a limiting design basis LOCA concurrent with the worst case single failure,

(continued)

Insert B 3.5.1-5

For a small break LOCA, HPCI failure is the most severe failure. In the analysis of events with HPCI failure, all five ADS valves and the low pressure ECCS injection/spray systems are assumed to operate. In the analysis of events with one ADS valve inoperable, HPCI and the low pressure ECCS injection/spray systems are assumed to operate.

BASES

LCO (continued)

the limits specified in Reference 9 could be exceeded. All ECCS subsystems must therefore be OPERABLE to satisfy the single failure criterion required by Reference 9.

LPCI subsystems may be considered OPERABLE during alignment and operation for decay heat removal when below the actual RHR cut-in permissive pressure in MODE 3, if capable of being manually realigned (remote or local) to the LPCI mode and not otherwise inoperable. Alignment and operation for decay heat removal includes when the required LPCI pump is not operating or when the system is realigned from or to the RHR shutdown cooling mode. At these low pressures and decay heat levels, a reduced complement of ECCS subsystems should provide the required core cooling, thereby allowing operation of RHR shutdown cooling when necessary.

APPLICABILITY

All ECCS subsystems are required to be OPERABLE during MODES 1, 2, and 3, when there is considerable energy in the reactor core and core cooling would be required to prevent fuel damage in the event of a break in the primary system piping. In MODES 2 and 3, when reactor steam dome pressure is $\leq$ 150 psig, ADS and HPCI are not required to be OPERABLE because the low pressure ECCS subsystems can provide sufficient flow below this pressure. ECCS requirements for MODES 4 and 5 are specified in LCO 3.5.2, "ECCS—Shutdown."

ACTIONS

A.1

If any one LPCI pump is inoperable, the inoperable pump must be restored to OPERABLE status within 30 days. In this Condition, the remaining OPERABLE pumps provide adequate core cooling during a LOCA. However, overall ECCS reliability is reduced, because a single failure in one of the remaining OPERABLE LPCI subsystems, concurrent with a LOCA, may result in the LPCI subsystems not being able to perform their intended safety function. The 30 day Completion Time is based on a reliability study cited in Reference 11 that evaluated the impact on ECCS availability, assuming various components and subsystems were taken out of service. The results were used to calculate the average availability of ECCS equipment needed to mitigate the consequences of a LOCA as a function of allowable repair times (i.e., Completion Times).

10

(continued)

BASES

ACTIONS (continued)

B.1

If a LPCI subsystem is inoperable for reasons other than Condition A, or a CS subsystem is inoperable, the inoperable low pressure ECCS injection/spray subsystem must be restored to OPERABLE status within 7 days. In this Condition, the remaining OPERABLE subsystems provide adequate core cooling during a LOCA. However, overall ECCS reliability is reduced, because a single failure in one of the remaining OPERABLE subsystems, concurrent with a LOCA, may result in the ECCS not being able to perform its intended safety function. The 7 day Completion Time is based on a reliability study (Ref. 11) that evaluated the impact on ECCS availability, assuming various components and subsystems were taken out of service. The results were used to calculate the average availability of ECCS equipment needed to mitigate the consequences of a LOCA as a function of allowed outage times (i.e., Completion Times). 10

C.1

If one LPCI pump in each subsystem is inoperable, one LPCI pump must be restored to OPERABLE status within 7 days. In this Condition, the remaining OPERABLE ECCS subsystems provide adequate core cooling during a LOCA. However, overall ECCS reliability is reduced because a single failure in one of the remaining OPERABLE ECCS subsystems, concurrent with a LOCA, may result in the ECCS not being able to perform its intended safety function. The 7 day Completion Time is based on a reliability study (Ref. 11) that evaluated the impact on ECCS availability, assuming various components and subsystems were taken out of service. The results were used to calculate the average availability of ECCS equipment needed to mitigate the consequences of a LOCA as a function of allowed outage times (i.e., Completion Times). 10

D.1

If two LPCI subsystems are inoperable for reasons other than Condition C, one inoperable subsystem must be restored to OPERABLE status within 72 hours. In this Condition, the

(continued)

Note: There are no changes on this page. This page is provided for continuity only.

BASES

ACTIONS

D.1 (continued)

remaining OPERABLE CS subsystems provide adequate core cooling during a LOCA. However, overall ECCS reliability is reduced, because a single failure in one of the remaining CS subsystems, concurrent with a LOCA, may result in ECCS not being able to perform its intended safety function. The 72 hour Completion Time is based on a reliability study cited in Reference 10 that evaluated the impact on ECCS availability, assuming various components and subsystems were taken out of service. The results were used to calculate the average availability of ECCS equipment needed to mitigate the consequences of a LOCA as a function of allowable repair times (i.e., Completion Times).

E.1 and E.2

If any Required Action and associated Completion Time of Condition A, B, C, or D is not met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

F.1 and F.2

If the HPCI System is inoperable and the RCIC System is verified to be OPERABLE, the HPCI System must be restored to OPERABLE status within 14 days. In this Condition, adequate core cooling is ensured by the OPERABILITY of the redundant and diverse low pressure ECCS injection/spray subsystems in conjunction with ADS. Also, the RCIC System will automatically provide makeup water at most reactor operating pressures. Verification of RCIC OPERABILITY is therefore required immediately when HPCI is inoperable. This may be performed as an administrative check by examining logs or other information to determine if RCIC is out of service for maintenance or other reasons. It does not mean to perform the Surveillances needed to demonstrate the OPERABILITY of

(continued)

BASES

ACTIONS

F.1 and F.2 (continued)

the RCIC System. If the OPERABILITY of the RCIC System cannot be verified, however, Condition H must be immediately entered. In the event of component failures concurrent with a design basis LOCA, there is a potential, depending on the specific failures, that the minimum required ECCS equipment will not be available. A 14 day Completion Time is based on a reliability study cited in Reference 10 and has been found to be acceptable through operating experience.

G.1 and G.2

If any one low pressure ECCS injection/spray subsystem, or one LPCI pump in both LPCI subsystems, is inoperable in addition to an inoperable HPCI System, the inoperable low pressure ECCS injection/spray subsystem(s) or the HPCI System must be restored to OPERABLE status within 72 hours. In this Condition, adequate core cooling is ensured by the OPERABILITY of the ADS and the remaining low pressure ECCS subsystems. However, the overall ECCS reliability is significantly reduced because a single failure in one of the remaining OPERABLE subsystems concurrent with a design basis LOCA may result in the ECCS not being able to perform its intended safety function. Since both a high pressure system (HPCI) and a low pressure subsystem(s) are inoperable, a more restrictive Completion Time of 72 hours is required to restore either the HPCI System or the low pressure ECCS injection/spray subsystem(s) to OPERABLE status. This Completion Time is based on a reliability study cited in Reference 11 and has been found to be acceptable through operating experience.

G.1

The LCO requires five ADS valves to be OPERABLE in order to provide the ADS function. Reference 12 contains the results of an analysis that evaluated the effect of two ADS valves being out of service. Per this analysis, operation of only three ADS valves will provide the required depressurization. However, overall reliability of the ADS is reduced, because a single failure in the OPERABLE ADS valves could result in a reduction in depressurization capability. Therefore,

With one ADS valve out of service, the

(continued)

BASES

ACTIONS

G.1 (continued)

operation is only allowed for a limited time. The 14 day Completion Time is based on a reliability study cited in Reference 10 and has been found to be acceptable through operating experience.

H.1 and H.2

If any Required Action and associated Completion Time of Condition F or G is not met, or if two or more required ADS valves are inoperable, the plant must be brought to a condition in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours and reactor steam dome pressure reduced to ≤ 150 psig within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

I.1

When multiple ECCS subsystems are inoperable, as stated in Condition I, the plant is in a condition outside of the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

SURVEILLANCE REQUIREMENTS

SR 3.5.1.1

The flow path piping has the potential to develop voids and pockets of entrained air. Maintaining the pump discharge lines of the HPCI System, CS System, and LPCI subsystems full of water ensures that the ECCS will perform properly, injecting its full capacity into the RCS upon demand. This will also prevent a water hammer following an ECCS initiation signal. One acceptable method of ensuring that the lines are full is to vent at the high points. The 31 day Frequency is based on the gradual nature of void buildup in the ECCS piping, the procedural controls governing system operation, and operating experience.

(continued)

Note: There are no changes on this page. This page is provided for continuity only.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.1.2

Verifying the correct alignment for manual, power operated, and automatic valves in the ECCS flow paths provides assurance that the proper flow paths will exist for ECCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position since these were verified to be in the correct position prior to locking, sealing, or securing. A valve that receives an initiation signal is allowed to be in a nonaccident position provided the valve will automatically reposition in the proper stroke time. This SR does not require any testing or valve manipulation; rather, it involves verification that those valves capable of potentially being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves. For the HPCI System, this SR also includes the steam flow path for the turbine and the flow controller position.

The 31 day Frequency of this SR was derived from the Inservice Testing Program requirements for performing valve testing at least once every 92 days. The Frequency of 31 days is further justified because the valves are operated under procedural control and because improper valve position would only affect a single subsystem. This Frequency has been shown to be acceptable through operating experience.

In MODE 3 with reactor steam dome pressure less than the actual RHR cut-in permissive pressure, the RHR System may be required to operate in the shutdown cooling mode to remove decay heat and sensible heat from the reactor. Therefore, this SR is modified by a Note that allows LPCI subsystems to be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned (remote or local) to the LPCI mode and not otherwise inoperable. Alignment and operation for decay heat removal includes when the required RHR pump is not operating or when the system is being realigned from or to the RHR shutdown cooling mode. At the low pressures and decay heat loads associated with operation in MODE 3 with reactor steam dome pressure less than the RHR cut-in permissive pressure, a reduced complement of low pressure ECCS subsystems should provide the required core cooling, thereby allowing operation of RHR shutdown cooling, when necessary.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.1.3

Verification every 31 days of the correct breaker alignment to the LPCI swing bus demonstrates that the AC electrical power is available to ensure proper operation of the associated LPCI injection valves and the recirculation pump discharge valves. The 31 day Frequency has been found acceptable based on engineering judgment and operating experience.

SR 3.5.1.4

Cycling the recirculation pump discharge valves through one complete cycle of full travel demonstrates that the valves are mechanically OPERABLE and will close when required. Upon initiation of an automatic LPCI subsystem injection signal, these valves are required to be closed to ensure full LPCI subsystem flow injection in the reactor via the recirculation jet pumps. De-energizing the valve in the closed position will also ensure the proper flow path for the LPCI subsystem. Acceptable methods of de-energizing the valve include de-energizing breaker control power, racking out the breaker or removing the breaker.

The Frequency of this SR is in accordance with the Inservice Testing Program. If any recirculation pump discharge valve is inoperable and in the open position, both LPCI subsystems must be declared inoperable.

SR 3.5.1.5, SR 3.5.1.6, and SR 3.5.1.7

The performance requirements of the low pressure ECCS pumps are determined through application of the 10 CFR 50, Appendix K criteria (Ref. 7). This periodic Surveillance is performed (in accordance with the ASME Code, Section XI, requirements for the ECCS pumps) to verify that the ECCS pumps will develop the flow rates required by the respective analyses. The low pressure ECCS pump flow rates ensure that adequate core cooling is provided to satisfy the acceptance criteria of Reference 10. The pump flow rates are verified against a test line pressure or system head equivalent to

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.1.5, SR 3.5.1.6, and SR 3.5.1.7 (continued)

the RPV pressure expected during a LOCA. The total system pump outlet pressure is adequate to overcome the elevation head pressure between the pump suction and the vessel discharge, the piping friction losses, and RPV pressure present during a LOCA. These values have been established analytically.

The flow tests for the HPCI System are performed at two different pressure ranges such that system capability to provide rated flow against a system head corresponding to reactor pressure is tested at both the higher and lower operating ranges of the system. The required system head should overcome the RPV pressure and associated discharge line losses. Adequate reactor steam pressure must be available to perform these tests. Additionally, adequate steam flow must be passing through the main turbine or turbine bypass valves to continue to control reactor pressure when the HPCI System diverts steam flow. Therefore, sufficient time is allowed after adequate pressure and flow are achieved to perform these tests. Reactor steam pressure must be $\geq$ 920 psig to perform SR 3.5.1.6 and $\geq$ 150 psig to perform SR 3.5.1.7. Adequate steam flow is represented by at least 2 turbine bypass valves open, or total steam flow $\geq 10^6$ lb/hr. Reactor startup is allowed prior to performing the low pressure Surveillance test because the reactor pressure is low and the time allowed to satisfactorily perform the Surveillance test is short. The reactor pressure is allowed to be increased to normal operating pressure since it is assumed that the low pressure test has been satisfactorily completed and there is no indication or reason to believe that HPCI is inoperable.

Therefore, SR 3.5.1.6 and SR 3.5.1.7 are modified by Notes that state the Surveillances are not required to be performed until 12 hours after the reactor steam pressure and flow are adequate to perform the test. The 12 hours allowed for performing the flow test after the required pressure and flow are reached is sufficient to achieve stable conditions for testing and provides reasonable time to complete the SRs.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.1.5, SR 3.5.1.6, and SR 3.5.1.7 (continued)

The Frequency for SR 3.5.1.5 and SR 3.5.1.6 is in accordance with the Inservice Testing Program requirements. The 24 month Frequency for SR 3.5.1.7 is based on the need to perform the Surveillance under the conditions that apply during a startup from a plant outage. Operating experience has shown that these components usually pass the SR when performed at the 24 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.5.1.8

The ECCS subsystems are required to actuate automatically to perform their design functions. This Surveillance verifies that, with a required system initiation signal (actual or simulated), the automatic initiation logic of HPCI, CS, and LPCI will cause the systems or subsystems to operate as designed, including actuation of the system throughout its emergency operating sequence, automatic pump startup and actuation of all automatic valves to their required positions. This SR also ensures that the HPCI System will automatically restart on an RPV low–low water level signal received subsequent to an RPV high water level trip and that the HPCI suction is automatically transferred from the CCST to the suppression pool on high suppression pool water level or low CCST water level. The LOGIC SYSTEM FUNCTIONAL TEST performed in LCO 3.3.5.1 overlaps this Surveillance to provide complete testing of the assumed safety function.

While this Surveillance can be performed with the reactor at power, operating experience has shown that these components usually pass the SR when performed at the 24 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note that excludes vessel injection/spray during the Surveillance. Since all active components are testable and full flow can be demonstrated by recirculation through the test line, coolant injection into the RPV is not required during the Surveillance.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.1.9

The ADS designated valves are required to actuate automatically upon receipt of specific initiation signals. A system functional test is performed to demonstrate that the mechanical portions of the ADS function (i.e., solenoids) operate as designed when initiated either by an actual or simulated initiation signal, causing proper actuation of all the required components. SR 3.5.1.10 and the LOGIC SYSTEM FUNCTIONAL TEST performed in LCO 3.3.5.1 overlap this Surveillance to provide complete testing of the assumed safety function.

The 24 month Frequency is based on the need to perform the Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the SR when performed at the 24 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note that excludes valve actuation since the valves are individually tested in accordance with SR 3.5.1.10.

SR 3.5.1.10

A manual actuation of each ADS valve is performed to verify that the valve and solenoid are functioning properly and that no blockage exists in the valve discharge lines. This is demonstrated by the response of the turbine control or bypass valve or by a change in the measured flow or by any other method suitable to verify steam flow. Adequate reactor steam dome pressure must be available to perform this test to avoid damaging the valve. Also, adequate steam flow must be passing through the main turbine or turbine bypass valves to continue to control reactor pressure when the ADS valves divert steam flow upon opening. Sufficient time is therefore allowed after the required pressure and flow are achieved to perform this SR. Adequate pressure at which this SR is to be performed is 300 psig (the pressure

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.1.10 (continued)

recommended by the valve manufacturer). Adequate steam flow is represented by at least 2 turbine bypass valves open. Reactor startup is allowed prior to performing this SR because valve OPERABILITY and the setpoints for overpressure protection are verified, per ASME requirements, prior to valve installation. Therefore, this SR is modified by a Note that states the Surveillance is not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. The 12 hours allowed for manual actuation after the required pressure is reached is sufficient to achieve stable conditions and provides adequate time to complete the Surveillance. SR 3.5.1.9 and the LOGIC SYSTEM FUNCTIONAL TEST performed in LCO 3.3.5.1 overlap this Surveillance to provide complete testing of the assumed safety function.

The Frequency of 24 months is based on the need to perform the Surveillance under the conditions that apply just prior to or during a startup from a plant outage. Operating experience has shown that these components usually pass the SR when performed at the 24 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.5.1.11

The LPCI System injection valves and recirculation pump discharge valves are powered from the LPCI swing bus, which must be energized after a single failure, including loss of power from the normal source to the swing bus. Therefore, the automatic transfer capability from the normal power source to the backup power source must be verified to ensure the automatic capability to detect loss of normal power and initiate an automatic transfer to the swing bus backup power source. Verification of this capability every 24 months ensures that AC electrical power is available for proper operation of the associated LPCI injection valves and recirculation pump valves. The swing bus automatic transfer scheme must be OPERABLE for both LPCI subsystems to be OPERABLE. The Frequency of 24 months is based on the need

INSERT B 3.5.1-16

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Insert B 3.5.1-16

SR 3.5.1.12

In order to credit the ADS function of the Target Rock safety/relief valve, the valve must be qualified in accordance with NUREG-0737, "Clarification of TMI Action Plan Requirements," Task II.K.3.28. The piping and supports from the accumulator to the Target Rock valves are seismically qualified, and spring-loaded ball check valves are installed in the pneumatic supply lines to minimize leakage from the valve accumulator. The surveillance requirement verifies that the accumulator leakage for the Target Rock safety/relief valve is less than or equal to 0.75 standard cubic feet per hour. This will ensure that the valve can operate for a minimum of five cycles for at least 30 minutes following the postulated event, assuming no air makeup is available to the accumulator.

The 30-minute operating time is adequate to ensure successful depressurization for the following reasons. First, the assumption of 5 valve cycles is conservative. The small break LOCA response requires the valve to open only once initially to depressurize the reactor. Second, the analyses show that the 30-minute time is adequate to depressurize the reactor following a small break LOCA. Third, subsequent maintenance of low-pressure conditions is adequately ensured by the remaining four electromatic relief valves.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.1.11 (continued)

to perform the Surveillance under the conditions that apply during a startup from a plant outage. Operating experience has shown that the components usually pass the SR when performed at the 24 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

REFERENCES

1. UFSAR, Section 6.3.2.1.

2. UFSAR, Section 6.3.2.2.

3. UFSAR, Section 6.3.2.3.

4. UFSAR, Section 6.3.2.4.

5. Letter from J.A. Zwolinski (NRC) to D.L. Farrar (Commonwealth Edison Company), "Resolution of NUREG-0737 Item II.K.3.28, Verify Qualification of Accumulators on Automatic Depressurization Valves," dated June 16, 1986.

5~~6~~. UFSAR, Section 15.6.4.

6~~7~~. UFSAR, Section 15.6.5.

7~~8~~. 10 CFR 50, Appendix K.

8~~9~~. UFSAR, Section 6.3.3.

9~~10~~. 10 CFR 50.46.

10~~11~~. Memorandum from R.L. Baer (NRC) to V. Stello, Jr. (NRC), "Recommended Interim Revisions to LCOs for ECCS Components," December 1, 1975.

12. ~~UFSAR, Section 6.3.3.1.4.~~

ENCLOSURE 2 - ATTACHMENT C
Supplement to GE-14 Fuel License Amendment Request for
Quad Cities Nuclear Power Station, Units 1 and 2

INFORMATION SUPPORTING A FINDING OF
NO SIGNIFICANT HAZARDS CONSIDERATION

According to 10CFR50.92(c), "Issuance of amendment," a proposed amendment to an operating license involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not:

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

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

Involve a significant reduction in a margin of safety.

In support of this determination, an evaluation of each of the three criteria set forth in 10CFR50.92 is provided below regarding the proposed license amendment.

Overview

Exelon Generation Company (EGC), LLC, previously Commonwealth Edison (ComEd) Company, is requesting changes to the Technical Specifications (TS), for Quad Cities Nuclear Power Station (QCNPS), Units 1 and 2. These changes are needed to support a change in fuel vendors from Siemens Power Corporation to General Electric. These changes are in addition to the changes submitted in a letter from R.M. Krich (ComEd) to U.S. NRC, "Request for Technical Specifications Changes, Transition to General Electric Fuel," dated Septemebr 29, 2000. The additional changes associated with this request involve the following.

- Increasing the number of required Automatic Depressurization System (ADS) Valves that are required to be operable from four to five.

- Removing the allowance to continue operating for 72 hours if the High Pressure Coolant Spay (HPCI) System is inoperable and one low pressure Emergency Core Cooling System (ECCS) injection/spray subsystem is inoperable.

- Adding a new surveillance for the Target Rock safety/relief valve accumulator.

The proposed TS changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

The proposed changes involve more restrictive limitations on operation. These changes do not affect the initiators of analyzed events or the assumed mitigation of accident or transient events. Analyzed events are initiated by the failure of plant structures, systems or components. The proposed changes do not impact the condition or performance of these structures, systems or components. Consequences of analyzed events are the result of the plant being operated within assumed parameters at the onset of any events. The evaluations supporting the transition to GE fuel revealed that the current Technical Specification (TS) Limiting Condition for Operation (LCO) and conditions must be revised to

place additional limitations on equipment to ensure that the plant is operated within the assumptions of the safety analyses. With the additional limitations, the analyses demonstrate that all of the acceptance criteria continue to be met. As a result, the changes do not involve a significant increase in the probability of consequences of an accident previously evaluated.

The proposed TS changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

The proposed changes do not involve a physical alteration of the facility or change the manner in which the facility is operated. No new or different equipment is being installed and no installed equipment is being removed. There is no alteration to the parameters within which the plant is normally operated or in the setpoints that initiate protective or mitigative actions. Consequently, no new failure modes are introduced and the changes therefore do not increase the possibility of a new or different kind of accident from any previously evaluated.

The proposed TS changes do not involve a significant reduction in a margin of safety.

Margin of safety is established through the design of the plant structures, systems and components, the parameters within which the plant is operated, and the establishment of setpoints for the actuation of equipment relied upon to respond to an event. The proposed changes do not impact the condition or performance of structures, systems or components relied upon for accident mitigation or any safety analysis assumptions. The changes reflect a reduction in redundancy in the capability of the Automatic Depressurization System (ADS). However, the proposed changes impose more restrictive requirements on operation to ensure that all of the accident analyses continue to meet acceptance criteria. Therefore the proposed changes do not involve a significant reduction in margin of safety.

Conclusion

The proposed changes, which involve increased operating restrictions associated with the Emergency Core Cooling System (ECCS), do not involve a Significant Hazards Consideration.

ENCLOSURE 2 - ATTACHMENT D
Supplement to GE-14 Fuel License Amendment Request for
Quad Cities Nuclear Power Station, Units 1 and 2

INFORMATION SUPPORTING AN ENVIRONMENTAL ASSESSMENT

EGC has evaluated this proposed change against the criteria for identification of licensing and regulatory actions requiring environmental assessment in accordance with 10 CFR 51.21, "Criteria for and identification of licensing and regulatory actions requiring environmental assessments." EGC has determined that this proposed change meets the criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9), "Criterion for categorical exclusion; identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review," and as such, has determined that no irreversible consequences exist in accordance with 10 CFR 50.92(b), "Issuance of amendment." This determination is based on the fact that this change is being proposed as an amendment to a license issued pursuant to 10 CFR 50, "Domestic Licensing of Production and Utilization Facilities," which changes a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, "Standards for Protection Against Radiation," or that changes an inspection or a surveillance requirement, and the amendment meets the following specific criteria.

(i) The amendment involves no significant hazards consideration.

As demonstrated in Attachment C, the proposed changes do not involve any significant hazards considerations.

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

The proposed change is limited to a series of additional operating restrictions associated with the Emergency Core Cooling Systems (ECCS). The change does not allow for an increase in the unit power level, does not increase the production, nor alter the flow path or method of disposal of radioactive waste or byproducts. Therefore, the proposed change does not affect actual unit effluents.

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

The proposed changes will not result in changes in the operation or configuration of the facility. There will be no change in the level of controls or methodology used for processing radioactive effluents or handling of solid radioactive waste. The proposed changes will not result in any change in the normal radiation levels within the plant. Therefore, there will be no increase in individual or cumulative occupational radiation exposure resulting from this change.