Commonwealth Edison
1400 Opus Place
Downers Grove, Illinois 60515

July 6, 1992

Dr. Thomas E. Murley, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Attn: Document Control Desk

Subject: Quad Cities Nuclear Power Station Unit 1
Application for Amendment to
Facility Operating License DPR-29,
Appendix A, Technical Specifications
NRC Docket Nos. 50-254

Dear Dr. Murley:

Pursuant to 10 CFR 50.90, Commonwealth Edison Company (CECo) proposes to amend Appendix A, Technical Specifications of Facility Operating License DPR-29. The proposed amendment reflects a modification to the High Pressure Coolant Injection (HPCI) turbine steam exhaust line. The proposed amendment adds the requirements for the new containment isolation valves which are part of the modification.

The proposed amendment request is provided as follows:

1. Attachment 1 provides the Safety Evaluation for the amendment request;

2. Attachment 2 provides a summary of the proposed changes;

3. Attachment 3 provides the proposed Technical Specification pages which reflect the requested changes;

4. Attachment 4 describes CECo's evaluation pursuant to 10 CFR 50.92(c); and,

5. Attachment 5 provides the Environmental Assessment for the amendment request.

The information contained in Enclosure 1 is considered to be proprietary information to General Electric, and is supported by an affidavit signed by General Electric, the owners of the information. Enclosure 2 contains the affidavit that sets forth the basis on which the information may be withheld from public disclosure by the NRC and addresses the considerations listed in paragraph (b)(4) of 10 CFR 2.790 of the NRC regulations. Accordingly, CECo requests that the information contained in Enclosure 1 be withheld from public disclosure in accordance with 10 CFR 2.790.

This modification will to be implemented during the twelfth refueling outage for Unit 1 (Q1R12) which is scheduled to begin on September 5, 1992 and end on December 6, 1992. CECo, therefore, respectfully requests NRC's approval of this proposed amendment prior to the end of the refueling outage. CECo will ensure that the Project Manager is appraised of any schedule changes with respect to the refueling outage.

Ltr-Encl. A001 1/1
Charge: NEC PDR 1 INP

This proposed amendment has been reviewed and approved by CECo's onsite and off-site review in accordance with Company procedures.

To the best of my knowledge and belief, the statements contained are true and correct. In some respect, these statements are not based on my personal knowledge, but obtained information furnished by other CECo employees, contract employees and consultants. Such information has been reviewed in accordance with company practice, and I believe it to be reliable.

CECo is notifying the State of Illinois of this application for amendment by transmitting a copy of this letter and its attachment to the designated State Official.

Please direct any questions concerning this submittal to John Schrage at (708) 515-7283.

Very truly yours,

John L. Schrage
Nuclear Licensing Administrator

Attachments: 1) Safety Evaluation
2) Summary of the Proposed Changes
3) Proposed Technical Specification Pages
4) Evaluation of Significant Hazards Consideration
5) Environmental Assessment

Enclosures: 1) General Electric Setpoint Calculations, GE-NE-901-013-049', Revision 1 dated 6/06/91
2) General Electric Company Affidavit
3) General Electric Company Service Information Letter SIL 30

Figures: 1) HPCI Turbine Exhaust Line
2) HPCI Sparger Conceptual Design
3) Isolation Logic for Vacuum Breaker Line

cc: A. Bert Davis, Regional Administrator-RIII
F.A. Maura, Inspector-RIII
L.N. Olshan, Project Manager-NRR
T.E. Taylor, Senior Resident Inspector-QC

State of ILLINOIS, County of DUPAGE
Signed before me on this 7th day
of July, 1992.

Notary Public Maryellen D Long

" OFFICIAL SEAL "
MARYELLEN D. LONG
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES 8/11/93

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ATTACHMENT 1

DESCRIPTION AND SAFETY ANALYSIS OF PROPOSED CHANGES TO

APPENDIX A, TECHNICAL SPECIFICATIONS

QUAD CITIES STATION

UNIT 1

FACILITY OPERATING LICENSE DPR-29

Introduction

Commonwealth Edison Company (CECo) proposes to amend the Facility Operating License for Quad Cities Nuclear Power Station (QCNPS) Unit 1 (DPR-29), Appendix A, Technical Specifications (TS). The proposed changes are consistent with those that were recently approved for Unit 2, DPR-30, Amendment No. 130. The proposed amendment would:

1. Reflect a proposed modification to the HPCI turbine steam exhaust line vacuum breaker configuration. This modification is scheduled for the upcoming cycle 12 refueling outage. The proposed modification will create a new primary containment boundary such that the steam exhaust line check valve 2301-45 can be removed from the 10 CFR 50, Appendix J leak rate testing program. Revised testing requirements for the 2301-45 valve will be incorporated into the Inservice Testing Program according to Section XI of the ASME Code per 10 CFR 50.55(g).

2. Propose Technical Specification changes to correct an omission of the HPCI low pressure isolation setpoint to Table 3.2-1.

3. Propose Technical Specification changes to add two new vacuum line primary containment isolation valves to Table 3.7-1.

Background

On June 15, 1990, USNRC Region III issued Inspection Report 50-254(265)/89024 which summarized the results of their inspection of the Quad Cities 10 CFR 50, Appendix J test program. A Notice of Violation was issued, which cited ineffective corrective actions to repetitive valve failures. One of the valves which was cited as a concern was the High Pressure Coolant Injection (HPCI) steam exhaust check valve, 2301-45. The HPCI steam exhaust valve has experienced repeated Local Leak Rate (LLRT) failures. Cyclical "chugging" loads from unstable steam condensation, during periods of low HPCI turbine steam flow, are believed to be the cause of the repeated failures. Previous attempts to improve valve performance have consisted of redesigning the 2301-45 valve and/or changing the seating materials.

In response to the Notice of Violation, CECo committed to accelerate the test interval for the 2301-45 valve to ensure that its containment function remained effective. In addition, surveillance procedures were revised to minimize potential damage to the valve during low steam flow turbine operations.

In September, 1990 CECo conceptualized a proposed modification to the current design of the HPCI exhaust system. This proposed modification provides the following benefits:

1. Adds the ability to isolate the vacuum breaker line through the use of motor operated valves (MOV), thereby avoiding the potential for a containment atmosphere leakage path through the HPCI turbine exhaust;

2. Improves the reliability of the vacuum breaker with a "one-out-of-two twice" check valve configuration;

3. Provides improved access for maintenance, since the vacuum breakers are located external to the torus; and,

4. Improves the steam condensation stability through the use of a sparger which is designed to provide for more stable condensation over a wide range of steam flows, thereby minimizing the cyclical "chugging" loads on the 2301-45 valve.

Existing Configuration

The existing configuration and proposed modification to the HPCI steam exhaust line are shown on Figure 1. The HPCI turbine exhaust line runs from the exhaust of the HPCI turbine through the Core Spray corner room, penetrates the torus and discharges below the torus water level. The line contains two large turbine exhaust check valves, 2301-45 and 2301-74, which are designed to prevent water from backing up into the turbine.

Inside the Torus, a vacuum breaker line, equipped with two small check valves, ties into the HPCI steam exhaust line downstream of the two exhaust check valves. The vacuum breaker line communicates with the containment atmosphere, thereby providing a potential leakage path to areas outside the containment boundary. To address this potential leakage path, current containment testing provisions require 10 CFR 50, Appendix J, Type C testing of the 2301-45 valve.

Current automatic HPCI isolation is provided by turbine steam supply valves, 2301-4 and 2301-5. These containment isolation valves will isolate on a Group IV isolation signal. The current signals for Group IV are high HPCI steam flow, high HPCI room temperature, or low reactor pressure. The basis for the high steam flow and high room temperature isolations is to assure system isolation in the event of a steam line break. While the basis for the low steam line pressure isolation is to assure that steam and radioactive gases will not escape from the HPCI turbine shaft seals into the reactor building after steam pressure has decreased to such a low value that the turbine cannot be operated.

Proposed Modification

The proposed modification (Figure 1) eliminates the existing air leakage path created by the current vacuum breaker line and addresses the cause of the 2301-45 valve deterioration.

The existing vacuum breaker line which is located inside the torus will be removed. The HPCI exhaust line terminates below the minimum water level of the suppression pool; therefore, the line will not communicate directly with the containment atmosphere. The suppression pool water inventory provides an effective water seal for the exhaust line during the post-accident period.

To provide the vacuum relief function and create a new containment boundary, a new 4-inch vacuum breaker line (reference Figure 1), located external to the torus, will be installed. The new vacuum breaker line will be an isolable air leakage path containing two MOVs; four 4-inch check valves; and the necessary blocking valves and test taps for LLRT. The outboard isolation valve will be powered from a 250-volt D.C., Division II power source. The inboard MOV will be fed from a 480-volt A.C. Division II power source. Both MOVs will be procured to safety-related and environmental qualification standards.

To protect the HPCI turbine exhaust line from unstable steam condensation loads, a sparger will be installed on the end of the HPCI turbine exhaust line inside of the torus. The first row of holes on the sparger will be located at or below the current HPCI exhaust line submergence (reference Figure 2). The valves and piping will be qualified for all applicable loads, including seismic and Mark I containment considerations.

The logic for the vacuum breaker isolation valves has been developed in accordance with the recommendations contained in General Electric Service Information Letter (SIL), No. 30 (Enclosure 3), and is consistent with the design of later operating plants (e.g., LaSalle RCIC system). The vacuum line isolation valves will be normally open to assure the operational readiness of HPCI. Automatic isolation will occur during conditions indicative of a large break inside of the drywell concurrent with low reactor pressure conditions. The high drywell pressure signal ensures that the vacuum breaker function will not isolate unless HPCI operation is inhibited under conditions indicative a large break loss-of-coolant accident. The low pressure isolation condition will ensure that the HPCI system will not be isolated until steam pressure has decreased to the point where the HPCI can no longer perform its design function. The isolation signal is initiated by a one-out-of-two taken twice arrangement (reference Figure 3), with a signal seal-in feature that must be reset to allow manual reopening of the isolation valves. The isolation signal to each valve is supported by separate control divisions to ensure that no single physical failure will prevent isolation.

The new vacuum breaker isolation valves will have no greater than a 50-second closure time. The maximum closure time will assure that any potential radiological release, during a design basis loss-of-coolant accident, will not exceed regulatory and TS limits. The closure time was determined on the ability of the valve to close. Since less than 4% of the assumed maximum number of damaged rods experience cladding damage in the first 125-seconds after the postulated accident occurs, a maximum closure time of 50-seconds is sufficient.

Proposed Technical Specifications

Table 3.2-1

Current Technical Specification Table 4.2-1, "Minimum Test and Calibration Frequency for Core and Containment Cooling System Instrumentation, Rod Blocks, and Isolations," requires that the HPCI isolation instruments be periodically calibrated and tested. The low pressure isolation function surveillance requirements are included as part of these periodic tests. Technical Specification Table 3.2-1, "Instrumentation that Initiates Primary Containment Isolation Functions," does not contain a corresponding limiting condition for operation requirement. To correct this omission, the requirements for the HPCI low reactor pressure isolation are proposed.

The basis for the HPCI turbine steam line low pressure isolation is to assure that steam and radioactive gases will not escape from the HPCI turbine shaft seals into the reactor building after steam pressure has decreased to a level where the HPCI turbine cannot operate.

The low pressure instruments are currently set such that the isolation does not occur prior to reactor pressure decreasing to 90 psig. Prior to the approval of Technical Specification Amendment No. 130 (DPR-29) and 124 (DPR-30), HPCI was required to be operable at a reactor pressure greater than 90 psig. The SAFER/GESTR Analysis for Quad Cities was used to support changing the operability requirements such that HPCI operation is required to a decreasing reactor pressure of 150 psig.

scl:1849:6

CECo contracted General Electric to calculate a new isolation setpoint based on the SAFER/GESTR Analysis inputs. The calculation was performed utilizing methodology contained in NEDC-31336, "General Electric Instrument Setpoint Methodology," dated October, 1986. The upper bounding limit for the low pressure isolation signal was 150 psig, based on the SAFER/GESTR Analysis inputs. The lower bounding limit of 95 psig was chosen based on General Electric experience with the stall pressures of HPCI turbines. The lower bounding limit is conservative in that the anticipated stall pressure for the HPCI turbine is well below a reactor pressure of 95 psig. The recommended licensing setpoint value is 100 psig. The calculation is provided in Enclosure 1.

Table 3.7-1

The proposed changes to Technical Specification Table 3.7-1, "Primary Containment Isolation," adds the vacuum breaker isolation valves. As discussed previously, these valves will be part of the Group IV Isolation which affects the HPCI system. The vacuum breaker isolation valves will close within a maximum specified time of 50-seconds. The automatic closure will occur during high drywell pressure concurrent with low reactor pressure. The isolation logic is consistent with General Electric recommendations contained in SIL 30 and also with later designs for the system. This isolation scheme assures that the system will be maintained in operational readiness except under conditions where HPCI can no longer operate, concurrent with indication of a break inside of the drywell. As previously discussed, the HPCI steam supply valves isolate during conditions which are indicative of a steam line break or under pressure conditions when HPCI can no longer perform its design function. The closure time of 50-seconds is sufficient to limit the assumed radiological release, during a design basis loss-of-coolant accident, below regulatory and license limits.

The proposed design provides a more reliable containment isolation function. A more effective means of containment isolation is provided through the use of small, motor-operated valves in place of the turbine exhaust check valves. The vacuum breaker isolation valves can be closed through remote or local operation in the unlikely event of a failure of the automatic isolation.

The current SAFER/GESTR Analysis for Quad Cities Station credits HPCI operation during decreasing reactor pressure up to 150 psig. As such, Commonwealth Edison contracted General Electric to calculate a new isolation setpoint based on the current SAFER/GESTR Analysis inputs.

The calculation was performed utilizing methodology contained in NEDC-31336, "General Electric Instrument Setpoint Methodology" dated October, 1986. The upper bounding limit for the isolation signal was 150 psig which is based on the SAFER/GESTR Analysis inputs. A lower bound of 95 psig was chosen based on

GE experience to assure equipment protection. The lower bound is conservative in that the anticipated stall pressure for the HPCI turbine is well below a reactor pressure of 95 psig. The recommended value for the nominal isolation setpoint (Licensing) is 100 psig. The calculation is provided in Enclosure 1.

The proposed changes to the QCNPS Technical Specification have been reviewed and approved by the On-Site Review in accordance with controlled Station Procedures. We have review these proposed these proposed amendments in accordance with 10 CFR 50.92(c) and determined that no significant hazards consideration exist. This evaluation is documented in Attachment 4.

ATTACHMENT 2

SUMMARY OF THE PROPOSED CHANGE TO APPENDIX A

TECHNICAL SPECIFICATIONS

QUAD CITIES STATION

UNIT 1

FACILITY OPERATING LICENSE DPR-29

Page 3.2/4.2-8 and -9

1. Revise the fifth paragraph of the bases to read:

   "A trip of this instrumentation results in closure of the RCIC or HPCI steam supply isolation valves. The trip logic for this function is similar to that for the main steam isolation valves, ..."

2. Add the following to the fifth paragraph:

   "In addition, the steam supply valves for each system are closed on low steamiine pressure to provide primary containment isolation when the reactor pressure, as sensed in the system steamlines, is below the required pressure for turbine operations."

3. Add the following to create a new sixth paragraph:

   "Operation of the HPCI turbine will continue as long as reactor pressure is above 150 psig. When the reactor pressure falls below 150 psig, the speed of the turbine-pump unit will decrease and gradually be slowed due to stop friction and windage losses at low reactor pressures. The low reactor pressure isolation setpoint was developed in accordance with NEDC-31336, "General Electric Instrument Setpoint Methodology," dated October, 1986. The trip setpoint of greater than or equal to 100 psig was calculated such that the isolation will occur on decreasing reactor pressure to provide primary containment isolation when the reactor pressure, as sensed in the system steamlines, is below the required pressure for turbine operation. The external vacuum breaker line for the HPCI turbine will isolate on low steamline pressure concurrent with high drywell pressure signals. The instrumentation and controls ensure the proper HPCI and primary containment response to a HPCI steamline break

(isolation of the steamline supply valves only), a large break inside the containment (closure of the steam supply and vacuum relief isolation valves) and a small or intermediate size break inside containment (steam supply and vacuum breaker isolation valves remain open for HPCI operation)."

Page 3.2/4.2-15

1. Add the HPCI steam line pressure low isolation requirements to Table 3.2-1. The minimum number of operable or tripped instrument channels as "4" and a trip level setting of greater than or equal to 100 psig.

Page 3.7/4.7-37

1. Add the vacuum breaker isolation valves to Table 3.7-1 to include the following information: Group 4 Isolation; Vacuum breaker isolation MO-2399-40, MO-2399-41; Number of Power Operated Valves Outboard: (MO-2399-41) and Inboard: 1 (MO-2399-40); Maximum Operating Time: ≤50; Normal Operating Position: O; Action on Initiating Signal: GC.

Page 3.7/4.7-38

1. Change the description of Group 4, as follows:

   "The steam supply isolation valves in the high ..."

2. Add the following to the description of the Group 4 isolation:

   "The turbine exhaust vacuum breaker isolation valves close when both of the following signals are present (simultaneously):

   1. High Drywell pressure

   2. Low reactor pressure"

3. Review Group 5 isolation description as follows:

   "Isolation valves in the reactor core isolation cooling system (RCIC) are closed upon any one of the following signals:

   1. RCIC steamline high flow

   2. High temperature in the vicinity of the RCIC steamline

   3. Low reactor pressure."