



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

Docket Nos.: 50-254
and 50-265

February 3, 1988

Mr. L. D. Butterfield, Jr.
Nuclear Licensing Manager
Commonwealth Edison Company
Post Office Box 767
Chicago, Illinois 60690

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Dear Mr. Butterfield:

SUBJECT: HPCI/RCIC DISCHARGE LINE TS AMENDMENT
(TAC NOS. 66344 AND 66345)

Re: Quad Cities Nuclear Power Station, Units 1 and 2

The Commission has issued the enclosed Amendment Nos. 104 and 100 to Facility Operating License Nos. DPR-29 and DPR-30 for the Quad Cities Nuclear Power Station (QCNP), Units 1 and 2. These amendments are in response to your application dated October 6, 1987, as modified by November 24, 1987, which requested revision of Technical Specification (TS) Section 3.5.G, and associated surveillance requirements bases. Consequently, TS now require the discharge lines of the High Pressure Core Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) Systems to remain filled by maintaining a certain Contaminated Condensate Storage Tank level; without reliance upon an active fill system pump.

Commonwealth Edison Company (CECo) staff (i.e. Nuclear Licensing and QCNP) were notified of an NRC technical concern regarding potential formation of vapor pockets in HPCI or RCIC discharge lines due to high pressure reactor coolant back-leakage through interface boundary valves. Vapor pockets are considered undesirable because they can contribute to debilitating steam-water hammer conditions during HPCI or RCIC systems start-up. In a conference call held November 10, 1987, CECo committed to review this technical concern for applicability at QCNP and submit a response to the NRC.

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P PDR

A copy of our related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly Federal Register notices.

Sincerely,

Original Signed by/

Thierry Ross, Project Manager
Project Directorate III-2
Division of Reactor Projects - III,
IV, V and Special Projects

Enclosures:

- 1. Amendment No.104 to License No. DPR-29
- 2. Amendment No.100 to License No. DPR-30
- 3. Safety Evaluation

cc w/enclosures:
See next page

TR for
PDIII-2:LA
LLuther
11/25/87

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11/25/87

Up/checked SECY & STATE before issuance
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M Young
2/1/88

PDIII-2:PD
DMuller
2/3/88

Mr. L. D. Butterfield, Jr.
Commonwealth Edison Company

Quad Cities Nuclear Power Station
Units 1 and 2

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

COMMONWEALTH EDISON COMPANY

AND

IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

DOCKET NO. STN 50-254

QUAD CITIES NUCLEAR POWER STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 104
License No. DPR-29

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Commonwealth Edison Company (the licensee) dated October 6, 1987 as supplemented by November 24, 1987, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Facility Operating License No. DPR-29 is hereby amended to read as follows:

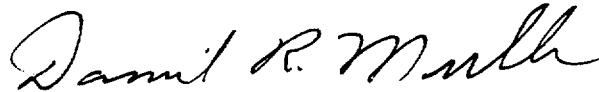
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P PDR

B. Technical Specifications

The Technical Specifications contained in Appendix A and B, as revised through Amendment No. 104, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Daniel R. Muller, Director
Project Directorate III-2
Division of Reactor Projects - III,
IV, V and Special Projects

Attachment:
Changes to the Technical
Specifications

Date of Issuance: February 3, 1988

ATTACHMENT TO LICENSE AMENDMENT NO. 104

FACILITY OPERATING LICENSE NO. DPR-29

DOCKET NO. 50-254

Revise the Appendix A technical Specifications by removing the pages identified below and inserting the attached pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change.

REMOVE

3.5/4.5-8

3.5/4.5-16

INSERT

3.5/4.5-8

3.5/4.5-16

QUAD-CITIES
DPR-29

2. The discharge pipe pressure for Core Spray and LPCI mode of RHR shall be maintained at greater than 40 psig and less than 90 psig. If pressure in any of these systems is less than 40 psig or greater than 90 psig, this condition shall be alarmed in the control room and immediate corrective action taken. If the discharge pipe pressure is not within these limits in 12 hours after the occurrence, an orderly shutdown shall be initiated, and the reactor shall be in a cold shutdown condition within 24 hours after initiation.
3. Filled discharge piping for HPCI and RCIC systems is ensured by maintaining the level in the Contaminated Condensate Storage Tanks (CCST's) at or above 9.5 feet. If the CCST level falls below 9.5 feet, restore the level within 12 hours or line up both HPCI and RCIC to take a suction from the torus per 4.5.G.3.

H. Condensate Pump Room Flood Protection

1. The systems installed to prevent or mitigate the consequences of flooding of the condensate pump room shall be operable prior to startup of the reactor.
2. The condenser pit water level switches shall trip the condenser circulating water pumps and alarm in the control room if water level in the condenser pit exceeds a level of 5 feet above the pit floor. If a failure occurs in one of these trip and alarm circuits, the failed circuit shall be immediately placed in a trip condition and reactor operation shall be permissible for the following 7 days unless the circuit is sooner made operable.

2. Following any period where HPCI, RCIC, LPCI mode of the RHR or core spray have been out of service and drained for maintenance, the discharge piping of the inoperable system shall be vented from the high point prior to the return of the system to service.
3. Whenever the HPCI or RCIC system is lined up to take suction from the torus, the discharge piping of the HPCI and RCIC shall be vented from the high point of the system and water flow observed every 24 hours.
4. The pressure switches which monitor the discharge lines and the discharge of the fill system pump to ensure that they are full shall be functionally tested every month and calibrated every 3 months. The pressure switches shall be set to alarm at a decreasing pressure of ≥ 40 psig and an increasing pressure of ≤ 90 psig.

H. Condensate Pump Room Flood Protection

1. The following surveillance requirements shall be observed to assure that the condensate pump room flood protection is operable.
 - a. The piping and electrical penetrations, bulkhead doors, and submarine doors for the vaults containing the RHR service water pumps and diesel generator cooling pumps shall be checked during each operating cycle by pressurizing to 15 ± 2 psig and checking for leaks using a soap bubble solution. The criteria for acceptance shall be no visible leakage through the soap bubble solution.

QUAD-CITIES
DPR-29

4.5 SURVEILLANCE REQUIREMENTS BASES

The testing interval for the core and containment cooling systems is based on a quantitative reliability analysis, judgment, and practicality. The core cooling systems have not been designed to be fully testable during operation. For example, the core spray final admission valves do not open until reactor pressure has fallen to 350 psig. Thus, during operation, even if high drywell pressure were simulated, the final valves would not open. In the case of the HPCI, automatic initiation during power operation would result in pumping cold water into the reactor vessel which is not desirable.

The systems can be automatically actuated during a refueling outage and this will be done. To increase the availability of the individual components of the core and containment cooling systems, the components which make up the system, i.e., instrumentation, pumps, valve operators, etc., are tested more frequently. The instrumentation is functionally tested each month. Likewise the pumps and motor-operated valves are also tested each month to assure their operability. The combination of a yearly simulated automatic actuation test and monthly tests of the pumps and valve operators is deemed to be adequate testing of these systems.

With components or subsystems out of service, overall core and containment cooling reliability is maintained by demonstrating the operability of the remaining cooling equipment. The degree of operability to be demonstrated depends on the nature of the reason for the out-of-service equipment. For routine out-of-service periods caused by preventative maintenance, etc., the pump and valve operability checks will be performed to demonstrate operability of the remaining components. However, if a failure, design deficiency, etc., causes the out-of-service period, then the demonstration of operability should be thorough enough to assure that a similar problem does not exist on the remaining components. For example, if an out-of-service period caused by failure of a pump to deliver rated capacity due to a design deficiency, the other pumps of this type might be subjected to a flow rate test in addition to the operability checks.

The verification of the main steam relief valve operability during manual actuation surveillance testing must be made independent of temperatures indicated by thermocouples downstream of the relief valves. It has been found that a temperature increase may result with the valve still closed. This is due to steam being vented through the pilot valves during the surveillance test. By first opening a turbine bypass valve, and then observing its closure response during relief valve actuation, positive verification can be made for the relief valve opening and passing steam flow. Closure response of the turbine control valves during relief valve manual actuation would likewise serve as an adequate verification for the relief valve opening. This test method may be performed over a wide range of reactor pressures greater than 150 psig. Valve operation below 150 psig is limited by the spring tension exhibited by the relief valves.

The surveillance requirements to ensure that the discharge piping of the core spray, LPCI mode of the RHR, HPCI and RCIC systems is filled provides for a visual observation that water flows from a high point vent. This ensures that the line is in a full condition.

Instrumentation has been provided on core spray and LPCI mode of RHR to monitor the pressure of water in the discharge piping between the monthly intervals at which the lines are vented and alarm the control room if the pressure is inadequate. This instrumentation will be calibrated on the same frequency as the safety system instrumentation and the alarm system tested monthly. This testing ensures that, during the interval between the monthly venting checks, the status of the discharge piping is monitored on a continuous basis. An alarm point of 40 psig for the low pressure of the fill system has been chosen because, due to elevations of piping within the plant, 39 psig is required to keep the lines full. The shutoff head of the fill system pumps is less than 90 psig and therefore will not defeat the low-pressure cooling pump discharge pressure interlock 100 psig as shown in Table 3.2-2. A margin of 10 psig is provided by the high pressure alarm point of 90 psig.

HPCI and RCIC systems normally take a suction from the Contaminated Condensate Storage Tanks (CCST's). The level in the CCST's is maintained at or above 9.5 feet. This level corresponds to an elevation which is greater than the elevation of the last check valves in the discharge pipes of either the HPCI or RCIC systems. Therefore, filled discharge piping of HPCI or RCIC systems is ensured when lined up to the CCST and tank level is at or above 9.5 feet.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

COMMONWEALTH EDISON COMPANY

AND

IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

DOCKET NO. STN 50-265

QUAD CITIES NUCLEAR POWER STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 100
License No. DPR-30


1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Commonwealth Edison Company (the licensee) dated October 6, 1987 as supplemented by November 24, 1987, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Facility Operating License No. DPR-30 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendix A and B, as revised through Amendment No. 100 , are hereby incorporated in this license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Daniel R. Muller, Director
Project Directorate III-2
Division of Reactor Projects - III,
IV, V and Special Projects

Attachment:
Changes to the Technical
Specifications

Date of Issuance: February 3, 1988

ATTACHMENT TO LICENSE AMENDMENT NO. 100

FACILITY OPERATING LICENSE NO. DPR-30

DOCKET NO. STN-50-265

Revise the Appendix A technical Specifications by removing the pages identified below and inserting the attached pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change.

REMOVE

3.5/4.5-8

3.5/4.5-16

INSERT

3.5/4.5-8

3.5/4.5-16

QUAD-CITIES
DPR-30

2. The discharge pipe pressure for Core Spray and LPCI mode of RHR shall be maintained at greater than 40 psig and less than 90 psig. If pressure in any of these systems is less than 40 psig or greater than 90 psig, this condition shall be alarmed in the control room and immediate corrective action taken. If the discharge pipe pressure is not within these limits in 12 hours after the occurrence, an orderly shutdown shall be initiated, and the reactor shall be in a cold shutdown condition within 24 hours after initiation.
3. Filled discharge piping for HPCI and RCIC systems is ensured by maintaining the level in the Contaminated Condensate Storage Tanks (CCST's) at or above 9.5 feet. If the CCST level falls below 9.5 feet, restore the level within 12 hours or line up both HPCI and RCIC to take a suction from the torus per 4.5.G.3.

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2. Following any period where HPCI, RCIC, LPCI mode of the RHR or core spray have been out of service and drained for maintenance, the discharge piping of the inoperable system shall be vented from the high point prior to the return of the system to service.
3. Whenever the HPCI or RCIC system is lined up to take suction from the torus, the discharge piping of the HPCI and RCIC shall be vented from the high point of the system and water flow observed every 24 hours.
4. The pressure switches which monitor the discharge lines and the discharge of the fill system pump to ensure that they are full shall be functionally tested every month and calibrated every 3 months. The pressure switches shall be set to alarm at a decreasing pressure of ≥ 40 psig and an increasing pressure of ≤ 90 psig.

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1. The following surveillance requirements shall be observed to assure that the condensate pump room flood protection is operable.
 - a. The piping and electrical penetrations, bulkhead doors, and submarine doors for the vaults containing the RHR service water pumps and diesel generator cooling pumps shall be checked during each operating cycle by pressurizing to 15 ± 2 psig and checking for leaks using a soap bubble solution. The criteria for acceptance shall be no visible leakage through the soap bubble solution.

QUAD-CITIES
DPR-30

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The systems can be automatically actuated during a refueling outage and this will be done. To increase the availability of the individual components of the core and containment cooling systems, the components which make up the system, i.e., instrumentation, pumps, valve operators, etc., are tested more frequently. The instrumentation is functionally tested each month. Likewise the pumps and motor-operated valves are also tested each month to assure their operability. The combination of a yearly simulated automatic actuation test and monthly tests of the pumps and valve operators is deemed to be adequate testing of these systems.

With components or subsystems out of service, overall core and containment cooling reliability is maintained by demonstrating the operability of the remaining cooling equipment. The degree of operability to be demonstrated depends on the nature of the reason for the out-of-service equipment. For routine out-of-service periods caused by preventative maintenance, etc., the pump and valve operability checks will be performed to demonstrate operability of the remaining components. However, if a failure, design deficiency, etc., causes the out-of-service period, then the demonstration of operability should be thorough enough to assure that a similar problem does not exist on the remaining components. For example, if an out-of-service period caused by failure of a pump to deliver rated capacity due to a design deficiency, the other pumps of this type might be subjected to a flow rate test in addition to the operability checks.

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Instrumentation has been provided on Core Spray and LPCI mode of RHR to monitor the pressure of water in the discharge piping between the monthly intervals at which the lines are vented and alarm the control room if the pressure is inadequate. This instrumentation will be calibrated on the same frequency as the safety system instrumentation and the alarm system tested monthly. This testing ensures that, during the interval between the monthly venting checks, the status of the discharge piping is monitored on a continuous basis. An alarm point of > 40 psig for the low pressure of the fill system has been chosen because, due to elevations of piping within the plant, 39 psig is required to keep the lines full. The shutoff head of the fill system pumps is less than 90 psig and therefore will not defeat the low-pressure cooling pump discharge press interlock 100 psig as shown in Table 3.2-2. A margin of 10 psig is provided by the high pressure alarm point of 90 psig.

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NO. 104 TO FACILITY OPERATING LICENSE NO. DPR-29
AND AMENDMENT NO. 100 TO FACILITY OPERATING LICENSE NO. DPR-30

COMMONWEALTH EDISON COMPANY

AND

IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2

DOCKET NOS. 50-254 AND 50-265

1.0 INTRODUCTION

As a result of an ongoing, comprehensive, internal review of DPR-29, Appendix A, Technical Specifications (TS) by the Commonwealth Edison Company (CECo, the licensee) Quality Assurance Department, several inconsistencies were identified between TS requirements and actual plant design, configuration, and/or procedures. One such finding was submitted to the Nuclear Regulatory Commission (NRC) as a request for temporary waiver of compliance and TS amendment on October 6, 1987. This request was submitted to revise the methodology required for ensuring discharge lines in High Pressure Core Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) Systems remain filled.

By another letter dated October 6, 1987, the NRC approved a temporary waiver of compliance for affected TS Section 3.5.G.2. It was determined that actual station practice and system configuration were adequate to meet the safety intent of TS 3.5.G.2, and was therefore acceptable on an interim basis (to expire after sixty days). However, on November 24, 1987, following a series of conference calls with NRC staff, CECo supplemented their original application in order to increase the surveillance frequency requirement for venting HPCI/RCIC discharge lines, when aligned to the torus, from "monthly" to every "twenty-four hours". The proposed TS amendment (including its supplement) was subsequently renoticed in the Federal Register on December 16, 1987 for public comment. In addition, an extended TS waiver of compliance was issued on December 4, 1987, for an additional 60 days.

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2.0 EVALUATION

Limiting Conditions for Operation of TS 3.5.G requires that discharge piping, from pump discharge to last check valve, must be filled for Core Spray (CS), Low Pressure Core Injection (LPCI), HPCI, and RCIC Systems. The discharge lines of both low pressure (CS and LPCI mode of Residual Heat Removal (RHR) System) Emergency Core Cooling Systems (ECCS) and high pressure cooling systems (HPCI and RCIC) must be maintained between 40 psig and 90 psig, which necessitates using a special ECCS fill system pump. In actual operation, only low pressure systems require use of the fill pump for reasons discussed below. For high pressure systems, assurance of filled discharge lines has been achieved by maintaining an adequate level in the Contaminated Condensate Storage Tank (CCST), which is the normal water source for both HPCI and RCIC.

At Quad Cities, pressure switches and corresponding control room alarms are installed on CS and LPCI mode of RHR, but no pressure switches or alarms are installed on HPCI or RCIC. The 90 psig upper limit setpoint ensures the low-pressure cooling pump discharge pressure interlock is not defeated. This interlock applies to CS and LPCI mode of RHR, but not to HPCI or RCIC. HPCI and RCIC operate at pressures above the low-pressure interlock setpoint. The 40 psig lower limit setpoint ensures discharge piping up to the last check valve remains full. CS and LPCI mode of RHR are normally lined up to take a suction from the suppression chamber. Due to relative elevation differences between the suppression chamber and the last check valve in either CS or LPCI mode of RHR, a minimum pressure of 39 psig is required to maintain the discharge piping of these systems full. This pressure is maintained by valving in an ECCS fill system pump.

During routine operations, HPCI and RCIC are aligned to take suction from the CCSTs. Due to relative elevation differences between the CCSTs and the last check valve in either HPCI or RCIC, the discharge piping of these systems will remain full by maintaining a minimum CCST level of 9.5 feet. This passive method assures discharge piping for HPCI and RCIC are filled, without reliance upon an active method (ECCS fill system pump).

NRC staff concludes that ensuring HPCI and RCIC system discharge lines remain full can be accomplished by maintaining a minimum level in the CCSTs. In fact, a passive fill method is preferable because it does not rely upon a single active system (ECCS fill system pump). Furthermore, this methodology is consistent with actual plant instrumentation which only includes pressure switches and control room alarms on the discharge lines of low pressure ECCS systems. Consequently, NRC staff has determined that CECO's amendment application of October 6, 1987, is acceptable.

On November 24, 1987, CECO proposed to increase the surveillance frequency for manually venting the HPCI/RCIC discharge piping whenever the suction supply is diverted to the torus because of CCST unavailability. This will provide additional assurance that the discharge piping remains full under these abnormal conditions. The NRC staff has concluded that this supplement to the original application is also acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

These amendments involve a change to a requirement with respect to the use of a facility component located within the restricted area as defined in 10 CFR Part 20, and changes surveillance requirements. The staff has determined these amendments involve no significant increase in the amounts, and no significant change in the types of any effluents that may be released offsite and there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding these amendments involve no significant hazards consideration and there has been no public comment on such finding. Accordingly, these amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement nor environmental assessment need be prepared in connection with the issuance of this amendment.

4.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security nor to the health and safety of the public.

Principal Contributor: T. Ross

Dated: February 3, 1988