July 13, 1994

Docket Nos. 50-254
and 50-265

Mr. D. L. Farrar
Nuclear Regulatory Services
Commonwealth Edison Company
Executive Towers West III, Suite 500
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Downers Grove, Illinois 60515

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Dear Mr. Farrar:

SUBJECT: ISSUANCE OF AMENDMENTS (TAC NOS. M89084 AND M89083)

The Commission has issued the enclosed Amendment No. 149 to Facility Operating License No. DPR-29 and Amendment No. 145 to Facility Operating License No. DPR-30 for the Quad Cities Nuclear Power Station, Units 1 and 2, respectively. The amendments are in response to your application dated March 11, 1994.

The amendments add new hydraulic snubbers on the main steamlines to the Technical Specifications (TS) for Quad Cities, Units 1 and 2, and also change the snubber visual inspection interval and corrective actions in TS Section 3.6.1 and 4.6.1 to the format and content of the Boiling Water Reactors (BWR) Standardized Technical Specifications (STS), as revised by Generic Letter 90-09, "Alternative Requirements for Snubber Visual Inspection Intervals and Corrective Actions," dated December 11, 1990.

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

Sincerely,

Original signed by:
Chandu P. Patel, Project Manager
Project Directorate III-2
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 149 to DPR-29
2. Amendment No. 145 to DPR-30
3. Safety Evaluation

cc w/enclosures:
See next page

CP-1

OFC	LA:PDIII-2	PM:PDIII-2	MEB	OGC	D:PDIII-2	
NAME	CHAWES	CPATEL CPP	RWESSMAN	RBachmann	RCAPRA	
DATE	6/17/94	6/21/94	6/22/94	6/29/94	7/12/94	/94
COPY	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO

DFO1

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

COMMONWEALTH EDISON COMPANY

AND

IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

DOCKET NO. 50-254

QUAD CITIES NUCLEAR POWER STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 149
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 March 11, 1994, 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:

B. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 149 , 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

Robert A. Capra

Robert A. Capra, Director
Project Directorate III-2
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: July 13, 1994

ATTACHMENT TO LICENSE AMENDMENT NO. 149

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	INSERT
ii	ii
v	v
3.6/4.6-12a	3.6/4.6-12a
3.6/4.6-13	3.6/4.6-13
3.6/4.6-14	3.6/4.6-14
3.6/4.6-15	3.6/4.6-15
-	3.6/4.6-15a
-	3.6/4.6-15b
-	3.6/4.6-15c
-	3.6/4.6-15d
3.6/4.6-24 (Bases)	3.6/4.6-24 (Bases)
3.6/4.6-24a (Bases)	-
3.6/4.6-25 (Bases)	3.6/4.6-25 (Bases)
-	3.6/4.6-25a (Bases)
3.6/4.6-36 (Table 4.6-3)	3.6/4.6-36 (Table 4.6-3)
-	Figure 4.6-2

QUAD CITIES
DPR-29

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QUAD CITIES
DPR-29

TECHNICAL SPECIFICATIONS

APPENDIX A

LIST OF TABLES

I. Snubbers

1. During Run, Startup/Hot Standby, and Hot Shutdown, and during Cold Shutdown and Refuel for snubbers located on systems required operable during Cold Shutdown and Refuel, all required snubbers shall be operable. The only snubbers excluded from this requirement are those installed on nonsafety-related systems and then only if their failure or failure of the system on which they are installed would have no adverse impact on any safety-related system.

2. With one or more snubbers inoperable, on any system, within 72 hours:

   a. Replace or restore the inoperable snubber(s) to operable status, and

   b. Perform an engineering evaluation per Specification 4.6.I.7 on the attached component.

   Otherwise, declare the attached system inoperable and follow the appropriate ACTION statement for that system.

I. Snubbers

Each snubber shall be demonstrated operable by the performance of the following augmented inservice inspection program.

1. Inspection Types

   As used in this specification, "type of snubber" shall mean snubbers of the same design and manufacturer, irrespective of capacity.

2. Visual Inspections

   Snubbers are categorized as inaccessible or accessible during reactor operation. Each of these categories (inaccessible and accessible) may be inspected independently according to the schedule determined by Table 4.6-3. The visual inspection interval for each type of snubber shall be determined based upon the criteria provided in Table 4.6-3[a].

3. Visual Inspection Acceptance Criteria

   Visual inspections shall verify that: (1) the snubber has no visible indications of damage or impaired operability, (2) attachments to the foundation or supporting structure are functional, and (3) fasteners for the attachment of the snubber to the component and to the snubber anchorage are functional. Snubbers which appear inoperable as a result of

a The first inspection interval determined using this criteria shall be based upon the previous inspection interval as established by the requirements in effect before amendment (149).

visual inspections shall be classified as unacceptable. A review and evaluation shall be performed and documented to justify continued operation with an unacceptable snubber. If continued operation cannot be justified, the snubber shall be declared inoperable and the requirements of Specification 3.6.I.2 shall be met.

Snubbers originally classified as unacceptable may be reclassified as acceptable for the purpose of establishing the next visual inspection interval, provided that: (1) the cause of the rejection is clearly established and remedied for that particular snubber and for other snubbers irrespective of type that may be generically susceptible; and (2) the affected snubber is functionally tested in the as-found condition and determined operable per Specification 4.6.I.6.

4. Transient Event Inspection

An inspection shall be performed of all snubbers attached to sections of systems that have experienced unexpected, potentially damaging transients, as determined from a review of operational data or a visual inspection of the systems, within 72 hours for accessible systems and 6 months for inaccessible systems following this determination. In addition to satisfying the visual inspection acceptance criteria, freedom-of-motion of mechanical snubbers shall be verified using at least one of the following: (1) manually induced snubber movement; or (2) evaluation of in-place snubber piston setting; or (3) stroking the mechanical snubber through its full range of travel.

5. Functional Tests

At least once per 18 months, a representative sample of snubbers shall be tested using one of the following sample plans for each type of snubber. The sample plan shall be selected prior to the test period and cannot be changed during the test period. The NRC Regional Administrator shall be notified in writing of the sample plan selected prior to the test period or the sample plan used in the prior test period shall be implemented:

a. At least 10% of the total of each type of snubber shall be functionally tested either in-place or in a bench test. For each snubber of a type that does not meet the functional test acceptance criteria of Specification 4.6.I.6, an additional 10% of that type of snubber shall be functionally tested until no more failures are found or until all snubbers of that type have been functionally tested; or

b. A representative sample of each type of snubber shall be functionally tested, in accordance with Figure 4.6-2. "C" is the total number of snubbers of a type found not meeting the acceptance requirements of Specification 4.6.I.6. The cumulative number of snubbers of a type tested is denoted by "N". At the end of each day's testing, the new values of "N" and "C" (previous day's total plus current day's increments) shall be plotted on Figure 4.6-2.

If at any time the point plotted falls on or above the "Reject" line, all snubbers of that type shall be functionally tested. If at any time the point plotted falls on or below the "Accept" line, testing of snubbers of that type may be terminated. When the point plotted lies in the "Continue Testing" region, additional snubbers of that type shall be tested until the point falls in the "Accept" region or the "Reject" region, or all the snubbers of that type have been tested. Testing equipment failure during functional testing may invalidate that day's testing and allow that day's testing to resume anew at a later time, providing all snubbers tested with the failed equipment during the day of equipment failure are retested; or

c. An initial representative sample of 55 snubbers of each type shall be functionally tested. For each snubber type which does not meet the functional test acceptance criteria, another sample of at least one-half the size of the initial sample shall be tested until the total number tested is equal to the initial sample size multiplied by the factor, 1 + C/2, where "C" is the number of snubbers found which do not meet the functional test acceptance criteria. The results from this sample plan shall be plotted using an "Accept" line which follows the equation $N = 55(1 + C/2)$. Each snubber point should be plotted as soon as the snubber is tested. If the point plotted falls on or below the

"Accept" line, testing of that type of snubber may be terminated. If the point plotted falls above the "Accept" line, testing must continue until the point falls on or below the "Accept" line or all the snubbers of that type have been tested.

The representative sample selected for the functional test sample plans shall be randomly selected from the snubbers of each type and reviewed before beginning the testing. The review shall ensure as far as practical that they are representative of the various configurations, operating environments, range of size, and capacity of snubbers of each type.

Snubbers placed in the same location as snubbers which failed the previous functional test shall be retested at the time of the next functional test but shall not be included in the sample plan, and failure of this functional test shall not be the sole cause for increasing the sample size under the sample plan. If during testing, additional sampling is required due to failure of only one type of snubber, the functional testing results shall be reviewed at the time to determine if additional samples should be limited to the type of snubber which has failed the functional testing.

6. Functional Test Acceptance Criteria

The snubber functional test shall verify that:

a. Activation (restraining action) is achieved within the specified range in both tension and compression;

b. Snubber bleed, or release rate where required, is present in both tension and compression, within the specified range (hydraulic snubbers, only);

c. For mechanical snubbers, the force required to initiate or maintain motion of the snubber is within the specified range in both directions of travel; and

d. For snubbers specifically required not to displace under continuous load, the ability of the snubber to withstand load without displacement.

Testing methods may be used to measure parameters indirectly or parameters other than those specified if those results can be correlated to the specified parameters through established methods.

7. Functional Test Failure Analysis

An engineering evaluation shall be made of each failure to meet the functional test acceptance criteria to determine the cause for the failure. The results of this evaluation shall be used, if applicable, in selecting snubbers to be tested in an effort to determine the operability of other snubbers irrespective of type which may be subject to the same failure mode.

For the snubbers found inoperable, an engineering evaluation shall be performed on the components to which the inoperable snubbers are attached. The purpose of this engineering evaluation shall be to determine if the components to which the inoperable snubbers are attached were adversely affected by the inoperability of the

snubbers in order to ensure that the component remains capable of meeting the designed service.

If any snubber selected for functional testing either fails to activate or fails to move, i.e., frozen-in-place, the cause will be evaluated and, if caused by manufacturer or design deficiency, all snubbers of the same type subject to the same defect shall be functionally tested. This testing requirement shall be independent of the requirements stated in Specification 4.6.I.5 for snubbers not meeting the functional test acceptance criteria.

8. Functional Testing of Repaired and Replaced Snubbers

Snubbers which fail the visual inspection or the functional test acceptance criteria shall be repaired or replaced. Replacement snubbers and snubbers which have repairs which might affect the functional test result shall be tested to meet the functional test criteria before installation in the unit. Mechanical snubbers shall have met the acceptance criteria subsequent to their most recent service, and the freedom-of-motion test must have been performed within 12 months before being installed in the unit.

9. Snubber Service Life Program

The service life of all snubbers shall be monitored to ensure that the service life is not exceeded between surveillance inspections. The maximum expected service life for various seals, springs, and other critical parts shall be extended or shortened based on monitored test results and failure history. Critical parts shall be replaced so that the maximum service life will

not be exceeded during a period when the snubber is required to be operable. The parts replacements shall be documented and the documentation shall be retained in accordance with Specification 6.5.B.

H. Recirculation Pump Flow Limitations

The LPCI loop selection logic is described in the SAR, Section 6.2.4.2.5. For some limited low probability accidents with the recirculation loop operating with large speed differences, it is possible for the logic to select the wrong loop for injection. For these limited conditions, the core spray itself is adequate to prevent fuel temperatures from exceeding allowable limits. However, to limit the probability even further, a procedural limitation has been placed on the allowable variation in speed between the recirculation pumps.

The licensee's analyses indicate that above 80% power the loop select logic could not be expected to function at a speed differential of 15%. Below 80% power, the loop select logic would not be expected to function at a speed differential of 20%. This specification provides a margin of 5% in pump speed differential before a problem could arise. If the reactor is operating on one pump, the loop select logic trips that pump before making the loop selection.

Analyses have been performed which support indefinite single loop operation provided the appropriate restrictions are implemented within 24 hours. The MCPR Safety Limit has been increased by 0.01 to account for core flow and TIP reading uncertainties which are used in the statistical analysis of the safety limit. The MCPR Operating Limit, as specified in the CORE OPERATING LIMITS REPORT, has also been increased by 0.01 to maintain the same margin to the safety limit as during Dual Loop operation.

The flow biased scram and rod block setpoints are reduced to account for uncertainties associated with backflow through the idle jet pumps when the operating recirculation pump is above 20-40% of rated speed. This assures that the flow biased trips and blocks occur at conservative neutron flux levels for a given core flow.

In order to prevent undue stress on the vessel nozzles and bottom head region, the recirculation loop temperature shall be within 50 °F of each other prior to startup of an idle loop. The loop temperature must also be within 50 °F of the reactor pressure vessel steam space coolant temperature to prevent thermal shock to the recirculation pump and recirculation nozzles. Since the coolant in the bottom of the vessel is at a lower temperature than the coolant in the upper regions of the core, undue stress on the vessel would result if the temperature difference were greater than 145 °F. Additionally, asymmetric speed operation of recirculation pumps during idle loop startup induces levels of jet pump riser vibration that are higher than normal. The specific limitation of 45% of rated pump speed for the operating recirculation pump prior to the start of the idle recirculation pump ensures that the recirculation pump speed mismatch requirements presented in Specification 3.6.H.1 are maintained.

3.6/4.6.I Snubbers

Mechanical and hydraulic snubbers are provided to ensure that the structural integrity of the reactor coolant system and all other safety-related systems is maintained during and following a seismic event or other event initiating dynamic loads. Snubbers are classified and grouped by design, manufacturer and accessibility. A list of individual snubbers with information of snubber location, classification or group, and system affected is maintained at the plant. The accessibility of each snubber is determined and documented for each snubber. The determination is based upon the existing radiation levels and the expected time to perform a visual inspection in each snubber location as well as other factors associated with accessibility during plant operation (e.g., temperature, atmosphere, location, etc.), and the recommendations of Regulatory Guides 8.8 and 8.10.

The visual inspection frequency is based upon maintaining a constant level of snubber protection to the systems. Therefore, the required inspection interval varies with the number of unacceptable snubbers found during the previous inspection, the total population or category size for each snubber type, and the previous inspection interval. A snubber is considered unacceptable if it fails to satisfy the acceptance criteria of the visual inspection. Snubbers may be categorized, based upon their accessibility during power operation, as accessible or inaccessible. These categories may be examined separately or jointly as determined and documented prior to the inspections. The categorization is used as the basis for determining the next inspection interval for that category.

If a review and evaluation can not justify continued operation with an unacceptable snubber, the snubber is declared inoperable and the applicable action taken. To determine the next surveillance interval, the unacceptable snubber may be reclassified as acceptable if it can be demonstrated that the snubber is operable in its as-found condition by the performance of a functional test. The next visual inspection interval may be twice, the same, or reduced by as much as two-thirds of the previous inspection interval, depending on the number of unacceptable snubbers found in proportion to the size of the population or category for each type of snubber included in the previous inspection. The inspection interval may be as long as 48 months and the provisions of Specification 1.0.DD may be applied.

When a snubber is found to be inoperable, an engineering evaluation is performed, in addition to the determination of the snubber mode of failure, in order to determine if any safety-related component or system has been adversely affected by the inoperability of the snubber. The engineering evaluation shall determine whether or not the snubber mode of failure has imparted a significant effect or degradation on the supported component or system.

To provide additional assurance of snubber functional reliability , a representative sample of the installed snubbers will be functionally tested at 18 month intervals. This sample is identified using one of three methods:

1. Functionally test 10% of a type of snubber with an additional 10% tested for each functional testing failure, or

2. Functionally test a sample size and determine sample acceptance or rejection using Figure 4.6-2, or

3. Functionally test a representative sample size and determine sample acceptance or rejection using the stated equation.

Figure 4.6-2 was developed using "Wald's Sequential Probability Ratio Plan" as described in "Quality Control and Industrial Statistics" by Acheson J. Duncan.

Permanent or other exemptions from the surveillance program for individual snubbers may be granted by the NRC if a justifiable basis for exemption is presented and, if applicable, snubber life destructive testing was performed to qualify the snubber for the applicable design conditions at either the completion of their fabrication or at a subsequent date. Snubbers so exempted are listed in the list of individual snubbers indicating the extent of the exemptions.

The service life of a snubber is established via manufacturer input and information through consideration of the snubber service conditions and associated installation and maintenance records (newly installed snubbers, seal replace, spring replaced, in high radiation area, in high temperature area, etc.). The requirement to monitor the snubber service life is included to ensure that the snubbers periodically undergo a performance evaluation in view of their age and operating conditions. These records provide statistical bases for future consideration of snubber service life.

Table 4.6-3

SNUBBER VISUAL INSPECTION CRITERIA

Population[a][b] or Category	NUMBER OF UNACCEPTABLE SNUBBERS		
	Column A [c][f] Extend Interval	Column B [d][f] Repeat Interval	Column C [e][f] Reduce Interval
1	0	0	1
80	0	0	2
100	0	1	4
150	0	3	8
200	2	5	13
300	5	12	25
400	8	18	36
500	12	24	48
750	20	40	78
≥1000	29	56	109

a The next visual inspection interval for a snubber population or category size shall be determined based upon the previous inspection interval and the number of unacceptable snubbers found during that interval. Snubbers may be categorized, based upon their accessibility during power operation, as accessible or inaccessible. These categories may be examined separately or jointly. However, the decision must be made and documented before any inspection and shall be used as the basis upon which to determine the next inspection interval for that category.

b Interpolation between population or category sizes and the number of unacceptable snubbers is permissible. Use next lower integer for the value of the limit for Columns A, B, or C if that integer includes a fractional value of unacceptable snubbers as determined by interpolation.

c If the number of unacceptable snubbers is equal to or less than the number in Column A, the next inspection interval may be twice the previous interval, but not greater than 48 months.

d If the number of unacceptable snubbers is equal to or less than the number in Column B but greater than the number in Column A, the next inspection interval shall be the same as the previous interval.

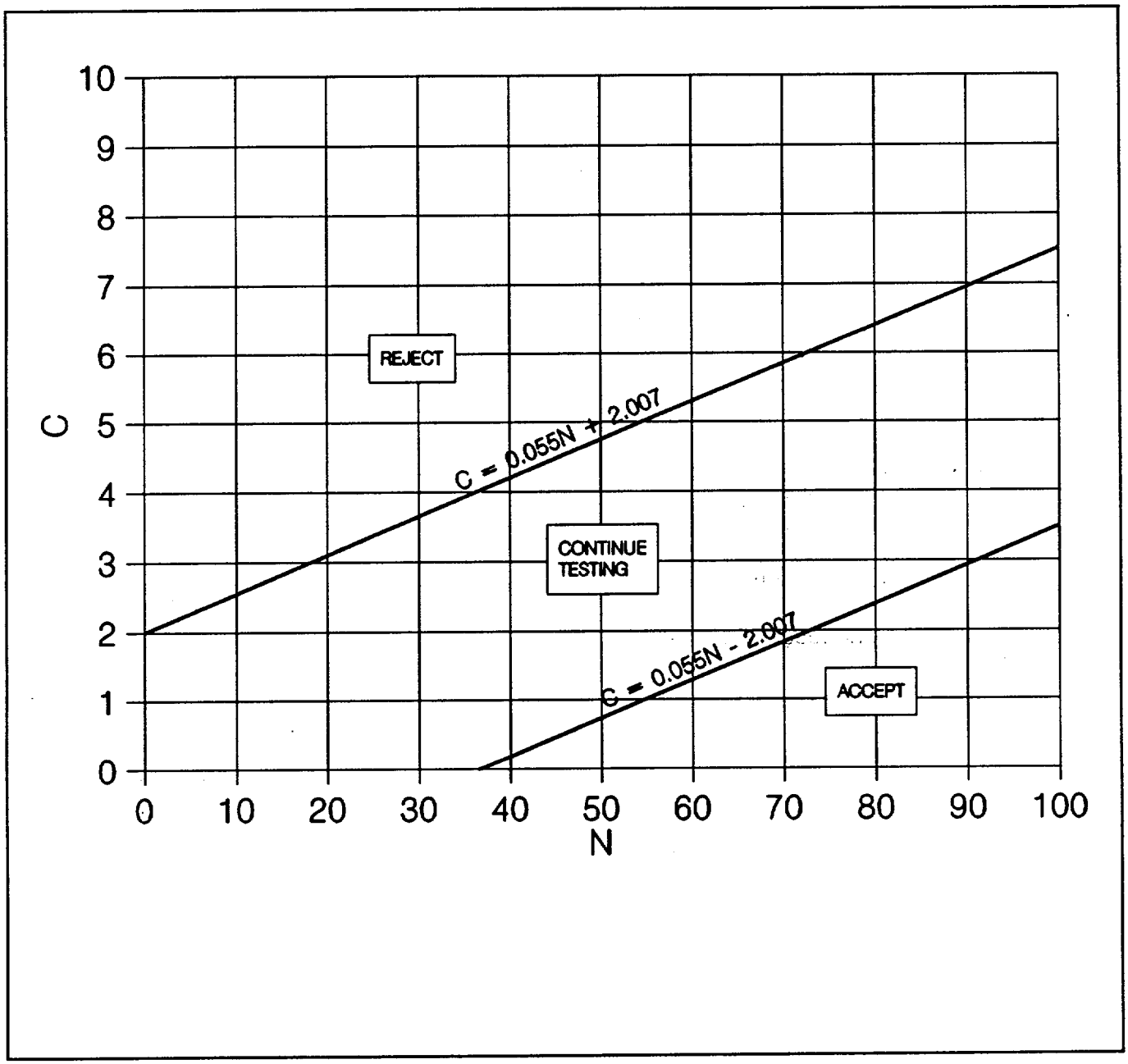
e If the number of unacceptable snubbers is equal to or greater than the number in Column C, the next inspection interval shall be two-thirds of the previous interval, but not less than 31 days. However, if the number of unacceptable snubbers is less than the number in Column C but greater than the number in Column B, the next interval shall be reduced proportionally by interpolation, that is, the previous interval shall be reduced by a factor that is one-third of the ratio of the difference between the number of unacceptable snubbers found during the previous interval and the number in Column B to the difference in the numbers in Columns B and C.

f The provisions of Specification 1.0.DD are applicable for all inspection intervals up to and including 48 months.

QUAD-CITIES
DPR-29

Figure 4.6-2

SAMPLING PLAN FOR SNUBBER FUNCTIONAL TESTING



N = Cumulative number of snubbers of a type tested

C = Total number of snubbers of a type not meeting acceptance

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

COMMONWEALTH EDISON COMPANY

AND

IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

DOCKET NO. 50-265

QUAD CITIES NUCLEAR POWER STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 145
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 March 11, 1994, 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 Appendices A and B, as revised through Amendment No. 145, 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. It should be implemented prior to the startup from 13th refueling outage.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert A. Capra

Robert A. Capra, Director
Project Directorate III-2
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: July 13, 1994

ATTACHMENT TO LICENSE AMENDMENT NO. 145

FACILITY OPERATING LICENSE NO. DPR-30

DOCKET NO. 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	INSERT
v	v
3.6/4.6-5c	3.6/4.6-5c
-	3.6/4.6-5d
-	3.6/4.6-5e
-	3.6/4.6-5f
-	3.6/4.6-5g
-	3.6/4.6-5h
3.6/4.6-6	3.6/4.6-6
3.6/4.6-7	3.6/4.6-7
3.6/4.6-14 (Bases)	3.6/4.6-14 (Bases)
3.6/4.6-14a (Bases)	3.6/4.6-14a (Bases)
-	3.6/4.6-22 (Table 4.6-3)
-	Figure 4.6-2

QUAD CITIES
DPR-30
TECHNICAL SPECIFICATIONS

APPENDIX A

LIST OF TABLES

I. Snubbers

1. During Run, Startup/Hot Standby, and Hot Shutdown, and during Cold Shutdown and Refuel for snubbers located on systems required operable during Cold Shutdown and Refuel, all required snubbers shall be operable. The only snubbers excluded from this requirement are those installed on nonsafety-related systems and then only if their failure or failure of the system on which they are installed would have no adverse impact on any safety-related system.

2. With one or more snubbers inoperable, on any system, within 72 hours:

   a. Replace or restore the inoperable snubber(s) to operable status, and

   b. Perform an engineering evaluation per Specification 4.6.I.7 on the attached component.

   Otherwise, declare the attached system inoperable and follow the appropriate ACTION statement for that system.

I. Snubbers

Each snubber shall be demonstrated operable by the performance of the following augmented inservice inspection program.

1. Inspection Types

   As used in this specification, "type of snubber" shall mean snubbers of the same design and manufacturer, irrespective of capacity.

2. Visual Inspections

   Snubbers are categorized as inaccessible or accessible during reactor operation. Each of these categories (inaccessible and accessible) may be inspected independently according to the schedule determined by Table 4.6-3. The visual inspection interval for each type of snubber shall be determined based upon the criteria provided in Table 4.6-3[a].

3. Visual Inspection Acceptance Criteria

   Visual inspections shall verify that: (1) the snubber has no visible indications of damage or impaired operability, (2) attachments to the foundation or supporting structure are functional, and (3) fasteners for the attachment of the snubber to the component and to the snubber anchorage are functional. Snubbers which appear inoperable as a result of

a The first inspection interval determined using this criteria shall be based upon the previous inspection interval as established by the requirements in effect before amendment (145).

visual inspections shall be classified as unacceptable. A review and evaluation shall be performed and documented to justify continued operation with an unacceptable snubber. If continued operation cannot be justified, the snubber shall be declared inoperable and the requirements of Specification 3.6.I.2 shall be met.

Snubbers originally classified as unacceptable may be reclassified as acceptable for the purpose of establishing the next visual inspection interval, provided that: (1) the cause of the rejection is clearly established and remedied for that particular snubber and for other snubbers irrespective of type that may be generically susceptible; and (2) the affected snubber is functionally tested in the as-found condition and determined operable per Specification 4.6.I.6.

4. Transient Event Inspection

An inspection shall be performed of all snubbers attached to sections of systems that have experienced unexpected, potentially damaging transients, as determined from a review of operational data or a visual inspection of the systems, within 72 hours for accessible systems and 6 months for inaccessible systems following this determination. In addition to satisfying the visual inspection acceptance criteria, freedom-of-motion of mechanical snubbers shall be verified using at least one of the following: (1) manually induced snubber movement; or (2) evaluation of in-place snubber piston setting; or (3) stroking the mechanical snubber through its full range of travel.

5. Functional Tests

At least once per 18 months, a representative sample of snubbers shall be tested using one of the following sample plans for each type of snubber. The sample plan shall be selected prior to the test period and cannot be changed during the test period. The NRC Regional Administrator shall be notified in writing of the sample plan selected prior to the test period or the sample plan used in the prior test period shall be implemented:

a. At least 10% of the total of each type of snubber shall be functionally tested either in-place or in a bench test. For each snubber of a type that does not meet the functional test acceptance criteria of Specification 4.6.I.6, an additional 10% of that type of snubber shall be functionally tested until no more failures are found or until all snubbers of that type have been functionally tested; or

b. A representative sample of each type of snubber shall be functionally tested, in accordance with Figure 4.6-2. "C" is the total number of snubbers of a type found not meeting the acceptance requirements of Specification 4.6.I.6. The cumulative number of snubbers of a type tested is denoted by "N". At the end of each day's testing, the new values of "N" and "C" (previous day's total plus current day's increments) shall be plotted on Figure 4.6-2.

If at any time the point plotted falls on or above the "Reject" line, all snubbers of that type shall be functionally tested. If at any time the point plotted falls on or below the "Accept" line, testing of snubbers of that type may be terminated. When the point plotted lies in the "Continue Testing" region, additional snubbers of that type shall be tested until the point falls in the "Accept" region or the "Reject" region, or all the snubbers of that type have been tested. Testing equipment failure during functional testing may invalidate that day's testing and allow that day's testing to resume anew at a later time, providing all snubbers tested with the failed equipment during the day of equipment failure are retested; or

c. An initial representative sample of 55 snubbers of each type shall be functionally tested. For each snubber type which does not meet the functional test acceptance criteria, another sample of at least one-half the size of the initial sample shall be tested until the total number tested is equal to the initial sample size multiplied by the factor, 1 + C/2, where "C" is the number of snubbers found which do not meet the functional test acceptance criteria. The results from this sample plan shall be plotted using an "Accept" line which follows the equation $N = 55(1 + C/2)$. Each snubber point should be plotted as soon as the snubber is tested. If the point plotted falls on or below the

"Accept" line, testing of that type of snubber may be terminated. If the point plotted falls above the "Accept" line, testing must continue until the point falls on or below the "Accept" line or all the snubbers of that type have been tested.

The representative sample selected for the functional test sample plans shall be randomly selected from the snubbers of each type and reviewed before beginning the testing. The review shall ensure as far as practical that they are representative of the various configurations, operating environments, range of size, and capacity of snubbers of each type.

Snubbers placed in the same location as snubbers which failed the previous functional test shall be retested at the time of the next functional test but shall not be included in the sample plan, and failure of this functional test shall not be the sole cause for increasing the sample size under the sample plan. If during testing, additional sampling is required due to failure of only one type of snubber, the functional testing results shall be reviewed at the time to determine if additional samples should be limited to the type of snubber which has failed the functional testing.

6. Functional Test Acceptance Criteria

The snubber functional test shall verify that:

a. Activation (restraining action) is achieved within the specified range in both tension and compression;

b. Snubber bleed, or release rate where required, is present in both tension and compression, within the specified range (hydraulic snubbers, only);

c. For mechanical snubbers, the force required to initiate or maintain motion of the snubber is within the specified range in both directions of travel; and

d. For snubbers specifically required not to displace under continuous load, the ability of the snubber to withstand load without displacement.

Testing methods may be used to measure parameters indirectly or parameters other than those specified if those results can be correlated to the specified parameters through established methods.

7. Functional Test Failure Analysis

An engineering evaluation shall be made of each failure to meet the functional test acceptance criteria to determine the cause for the failure. The results of this evaluation shall be used, if applicable, in selecting snubbers to be tested in an effort to determine the operability of other snubbers irrespective of type which may be subject to the same failure mode.

For the snubbers found inoperable, an engineering evaluation shall be performed on the components to which the inoperable snubbers are attached. The purpose of this engineering evaluation shall be to determine if the components to which the inoperable snubbers are attached were adversely affected by the inoperability of the

snubbers in order to ensure that the component remains capable of meeting the designed service.

If any snubber selected for functional testing either fails to activate or fails to move, i.e., frozen-in-place, the cause will be evaluated and, if caused by manufacturer or design deficiency, all snubbers of the same type subject to the same defect shall be functionally tested. This testing requirement shall be independent of the requirements stated in Specification 4.6.I.5 for snubbers not meeting the functional test acceptance criteria.

8. Functional Testing of Repaired and Replaced Snubbers

Snubbers which fail the visual inspection or the functional test acceptance criteria shall be repaired or replaced. Replacement snubbers and snubbers which have repairs which might affect the functional test result shall be tested to meet the functional test criteria before installation in the unit. Mechanical snubbers shall have met the acceptance criteria subsequent to their most recent service, and the freedom-of-motion test must have been performed within 12 months before being installed in the unit.

9. Snubber Service Life Program

The service life of all snubbers shall be monitored to ensure that the service life is not exceeded between surveillance inspections. The maximum expected service life for various seals, springs, and other critical parts shall be extended or shortened based on monitored test results and failure history. Critical parts shall be replaced so that the maximum service life will

not be exceeded during a period when the snubber is required to be operable. The parts replacements shall be documented and the documentation shall be retained in accordance with Specification 6.5.B.

3.6/4.6.I Snubbers

Mechanical and hydraulic snubbers are provided to ensure that the structural integrity of the reactor coolant system and all other safety-related systems is maintained during and following a seismic event or other event initiating dynamic loads. Snubbers are classified and grouped by design, manufacturer and accessibility. A list of individual snubbers with information of snubber location, classification or group, and system affected is maintained at the plant. The accessibility of each snubber is determined and documented for each snubber. The determination is based upon the existing radiation levels and the expected time to perform a visual inspection in each snubber location as well as other factors associated with accessibility during plant operation (e.g., temperature, atmosphere, location, etc.), and the recommendations of Regulatory Guides 8.8 and 8.10.

The visual inspection frequency is based upon maintaining a constant level of snubber protection to the systems. Therefore, the required inspection interval varies with the number of unacceptable snubbers found during the previous inspection, the total population or category size for each snubber type, and the previous inspection interval. A snubber is considered unacceptable if it fails to satisfy the acceptance criteria of the visual inspection. Snubbers may be categorized, based upon their accessibility during power operation, as accessible or inaccessible. These categories may be examined separately or jointly as determined and documented prior to the inspections. The categorization is used as the basis for determining the next inspection interval for that category.

If a review and evaluation can not justify continued operation with an unacceptable snubber, the snubber is declared inoperable and the applicable action taken. To determine the next surveillance interval, the unacceptable snubber may be reclassified as acceptable if it can be demonstrated that the snubber is operable in its as-found condition by the performance of a functional test. The next visual inspection interval may be twice, the same, or reduced by as much as two-thirds of the previous inspection interval, depending on the number of unacceptable snubbers found in proportion to the size of the population or category for each type of snubber included in the previous inspection. The inspection interval may be as long as 48 months and the provisions of Specification 1.0.DD may be applied.

When a snubber is found to be inoperable, an engineering evaluation is performed, in addition to the determination of the snubber mode of failure, in order to determine if any safety-related component or system has been adversely affected by the inoperability of the snubber. The engineering evaluation shall determine whether or not the snubber mode of failure has imparted a significant effect or degradation on the supported component or system.

To provide additional assurance of snubber functional reliability , a representative sample of the installed snubbers will be functionally tested at 18 month intervals. This sample is identified using one of three methods:

1. Functionally test 10% of a type of snubber with an additional 10% tested for each functional testing failure, or

2. Functionally test a sample size and determine sample acceptance or rejection using Figure 4.6-2, or

3. Functionally test a representative sample size and determine sample acceptance or rejection using the stated equation.

Figure 4.6-2 was developed using "Wald's Sequential Probability Ratio Plan" as described in "Quality Control and Industrial Statistics" by Acheson J. Duncan.

Permanent or other exemptions from the surveillance program for individual snubbers may be granted by the NRC if a justifiable basis for exemption is presented and, if applicable, snubber life destructive testing was performed to qualify the snubber for the applicable design conditions at either the completion of their fabrication or at a subsequent date. Snubbers so exempted are listed in the list of individual snubbers indicating the extent of the exemptions.

The service life of a snubber is established via manufacturer input and information through consideration of the snubber service conditions and associated installation and maintenance records (newly installed snubbers, seal replace, spring replaced, in high radiation area, in high temperature area, etc.). The requirement to monitor the snubber service life is included to ensure that the snubbers periodically undergo a performance evaluation in view of their age and operating conditions. These records provide statistical bases for future consideration of snubber service life.

Table 4.6-3

SNUBBER VISUAL INSPECTION CRITERIA

Population [a][b] or Category	NUMBER OF UNACCEPTABLE SNUBBERS		
	Column A [c][f] Extend Interval	Column B [d][f] Repeat Interval	Column C [e][f] Reduce Interval
1	0	0	1
80	0	0	2
100	0	1	4
150	0	3	8
200	2	5	13
300	5	12	25
400	8	18	36
500	12	24	48
750	20	40	78
≥1000	29	56	109

a The next visual inspection interval for a snubber population or category size shall be determined based upon the previous inspection interval and the number of unacceptable snubbers found during that interval. Snubbers may be categorized, based upon their accessibility during power operation, as accessible or inaccessible. These categories may be examined separately or jointly. However, the decision must be made and documented before any inspection and shall be used as the basis upon which to determine the next inspection interval for that category.

b Interpolation between population or category sizes and the number of unacceptable snubbers is permissible. Use next lower integer for the value of the limit for Columns A, B, or C if that integer includes a fractional value of unacceptable snubbers as determined by interpolation.

c If the number of unacceptable snubbers is equal to or less than the number in Column A, the next inspection interval may be twice the previous interval, but not greater than 48 months.

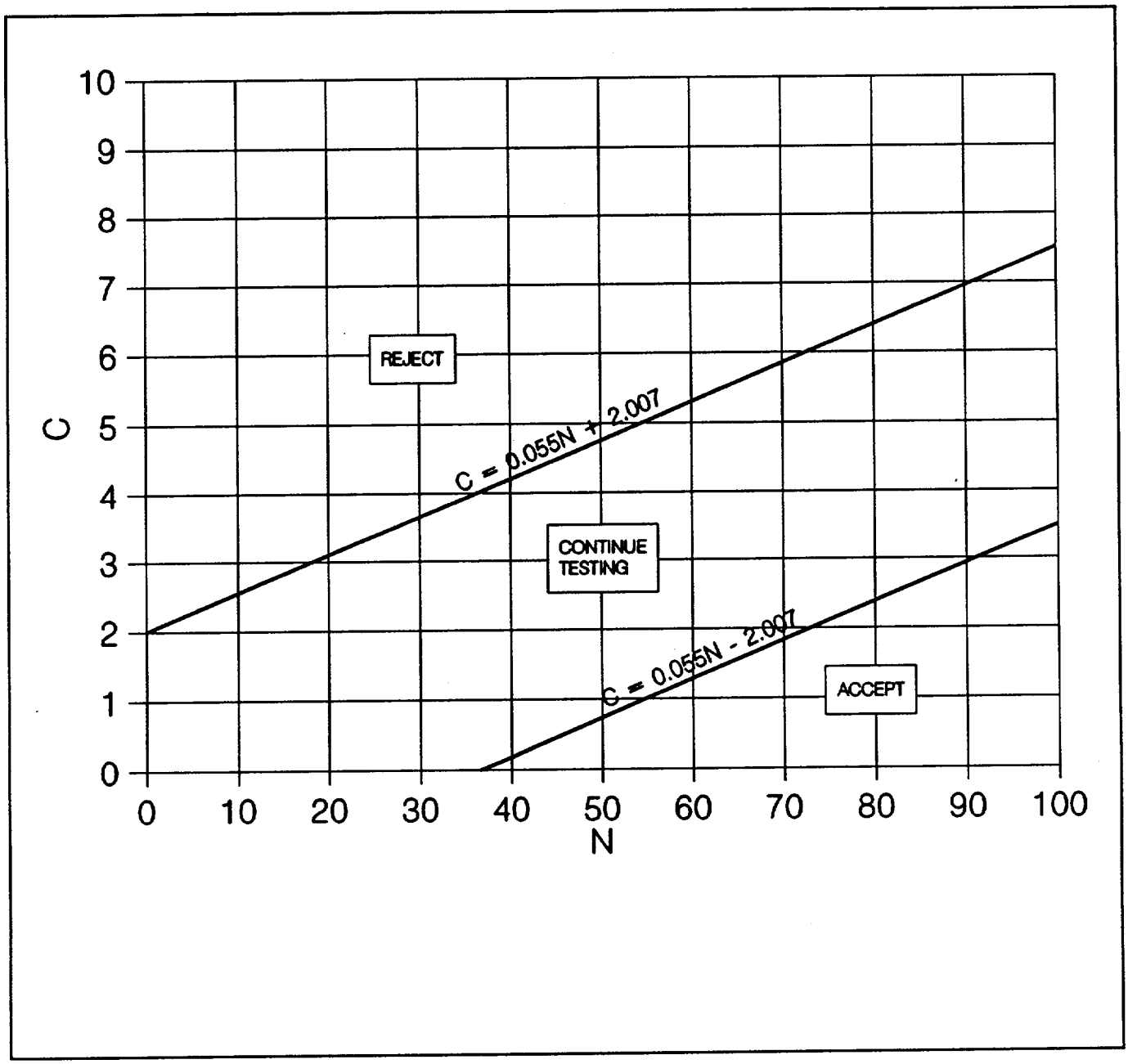
d If the number of unacceptable snubbers is equal to or less than the number in Column B but greater than the number in Column A, the next inspection interval shall be the same as the previous interval.

e If the number of unacceptable snubbers is equal to or greater than the number in Column C, the next inspection interval shall be two-thirds of the previous interval, but not less than 31 days. However, if the number of unacceptable snubbers is less than the number in Column C but greater than the number in Column B, the next interval shall be reduced proportionally by interpolation, that is, the previous interval shall be reduced by a factor that is one-third of the ratio of the difference between the number of unacceptable snubbers found during the previous interval and the number in Column B to the difference in the numbers in Columns B and C.

f The provisions of Specification 1.0.DD are applicable for all inspection intervals up to and including 48 months.

Figure 4.6-2

SAMPLING PLAN FOR SNUBBER FUNCTIONAL TESTING



N = Cumulative number of snubbers of a type tested

C = Total number of snubbers of a type not meeting acceptance

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 149 TO FACILITY OPERATING LICENSE NO. DPR-29

AND AMENDMENT NO. 145 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

By letter dated March 11, 1994, Commonwealth Edison Company (CECo, the licensee) proposed changes to the Technical Specifications (TS) for Quad Cities Nuclear Power Station, Units 1 and 2. The proposed changes add surveillance requirements for new hydraulic snubbers which are being installed on the main steamlines (MSLs) during the current Unit 1 refueling outage. These snubbers will also be installed in Unit 2 during the Unit 2 refueling outage currently scheduled for the first quarter of 1995. The amendments will also change the snubbers visual inspection intervals and corrective actions in Technical Specification Sections 3.6.1 and 4.6.1 to make them consistent with the Boiling Water Reactors (BWR) Standardized Technical Specifications (STS) and the guidance provided by Generic Letter (GL) 90-09, "Alternative Requirements for Snubber Visual Inspection Intervals and Corrective Actions," dated December 11, 1990.

2.0 EVALUATION

In order to prevent main steamline snubber failures and address vibration concerns associated with the electromagnetic relief valves, the licensee will be replacing the existing mechanical snubbers with hydraulic snubbers at Quad Cities, Units 1 and 2. The hydraulic design will provide a dampening effect for the MSLs. The licensee has proposed to add the functional test and acceptance criteria for hydraulic snubbers in the TS for Quad Cities, Units 1 and 2. In addition, the licensee has proposed to adopt the STS for BWR and to include the guidance provided by Generic Letter 90-09 which is discussed below.

The snubber visual examination schedule in the current TS for Quad Cities, Units 1 and 2, is based on the permissible number of inoperable snubbers found during the visual examination. The existing snubber visual examination schedule is based only on the absolute number of inoperable snubbers found

during the visual examinations irrespective of the total population of snubbers. In 1990, the staff acknowledged that many licensees with a large snubber population found the visual examination schedule excessively restrictive. To alleviate this concern, the staff provided guidance (GL 90-09) on the alternative visual examination schedule to allow licensees to perform visual examinations and corrective actions during plant outages without reducing the confidence level provided by the previous visual examination schedule. The new visual examination schedule specifies the permissible number of inoperable snubbers for various snubbers populations. The basic examination interval is the normal fuel cycle up to 24 months. This interval may be extended to as long as twice the fuel cycle or reduced to as small as two-thirds of the fuel cycle, depending on the number of unacceptable snubbers found during the visual examination. The examination interval may vary by $\pm$ 25 percent to coincide with the actual outage. The staff encouraged all licensees to propose changes to their TS to make them consistent with the guidance provided in GL 90-09.

The licensee has proposed changes to TS Sections 3.6.1 and 4.6.1 that are consistent with the guidance provided in GL 90-09 for snubber visual examination at Quad Cities, Units 1 and 2. In addition, the proposed limiting condition (LCO) for inoperable snubbers, the surveillance requirements, and the acceptance criteria are consistent with the BWR STS. Based on its review of these requirements, the staff finds that the proposed changes to the TS for Quad Cities, Units 1 and 2, are acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Illinois State official was notified of the proposed issuance of these amendments. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and change surveillance requirements. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (59 FR 17595). Accordingly, the 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 or environmental assessment need be prepared in connection with the issuance of the amendments.

5.0 CONCLUSION

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

Principal Contributor: C. P. Patel

Date: July 13, 1994