

Docket Nos. ~~50-254~~
50-265

SEP 13 1976

Commonwealth Edison Company
ATTN: Mr. R. L. Bolger
Assistant Vice President
Post Office Box 767
Chicago, Illinois 60690

Gentlemen:

In response to your request dated August 6, 1976 and a supplement thereto dated August 26, 1976, the Commission has issued the enclosed Amendment Nos. 31 and 30 to Facility Operating License Nos. DPR-29 and DPR-30 for Unit Nos. 1 and 2 of the Quad Cities Nuclear Power Station, respectively.

These amendments revise the airborne effluent release limits by refining the previously used calculational model to reflect the staff's current model and by adding new limiting conditions for operation which reduce the allowable annual and quarterly iodine releases to quantities that are as low as reasonably achievable.

Copies of the related Safety Evaluation, Environmental Impact Appraisal, Notice of Issuance and Negative Declaration are also enclosed.

Sincerely,

Original signed by
M. Grotenhuis

Dennis L. Ziemann, Chief
Operating Reactors Branch #2
Division of Operating Reactors

Enclosures:

1. Amendment No. 31 to License No. DPR-29
2. Amendment No. 30 to License No. DPR-30
3. Environmental Impact Appraisal
4. Safety Evaluation
5. Notice and Negative Declaration

Notified of abill of CEEO at 2:00 pm 9/13/76 that this amendment was signed

cc w/enclosures:

See next page	DOR:ORB #2	DOR:ORB #2	DOR:ORB #2	OELD	DOR:ORB #2
OFFICE	PWO' Connor:ah	RMDiggs	BGRimes	KARMAN	DLZiemann
SURNAME	9/9/76	9/10/76	9/13/76	9/10/76	9/13/76
DATE					

Commonwealth Edison Company

- 2 -

September 13, 1976

cc w/enclosures:
Mr. Charles Whitmore
President and Chairman
Iowa-Illinois Gas and
Electric Company
206 East Second Avenue
Davenport, Iowa 52801

Chief, Radiation and Noise Section
U. S. Environmental Protection Agency
230 S. Dearborn Street
Chicago, Illinois 60604

Mr. John W. Rowe
Isham, Lincoln & Beale
Counselors at Law
One First National Plaza, 42nd Floor
Chicago, Illinois 60603

Anthony Z. Roisman, Esquire
Roisman, Kessler and Cashdan
1025 15th Street, N. W., 5th Floor
Washington, D. C. 20005

Moline Public Library
504 - 17th Street
Moline, Illinois 61265

Mr. Robert W. Watts, Chairman
Rock Island County Board of
Supervisors
Rock Island County Court House
Rock Island, Illinois 61201

cc w/enclosures and cy of CECO's
filings dated. 8/6/76 and
8/26/76:

Department of Public Health
ATTN: Chief, Division of
Radiological Health
535 West Jefferson
Springfield, Illinois 62706

Dr. Neill Thomasson (AW-459)
Chief, Energy Systems Analysis Branch
Office of Radiation Programs
Environmental Protection Agency
401 M Street, S. W.
Washington, D. C. 20460

COMMONWEALTH EDISON COMPANY
AND
IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

DOCKET NO. 50-254

QUAD CITIES UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 31
License No. DPR-29

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by the Commonwealth Edison Company (the licensee) dated August 6, 1976, and a supplement thereto dated August 26, 1976, comply 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.

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2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment.
3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Original signed by
M. Crotenhuis *[Signature]*
Dennis L. Ziemann, Chief
Operating Reactors Branch #2
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: SEP 13 1976

OFFICE >						
SURNAME >						
DATE >						

ATTACHMENT TO LICENSE AMENDMENT NO. 31

FACILITY OPERATING LICENSE NO. DPR-29

DOCKET NO. 50-254

Replace the existing pages 3.8/4.8-3, 3.8/4.8-4, 3.8/4.8-5, 3.8/4.8-9, 3.8/4.8-10 and 3.8/4.8-18 of the Technical Specifications with the attached revised pages. Changes on these pages are denoted by marginal lines.

QUAD-CITIES
DPR-29

extent permitted by power demand, to reduce such release rates.

- c. The annual average release rate of gross radioactivity from the plant chimney shall not exceed 0.080 Ci/sec for Q_1 or Q_2 or 0.110 Ci/sec for Q_1 and Q_2 operation.
- d. If the limits of Specification 3.8.A.4.b are exceeded for a period of greater than 48 hours, the Deputy Director for Reactor Projects, Directorate of Licensing shall be notified in writing within 48 hours of plans for reducing the radioactive effluent release rate to a level below those limits.

During periods in which the gross radioactivity release rates are greater than 25% of Specification 3.8.A.3.a., hourly measurements of meteorological parameters shall be recorded.

B. Iodine and Particulate Releases to the Atmosphere

1. The I-131 and particulates with half lives greater than 8 days released from the reactor building vent stack and plant chimney shall be continuously monitored. To accomplish this, particulate filters and charcoal cartridges shall be installed and operable at all times except as stated in Specification 3.8.G.

- 2.a. The release rate limit of all radioiodines and radioactive materials in particulate form with half-lives greater than eight days, released to the environs as part of gaseous wastes from the site shall be such that:

$$7.3 \times 10^5 Q_V + 2.6 \times 10^5 Q_C \leq 1$$

where:

Q_V = release rate from the reactor building vent stack in curies/sec.

Q_C = release rate from the plant chimney in curies/sec.

B. Iodine and Particulate Releases to the Atmosphere

1. Station records of release of iodine-131 and particulates shall be maintained on the basis of all chimney and stack filters and cartridges counted.
2. The chimney filters and cartridges shall be counted weekly when the measured release rate of the sum of iodine-131 and particulates is less than 10% of the release rate given in Specification 3.8.B.2.a.; otherwise the chimney filters and cartridges shall be removed and counted daily.

If the results of surveillance required by Specification 4.6.C.1.c or d for the primary coolant after reactor startup exceed 10% of Specification 3.6.C.1, the charcoal cartridge shall be removed and analyzed for radioactive iodines of I-131, I-133, and I-135.

When chimney monitors indicate an increase in radioactive gaseous effluents of 25% or 5000 μ Ci/sec, whichever is greater during steady-state operation, the chimney filter and cartridge shall be removed and counted.

A determination shall be made of the total of I-131 and particulates with

QUAD-CITIES
DPR-29

- b.(1) The average release rate per site of all radioiodines and radioactive materials in particulate form with half-lives greater than eight days during any calendar quarter shall be such that:

$$13 \{ 7.3 \times 10^5 Q_V + 2.6 \times 10^5 Q_C \} \leq 1$$

- b.(2) The amount of iodine-131 released during any calendar quarter shall not exceed 2 Ci/reactor.

- c.(1) The average release rate per site of all radioiodines and radioactive materials in particulate form with half-lives greater than eight days during any period of 12 consecutive months shall be such that:

$$25 \{ 7.3 \times 10^5 Q_V + 2.6 \times 10^5 Q_C \} \leq 1$$

- c.(2) The amount of iodine-131 released during any period of 12 consecutive months shall not exceed 4 Ci/reactor.

- 3.a. The design objectives stipulate that the annual total quantity of all radioiodines and radioactive material in particulate forms with half-lives greater than eight days, above background, from all reactors at a site should not result in an annual dose to any organ of an individual in an unrestricted area from all pathways of exposure in excess of 15 mrem and that the annual total quantity of Iodine-131 discharged from each reactor at a site should not exceed 1 Ci.

- b. Should any of the conditions of 3.8.B.3.c(1) or (2) listed below exist, the licensee shall make an investigation to identify the causes of the release rates, define and initiate a program of action to reduce the release rates to the design objective levels. The licensee shall report those actions to the NRC within 30 days from the end of the quarter during which the releases occurred.

half lives greater than 8 days released weekly. An analysis shall also be performed of a sample at least quarterly for the radionuclides I-133 and I-135.

For release of radioactive material in particulate form, a sample shall be drawn continuously through a particulate filter. Measurements shall be made on these filters to determine the quantities of nuclides in particulate form with half lives greater than 8 days that are released to the environment.

The particulate filters shall be changed and analyzed at least weekly for gross beta-particulate radioactivity with half lives greater than 8 days. Monthly, a composite of those filters used during the month shall be prepared. This composite shall be analyzed for the principal gamma-emitting nuclides.

Analysis for Sr-89 and Sr-90 shall be made quarterly. Gross alpha radioactivity shall be determined quarterly.

3. The ventilation stack filters and cartridges shall be counted weekly when the measured release rate of the sum of iodine-131 and particulates is less than 25% of the release rate given in Specification 3.8.B.2.a.; otherwise the ventilation stack filters and cartridges shall be removed and counted daily.

A determination shall be made of the total I-131 and particulates with half lives greater than 8 days released weekly. An analysis sample shall be taken at least quarterly for the radionuclides I-133 and I-135.

For release of radioactive material in particulate form, a sample shall be drawn continuously through a particulate filter. Measurements shall be made on these filters to determine the quantities of nuclides in particulate form with half lives greater than 8 days that are released to the environment.

The particulate filters shall be changed and analyzed at least weekly for gross

c.(1) If the average release rate per site of all radioiodines and radioactive materials in particulate form with half-lives greater than eight days during any calendar quarter is such that:

$$50 \{ 7.3 \times 10^5 Q_V + 2.6 \times 10^5 Q_D \} \leq 1$$

c.(2) If the amount of iodine-131 released during any calendar quarter is greater than 0.5 Ci/reactor.

beta-particulate radioactivity with half lives greater than 8 days. Monthly, a composite of these filters used during the month shall be prepared. This composite shall be analyzed for the principal gamma-emitting nuclides.

Analyses for Sr-89 and Sr-90 shall be made quarterly. Gross alpha radioactivity shall be determined quarterly.

C. Mechanical Vacuum Pump

1. The mechanical vacuum pump shall be capable of being isolated and secured on a signal of high radioactivity or shall be isolated and secured whenever the main steam isolation valves are open.
2. If Specification 3.8.C.1 is not met following a routine surveillance check, orderly shutdown shall be initiated and the reactor shall be in the cold shutdown within 24 hours.

C. Mechanical Vacuum Pump

At least once during each operating cycle, automatic securing and isolation of the mechanical vacuum pump shall be verified.

D. Liquid Releases

1. Radioactive liquid released from the facility shall be continuously monitored. To accomplish this, either the radiation monitor on the discharge line or the discharge bay sampler shall be operable or grab samples shall be taken in the discharge bay during the course of the discharge.
2. a. The maximum concentration of gross radioactivity (above background) in the discharge bay shall not exceed the limits stated below unless the discharge is controlled on a radionuclide basis in accordance with Appendix B, Table II, Column 2 of 10 CFR 20 and note 1 thereto:

maximum concentration - excluding tritium:

 $1 \times 10^{-7} \mu\text{Ci/ml}$
- b. The maximum concentration of tritium in the discharge bay shall not exceed $3 \times 10^{-3} \mu\text{Ci/ml}$.

D. Liquid Releases

1. The radiation monitor shall be calibrated quarterly and functionally tested monthly and shall have an instrument check at least daily during discharges. The operability of the sampler shall be verified on a daily basis.
2. Measurements shall be made on a representative sample of each batch released and station records retained of the activity (mCi) and concentration ($\mu\text{Ci/ml}$) of gross radioactivity and volume (gal) of each batch of liquid effluent released and estimates made of the average water flow (gpm) used to dilute the liquid effluent prior to release from the restricted area.

Each batch of liquid effluent released shall be analyzed for gross beta and gamma radioactivity with efficiency of counting determined at least quarterly from gamma scans and isotopic analyses.

QUAD-CITIES
DPR-29

drywell purging or possible equipment degradation and not related to the power operation or fuel performance, the release limit specification has been separated from the limit specified for the plant chimney. The calculated and measured dose contributions from these sources are additive for purposes of meeting the limits specified in 10 CFR 20, but are not required as a basis for operation. Both E and E should be determined for the ventilation stack releases.

The intent of the voluntary limits in Section 3.8.A.4 is not to relieve the licensee of its obligation to exert its best efforts to keep levels of radioactive material in effluents as low as practicable. At the action level specified in Section 3.8.A.4.b, the Commission is to be informed of the licensee's plans for continued operation of the facilities. The limits given in Specification 3.8.A.4.c give the annual average release which represents the limits of permissible operation which reduces the permissible activity released compared with continuing operation at the conditions stated in Section 20.106 of 10 CFR 20.

Specifications 3.8.A.4.b and 3.8.A.4.c are interim limits volunteered by the licensee to keep the off-gas emission levels to as low as practicable with the present off-gas handling system until the final modifications to the radioactivity control equipment on the off-gas system proposed by the licensee can be completed and placed in operation. Action will be taken to reduce off-gas radioactivity emissions in accordance with Specification 3.8.A.4.b so that the release will not exceed the release noted in Specification 3.8.A.4.c.

Commonwealth Edison has embarked on a program of selecting, designing, and installing additional equipment to reduce off-gas emissions in Quad-Cities Units 1 and 2. This equipment is expected to reduce substantially the release of radioactive material in the effluent. Commonwealth Edison has submitted Special Report No. 1 for Quad-Cities 1 and 2 concerning a description of its proposed design for this equipment. Upon completion of the installation of this equipment, the SAR and technical specifications will be revised to include the design of system and the effect of operation of the emission reducing equipment.

As for the gross radioactivity releases from the plant chimney and from the reactor building ventilation stack, the AEC staff analyzed the releases from these separate points on the basis of an elevated release for the plant chimney and of a ground level release for the reactor building ventilation stack. The same reasoning has been used by the staff for separating the release limits into separate specifications. The most critical sectors for the plant chimney are the northeast and southeast sectors, while for the reactor building, the north sector is most critical for both release points in respect to gross radioactivity releases (whole body dose considerations).

B. Iodine and Particulate Releases

The release rate Specifications for a radioiodine and radioactive material in particulate form with half-lives greater than eight days are dependent on existing radionuclide pathways to man. The pathways which were examined for these Specifications are: 1) individual inhalation of airborne radionuclides, 2) deposition of radionuclides onto green leafy vegetation with subsequent consumption by man, and 3) deposition onto grassy areas where milch animals graze with consumption of the milk by man. Methods for estimating doses to the thyroid via these pathways are described in Proposed Regulatory Guide 1.109. The offsite location with the highest anticipated thyroid dose rate from radioiodines and radioactive material in particulate form with half-lives greater than eight days was determined using on-site meteorological data and the expressions described in Proposed Regulatory Guide 1.111.

QUAD-CITIES
DPR-29

Specification 3.8.B.2a limits the release rate of radioiodines and radioactive material in particulate form with half-lives greater than eight days so that the corresponding annual thyroid dose via the most restrictive pathway is less than 1500 mrem.

For radioiodines and radioactive material in particulate form with half-lives greater than eight days, the most restrictive location is a dairy cow located 1694 meters in the south direction (vent stack D/Q = $2.5 \times 10^{-9} \text{ m}^{-2}$; chimney D/Q = $8.5 \times 10^{-10} \text{ m}^{-2}$) and the equations in specification 3.8.2a,b(1),c(1) are based on this assumption.

Specification 3.8.B.2b.(1),b.(2),c.(1) and c.(2) establishes upper offsite levels for the releases of radioiodines and radioactive material in particulate form with half-lives greater than eight days at twice the design objective annual quantity during any calendar quarter, or four times the design objective annual quantity during any period of 12 consecutive months. In addition to the limiting conditions for operation of Specifications 3.8.B.3.c.(1) and c.(2) the reporting requirements of 3.8.B.3.b provide that the cause shall be identified whenever the release of gaseous effluents exceeds one-half the design objective annual quantity during any calendar quarter and that the proposed program of action to reduce such release rates to the design objectives shall be described.

C. Mechanical Vacuum Pump

The purpose of isolating the mechanical vacuum line is to limit release of activity from the main condenser. During an accident, fission products would be transported from the reactor through the main steamline to the main condenser. The fission product radioactivity would be sensed by the main steamline radioactivity monitors which initiate isolation.

D. Liquid Effluents

Liquid effluent release rates will be controlled in terms of the concentration in the discharge bay. In the case of unidentified mixtures, such a concentration limit is based on the assumption that the entire content is made up of the most restrictive isotope in accordance with 10 CFR 20. Such a limit assures that even if a person obtained all of his daily water intake from such a source, the resultant dose would not exceed that specified in 10 CFR 20. Since no such use of the discharge bay is made and considerable natural dilution occurs prior to any location where such doses could occur, this assures that offsite doses from this source will be far less than the limits specified in 10 CFR 20. In addition to the two independent samples of each batch prior to discharge, a radiation monitor on the discharge line and a sampler in the discharge bay give further assurance that discharges are kept at or below the maximum limits at all times.

E. Radioactive Liquid Waste Storage

As discussed in the SAR, the radioactive waste tanks that are at or above grade are located such that their postulated catastrophic failure could cause release of their contained radioactivity to the Mississippi River. To assure that such a postulated release would not raise radioactivity levels in the River to values greater than 10 CFR 20 at the water intake at the city of Davenport, Iowa, a limit on the amount of radioactivity that tanks can contain is established.

QUAD-CITIES
DPR-29

TABLE 4.8-1 (Cont'd)

SAMPLE CODING SYSTEM

Sample Type Code

Sampling Type	Code
Airborne particulate	AP
Airborne I-131 screen	I
Milk	M
Grass	G
Cattle feed	CF
Rainwater (fallout)	FW
Well water	WW
Vegetation	V
Surface water (river)	SW
Bottom sediment (silt)	SI
Periphyton	SL
Vegetables	P
Fish	F
Thermoluminescent dosimeters	TLD
Bethic animals	BA
Aquatic plants	APL
Rabbits	R

A census of animals producing milk for human consumption shall be conducted at the beginning and at the middle of the grazing season to determine their location and number with respect to the site. The census shall be conducted under the following conditions:

1. Within a 1-mile radius from the plant site or within the 15 mrem/yr isodose line, ^{1/} whichever is larger, enumeration by a door-to-door or equivalent counting technique.
2. Within a 5-mile radius for cows and a 15-mile radius for goats, enumeration by using referenced information from county agricultural agents or other reliable sources.

If it is learned from this census that animals are present at a location which yields a calculated thyroid dose greater than from previously sampled animals, the new location shall be added to the surveillance program as soon as practicable. The sampling location having the lowest calculated dose may then be dropped from the surveillance program at the end of the grazing season during which the census was conducted. Also, any location from which milk can no longer be obtained may be dropped from the surveillance program after notifying the NRC in writing that milk-producing animals are no longer present at that location.

COMMONWEALTH EDISON COMPANY
AND
IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

DOCKET NO. 50-265

QUAD CITIES UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 30
License No. DPR-30

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by the Commonwealth Edison Company (the licensee) dated August 6, 1976, and a supplement thereto dated August 26, 1976, comply 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.

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DATE >						

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment.
3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Original signed by
M. Grotenhuis

for

Dennis L. Ziemann, Chief
Operating Reactors Branch #2
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: SEP 18 1976

OFFICE >						
SURNAME >						
DATE >						

ATTACHMENT TO LICENSE AMENDMENT NO. 30

FACILITY OPERATING LICENSE NO. DPR-30

DOCKET NO. 50-265

Replace the existing pages 3.8/4.8-3, 3.8/4.8-4, 3.8/4.8-5, 3.8/4.8-9, 3.8/4.8-10 and 3.8/4.8-18 of the Technical Specifications with the attached revised pages. Changes on these pages are denoted by marginal lines.

QUAD-CITIES

DPR-30

extent permitted by power demand, to reduce such release rates.

- c. The annual average release rate of gross radioactivity from the plant chimney shall not exceed 0.080 Ci/sec for Q₁ or Q₂ or 0.110 Ci/sec for Q₁ and Q₂ operation.
- d. If the limits of Specification 3.8.A.4.b are exceeded for a period of greater than 48 hours, the Deputy Director for Reactor Projects, Directorate of Licensing shall be notified in writing within 48 hours of plans for reducing the radioactive effluent release rate to a level below those limits.

B. Iodine and Particulate Releases to the Atmosphere

- 1. The I-131 and particulates with half lives greater than 8 days released from the reactor building vent stack and plant chimney shall be continuously monitored. To accomplish this, particulate filters and charcoal cartridges shall be installed and operable at all times except as stated in Specification 3.8.G.

- 2.a. The release rate limit of all radioiodines and radioactive materials in particulate form with half-lives greater than eight days, released to the environs as part of gaseous wastes from the site shall be such that:

$$7.3 \times 10^5 Q_V + 2.6 \times 10^5 Q_C \leq 1$$

where:

Q_V = release rate from the reactor building vent stack in curies/sec.

Q_C = release rate from the plant chimney in curies/sec.

During periods in which the gross radioactivity release rates are greater than 25% of Specification 3.8.A.3.a., hourly measurements of meteorological parameters shall be recorded.

B. Iodine and Particulate Releases to the Atmosphere

- 1. Station records of release of iodine-131 and particulates shall be maintained on the basis of all chimney and stack filters and cartridges counted.
- 2. The chimney filters and cartridges shall be counted weekly when the measured release rate of the sum of iodine-131 and particulates is less than 10% of the release rate given in Specification 3.8.B.2.a.; otherwise the chimney filters and cartridges shall be removed and counted daily.

If the results of surveillance required by Specification 4.6.C.1.c or d for the primary coolant after reactor startup exceed 10% of Specification 3.6.C.1, the charcoal cartridge shall be removed and analyzed for radioactive iodines of I-131, I-133, and I-135.

When chimney monitors indicate an increase in radioactive gaseous effluents of 25% or 5000 μCi/sec, whichever is greater during steady-state operation, the chimney filter and cartridge shall be removed and counted.

A determination shall be made of the total of I-131 and particulates with

QUAD-CITIES

DPR-30

- b. (1) The average release rate per site of all radioiodines and radioactive materials in particulate form with half-lives greater than eight days during any calendar quarter shall be such that:

$$13 \{ 7.3 \times 10^5 Q_V + 2.6 \times 10^5 Q_C \} \leq 1$$

- b. (2) The amount of iodine-131 released during any calendar quarter shall not exceed 2 Ci/reactor.

- c. (1) The average release rate per site of all radioiodines and radioactive materials in particulate form with half-lives greater than eight days during any period of 12 consecutive months shall be such that:

$$25 \{ 7.3 \times 10^5 Q_V + 2.6 \times 10^5 Q_C \} \leq 1$$

- c. (2) The amount of iodine-131 released during any period of 12 consecutive months shall not exceed 4 Ci/reactor.

- 3.a. The design objectives stipulate that the annual total quantity of all radioiodines and radioactive material in particulate forms with half-lives greater than eight days, above background, from all reactors at a site should not result in an annual dose to any organ of an individual in an unrestricted area from all pathways of exposure in excess of 15 mrem and that the annual total quantity of Iodine-131 discharged from each reactor at a site should not exceed 1 Ci.

- b. Should any of the conditions of 3.8.B.3.c(1) or (2) listed below exist, the licensee shall make an investigation to identify the causes of the release rates, define and initiate a program of action to reduce the release rates to the design objective levels. The licensee shall report those actions to the NRC within 30 days from the end of the quarter during which the releases occurred.

half lives greater than 8 days released weekly. An analysis shall also be performed of a sample at least quarterly for the radionuclides I-133 and I-135.

For release of radioactive material in particulate form, a sample shall be drawn continuously through a particulate filter. Measurements shall be made on these filters to determine the quantities of nuclides in particulate form with half lives greater than 8 days that are released to the environment.

The particulate filters shall be changed and analyzed at least weekly for gross beta-particulate radioactivity with half lives greater than 8 days. Monthly, a composite of those filters used during the month shall be prepared. This composite shall be analyzed for the principal gamma-emitting nuclides.

Analysis for Sr-89 and Sr-90 shall be made quarterly. Gross alpha radioactivity shall be determined quarterly.

3. The ventilation stack filters and cartridges shall be counted weekly when the measured release rate of the sum of iodine-131 and particulates is less than 25% of the release rate given in Specification 3.8.B.2.a.; otherwise the ventilation stack filters and cartridges shall be removed and counted daily.

A determination shall be made of the total I-131 and particulates with half lives greater than 8 days released weekly. An analysis sample shall be taken at least quarterly for the radionuclides I-133 and I-135.

For release of radioactive material in particulate form, a sample shall be drawn continuously through a particulate filter. Measurements shall be made on these filters to determine the quantities of nuclides in particulate form with half lives greater than 8 days that are released to the environment.

The particulate filters shall be changed and analyzed at least weekly for gross

- c.(1) If the average release rate per site of all radioiodines and radioactive materials in particulate form with half-lives greater than eight days during any calendar quarter is such that

QUAD-CITIES
DPR=30

$$50(5.7 \times 10^5 Q_V + 2.9 \times 10^5 Q_C) \leq 1$$

- c.(2) If the amount of iodine-131 released during any calendar quarter is greater than 0.5 Ci/reactor.

beta-particulate radioactivity with half lives greater than 8 days. Monthly, a composite of these filters used during the month shall be prepared. This composite shall be analyzed for the principal gamma-emitting nuclides.

Analyses for Sr-89 and Sr-90 shall be made quarterly. Gross alpha radioactivity shall be determined quarterly.

C. Mechanical Vacuum Pump

1. The mechanical vacuum pump shall be capable of being isolated and secured on a signal of high radioactivity or shall be isolated and secured whenever the main steam isolation valves are open.
2. If Specification 3.8.C.1 is not met following a routine surveillance check, orderly shutdown shall be initiated and the reactor shall be in the cold shutdown within 24 hours.

C. Mechanical Vacuum Pump

At least once during each operating cycle, automatic securing and isolation of the mechanical vacuum pump shall be verified.

D. Liquid Releases

1. Radioactive liquid released from the facility shall be continuously monitored. To accomplish this, either the radiation monitor on the discharge line or the discharge bay sampler shall be operable or grab samples shall be taken in the discharge bay during the course of the discharge.
2. a. The maximum concentration of gross radioactivity (above background) in the discharge bay shall not exceed the limits stated below unless the discharge is controlled on a radionuclide basis in accordance with Appendix B, Table II, Column 2 of 10 CFR 20 and note 1 thereto:
maximum concentration - excluding tritium:
 $1 \times 10^{-7} \mu\text{Ci/ml}$
- b. The maximum concentration of tritium in the discharge bay shall not exceed $3 \times 10^{-3} \mu\text{Ci/ml}$.

D. Liquid Releases

1. The radiation monitor shall be calibrated quarterly and functionally tested monthly and shall have an instrument check at least daily during discharges. The operability of the sampler shall be verified on a daily basis.
2. Measurements shall be made on a representative sample of each batch released and station records retained of the activity (mCi) and concentration ($\mu\text{Ci/ml}$) of gross radioactivity and volume (gal) of each batch of liquid effluent released and estimates made of the average water flow (gpm) used to dilute the liquid effluent prior to release from the restricted area.

Each batch of liquid effluent released shall be analyzed for gross beta and gamma radioactivity with efficiency of counting determined at least quarterly from gamma scans and isotopic analyses.

QUAD-CITIES

DPR-30

drywell purging or possible equipment degradation and not related to the power operation or fuel performance, the release limit specification has been separated from the limit specified for the plant chimney. The calculated and measured dose contributions from these sources are additive for purposes of meeting the limits specified in 10 CFR 20, but are not required as a basis for operation. Both E and E should be determined for the ventilation stack releases.

The intent of the voluntary limits in Section 3.8.A.4 is not to relieve the licensee of its obligation to exert its best efforts to keep levels of radioactive material in effluents as low as practicable. At the action level specified in Section 3.8.A.4.b, the Commission is to be informed of the licensee's plans for continued operation of the facilities. The limits given in Specification 3.8.A.4.c give the annual average release which represents the limits of permissible operation which reduces the permissible activity released compared with continuing operation at the conditions stated in Section 20.106 of 10 CFR 20.

Specifications 3.8.A.4.b and 3.8.A.4.c are interim limits volunteered by the licensee to keep the off-gas emission levels to as low as practicable with the present off-gas handling system until the final modifications to the radioactivity control equipment on the off-gas system proposed by the licensee can be completed and placed in operation. Action will be taken to reduce off-gas radioactivity emissions in accordance with Specification 3.8.A.4.b so that the release will not exceed the release noted in Specification 3.8.A.4.c.

Commonwealth Edison has embarked on a program of selecting, designing, and installing additional equipment to reduce off-gas emissions in Quad-Cities Units 1 and 2. This equipment is expected to reduce substantially the release of radioactive material in the effluent. Commonwealth Edison has submitted Special Report No. 1 for Quad-Cities 1 and 2 concerning a description of its proposed design for this equipment. Upon completion of the installation of this equipment, the SAR and technical specifications will be revised to include the design of system and the effect of operation of the emission reducing equipment.

As for the gross radioactivity releases from the plant chimney and from the reactor building ventilation stack, the AEC staff analyzed the releases from these separate points on the basis of an elevated release for the plant chimney and of a ground level release for the reactor building ventilation stack. The same reasoning has been used by the staff for separating the release limits into separate specifications. The most critical sectors for the plant chimney are the northeast and southeast sectors, while for the reactor building, the north sector is most critical for both release points in respect to gross radioactivity releases (whole body dose considerations).

B. Iodine and Particulate Releases

The release rate Specifications for a radioiodine and radioactive material in particulate form with half-lives greater than eight days are dependent on existing radionuclide pathways to man. The pathways which were examined for these Specifications are: 1) individual inhalation of airborne radionuclides, 2) deposition of radionuclides onto green leafy vegetation with subsequent consumption by man, and 3) deposition onto grassy areas where milch animals graze with consumption of the milk by man. Methods for estimating doses to the thyroid via these pathways are described in Proposed Regulatory Guide 1.109. The offsite location with the highest anticipated thyroid dose rate from radioiodines and radioactive material in particulate form with half-lives greater than eight days was determined using on-site meteorological data and the expressions described in Proposed Regulatory Guide 1.111.

QUAD-CITIES

DPR-30

Specification 3.8.B.2a limits the release rate of radioiodines and radioactive material in particulate form with half-lives greater than eight days so that the corresponding annual thyroid dose via the most restrictive pathway is less than 1500 mrem.

For radioiodines and radioactive material in particulate form with half-lives greater than eight days, the most restrictive location is a dairy cow located 1694 meters in the south direction (vent stack D/Q = $2.5 \times 10^{-9} \text{ m}^{-2}$; chimney D/Q = $8.5 \times 10^{-10} \text{ m}^{-2}$) and the equations in specification 3.8.2a,b(1),c(1) are based on this assumption.

Specification 3.8.B.2b.(1),b.(2),c.(1) and c.(2) establishes upper offsite levels for the releases of radioiodines and radioactive material in particulate form with half-lives greater than eight days at twice the design objective annual quantity during any calendar quarter, or four times the design objective annual quantity during any period of 12 consecutive months. In addition to the limiting conditions for operation of Specifications 3.8.B.3.c.(1) and c.(2) the reporting requirements of 3.8.B.3.b provide that the cause shall be identified whenever the release of gaseous effluents exceeds one-half the design objective annual quantity during any calendar quarter and that the proposed program of action to reduce such release rates to the design objectives shall be described.

C. Mechanical Vacuum Pump

The purpose of isolating the mechanical vacuum line is to limit release of activity from the main condenser. During an accident, fission products would be transported from the reactor through the main steamline to the main condenser. The fission product radioactivity would be sensed by the main steamline radioactivity monitors which initiate isolation.

D. Liquid Effluents

Liquid effluent release rates will be controlled in terms of the concentration in the discharge bay. In the case of unidentified mixtures, such a concentration limit is based on the assumption that the entire content is made up of the most restrictive isotope in accordance with 10 CFR 20. Such a limit assures that even if a person obtained all of his daily water intake from such a source, the resultant dose would not exceed that specified in 10 CFR 20. Since no such use of the discharge bay is made and considerable natural dilution occurs prior to any location where such doses could occur, this assures that offsite doses from this source will be far less than the limits specified in 10 CFR 20. In addition to the two independent samples of each batch prior to discharge, a radiation monitor on the discharge line and a sampler in the discharge bay give further assurance that discharges are kept at or below the maximum limits at all times.

E. Radioactive Liquid Waste Storage

As discussed in the SAR, the radioactive waste tanks that are at or above grade are located such that their postulated catastrophic failure could cause release of their contained radioactivity to the Mississippi River. To assure that such a postulated release would not raise radioactivity levels in the River to values greater than 10 CFR 20 at the water intake at the city of Davenport, Iowa, a limit on the amount of radioactivity that tanks can contain is established.

TABLE 4.8-1 (Cont'd)

SAMPLE CODING SYSTEM

Sample Type Code	Sampling Type	Code
	Airborne particulate	AP
	Airborne I-131 screen	I
	Milk	M
	Grass	G
	Cattle feed	CF
	Rainwater (fallout)	FW
	Well water	WW
	Vegetation	V
	Surface water (river)	SW
	Bottom sediment (silt)	SI
	Periphyton	SL
	Vegetables	P
	Fish	F
	Thermoluminescent dosimeters	TLD
	Bethic animals	BA
	Aquatic plants	APL
	Rabbits	R

A census of animals producing milk for human consumption shall be conducted at the beginning and at the middle of the grazing season to determine their location and number with respect to the site. The census shall be conducted under the following conditions:

1. Within a 1-mile radius from the plant site or within the 15 mrem/yr isodose line, whichever is larger, enumeration by a door-to-door or equivalent counting technique.
2. Within a 5-mile radius for cows and a 15-mile radius for goats, enumeration by using referenced information from county agricultural agents or other reliable sources.

If it is learned from this census that animals are present at a location which yields a calculated thyroid dose greater than from previously sampled animals, the new location shall be added to the surveillance program as soon as practicable. The sampling location having the lowest calculated dose may then be dropped from the surveillance program at the end of the grazing season during which the census was conducted. Also, any location from which milk can no longer be obtained may be dropped from the surveillance program after notifying the NRC in writing that milk-producing animals are no longer present at that location.



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

ENVIRONMENTAL IMPACT APPRAISAL BY THE DIVISION OF OPERATING REACTORS

SUPPORTING AMENDMENT NOS. 31 AND 30 TO DPR-29 AND DPR-30

COMMONWEALTH EDISON COMPANY
AND
IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

QUAD CITIES NUCLEAR POWER STATION UNIT NOS. 1 AND 2

DOCKET NOS. 50-254 AND 50-265

ENVIRONMENTAL IMPACT APPRAISAL

1. Description of Proposed Action

By letters dated August 6, 1976 and August 26, 1976, the Commonwealth Edison Company (CECo) submitted proposed changes to the Technical Specifications Appendix A to License Nos. DPR-29 and DPR-30. The proposed changes would establish a new instantaneous iodine release rate for effluent releases from the Quad Cities Nuclear Power Station Unit Nos. 1 and 2 (Quad Cities) and would impose new quarterly and annual iodine release design objectives and limits calculated in accordance with the Commission's current practices. The NRC staff has reviewed this proposed action to determine whether any environmental impact is associated with these proposed changes and the conclusions are set forth below.

The licensee is presently licensed to possess and operate the Quad Cities Station located in the State of Illinois, County of Rock Island, at power levels up to 2,511 megawatt thermal (Mwt) for each unit. The proposed changes to the iodine release limits would not result in an increase or decrease in the power level of the Units. Since neither power level nor fuel burnup is affected by the action, the action does not affect the benefits of electric power production considered for the captioned facility in the Commission's Final Environmental Statement (FES) for the Quad Cities Station, Docket Nos. 50-254 and 50-265 dated September 1972.

2. Environmental Impact of the Proposed Action

The revised iodine effluent limits would not significantly change the total quantities or type of radioactivity discharged to the environment from the Quad Cities Station. Appendix I technical specifications for radioactive effluents are presently being developed and will be issued for Quad Cities when complete. In the interim, the licensee proposes that the Quad Cities radioactive effluent release limits for I-131 and particulates be revised to the proposed design objectives stated in staff's Concluding Statement on Appendix I (RM-50-2). These revised Technical Specifications would result in plant operation with limiting conditions for operation for radioactive iodine and particulates (design objectives) which are consistent with those in use or proposed for other operation reactors.

The revised technical specifications will have effluent release design objectives of 15 mrem per year thyroid dose. This results in 0.42 curies of I-131 and particulates per year released from the vent and 1.2 curies per year released from the stack. These design objectives correspond to the previous limits which restricted instantaneous plant releases to 0.47 curies per year from the vent and 189 curies per year from the stack. If the licensee's releases exceed 1/2 the design objective in a quarter, he must (1) identify the causes, (2) initiate a program to reduce the releases, and (3) report these actions to the NRC. The revised specifications also limit the quarterly and annual average release to two and four times the design objective quantities.

Based on the above, there is not a significant change in allowable quantities of radioactive materials released per year from the Quad Cities Station. Therefore, there will be no significant environmental impact attributable to this action.

3. Conclusion and Basis for Negative Declaration

On the basis of the foregoing analysis, it is concluded that there would be no significant environmental impact attributable to the proposed action. Having made this conclusion, the Commission has further concluded that no environmental impact statement for the proposed action need be prepared and that a negative declaration to this effect is appropriate.

Date: September 13, 1976



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NOS. 31 AND 30 TO FACILITY LICENSE
NOS. DPR-29 AND DPR-30

COMMONWEALTH EDISON COMPANY
AND
IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

QUAD CITIES NUCLEAR POWER STATION UNIT NOS. 1 AND 2

DOCKET NOS. 50-254 AND 50-265

INTRODUCTION

By letters dated August 6, 1976 and August 26, 1976, the Commonwealth Edison Company (CECo) proposed to change the Appendix A Technical Specifications for Quad Cities Station Unit Nos. 1 and 2. The proposed changes involve (1) a recalculation of the airborne iodine effluent release limits using the Commission's current methodology and (2) the addition of new Limiting Conditions for Operation for the quarterly and annual average release rates of airborne iodine effluents. These proposed changes would constitute interim limits until the Commission issues its final Appendix I Technical Specifications.

The present Quad Cities iodine effluent release limits were calculated prior to the Commission's development of its current criteria for implementing the "as low as reasonably achievable (ALARA)" concept of minimizing effluent releases and are unnecessarily conservative with respect to those criteria. The changes proposed for the Quad Cities Station iodine release limits have been calculated in accordance with the Commission's current guidelines and are similar to limits issued recently on other operating reactors.

On June 4, 1976, in accordance with the requirements of Section V of Appendix I to 10 CFR Part 50, CECo filed with the Commission (1) information necessary to evaluate the means employed for keeping levels of radioactivity in effluents to unrestricted areas as low as reasonably achievable and (2) plans and proposed technical specifications developed for the purpose of keeping releases of radioactive materials to unrestricted areas during normal reactor operations, including expected operational occurrences, as low as is reasonably achievable. Our preliminary review of this submittal indicates that the CECo filing has satisfactorily met the requirements of Section V of Appendix I to 10 CFR Part 50.

The Quad Cities Station reactors are currently being evaluated for compliance with the design objectives of Appendix I to 10 CFR Part 50, Licensing of Production and Utilization Facilities. Revised standard ALARA radioactive effluent technical specifications are also being developed by the Commission. The evaluation of the licensee's Appendix I submittal may result in a further revision to their effluent systems and the technical specifications for these systems.

DISCUSSION

The existing Quad Cities Station instantaneous iodine release limits were selected to assure that under the most conservative assumptions, a milk cow located at the site boundary in the direction of the least favorable meteorological dispersion conditions, the highest thyroid dose possible through the cow-milk-child pathway would always be less than the 10 CFR 20 limit of 1500 mrem per year. The assumptions which were used in this early AEC model have subsequently been replaced by the methodology and assumptions formulated in the Commission's concept of reducing effluent releases to levels that are as low as reasonably achievable.

In evaluating the impact of iodine releases these more recent NRC methods and assumptions consider the dose that could be received through the cow-milk-infant pathway and calculates this dose using the location of the real cow in the direction of the worst meteorological dispersion conditions rather than a hypothetical cow at the site boundary. The proposed limits are based upon a design objective dose of 15 mrem per year to the thyroid through this real pathway.

In operating the Quad Cities Station CECO has on occasion had to shut down the plant's ventilation system to prevent exceeding the instantaneous iodine release rate limit. This conservative limit is based on a nonexistent cow-milk-child pathway. When the ventilation system is shutdown, in-plant concentrations of airborne iodine increase to such levels that require plant personnel to wear respiratory protective equipment while performing their duties. This condition often causes maintenance activities to require a longer time to complete thereby increasing the radiation exposure received by the plant personnel. In addition, working in respiratory protective equipment in high airborne radioactivity areas creates the potential for personnel over exposure in the event of respiratory protective equipment failure or human error.

CECo has taken the following measures to decrease the magnitude of iodine releases to the reactor building:

1. When an increased release rate is detected by the vent monitor, an investigation is initiated to determine the cause and corrective action is taken if practicable. In addition, preventive maintenance is also practiced, e.g. packings are replaced and seal rings are tightened on suspected leaking equipment.
2. A special ventilation system is used during lifting of the reactor vessel head, which routes the initial volume of reactor air directly to the standby gas treatment system. This ventilation prevents release of iodine to the building atmosphere.
3. During refueling the reactor steam dryer and steam separator are moved under water when possible and are sprayed with water when above water level to keep iodine from becoming airborne. Also, water is sprayed on the cavity and storage pool walls whenever water levels are lowered.
4. Various plant components, which have been identified as major sources of iodine leakage, have been modified to minimize leakage.

In spite of these efforts to minimize iodine releases, the iodine concentrations in the reactor building occasionally still exceed the release limit requiring the ventilation system to be shut down which causes the iodine concentrations to increase to levels which require respiratory protective equipment to be worn in the reactor building.

EVALUATION

The first proposed change would increase the instantaneous iodine release rate limit for the reactor building vent stack from 0.015 $\mu\text{ci}/\text{sec}$ to 1.4 $\mu\text{ci}/\text{sec}$ and would reduce the instantaneous iodine release rate limit for the plant chimney from 6.0 $\mu\text{ci}/\text{sec}$ to 3.8 $\mu\text{ci}/\text{sec}$. This change results from the application of more recent NRC guidelines for the calculation of thyroid dose due to airborne iodine effluent releases. The thyroid dose, calculated using NRC approved methods and guidelines assuming operation at the new limit for a year, remains unchanged at 1500 mrem. We conclude that this new limit provides greater operational flexibility and does not result in an increase in the maximum thyroid dose to the public and is acceptable.

The second proposed change would establish quarterly average and annual average release rate limiting conditions for operation which limit the maximum possible thyroid dose to which an individual could be actually exposed to 60 mrem in any twelve consecutive months and 30 mrem in any calendar quarter. These additional limits reduce the doses that

can be received by the public on an annual or a quarterly period and assure that these doses are as low as reasonably achievable. This change is acceptable. With this change we would require a cow census which was not previously required. The cow census would assure that the monitoring program would be adjusted as the location of cows is changed. The proposed change results in a radioactive effluent design objective that is compatible with Appendix I to 10 CFR Part 50.

ENVIRONMENTAL CONSIDERATION

Our evaluation of the potential for environmental impact as a result of changing the design objectives for systems controlling radioactive effluents is contained in the Environmental Impact Appraisal and Negative Declaration that are being issued with this Safety Evaluation.

CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) because the changes do not involve a significant increase in the probability or consequences of accidents previously considered and do not involve a significant decrease in a safety margin, the changes do not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Date: September 13, 1976

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NOS. 50-254 AND 50-265

COMMONWEALTH EDISON COMPANY
AND
IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

NOTICE OF ISSUANCE OF AMENDMENTS TO FACILITY
OPERATING LICENSES AND NEGATIVE DECLARATION

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment Nos. 31 and 30 to Facility Operating License Nos. DPR-29 and DPR-30, issued to Commonwealth Edison Company (acting for itself and on behalf of the Iowa-Illinois Gas and Electric Company) (the licensees), which revised Technical Specifications for operation of the Quad Cities Station Unit Nos. 1 and 2 (the facilities) located in Rock Island County, Illinois. The amendments are effective as of their date of issuance.

The amendments revise the effluent release limits by refining the previously used calculational model to reflect the staff's current model and by adding new limiting conditions for operation which reduce the allowable annual and quarterly iodine releases to quantities that are as low as reasonably achievable.

The application for the amendments complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendments. Prior public notice of these amendments was not required since the amendments do not involve a significant hazards consideration.

The Commission has prepared an environmental impact appraisal for the revised Technical Specifications and has concluded that an environmental impact statement for this particular action is not warranted because there will be no significant environmental impact attributable to the proposed action.

For further details with respect to this action, see (1) the application for amendments dated August 6, 1976, and a supplement thereto dated August 26, 1976, (2) Amendment Nos. 31 and 30 to License Nos. DPR-29 and DPR-30, (3) the Commission's related Safety Evaluation, and (4) the Commission's Environmental Impact Appraisal. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N. W., Washington, D. C. and at the Moline Public Library, 504 - 17th Street, Moline, Illinois 60625.

A copy of items (2), (3) and (4) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Operating Reactors.

Dated at Bethesda, Maryland, this 13th day of September, 1976.

FOR THE NUCLEAR REGULATORY COMMISSION



Marshall Grotenhuis, Acting Chief
Operating Reactors Branch #2
Division of Operating Reactors

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NOS. 50-254 AND 50-265

COMMONWEALTH EDISON COMPANY

AND

IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

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Dated at Bethesda, Maryland, this day of

FOR THE NUCLEAR REGULATORY COMMISSION

Operating Reactors Branch #2
Division of Operating Reactors

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