

March 13, 1986

Docket No. 50-254

Mr. Dennis L. Farrar
Director of Nuclear Licensing
Commonwealth Edison Company
Post Office Box 767
Chicago, Illinois 60690

Dear Mr. Farrar:

SUBJECT: MAPLHGR AND HAFNIUM NEUTRON ABSORBER TECHNICAL SPECIFICATION
CHANGES (TAC 60174, 56512)

Re: Quad Cities Nuclear Power Station, Unit 1

The Commission has issued the enclosed Amendment No. 93 to Facility Operating License No. DPR-29 for the Quad Cities Nuclear Power Station, Unit 1. The amendment is in response to your applications dated October 2, 1984 and October 29, 1985.

This amendment revises the Technical Specifications to delete maximum average planar linear heat generation rate (MAPLHGR) curves for fuel no longer used in the core, adds MAPLHGR curves for other fuels being loaded into the core, extends to higher exposure the MAPLHGR curve of a fuel type already in the core, replots for clarity all MAPLHGR curves and adjusts page and sheet numbers to reflect the updated MAPLHGR curves. The amendment also provides for use of hafnium metal as a neutron absorber in control blades.

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

Sincerely,

~~Original signed by~~

John A. Zwolinski, Director
BWR Project Directorate #1
Division of BWR Licensing

Enclosures:

1. Amendment No. 93 to License No. DPR-29
2. Safety Evaluation

cc w/enclosures:
See next page

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Mr. Dennis L. Farrar
Commonwealth Edison Company

Quad Cities Nuclear Power Station
Unit 1

cc:

Mr. B. C. O'Brien
President
Iowa-Illinois Gas and
Electric Company
206 East Second Avenue
Davenport, Iowa 52801

Robert G. Fitzgibbons, Jr.
Isham, Lincoln & Beale
Three First National Plaza
Suite 5200
Chicago, Illinois 60602

Mr. Nick Kalivianakis
Plant Superintendent
Quad Cities Nuclear Power Station
22710 - 206th Avenue - North
Cordova, Illinois 61242

Resident Inspector
U. S. Nuclear Regulatory Commission
22712 206th Avenue North
Cordova, Illinois 61242

Chairman
Rock Island County Board
of Supervisors
Rock Island County Court House
Rock Island, Illinois 61201

Mr. Gary N. Wright
Nuclear Facility Safety
Illinois Department of
Nuclear Safety
1035 Outer Park Drive, 5th Floor
Springfield, Illinois 62704

Regional Administrator, Region III
U. S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137



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

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. 93
License No. DPR-29

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The applications for amendment by Commonwealth Edison Company (the licensee) dated October 2, 1984 and October 29, 1985, 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 applications, 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 2.C.(2) of Facility Operating License No. DPR-29 is hereby amended to read as follows:

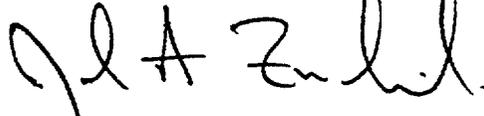
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(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 93, 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



John A. Zwolinski, Director
BWR Project Directorate #1
Division of BWR Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 13, 1986.

ATTACHMENT TO LICENSE AMENDMENT NO. 93

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

Fig 3.5-1 (Sheet 1 of 4)

Fig 3.5-1 (Sheet 2 of 4)

Fig 3.5-1 (Sheet 3 of 4)

Fig 3.5-1 (Sheet 4 of 4)

5.0-1

INSERT

Fig 3.5-1 (Sheet 1 of 4)

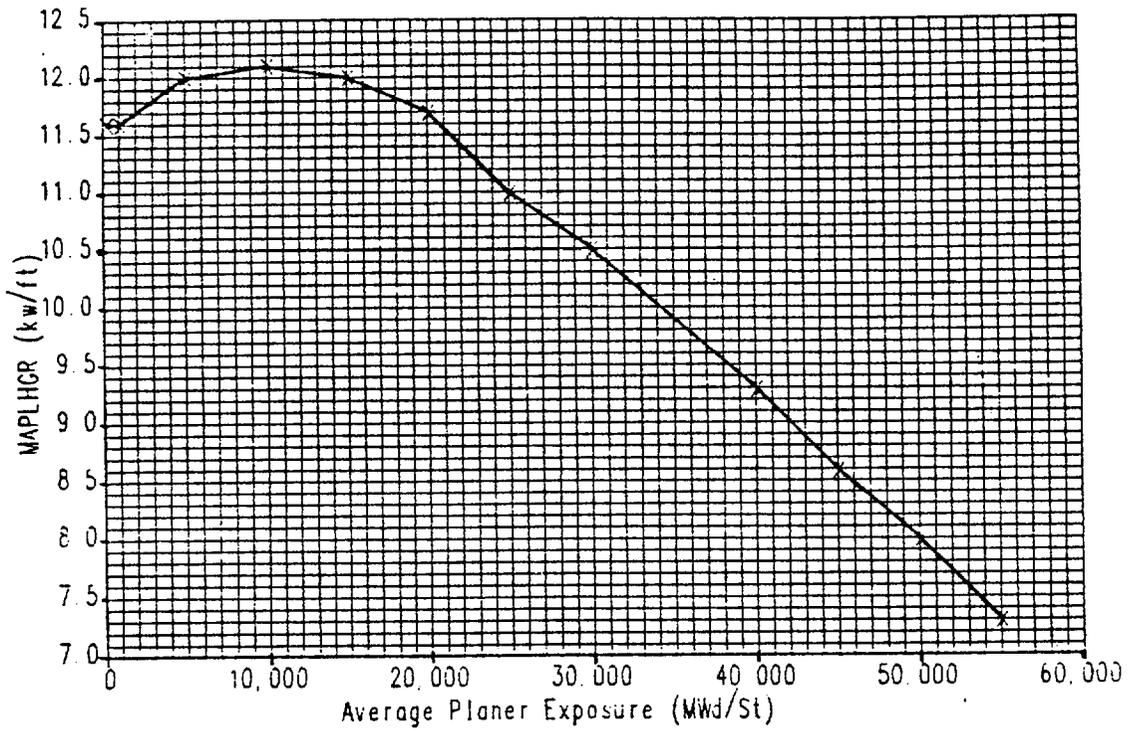
Fig 3.5-1 (Sheet 2 of 4)

Fig 3.5-1 (Sheet 3 of 4)

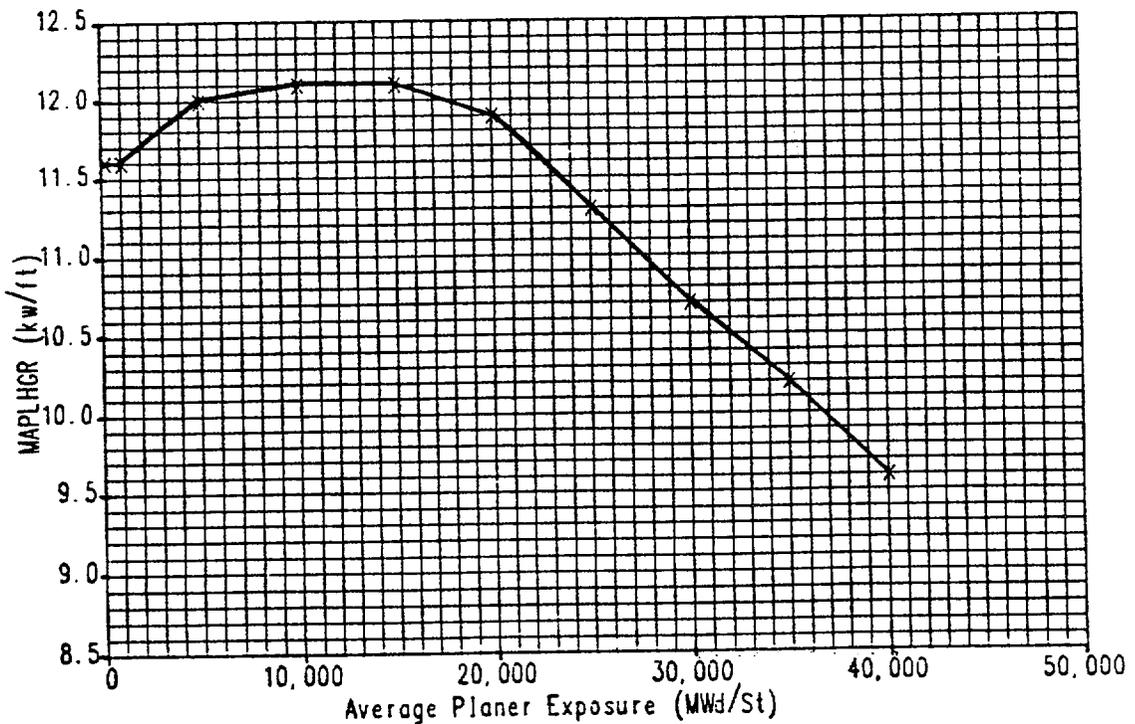
Fig 3.5-1 (Sheet 4 of 4)

5.0-1

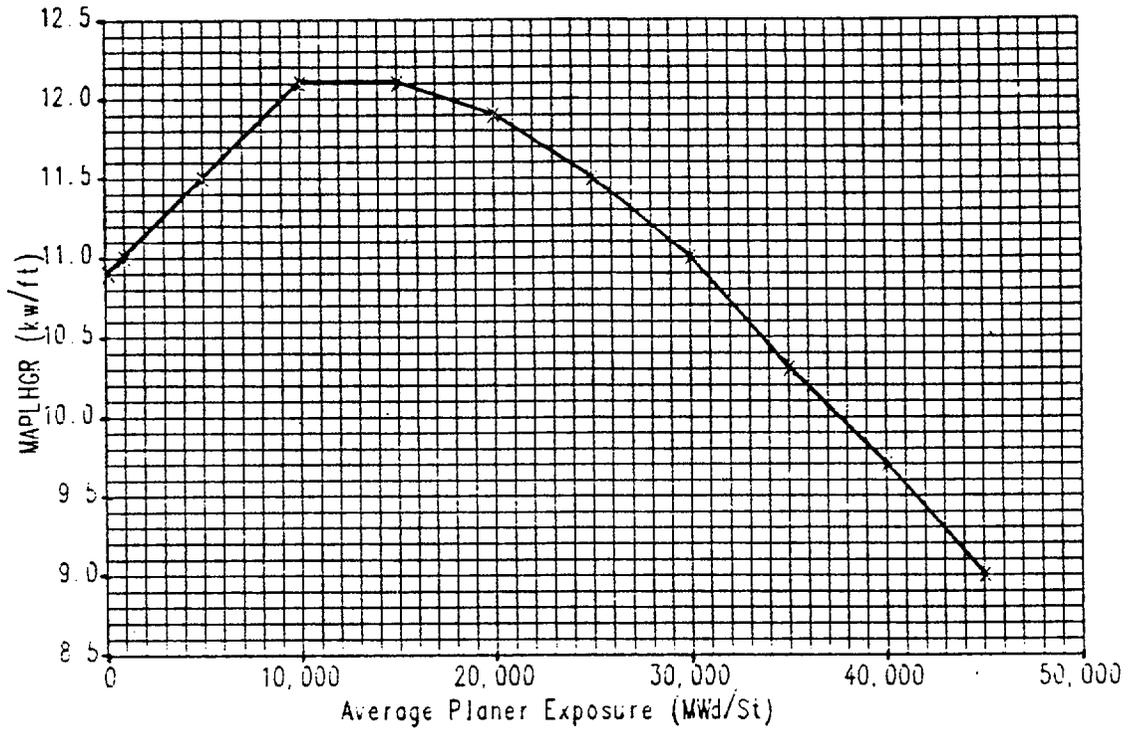
MAPLHGR Vs. Average Planer Exposure
Fuel Type Bärrier LTA



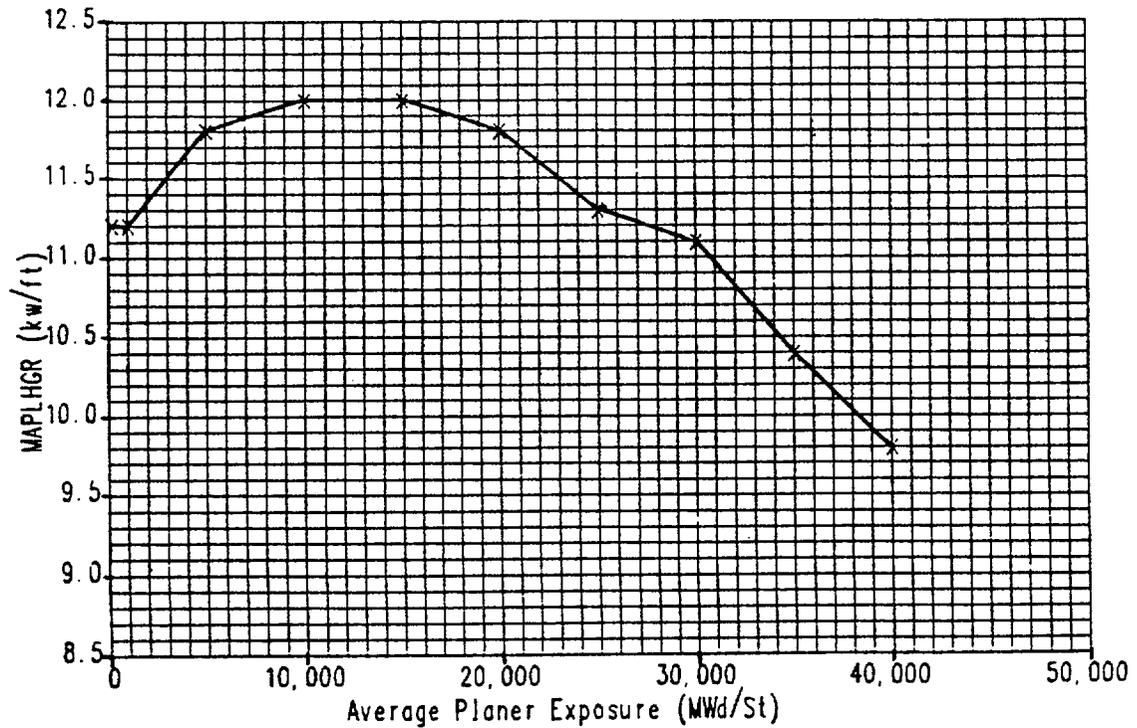
MAPLHGR Vs. Average Planer Exposure
Fuel Types P8DRB265L/P8DGB265L



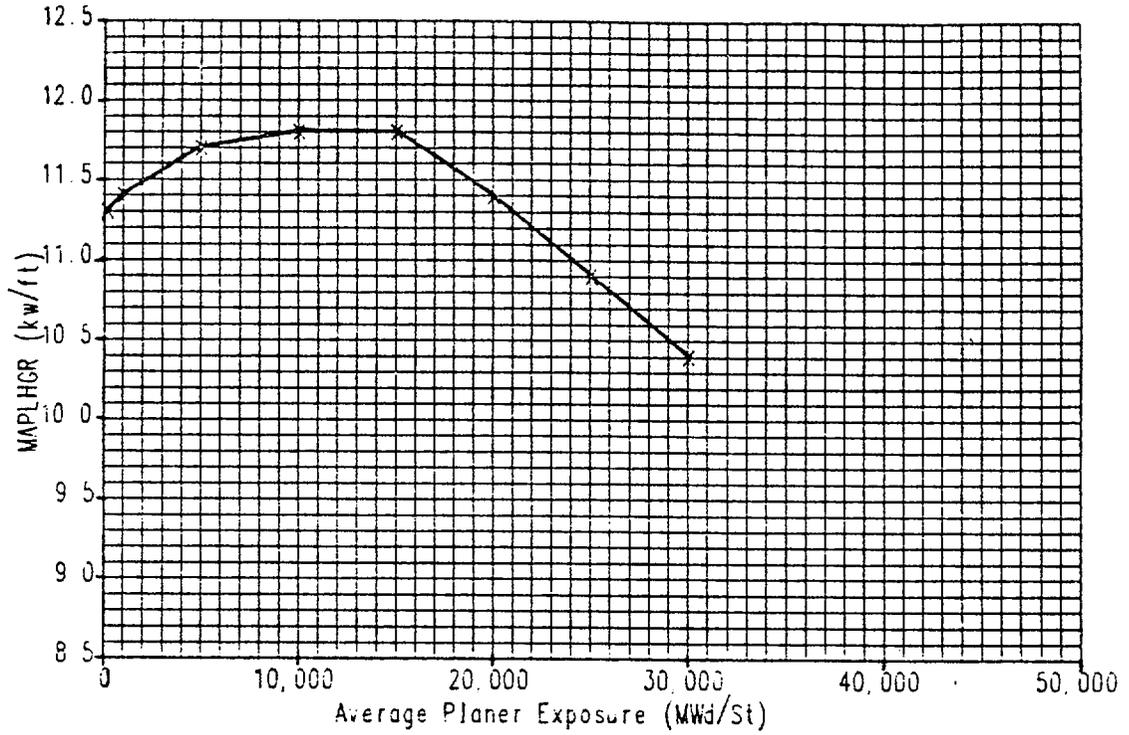
MAPLHGR Vs. Average Planer Exposure
Fuel Type BP8DRB299



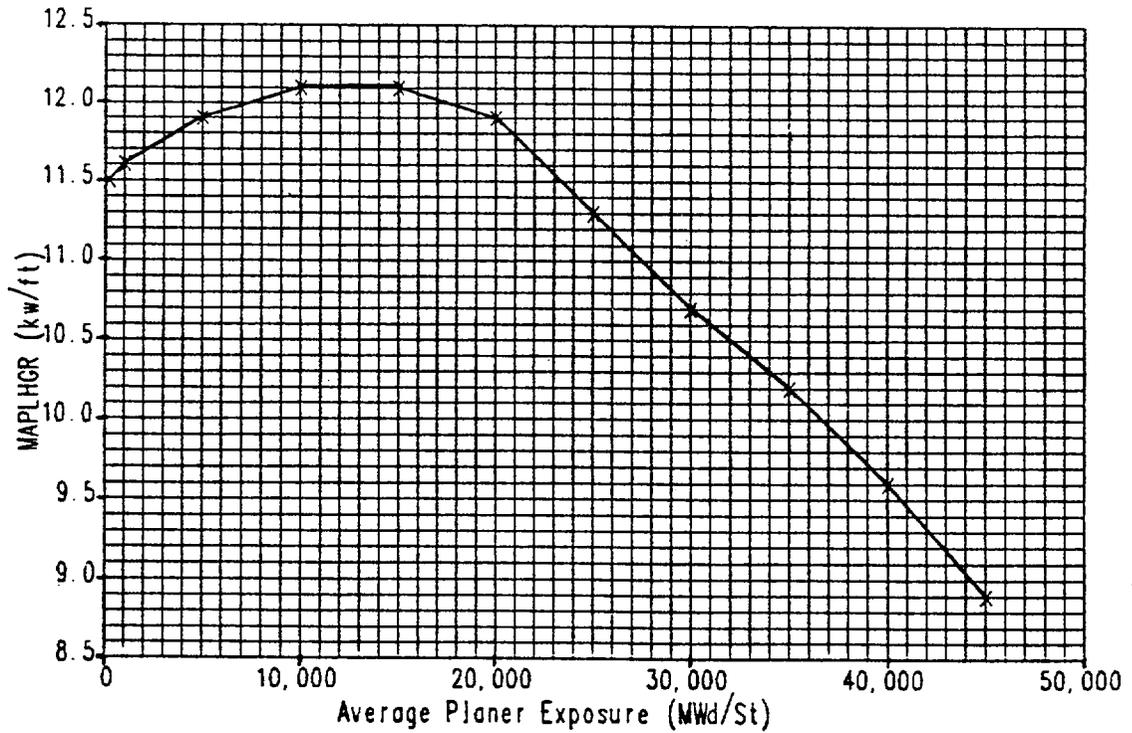
MAPLHGR Vs. Average Planer Exposure
Fuel Type P8DRB282



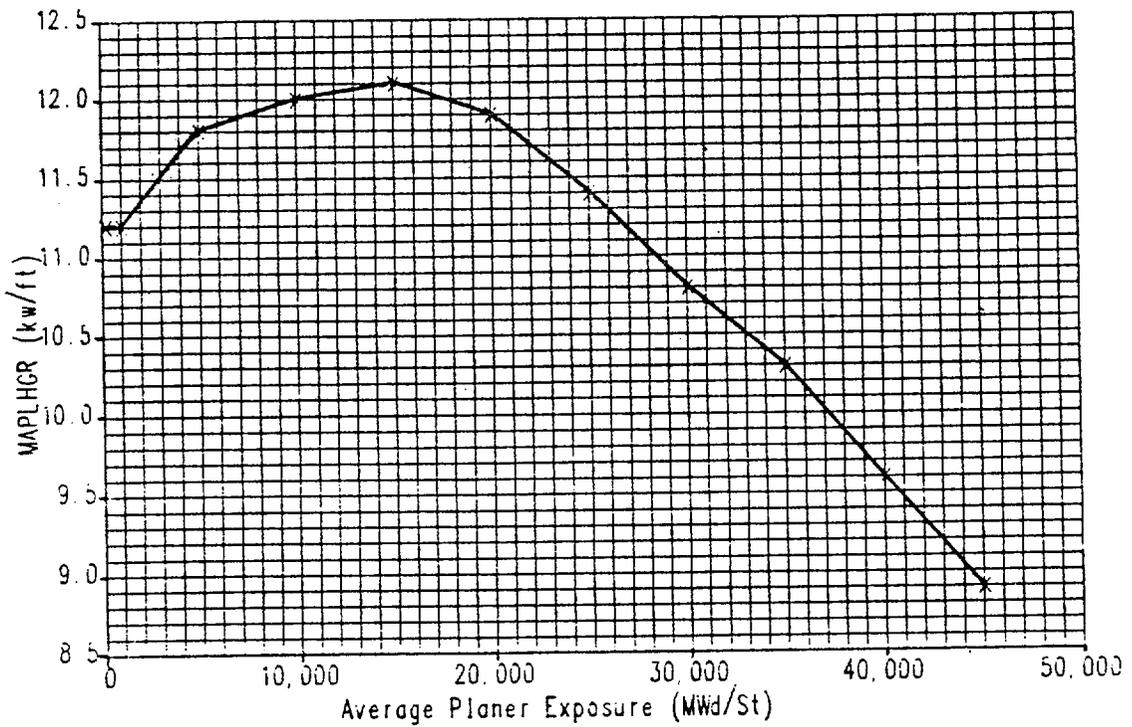
MAPLHGR Vs. Average Planer Exposure
Fuel Type P8DRB239



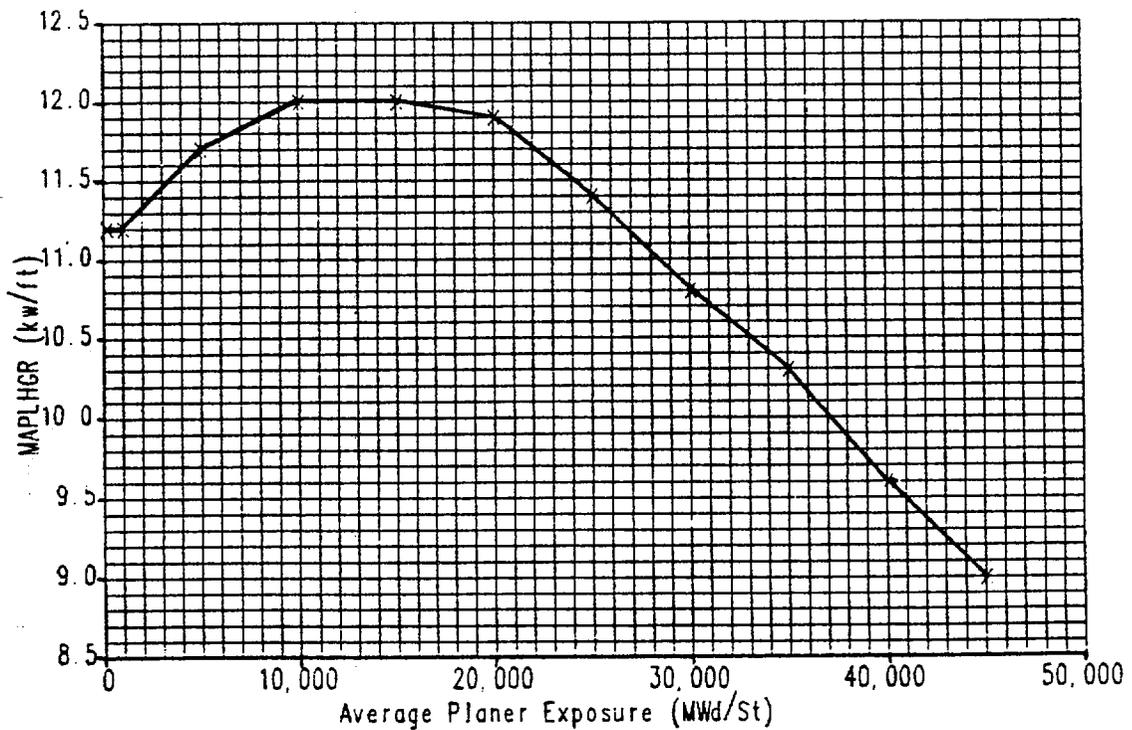
MAPLHGR Vs. Average Planer Exposure
Fuel Types P8DRB265H/BP8DRB265H



MAPLHGR Vs. Average Planer Exposure
Fuel Type BP8DRB282



MAPLHGR Vs. Average Planer Exposure
Fuel Type BP8DRB283H



QUAD CITIES
DPR-29

5.0 DESIGN FEATURES

5.1 Site

The Quad Cities Station, which consists of a tract of land of approximately 404 acres, is located about 3 miles north of Cordova, Illinois, Rock Island County, Illinois. The tract is situated in portions of Sections 7, 8, 17, and 18 of Township 20 North, Range 2 East.

5.2 Reactor

- A. The core shall consist of not more than 724 fuel assemblies.
- B. The reactor core shall contain 177 cruciform-shaped control rods. The control material shall be boron carbide powder (B_4C) compacted to approximately 70% of theoretical density or hafnium metal.

5.3 Reactor Vessel

The reactor vessel shall be as described in Table 4.1.1 of the SAR. The applicable design codes shall be as described in Table 4.1.1 of the SAR.

5.4 Containment

- A. The principal design parameters and applicable design codes for the primary containment shall be as given in Table 5.2.1 of the SAR.
- B. The secondary containment shall be as described in Section 5.3.2 of the SAR, and the applicable codes shall be as described in Section 12.1.1.3 of the SAR.
- C. Penetrations to the primary containment and piping passing through such penetrations shall be designed in accordance with standards set forth in Section 5.2.2 of the SAR.

5.5 Fuel Storage

- A. The new fuel storage facility shall be such that the K_{eff} dry is less than 0.90 and flooded is less than 0.95.
- B. The K_{eff} of the spent fuel storage pool shall be less than or equal to 0.95.

5.6 Seismic Design

The reactor building and all contained engineered safeguards are designed for the maximum credible earthquake ground motion with an acceleration of 24% of gravity. Dynamic analysis was used to determine the earthquake acceleration application to the various elevations in the reactor building.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NO. 93 TO FACILITY OPERATING LICENSE NO. DPR-29
COMMONWEALTH EDISON COMPANY
AND
IOWA-ILLINOIS GAS AND ELECTRIC COMPANY
QUAD CITIES NUCLEAR POWER STATION, UNIT 1
DOCKET NO. 50-254

1.0 INTRODUCTION

By letter dated October 29, 1985, Commonwealth Edison Company (CECo, the licensee) proposed changes to the Technical Specifications (TS) for Quad Cities Unit 1 (Reference 1). These changes would delete MAPLHGR curves for GE fuel type no longer used in the core, add MAPLHGR curves for GE fuel type BP8DRB282 and BP8DRB299 to be used in upcoming Operating Cycle 9, and extend the MAPLHGR curves for "Barrier LTA" fuel to planar average burnup of 55,000 MWD/ST. All MAPLHGR curves in the TS would be replotted for clarity, with page and sheet numbers adjusted as required to reflect the above additions and deletions.

In addition, by letter dated October 2, 1984 (Reference 2) CECo proposed a change in the TS to allow for use of hafnium as a control rod absorber material for both Units 1 and 2. By our letter dated May 30, 1985 (Reference 3) we authorized such a change for Unit 2. A similar change for Unit 1 is addressed here.

2.0 EVALUATION

2.1 MAPLHGR Changes

The emergency core cooling system (ECCS) analysis for Quad Cities Units 1 and 2, as well as for Dresden Units 2 and 3, is contained in General Electric Company (GE) Topical Report, NEDO-24146-A (Reference 4), which document was previously approved by NRC staff as the basis for MAPLHGR limits for GE nuclear fuels used in those nuclear units. This reference document, when supplemented by appropriate errata and addenda, continues to be the basis for MAPLHGR limits for GE fuels used in those units. The licensee's application (Reference 1) contains Errata and Addenda No. 14 to Reference 4 which provides MAPLHGR curves for fuel types BP8DRB282 and BP8DRB299, which fuels will be used in the upcoming Operating Cycle No. 9 for Quad Cities Unit 1. Since the MAPLHGR curves given in Errata and Addenda

No. 14 to Reference 4 are based on previously approved ECCS analyses contained in Reference 4, and so satisfy the requirements of the 10 CFR 50.46 acceptance criteria, they are appropriate for incorporation into the TS for Quad Cities Unit 1; therefore, the licensee's proposal to incorporate the MAPLHGR curves for fuel types BP8DRB282 and BP8DRB299 into the TS is acceptable.

Reference 1 also contains a request to approve an extension of the MAPLHGR curve for fuel type "Barrier LTA" (BLTA) to 55,000 MWD/ST. The fuel assemblies for which the request is made are two assemblies of zirconium-lined fuel rods introduced into the core for reload for Operating Cycle 5, so the upcoming Operating Cycle 9 will be the fifth (and last) cycle of exposure for these test assemblies. The assemblies are designed to demonstrate improved fuel integrity under more-than-normal stress, including higher-than-normal burnup conditions. By letter dated August 13, 1985 (Reference 5), the NRC staff issued approval of the GE Topical Report NEDE-22148 (Reference 6) on extended burnup of GESTAR - referenced fuels (Reference 7). Reference 5 approves peak pellet exposure of BLTA to 60,000 MWD/MT. This approved exposure is greater than the 55,000 MWD/ST requested by the licensee, so the requested extended MAPLHGR value is within that reviewed and approved by NRC staff, so the requested change is acceptable.

2.2 Hafnium Neutron Absorber Material

The licensee has requested that Unit 1 TS be conditioned to allow use of hafnium metal, as well as boron (in the form of boron carbide, B₄C), as a neutron absorber material in the control rod blades (Reference 2). The staff has previously approved use of hafnium for this purpose in other nuclear units, including Quad Cities Unit 2, Dresden Units 2 and 3, Brunswick Units 1 and 2, and some pressurized water reactors. In this case, the licensee plans to use eight control blades manufactured by ASEA-ATOM (A-A), a Swedish firm. The blades are of a design similar to, but not identical to, those already approved for use in Dresden Unit 3. The A-A control blade has been described in Licensing Topical Report TR-UR-85-225, "ASEA-ATOM Control Blades for US BWRs" (Reference 9). Following NRC staff review of the A-A Topical Report, approval was given for use of the A-A control blade in US boiling water reactors (BWRs) (Reference 10), subject to the condition that their use is accounted for in plant specific safety analyses. This condition is met by the licensee's choice of the A-A Type 4 blade, which has mechanical and nuclear characteristics sufficiently close to those described in the Quad Cities Units 1 and 2 Final Safety Analysis Report that no modelling is required to reconcile any differences.

Since the staff has approved use of these hafnium bearing control blades in US BWRs, the licensee request to condition the TS to allow for use of hafnium for a neutron absorber in control blades is acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the installation or use of a facility component located within the restricted areas as defined in 10 CFR Part 20. The staff has determined that the amendment involves 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 this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement nor environmental assessment need be prepared in connection with the issuance of this amendment.

4.0 CONCLUSION

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

Principal Contributor: Roby Bevan

Dated: March 13, 1986.

References

1. Letter, J. Wojnarowski (CECo) to H. Denton (NRC), dated October 29, 1985.
2. Letter, B. Ryback (CECo) to H. Denton (NRC), dated October 2, 1984.
3. Letter, R. Bevan (NRC) to D. Farrar (CECo), dated May 30, 1985.
4. GE Topical Report, NEDO-24146-A, "Loss of Coolant Accident Analysis Report for Dresden Units 2, 3 and Quad Cities Units 1, 2 Nuclear Power Stations," Rev. 1, dated April 1979, as subsequently revised by Errata and Addenda 1 through 14.
5. Letter, C. Thomas (NRC) to J. Charnley (GE), dated August 13, 1985.
6. GE Topical Report NEDE-22148, "Extended Burnup Evaluation Methodology".
7. GE Topical Report, NEDO-24011-A, "Generic Reload Fuel Application," and Appendices.
8. Letter, D. Crutchfield (NRC) to D. Farrar (CECo), dated March 9, 1984.
9. ASEA-ATOM Topical Report TS-UR-85-225, "ASEA-ATOM Control Blades for US BWRs," submitted to NRC by letter dated September 24, 1985.
10. Memorandum, from G. Lainas (NRC) to H. Berkow (NRC), dated January 27, 1986.