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, B_4C), 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.