



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 90 TO FACILITY OPERATING LICENSE NO. DPR-29

COMMONWEALTH EDISON COMPANY  
AND  
IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

QUAD CITIES STATION, UNIT 1

DOCKET NO. 50-254

1.0 INTRODUCTION

By letters dated February 21, February 28 and May 8, 1984 Commonwealth Edison Company (CECo, the licensee) proposed changes to the Technical Specifications (TSs) for Quad Cities Unit 1 (See References 1, 2, 3). These changes would (1) incorporate new MAPLHGR curves for new barrier fuel of the same nuclear type as non-barrier fuel already in the core, and approve MAPLHGR curves for assembly average burnup to 45,000 MWD/ST for certain fuel types contained in the core during upcoming operating Cycle 8; (2) change the calibration and functional test frequencies for certain specific instrumentation that is being replaced with analog trip systems; and (3) incorporate appropriate TSs for operation with the newly modified scram discharge system.

2.0 EVALUATION

2.1 MAPLHGR Limits

The reference document containing the ECCS analysis for Quad Cities Units 1 and 2 (as well as Dresden Units 2 and 3) has previously been approved by the NRC staff and continues to be the basis for MAPLHGR limits for all fuel types used in these units (Reference 4). This reference document has been updated as appropriate for other fuel types by issuance of Errata and Addenda to Reference 4. Barrier fuel type BP8DRB283H is to be used in the core during the upcoming operating cycle, and is of the same nuclear design as the non-barrier fuel type P8DRB282H, which has already been approved for and used in Quad Cities Units. Since the two fuel types are of the same nuclear design, the MAPLHGR curve for the already-approved fuel type P8DRB282H applies also to the barrier fuel, as documented by General Electric (GE) in the Errata and Addenda No. 12 to Reference 4, and the licensee's proposal to incorporate this into their TSs is acceptable.

The application (Reference 1) also contains a request to approve an extension of MAPLHGR limits to assembly average burnup of 45,000 MWD/ST for two fuel types already in the core. By Errata and Addenda Nos. 11 and 12 to Reference 4, the licensee supports an extension to MAPLHGR curves from 40,000 to 45,000 MWD/ST for fuel types P8DRB265H and "Barrier LTA." These

limits were generated by method previously approved and having general applicability for MAPLHGR limit determination (Reference 5). In response to NRC staff concerns that the possible effects of enhanced fission gas release were not adequately considered in the fuel performance model, GE requested that credit for approved but unapplied ECCS evaluation model changes and calculated peak cladding temperature margin be used to avoid MAPLHGR penalties at high burnups (References 6 and 7). This proposal was found acceptable (Reference 8) provided that certain plant-specific conditions were met. As documented in the licensee's application (Reference 1), the GE-produced supporting reference document demonstrates the applicability to Quad Cities Unit 1 operating Cycle 8. Further, the staff has investigated potential changes in the radiological consequences of the fuel handling accident (the design basis accident) due to the possible involvement of extended burnup (as high as 45,000 MWd/MT) fuel in the accident scenario, and concludes that new radiological consequences would not be in excess of the SRP guideline value of 75 Rem to the thyroid. On the basis of the foregoing considerations, the extended MAPLHGR limits for the fuel types cited are acceptable.

## 2.2 Analog Trip Instrumentation Surveillance Frequency

Certain equipment is being replaced to satisfy the requirement of 10 CFR 50.49 regarding environmental qualification of electrical equipment important to safety. In associating with these changes, several existing instruments will be converted into analog trip systems; these are:

Reactor Low Water Level Instrument, 1-263-57A and B and 1-263-58A and B  
Reactor Water High Level Instrument, 1-263-73A and B  
HPCI High Steam Floor Instrument, 1-2389A thru D  
HPCI Steam Line Low Pressure Instrument, 1-2352 and 1-2353

The analog trip systems consist of an analog sensor and transmitter, and a trip unit arrangement which ultimately actuates a trip relay. The frequency of calibration and functional testing for instrument loops of the analog trip system has been established in Reference 9, an NRC-approved reference document. With the currently installed one-out-of-two, taken twice logic, the prescribed calibration/functional test frequency is once per month. The proper calibration/functional test frequency for the respective transmitters, however, is once per operating cycle. The TS changes proposed in Reference 2 would require the channel calibration to be performed at the transmitter at a frequency of once per operating cycle. Since this is the calibration frequency recommended in the NRC-approved GE Topical Report, NEDO-21617-A (Reference 9), and the proposal is to conform the surveillance requirements to the recommended and NRC-approved period, the licensee's proposal is acceptable.

### 2.3 Scram Discharge System

A Generic Safety Evaluation for the modified scram discharge system, issued December 10, 1980, endorsed the criteria set forth by the BWR Owners Subgroup to meet the concerns arising from the Browns Ferry incomplete scram event of July 1980. By the NRC Confirmatory Order of June 24, 1982, the licensee's commitment to modify its scram discharge system in response to these concerns was confirmed (Reference 10). Also, model Technical Specifications were forwarded to the licensee as guidance for revising the TS for operation with the newly modified scram discharge system. Following a period of discussion with the licensee regarding the application of the model Technical Specifications to the unit-specific TS for Quad Cities, Units 1 and 2, the licensee by letter dated February 28, 1984 proposed TSs for the newly modified scram discharge system for Unit 1. The TS changes proposed in the licensee's submittal are fully responsive to the concerns addressed in the Generic Safety Evaluation on Scram Discharge Systems, and are in keeping with the guidance provided in the model Technical Specifications, and are acceptable.

### 3.0 ENVIRONMENTAL CONSIDERATIONS

The amendment involves a change in the installation or use of a facility component located within the restricted area 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 the amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, the 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 or environmental assessment need be prepared in connection with the issuance of the amendment.

### 4.0 CONCLUSIONS

We have 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 or to the health and safety of the public.

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Dated: August 2, 1984

#### REFERENCES

- 1) Letter, R. Rybak (CECo) to H. Denton (NRC), dated February 21, 1984.
- 2) Letter, R. Rybak (CECo) to H. Denton (NRC), dated May 8, 1984.
- 3) Letter, R. Rybak (CECo) to H. Denton (NRC), dated February 28, 1984.
- 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 12.
- 5) Letter, D. Eisenhut (NRC) to E. Fuller (GE), dated May 30, 1977.
- 6) Letter, R. Engel (GE) to T. Ippolito (NRC), dated May 6, 1981.
- 7) Letter, R. Engel (GE) to T. Ippolito (NRC), dated May 28, 1981.
- 8) Memorandum, L. Rubenstein (NRC) for T. Novak (NRC), "Extension of GE-ECCS Performance Limits," dated June 25, 1981.
- 9) GE Topical Report, NEDO-21617-A, "Analog Transmitter/Trip Unit Systems for Engineered Safeguard Sensor Trip Inputs," dated December 1978.
- 10) Letter, D. Eisenhut (NRC) to D. Farrar (CECo), dated June 24, 1982.