



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 83 TO FACILITY 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 application dated August 19, 1982 and supplemented by two letters dated October 18, 1982, Commonwealth Edison Company (CECo, the licensee) proposed changes to the Technical Specifications (TS) for Quad Cities Unit 1 (References 1 and 2). These changes are required to support future reloads for Unit 1 in accordance with the provisions of 10 CFR 50.59 and are needed for the initial application of the ODYN transient analyses code to the upcoming operating cycle.

Earlier changes to the TS were made to bound future reloads of Unit 1 (see Reference 3). These changes did not, however, entirely bound the parameters applicable to operating cycle 7, primarily because the transient analyses had not previously been performed using the ODYN code, and also because extended MAPLHGR analyses had not been completed for all fuel types still in the core.

The changes approved here are very similar to those approved in a previous amendment for Quad Cities Unit 2, by letter dated December 23, 1981.

2.0 Evaluation

2.1 MAPLHGR Limits

The previously staff approved reference document NEDE 24146A (see Reference 6) contains an approved ECCS analysis for Quad Cities Units 1 and 2, as well as for Dresden Units 2 and 3, and continues to provide the basis for MAPLHGR limits for the fuel types used.

The licensee has proposed TS changes that will revise the MAPLHGR limit curves for fuel types 8DRB265L, P8DRB265L, P8DRB265H and P8DRB282. For all the fuel types mentioned, the revised curves extend the MAPLHGR limits from the previous maximum planar average exposure of 30,000 MWD/ST to a planar average exposure of 40,000 MWD/ST. MAPLHGR limits to nonprepressurized fuel have previously been conservatively applied to prepressurized

fuel because of the unavailability of the slightly less restrictive MAPLHGR limits for prepressurized fuels. These limits for prepressurized fuel are now available and are incorporated in the revised TS for upcoming operating Cycle 7. We previously approved the extension of MAPLHGR curves to fuel exposures of 40,000 MWD/ST for all fuel types cited here (see Reference 4) and therefore, find this acceptable.

## 2.2 Deletion of 7 X 7 Fuel Limits

Following completion of operating Cycle 6, all 7 X 7 fuel will be removed from the Unit 1 core, and there are no plans for future use of such fuel types in the core of Unit 1. Therefore, all references to MCPR, MAPLHGR AND LHGR operating limits for all 7 X 7 fuel types, including mixed oxide fuel previously burned in the core, have been removed from the TS.

## 2.3 Pressure Safety Limit Changes Due to ATWS RPT

As of January 1, 1981, Quad Cities Unit 1 has had a recirculation pump trip (RPT) installed and implemented to mitigate the effects of an anticipated transient without scram (ATWS). While this modification reduces peak pressures for transients without scram, it also has the effect of increasing the peak pressurization for a severe transient with scram, such as load reject without bypass or a main steam isolation valve (MSIV) closure without valve position trip. However, pressurization transients which do cause the RPT setpoint (1250 psig) to be exceeded can cause higher steamdome pressures, where the measured vessel pressure limit is increased from 1325 psig to 1345 psig. The vessel peak pressure at the bottom of the vessel remains at 1375 psig. The assumed pressure difference of 30 psig still assures compliance with ASME code criteria of 110% of vessel design pressure (i.e.  $110\% \times 1250 = 1375$  psig).

Wording changes in the bases have also been incorporated to clarify that compliance of peak vessel pressure with the ASME criteria also assures compliance of the primary system piping with the USASI criteria for the limiting point (i.e. less than 1410 psig at the lowest point in the recirculation line). These changes were recommended by GE to remove the false implication in the current bases that all points in the primary system must remain less than the ASME criteria for the vessel (1375 psig). On the basis of the foregoing consideration, we find these changes to be acceptable.

#### 2.4 Operating Limit MCPR; Use of ODYN Code

The most limiting operating transient (load reject without bypass) has been determined by the licensee using the ODYN transient analysis code. The calculated CPRs for this transient were adjusted to reflect either Option A or Option B  $\Delta$ CPR by employing the conversion method described in References 5 and 7. The initial MCPR values are then determined by adding the  $\Delta$ CPR to the safety limit MCPR to get an operating limit MCPR. Therefore, the operating limit MCPR TS has been modified to include an Option B format where the operating limit MCPRs for each fuel type have been incorporated in Sections 3.3.C/4.3.C and 3.5.K of the TS. These changes are consistent with our current position on the use of the ODYN transient analysis code, and are acceptable.

#### 2.5 Safety/Relief Valve Setpoint Changes

In analyses associated with the Mark I containment program, it was discovered that the torus could be subjected to excessive loads if a relief valve actuation occurs shortly after closure. This loading is the result of a water leg entrapped in the relief valve discharge line from the vacuum caused by the condensed steam in this line. To prevent such loading, a modification to the electromatic relief (EMR) valve logic is currently being installed which will delay automatic opening of two EMR valves up to ten seconds from the last closure of the valve. In order to maintain very similar overall Target Rock and EMR valve performance with the logic change and prevent excessive loading, the two affected EMR valves TS pressure setpoints must be lowered so that they are the first to actuate and the setpoint of one valve (Target Rock) will be raised.

For the limiting transient (load rejection w/o bypass) the pressurization is estimated by GE to be milder because there is a net relief valve setpoint decrease, thus slightly lowering the peak pressure and power for the transient.

The ASME overpressurization event (no credit for EMR valve actuation) is estimated by GE to have slightly increased peak pressure (no more than 5 psi) because the Target Rock SRV setpoint is slightly increased. This peak pressure increase is insignificant compared to the calculated margin to 1375 psig of 50 psi.

The delay in actuation between successive valve openings is required because of the possibility of an automatic depressurization immediately following opening of a valve for pressure relief. The calculated minimum acceptable delay time reported by the licensee is 6.2 seconds. This compares conservatively with the ten-second delay proposed for the TS, with ample margin.

We have reviewed the proposed changes in the SRV setpoints and the proposed delay for successive actuations and find the change to have minimal effect on safety limits, and therefore, we find the proposed changes to be acceptable.

#### 4.0 Environmental Consideration

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement, or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

#### 5.0 Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated, does not create the possibility of an accident of a type different from any evaluated previously, and does not involve a significant reduction in a margin of safety, the amendment does 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 this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: December 15, 1982

The following NRC personnel have contributed to this Safety Evaluation:

Roby Bevan and Wayne Hodges

## REFERENCES

1. Letter, Rausch (CECo) to Denton (NRC), "Proposed Amendment to Appendix A Technical Specifications to Facility Operating License DPR-29 to Implement 10 CFR 50.59 Reload Licensing with ODYN Transient Analysis and Extended Exposure MAPLHGR Limits", dated August 19, 1982
2. Letters (2), Rausch (CECo) to Denton (NRC), dated October 18, 1982
3. Letter, Ippolito (NRC) to Abel (CECo), dated December 5, 1980
4. NEDE-24011-A-1, "General Electric BWR Generic Reload Fuel Applications", July 1979
5. Letter, Buchholz (GE) to check (NRC), "Response to NRC Request for Information on ODYN Computer model", dated September 5, 1980.
6. NEDO 24146A, "LOCA Report for Dresden 2 and 3 and Quad Cities 1 and 2 Nuclear Power Stations" Revision 1, April 1979, as modified by Errata and Addenda Nos. 1 through 8
7. Letter, Buchholz (GE) to Check (NRC) "ODYN Adjustment Methods for Determination of Operating limits" dated January 19, 1981