



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NO. 63 TO PROVISIONAL OPERATING LICENSE NO. DPR-19

AMENDMENT NO. 54 TO FACILITY OPERATING LICENSE NO. DPR-25

AMENDMENT NO. 73 TO FACILITY OPERATING LICENSE NO. DPR-29

AMENDMENT NO. 66 TO FACILITY OPERATING LICENSE NO. DPR-30

COMMONWEALTH EDISON COMPANY
AND
IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

DOCKET NOS. 50-237, 50-249, 50-254 AND 50-265

1.0 INTRODUCTION

On June 29, 1981, Commonwealth Edison Company (CECo) (the licensee) notified NRC that one recirculation loop at Dresden Station Unit No. 2 had been declared inoperable and requested emergency authorization to operate in excess of the 24-hour period permitted by the Technical Specifications.

By a telecopied letter dated June 30, 1981, CECo, requested an immediate change to Provisional Operating License No. DPR-19 (Dresden 2) and an expeditious change to Facility Operating License Nos. DPR-25, DPR-29, and DPR-30 for Dresden 3, Quad Cities 1 and 2, respectively. The purpose of the requested changes is to allow continued operation of Dresden 2 while maintenance is performed on the inactive loop and to provide permanent license provisions authorizing 50% power operation with one loop out of service for an unlimited time period of Dresden Units 2 and 3 and Quad Cities Unit 1 and 2.

Because the NRC staff has not explicitly reviewed single-loop operation at Dresden 2 and 3 and Quad Cities 1 and 2 the current Technical Specifications require shutdown in 24 hours when operating on one recirculation loop.

The CECo request references their previous May 24, 1981 request for a similar authorization to operate Dresden 2 for a limited period of time in the single loop mode while repairing a damaged motor generator set. The Staff reviewed CECo's May 24 request and a supplement thereto dated May 27 and on June 1, 1981 issued Amendment No. 61 to License DPR-19 which authorized Dresden 2 to operate on one loop for up to 28 days.

2.0 EVALUATION

2.1 Steady State thermal power level will not exceed 50%

The licensee proposed to limit steady state thermal power to 50% of rated power when operating with one recirculation loop isolated. The licensee stated that for the Dresden 2 power/flow operating map the 100% flow control line intersects the natural circulation line at 53% power. With power limited to 50% no fuel damage would occur in the event of a recirculation pump seizure.

Operating at 50% power with appropriate T-S changes was approved on a temporary basis for the Duane Arnold plant and Peach Bottom Units 2 and 3 (Safety Evaluation Reports (SER) dated May 6, 1980 and May 15, 1981 respectively). It was concluded that for operation at 50% power transient and accident bounds would not be exceeded for these plants. Since the Dresden 2 is a lower power density plant than Peach Bottom we find that the analyses and conclusions would also apply to Dresden 2, Dresden 3, Quad Cities 1, and Quad Cities 2.

2.2 Minimum Critical Power Ratio (MCPR) Safety Limit will be increased by 0.03 to 1.10

The MCPR Safety Limit will be increased by 0.03 to account for increased uncertainties in core flow and Traversing Incore Plant (TIP) readings. The licensee has reported that this increase in the MCPR Safety Limit was addressed in GE reports specifically for Dresden 2 for one loop operation. On the basis of previous staff reviews for Duane Arnold and Peach Bottom and on our review of plant comparisons we find that this analysis is acceptable for Dresden 2 and 3 and Quad Cities 1 and 2.

2.3 Minimum Critical Power Ratio (MCPR) limiting condition for operation (LCO) will be increased by 0.03 in each case.

The staff proposed that the operating limit MCPR be increased by 0.03 and multiplied by the appropriate two loop K_f factors that are in the Dresden 2 and 3 and Quad Cities 1 and 2 Technical Specifications. This will preclude an inadvertent flow increase from causing the MCPR to drop below the safety limit MCPR. Using K_f factors derived for two loop operation is conservative for 1 loop operation. The licensee agreed to the staff's proposal of multiplying the operating limit MCPR by the Technical Specification K_f factor. This was also approved by the staff for Duane Arnold and Peach Bottom 2 and 3.

- 2.4 The Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) limits will be reduced by appropriate multipliers.

The licensee proposed reducing the Technical Specification MAPLHGR by 0.87 (7x7 fuel); 0.87 (8x8 fuel) and 0.84 (8x8R/P8x8R fuel) for single loop operation. These reductions were based on analyses by General Electric (GE) in reports NEDE 24011-P-A-1 and NEDO 24807. Since these reports have not been reviewed and approved by the staff for Dresden and Quad Cities Stations, we applied an additional conservatism by using a reduction factor of 0.70. The Peach Bottom units were allowed to operate with their MAPLHGR values reduced by factors of 0.71, 0.83, and 0.81 for an unlimited period of time for the three types of fuel. Accordingly, the greater MAPLHGR reduction factor of 0.70 for Dresden and Quad Cities is adequately conservative to assure operational safety.

- 2.5 The APRM Scram and Rod Block Setpoints and RBM Setpoints will be reduced.

The licensee proposed to modify the two loop APRM Scram, Rod Block and Rod Block Monitor (RBM) setpoints to account for back flow through half the jet pumps. The changes were based on plant specific analyses by GE. These setpoint equations will be changed in the Dresden and Quad Cities license conditions. The above changes are similar to the Duane Arnold and Peach Bottom Technical Specification changes and are acceptable to the staff.

- 2.6 The Suction valve in the idle loop is closed and electrically isolated.

The licensee will close the recirculation pump suction valve and remove power from the valve. In the event of a loss of coolant accident this would preclude partial loss of LPCI flow through the recirculation loop degrading the intended LPCI performance. The removal of power also helps to preclude a startup of an idle loop transient.

- 2.7 The Equalizer line between the loops will be isolated.

The licensee will close appropriate valves in the cross-tie (equalizer) line between the loops. The previously discussed analyses assumed the two loops were isolated, therefore, it is required that the cross-tie valve be closed.

- 2.8 The recirculation control will be in manual control.

The staff requested that the licensee operate the recirculation system in manual mode to eliminate the need for control system analyses and to reduce the effects of potential flow instabilities. This was also required of Duane Arnold and Peach Bottom. The licensee agreed to operate in this manner.

2.9 Surveillance Requirements

The staff requested that the licensee perform daily surveillance on the jet pumps to ensure that the pressure drop for one jet pump in a loop does not vary from the mean of all jet pumps in that loop by more than 5%. The licensee stated that this requirement is already incorporated in their technical specifications.

3.0 SUMMARY OF SINGLE LOOP OPERATION

In order to ensure an adequate margin of safety the licensee has committed to the following during single loop operation.

- A. The idle loop suction valve is closed and electrical power is removed.
- B. The recirculation controls will be placed in the manual mode.
- C. The settings for the APRM rod block trip, flow bias scram and the rod block monitor will be modified as necessary.
- D. Δ PLHGR reduction factors will be imposed.
- E. Power Level will be limited to 50% of rated.
- F. The cross-tie valve between the recirculation loops will be closed.
- G. Daily surveillance on jet pump operating characteristics will be performed.

4.0 AUTHORIZATION FOR SINGLE-LOOP OPERATION FOR EXTENDED PERIODS

CECo's previous request for Dresden 2 single loop operation was granted for a limited period of 28 days. During the period of single loop operation no anomalous behavior was observed and operation was within the special license conditions imposed by Amendment 61.

CECo submitted a General Electric Company Report, NEDO 24807, entitled "Dresden Nuclear Power Station Units 2 and 3 and Quad Cities Nuclear Power Station Units 1 and 2 Single Loop Operation" in support of its May 24, single loop request.

The methodology of the analysis is identical to that used in the Peach Bottom review, and the reactors are similar, all being General Electric Boiling Water Reactors.

During a period of single-loop operation that occurred at Browns Ferry Unit No. 1 in 1978, unexpected variations in jet pump flow and neutron flux were observed at a power level of 59%. These variations stopped when the power level was reduced below 59% and the reactor operated for approximately two months in single-loop operation until the end of cycle. In October 1978,

General Electric suggested that (1) the APRM flux noise should be limited to 5 percent peak to peak, (2) that the core plate Δp noise should be limited to 1 psi peak to peak due to fuel channel considerations and (3) the pump speed shall be reduced if the above surveillance indicates the presence of unexpected internal vibrations.

We have reviewed the results obtained in the NEDO 24807 review and conclude that the similarities in the analysis, the reactor system, and the conservative limits placed on flow induced internal vibration permit us to authorize operation with one loop out of service.

Therefore, based upon the above evaluation, we conclude that single-loop operation for Dresden 2 and 3 and Quad Cities 1 and 2 up to a power level of 50% and in accordance with the above proposed license changes, will not exceed the bounds of transients and accidents previously found acceptable by the staff.

5.0 ENVIRONMENTAL CONSIDERATIONS

We have determined that these amendments do 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 amendments involve 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 these amendments.

6.0 CONCLUSION

We have concluded, based on the considerations discussed above, that (1) because the amendments do not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the amendments 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 the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Dated: July 9, 1981