



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 127 TO FACILITY OPERATING LICENSE NO. DPR-19,  
AMENDMENT NO. 121 TO FACILITY OPERATING LICENSE NO. DPR-25,  
AMENDMENT NO. 147 TO FACILITY OPERATING LICENSE NO. DPR-29  
AND AMENDMENT NO. 143 TO FACILITY OPERATING LICENSE NO. DPR-30

COMMONWEALTH EDISON COMPANY

AND

IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3

QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2

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

## 1.0 INTRODUCTION

Dresden and Quad Cities Stations propose to revise Technical Specification (TS) 3/4.6 to allow Single Loop Operation (SLO) with the recirculation loop suction and discharge valves open. The amendments also delete outdated and unnecessary portions of TS 3.6.H for Dresden, Units 2 and 3, and provide more consistency with the BWR Standard TS (NUREG-0123, Revision 4).

## 2.0 EVALUATION

### 2.1 Recirculation Valve Configuration During SLO

Dresden Units 2 and 3 and Quad Cities Units 1 and 2 are proposing revisions to the TS to allow Single Loop Operation (SLO) with the recirculation suction valve and the recirculation discharge valve open and unisolated in the idle recirculation loop. During SLO, the current Dresden and Quad Cities TS require that the suction valve in the idle recirculation loop be closed and electrically isolated except when the idle loop is being prepared for return to service.

The original purpose of this requirement was to prevent the partial loss of Low Pressure Coolant Injection (LPCI) flow through the recirculation pump and into the downcomer region during a Loss-of-Coolant Accident (LOCA). However, closing the suction valve is not necessary in accident conditions because LPCI is provided with a means by which it selects the intact recirculation loop and automatically closes that recirculation loop's discharge valve.

Eliminating the requirement to isolate the idle recirculation loop increases plant reliability. Flow stagnation causes the idle loop to cool down to ambient drywell temperature. Temperature differences between the two recirculation loops leads to differential expansion rates which result in high stress conditions. Removing this requirement from the TS allows Dresden and Quad Cities to operate with a single recirculation loop operable with natural circulation in the idle loop keeping the temperature near reactor operating temperature and eliminating differential growth rates and high stress conditions.

## 2.2 Affects on Accident/Transient Analysis

The proposed changes potentially affect the Dresden and Quad Cities LOCA analyses and the analysis for the inadvertent startup of an idle recirculation pump in an unisolated loop. General Electric and Siemens Nuclear Power performed an analysis for both Dresden and Quad Cities with the idle recirculation loop not isolated during SLO. The conclusion of the analysis determined that the current LOCA analysis for both plants remains bounding.

The LOCA analysis for Quad Cities takes no credit for closure of the recirculation suction valve to properly direct LPCI flow into the lower plenum of the reactor. The LPCI loop selection logic is relied upon to automatically close the recirculation discharge valve of the selected intact loop. For Dresden, LPCI is not credited to inject because the limiting failure is the LPCI injection valve. It has been shown that the LPCI injection valve failure remains the limiting single failure at Dresden during SLO with the idle loop unisolated. The LOCA ECCS analyses previously performed for SLO remain applicable and the severity of a postulated LOCA event has not increased. The proposed changes do not physically change the plant in any manner that would increase the probability of a LOCA. The current MAPLHGR limits at Dresden and Quad Cities will continue to ensure that 10 CFR 50 Appendix K criteria are satisfied. The staff, therefore, finds that proposed SLO with the idle recirculation loop unisolated is acceptable and the above proposed changes to the TS are acceptable.

## 2.3 Inadvertent Startup of an Idle Recirculation Pump LCO and Surveillance

A new TS is also being added to require that an idle recirculation pump be electrically prohibited from starting within 24 hours after initiation of SLO. Provisions for testing and restart of the pump or motor-generator (MG) set are also included as a conservative measure. The inadvertent startup of an idle recirculation pump is precluded when the loop is unisolated because the discharge valve must be closed for the pump to start. This is further precluded by the added requirement to electrically prohibit the pump from starting. In addition, leaving the loop unisolated results in an increase in the temperature of the water in the loop. This would result in a correspondingly lower reactivity insertion should the inadvertent startup of the idle pump occur. Therefore, the proposed TS changes do not adversely affect plant safety at Dresden and Quad Cities Stations. The staff, therefore, finds this change acceptable.

The proposed changes to the Technical Specifications also add temperature monitoring surveillance requirements to preclude inadvertent startup of an idle

recirculation loop introducing unacceptable stresses in the primary system during idle pump starts. The proposed TS adds a temperature differential requirement between active and idle loops not to exceed 50°F. The proposed TS also adds requirements that the active loop pump speed must be less than 45% at Quad Cities and 43% at Dresden prior to starting the idle loop. This change is conservative and reduces the consequence to the plant in the event of an inadvertent idle pump startup. The aforementioned changes are administratively controlled where appropriate to ensure proper controls are in place to ensure these requirements are maintained. The proposed TS adds surveillances requiring the temperature differentials and pump speed to be determined and be within the above limits within 15 minutes prior to startup of the idle recirculation loop. The staff, therefore, finds the proposed changes to the TS acceptable.

#### 2.4 Other Changes

The proposed amendment eliminates and corrects sections in Dresden and Quad Cities TS which address SLO.

The proposed TS eliminates sections in the Dresden TS which address surveillance requirements during SLO operation upon entry into the thermal hydraulic instability region. The current Dresden TS require surveillance of the nuclear instrumentation be performed during SLO upon entrance into thermal hydraulic instability regions. This is contrary to the requirements of NRC Bulletin (IEB) 88-07. More conservative administrative controls/procedures are currently followed at Commonwealth Edison Company (CECo) to meet the requirements of NRC Bulletin (IEB) 88-07, Supplement 1. The administrative controls require the unit during SLO to exit the thermal hydraulic instability region as soon as possible or shut the unit down. These administrative controls currently in place to preclude the consequences of thermal hydraulic instability are more conservative than existing Dresden TS requirements. The current Dresden TS requirements governing thermal hydraulic stability are obsolete and would possibly lead to less safe operation if followed. There currently are no TS requirements governing thermal hydraulic instability requirements at Quad Cities. However, the administrative/procedural controls currently in place at both Dresden and Quad Cities Station conservatively preclude the station from experiencing thermal hydraulic instability situations and are consistent with the guidance provided in IEB 88-07, Supplement 1. The staff, therefore, finds the proposed change to the TS to be acceptable.

Another change for Dresden Station only is to remove operation with the Master Flow Control in Auto during SLO. This change ensures consistency between Dresden, Quad Cities and the Standard Technical Specifications. Operation in SLO above 65% core flow is difficult to achieve because of jet pump vibration concerns. For these reasons, operation in the auto flow control mode at Dresden while in SLO is proposed to be eliminated from the TS. This proposed change will ensure safer plant operation; therefore, the staff finds the proposed change to the TS acceptable.

The proposed amendment changes the Quad Cities TS actions to support SLO initiation within 24 hours, a change from the current 12 hours requirement. This

change ensures consistency between Dresden, Quad Cities, and the Improved Standard Technical Specification requirements. The additional 12 hours to initiate the actions required for SLO is a relaxation of current requirements, which require actions to support SLO initiation within 12 hours. Twenty four hours allows a reasonable time to review the cause of the condition and to effect necessary actions to return the inoperable loop to operation. This change is consistent with the current requirements within the Dresden Technical Specifications and the Improved Technical Specifications. The staff, therefore, finds the proposed changes to the TS acceptable.

Other changes proposed by the amendment request are the addition of requirements at Dresden and Quad Cities Station that require reduction to less than 25% power within two hours while the unit operates without forced circulation. The Dresden TS currently allows operation in natural circulation below 25% power. The new requirement would be to reduce power to less than 25% power within two hours, and place the unit in Hot Shutdown within 12 hours if both recirculation pumps trip. This change is prudent in light of recent instability concerns with Boiling Water Reactors (BWRs). The elimination of forced circulation requirements from the TS conservatively increases plant safety by eliminating a potentially unstable region of reactor operation. The staff finds the proposed change would ensure safer operation of the plant; therefore, the staff finds the proposed changes to the TS acceptable.

## 2.5 Changes to the Technical Specification Bases

Changes have been made to the Technical Specification Bases to reflect the aforementioned revisions. The revisions to the Bases are consistent with the changes made to the TS. The staff has reviewed the changes to the Bases and finds the changes acceptable.

## 3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Illinois State official was notified of the proposed issuance of the amendments. The State official had no comments.

## 4.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and change surveillance requirements. The NRC staff has determined that the amendments involve 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 amendments involve no significant hazards consideration, and there has been no public comment on such finding (59 FR 17594). Accordingly, the amendments meet 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 amendments.

#### 5.0 CONCLUSION

The Commission 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, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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