RANDOLPH 6-1200

Commonwealth Edison Company

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January 17, 1968

Dr. Peter A. Morris, Director
Division of Reactor Licensing
U. S. Atomic Energy Commission
Washington, D.C. 20545

Subject: Proposed Change No. 15 to the Operating License DPR-2, as Amended - Dkt 50-10

Regulatory Suppl File Cy.

Dear Dr. Morris:

Pursuant to 10 CFR 50.59 and paragraph 3.a(4) of License DPR-2, as amended ("DPR-2"), Commonwealth Edison requests that Appendix A of DPR-2 be changed to allow the refueling of the Dresden reactor without the use of cocked rods during fuel insertion as required in "DPR-2."

Reference is made to Proposed Change No. 14 of September 14, 1967 and as revised as of January 17, 1968, wherein the cocked rod refueling accident accident is evaluated.

Revise item "5.b." of Section "D. Power Operation" of Appendix "A" to DPR-2 to read in its entirety:

5. Reactivity Limits

   b. With the reactor in any condition, the following shutdown criterion shall be met:

      "Stuck Rod" Criterion: At every stage during loading and in the fully loaded configuration, the control rods must provide a shutdown control margin of at leat $0.01\Delta k$ with any rod wholly out of the core and completely unavailable.

Revise item "3" of Section "E. Refueling and Maintenance" by deletion of the second sentence of said paragraph 3, and the addition of the following sentence:

> The loading procedures shall require verification that the reactor is safely subcritical by withdrawing and re-inserting a control rod in the vicinity of the refueling activity before and after each fuel addition.

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The justification for this proposed change was submitted originally as the answer to Question 2 in Supplement A to the Description and Safety Evaluation Report for Proposed Change No. 14 to DPR-2; however, in the interest of continuity and clarity the answer to Question 2 of said report is restated below:

"The fact that the Type VI-I fuel assembly reactivity is greater than for previous Dresden fuel necessitated the re-examination of the refueling accident. The accident postulated is the lowering of a fuel assembly at the maximum design hoist rate into a near-critical core during refueling. The refueling accident has been hypothesized from a number of procedure violating circumstances and represants an accident of extremely low probability. Conservative assumptions for this analysis are as follows:

1. Two control rods, next to the fuel position to be loaded, have inadvertently been withdrawn to give a near critical 2 x 4 fuel assembly array with one center fuel assembly missing. The members of the refueling crew fail to note that these two control rods are withdrawn and start to load a fuel assembly into the vacant position.

2. The reactor operator in the control room fails to notice the indications from his instruments that the control rods are out and that the reactor is near critical prior to loading. Procedures require him to observe this instrumentation and to be in communication with the members of the refueling crew during all fuel loading operations.

3. The assembly is inserted into the vacant fuel position at the maximum design rate of the hoist, 12 in/sec.

4. The fuel assembly reactivity worth is 1.5% k. Analysis indicates that this is the maximum potential reactivity worth for Type VI-I fuel in the reload array shown in Fig. 2 of the Safety Evaluation Report.

5. The period scram circuitry fails.

6. The initial fuel and moderator temperature is 68°F. The power level at initial criticality is 10^{-8} times rated power (i.e., 7 watts).

7. The calculational model includes no negative reactivity feedback effect from moderator or clad heating or void formation. Only negative Doppler feedback is considered. Control rod motion is assumed not to start until 0.2 seconds after the scram signal of 120% of rated power.

Based on the above assumptions the calculations indicate that the maximum radially averaged fuel temperature in any fuel rod would be less than 2800°F, and the corresponding maximum central fuel temperature would be less than 3200°F. Clad temperatures will not exceed 2200°F. No fuel or clad melting is expected in this accident. The rapid power rise during the accident is terminated by the negative Doppler reactivity due to the fuel temperature rise, and the reactor is subsequently brought subcritical by the overpower scram. It will be noted that this accident is less severe than the one reported in the Cycle 4 Safety Evaluation Report for III-F fuel because a smaller number of fresh fuel assemblies are loaded into the core at BOC 6 than at BOC 4, and because of the higher exposure accumulated in the remaining assemblies.

Analysis of the equivalent accident, but without scram, indicates that bulk fuel melting would occur in several rods of two fuel assemblies, but that the peak fuel enthalpy rise would be insufficient to produce explosive fuel rod rupture."

Therefore, in consideration of the foregoing analysis, it is proposed that:

1. The license requirement for "cocked rods" during refueling operations be eliminated.

2. The fuel loading procedures be modified to require verification that the reactor is safely subcritical by withdrawing and re-inserting a control rod in the vicinity of the refueling activity before and after each fuel addition.

3. Control rod withdrawal during movement of the fuel over/or into the reactor core be prohibited.

In our opinion Proposed Change No. 15 shall not result in hazards which are greater than or different from, those analyzed in the Hazards Summary Report, specifically there is (1) no increase in the probability of, or (2) no increase in the consequence of, or (3) the creation of a credible probability of an accident different from, those accidents previously analyzed in the Hazards Summary Report as amended or in connection with the amendments and changes to Operating License DPR-2.

Very truly yours,

COMMONWEALTH EDISON COMPANY

By John H. Hughes
John H. Hughes
Nuclear Licensing Administrator

Subscribed and sworn to
before me this 17 day
of January, 1968.

My Commission Expires October 14, 1969

Julia S. Envy
Notary Public

1878

FROM: Commonwealth Edison
Chicago, Ill.
John H. Hughes

DATE OF DOCUMENT: 1-17-68

DATE RECEIVED: 1-18-68

NO.: 182

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TO: Morris

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ACTION NECESSARY ☐ | CONCURRENCE ☐ | DATE ANSWERED:
NO ACTION NECESSARY ☐ | COMMENT ☐ | BY:

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DESCRIPTION: (Must Be Unclassified)
Ltr submitted as Proposed Change # 15 req Appendix A, of lic DPR-2 be change to allow the refueling of reactor without the use of cocked rods during ~~xefuelx~~ fuel insertion as required.....

ENCLOSURES:
Ref. Prosed Change # 14, 9-14-6

REFERRED TO	DATE	RECEIVED BY	DATE
Fleury W/9 extra cys for action	1-18-68		
INFO CYS TO:			
H.Price & Staff			
Morris/Boyd			
Skovholt			
Dube/Levine			

REMARKS:
DIST:1 - Formal
1- Suppl file
1- AEC PDR
2- Compliance
1- OGC

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