June 23, 1994

Docket Nos. 50-249
and 50-254

Mr. D. L. Farrar, Manager
Nuclear Regulatory Services
Commonwealth Edison Company
Executive Towers West III, Suite 500
1400 OPUS Place
Downers Grove, Illinois 60515

Dear Mr. Farrar:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION CONCERNING CORE SHROUD CRACKING AT DRESDEN, UNIT 3, AND QUAD CITIES, UNIT 1

By letters dated June 6, 1994, June 13, 1994, and June 14, 1994, the Commonwealth Edison Company (CECo) provided additional information concerning the cracking of the core shroud and justification for the operation of Dresden, Unit 3, and Quad Cities, Unit 1, with the degraded shrouds. Based on the NRC staff review of the information, the staff finds that the additional information is required to allow the staff to justify restart of Dresden, Unit 3, and Quad Cities, Unit 1, with the degraded core shrouds. Please provide a response in writing by Monday, June 27, 1994. This schedule is based on the NRC staff review of the information and providing a safety evaluation prior to restart of Dresden, Unit 3, on July 10, 1994.

The reporting and/or recordkeeping requirements contained in this letter affect fewer than ten respondents; therefore, OMB clearance is not required under P.L. 96-511.

If you have any questions concerning this action, please contact me at (301) 504-1345.

Sincerely,
Original signed by Chandu Patel for
John F. Stang, Project Manager
Project Directorate III-2
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Enclosure:
Request for Additonal Information

cc w/enclosure: 280020
See next page

DISTRIBUTION:

Docket File	PDIII-2 r/f	NRC & Local PDRs	W. Russell
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OGC	ACRS (10)	C. Patel	

AA3

D01

OFC	LA:PDIII-2	PM:PDIII-2	PM:PDIII-2	D:PDIII-2		
NAME	CMOORE	JSTANG	CPATEL	RCAPRA		
DATE	6/23/94	6/23/94	6/23/94	6/23/94	/94	/94
COPY	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO

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REQUEST FOR ADDITIONAL INFORMATION

CONCERNING CORE SHROUD CRACKING AT

DRESDEN, UNIT 3, AND QUAD CITIES, UNIT 1

DOCKET NOS. 50-249 AND 50-254

MATERIALS QUESTIONS

1. Provide for both Dresden, Unit 3, and Quad Cities, Unit 1, the number of effective full power years of operation.

2. Provide information concerning the reactor coolant water chemistry for both units from the time of startup to the present and its effect on the core shroud cracking.

3. Provide justification that the 45 degree Ultra Sonic (UT) transducer would reliably detect all cracks in the core shroud if the cracking is tight or geometry is unfavorable. In addition, the justification should provide a detailed explanation of why bounding flow depth at the H_5 weld is 1.241 inches.

4. Provide justification to rule out cracking coming from the inside of shroud at the H_5 weld from the toe of the fillet weld.

5. Provide a map of the UT measurements on the H_5 weld.

6. Provide a comparison of the Boiling Water Reactor Owners Group core shroud screening criteria to that used for the Dresden and Quad Cities core shroud inspection.

7. Is the Dresden and Quad Cities H_5 fabrication similar to that of Brunswick (i.e., double V grooved, backgouged)?

8. Provide verification of the dimension of the fillet weld.

9. Provide justification that the crack growth rate in your June 13, 1994, submittal is bounded based on the water chemistry during the early years of operation at Dresden and Quad Cities. Could deeper cracks be expected based on water chemistry?

10. Provide justification that crack propagation path predictions have correctly incorporated the effects of residual stresses. Could the crack propagate through an alternate path (i.e., up through the cylinder)?

11. Provide stress distribution profile information across the H_5 weld.

12. What is the status of the use of hydrogen addition to the reactor coolant at Dresden and Quad Cities.

13. Provide the detailed results of the Dresden and Quad Cities boat sample metallurgical analyses.

14. Provide a detailed justification and clarification for the bases of crack depth sizing on the H_5 weld geometry using only UT detection capability.

15. What are the fracture toughness properties in the short transverse direction for the heavy stainless steel plate of the top guide support ring and the core plate support ring?

16. Justify why limit load analysis is appropriate for the stress distributions associated with the H_5 weld and fillet finite element analysis. Is bending appropriately considered?

17. What is the predicted/measured reduction in residual stresses with the cracking at the H_5 weld?

18. Provide an assessment of the operating margin against uncertainties in the approach used to size the H_5 weld crack by UT.

Probabilistic Questions

1. Provide the probabilities and bases of the design basis events as well as the data sources for the postulated event frequency. Also, provide the contribution to the core damage frequency and release frequency for these events.

2. Are the shroud cracks in conjunction with the steamline break or recirculation pipe break events incorporated in the IPE study? If so, provide the information.

Mechanical Engineering Questions

1. Provide complete structural/mechanical analysis of the core shroud, assuming worst-case degradation of the H_5 weld up to and including a 360-degree thru wall crack at H_5 for upset, emergency and faulted plant conditions (e.g., main steam line break (MSLB), recirculation line break (RCLB), SSE and most severe load combinations). Evaluate the effect of three-dimensional shroud movement (e.g., uplift/tilting and subsequent dropping, tilting, lateral motion, etc.) on the structural integrity and functionality of reactor internal components, equipment and support structures.

   Analysis package should fully describe all analytical assumptions with justifications, conservatisms, methodology (e.g., analytical models and boundary constraints, development and application of loads, stress and deflection calculations), and conclusions. Also provide information to verify that any computer codes used in the analysis have been properly benchmarked.

Reactor Systems Questions

1. What is the total flow value of the LPCI system under accident conditions (i.e., LOCA, large break and steamline break) with postulated worst-case single failure, and what are the limiting single failure assumptions applied and their impacts on injection flow?

2. What is the minimum core water level needed to assure adequate cooling following a DBA LOCA?

3. Provide the operating and design basis faulted condition loads for the H_5 weld. Identify the methodologies for determining the faulted condition loads and justify why the methodologies are appropriate (e.g., WHAM, RETRAN, approximate 3-D blowdown flow analysis). Provide all assumptions with justification conservatisms and initial and final conditions. In addition, provide all benchmarking and experimental data to justify the use of all codes.

4. Provide unavailibility data for the following ECCS scenarios: 1 core spray out; 1 LPCI out; both core sprays out; 1 LPCI injection valve unavailable; and common mode LPCI loop-select logic unavailable.

Reanalyses Question

1. In the May 26, 1994, meeting between the NRC and CECo concerning the core shroud, CECo indicated it would reevaluate continued operation after 6 months if the unit restarted without repairing the H_5 weld. Please provide the details of the proposed reevaluation and all other actions to be taken by CECo.