



**Commonwealth Edison**  
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June 13, 1994

Mr. William T. Russell, Director  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Attn: Document Control Desk

Subject: Analytical Evaluation of Core Shroud Cracking  
Identified at Dresden Nuclear Power Station Unit 3  
NRC Docket No. 50-249

- References:
- (a) D. Lister letter to T. Murley, dated June 6, 1994, Providing Response to Request for Additional Information Concerning Core Shroud Cracking at Dresden, Units 2 and 3, and Quad Cities, Units 1 and 2.
  - (b) General Electric Company Report GENE-523-05-0194, dated March 1994, Evaluation and Screening Criteria for the Dresden 2 and 3 Shrouds (Attachment 1).
  - (c) General Electric Company Report GENE-523-28-0294, Revision 1, dated June 1994, Recommended Inspection Criteria for the Dresden 2 and 3 Shrouds (Attachment 2).
  - (d) General Electric Company Report GENE-523-A69-0594, dated June 1994, Evaluation of the Indications Found at the H5 Weld Location in the Dresden Unit 3 Shroud (Attachment 3).
  - (e) Structural Integrity Report RAM-94-159, Revision 0, dated June 11, 1994, Evaluation of Circumferential Core Shroud Welds at Dresden Unit 3 (Attachment 4).
  - (f) General Electric Company Letter GLS 94-11, dated June 8, 1994, Response to Commonwealth Edison Technical Audit Questions Regarding the H5 Weld Flaw Evaluations for Dresden Unit 3 and Quad Cities Unit 1 (Attachment 5).

Dear Mr. Russell:

In reference (a) Commonwealth Edison (ComEd) submitted the results of the core shroud visual examination performed at Dresden, Unit 3. This submittal also included the results of supplemental ultrasonic examinations used to determine the extent of the cracking observed

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visually at the H5 weld location. Analytical evaluation of the cracking observed at each weld location was performed in accordance with ASME Section XI, IWB-3142.4. The purpose of this letter is to provide the results of the evaluations performed to the NRC staff in accordance with ASME Section XI, IWB-3144(b).

The analytical evaluation of the core shroud cracking consisted of structural margin assessments utilizing limit load and, where appropriate, linear elastic fracture mechanics (LEFM) at each horizontal weld location, H1 through H7. The structural margin assessments determined the minimum factor-of-safety available in terms of required area for a 24-month cycle of operation at each weld location. The operating margin consists of any margin above the Code required minimum factor-of-safety of 1.4. The following is a synopsis of the evaluation results at each weld location. The detailed evaluations are contained in the reference (d) and (e) reports. Also, the reference (f) letter provides the rationale for the structural analysis criteria and methods used in the reference (d) report.

**H1 Weld:** Based on limit load analysis of the visual inspection results, a minimum factor-of-safety of 15.3 is available in terms of required area for a 24-month cycle of operation.

**H2 Weld:** Based on limit load analysis of the visual inspection results, a minimum factor-of-safety of 2.2 is available in terms of required area for a 24-month cycle of operation.

Based on limit load analysis of the ultrasonic examination results, a minimum factor-of-safety of 16.8 is available in terms of required area for a 24-month cycle of operation.

**H3 Weld:** Based on limit load analysis of the visual inspection results, a minimum factor-of-safety of 11.9 is available in terms of required area for a 24-month cycle of operation.

**H4 Weld:** Based on limit load analysis of the visual inspection results, a minimum factor-of-safety of 4.0 is available in terms of required area for a 24-month cycle of operation.

Based on LEFM analysis of the visual inspection results, a minimum factor-of-safety of 1.4 is available in terms of required area for a 24-month cycle of operation.

**H5 Weld:** Based on limit load analysis of the ultrasonic examination results, a minimum factor-of-safety of 16 is available in terms of required area for a 24-month cycle of operation.

**H6 Weld:** Based on limit load analysis of the visual inspection results, a minimum factor-of-safety of 6.1 is available in terms of required area for a 24-month cycle of operation.

June 13, 1994

H7 Weld: Based on limit load analysis of the visual inspection results, a minimum factor-of-safety of 11.9 is available in terms of required area for a 24-month cycle of operation.

The above evaluation results, coupled with the substantial conservatisms that were built in to the flaw evaluations, demonstrate that the flaws observed in the core shroud welds during the D3R13 refuel outage represent no immediate safety concern, and that all applicable ASME Code safety margins will be maintained well beyond the end of the next operating cycle for Dresden Unit 3.

If there are any questions concerning this matter, please contact this office.

Sincerely,



Michael D. Lyster  
Site Vice-President  
Dresden Station

cc: J. B. Martin, Regional Administrator - RIII  
J. F. Stang, Project Manager - NRR  
M. N. Leach, Senior Resident Inspector - Dresden  
Office of Nuclear Facility Safety - IDNS