July 26, 1995

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

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION - CORE SHROUD REPAIR (TAC NOS. M91301 AND M91302)

Dear Mr. Farrar:

By letters dated May 24, June 6 and July 10, 1995, Commonwealth Edison Company (ComEd) submitted information to the NRC concerning the core shroud repair for the Dresden Nuclear Power Station, Units 2 and 3. On July 18, 1995, the staff held a conference call with ComEd and their consultants to discuss this repair. During the call, a list of preliminary questions were raised by the staff. Enclosed please find the Request for Additional Information (RAI) developed from this call. This information is required for the staff to complete the review of the Dresden core shroud repair.

Please provide this information as soon as possible to allow the staff to complete its review in a timely manner.

This requirement affects nine or fewer respondents and, therefore, is not subject to Office of Management and Budget review under P.L. 96-511.

If you have any further questions, please contact me at (301) 415-1345.

Sincerely,

Original signed by

John Stang, Senior Project Manager
Project Directorate III-2
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Docket Nos. 50-237, 50-249

Enclosure: Request for Additional Information

cc w/encl: see next page

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DOCUMENT NAME: DRESDEN.DR91301.RAI

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DATE	07/28/95		07/26/95		07/26/95					

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cc:

Michael I. Miller, Esquire
Sidley and Austin
One First National Plaza
Chicago, Illinois 60603

Mr. Thomas P. Joyce
Site Vice President
Dresden Nuclear Power Station
6500 North Dresden Road
Morris, Illinois 60450-9765

Mr. J. Heffley
Station Manager
Dresden Nuclear Power Station
6500 North Dresden Road
Morris, Illinois 60450-9765

U.S. Nuclear Regulatory Commission
Resident Inspectors Office
Dresden Station
6500 North Dresden Road
Morris, Illinois 60450-9766

Regional Administrator
U.S. NRC, Region III
801 Warrenville Road
Lisle, Illinois 60532-4351

Illinois Department of Nuclear Safety
Office of Nuclear Facility Safety
1035 Outer Park Drive
Springfield, Illinois 62704

Chairman
Grundy County Board
Administration Building
1320 Union Street
Morris, Illinois 60450

REQUEST FOR ADDITIONAL INFORMATION
CORE SHROUD REPAIR
DRESDEN, UNITS 2 AND 3

(1) In your design specification (25A5688, Revision 2), Sections 4.4.3 and 4.7, welding is identified as a repair contingency for austenitic 300 series stainless steel and in Section 4.4.3, assembly welds were mentioned. Please identify under what conditions repair welding and assembly welds will be applied during the fabrication and installation of the core shroud repair components. What are the controls or mitigation methods that will be implemented to minimize the magnitude of the residual stresses and material sensitization when applying welding?

(2) BWRVIP has issued the following documents to provide guidelines for visual examination (VT) and ultrasonic examination (UT) of core shrouds: (a) Standards for Visual Inspection of Core Shrouds, and (b) Core Shroud NDE Uncertainty & Procedure Standard. The guidelines in these documents should be followed in the examination of the core shroud and repair assemblies. If you do not intend to reference the subject BWRVIP documents in your examination specifications or procedures, please identify all the exceptions you are going to take against the referenced BWRVIP guidelines.

(3) When detailed heat treatment records (time, temperature and cooling rate) are not available, what kind of testing do you perform to ensure that the fabricated alloy X-750 components are properly heat treated?

(4) General Electric stated in their fabrication specification, 25A5690, Revision 2, Section 3.2, that critical, highly stressed, machined areas such as the tie rod threads (XM-19) will be resolution annealed after machining to remove a possible cold worked layer.

(a) Please describe the resolution annealing process and provide details regarding how this process was qualified and the results of your metallurgical evaluation of the tie rod threads after resolution annealing such as its effect on the material hardness, grain sizes, surface oxidation and the state of sensitization. If the qualification was not performed on XM-19 materials, please justify why a similar qualification process need not be applied to XM-19 materials.

(b) General Electric stated that a minimum of 0.030 inches of austenitic 300 series and XM-19 stainless steel and alloy X-750 materials may be removed after high temperature annealing as a control of intergranular attack (IGA). Please provide the test data to support that the removal of 0.030 inches of surface material would effectively eliminate the IGA effect resulting from all high temperature annealing.

(c) In Section 3.2.2.1 it was stated that the electrolyzing process (hard chrome plating) will be applied to the locking pins after centerless grind to size. Please describe how this process was qualified and its controlling parameters established. What is

ENCLOSURE

the required quality control testing to ensure the plating has correct thickness and acceptable surface condition (no surface defect in the plating or pitting in the base metal)?

(5) Please identify all the threaded areas and locations of crevices and stress concentration in each component of the core shroud repair assemblies. In the planning of in-service inspection those areas should be emphasized for inspection because these areas are most susceptible to stress corrosion cracking. Please provide these information in tables and supplement it with sketches.

(6) Please provide details of your controls in the practices of machining, grinding and threading to minimize the effect of cold work, such as amount of materials to be removed in each pass, application of coolant and sharpness of the tool.

(7) The staff realizes that the repair assemblies may be inspected by a combination of visual and ultrasonic examinations. However, the staff has some concerns regarding the reliability of such inspection to identify the potential degradation in the threaded joints and areas of crevices and stress concentration, which have limited access for inspection. Please provide a discussion and/or propose an alternative inspection such as disassembling the threaded joints for inspection to ensure that the areas mentioned above in the repair assemblies will be adequately inspected for early detection of potential degradation.

(8) Please provide details of your planned baseline in-service inspection (location, extent, frequency, methodology and justification) of the core shroud to support the core shroud repair.

(9) Please provide details of your planned in-service inspection (location, extent, frequency, methodology and justification) of the installed core shroud repair components. Your planned inspection should consider the staff recommendation in Item 7.

If complete information for Items 5 and 9 can not be provided at this time, identify the date when such information will be provided.

(10) Please identify the lubricants that would be used on the machined threads during installation. What are the controls of the content of chlorides, sulfides, halogens and other elements that are known to promote stress corrosion cracking in stainless steel and high nickel alloy?

(11) Please discuss how are you going to monitor the magnitude of the spring preload to ensure there is no substantial relaxation of the preload. Please also discuss the safety consequences if the spring preload is completely relaxed and the feasibility of measuring the overall preload during plant operation.

(12) In your shroud and shroud repair hardware stress analysis (GENE-771-81-1194, Revision 2), Section 3.2, tie rods are specified to be made of XM-19 material.

(a) Please discuss the reasons for selecting XM-19 material instead of austenitic 304 or 316 stainless steel (low carbon content), and provide the relevant service experience and laboratory testing data to support its application in the BWR environment.

(b) It should be noted that the acceptable yield strength of XM-19 material is limited to 90 ksi. Is this upper limit of the yield strength for XM-19 identified in your procurement specification?

(c) The staff finds that your specified heat treatment of air-cooling from the solution annealing temperature for XM-19 materials is not consistent with the BWRVIP guidelines provided in the document (BWROG-VIP-9410) of "BWR Core Shroud Repair Design Criteria," where water quenching from the solution annealing temperature is recommended. Since there is very limited service experience of XM-19 material in the BWR environment, the staff recommends that an accelerated stress corrosion testing of a mock-up simulating the XM-19 tie rod thread joint in a BWR environment should be performed to ensure there is no development of unexpected degradation.

(13) If the credit for the fillet or any circumferential welds in the core shroud is taken in the design of the proposed repair to maintain the required preload, please discuss in detail and provide the justification regarding the measures you plan to take, such as inspection, to ensure the welds are, and remain, in the condition assumed in the analyses.

(15) In GENE 771-81-1194, Revision 1, Volume 1, "Shroud Repair Hardware," Figure 6.3.2, page 37 shows the deformed configuration of long upper supports. Clarify the boundary conditions applied to the finite element model at the interface between the long upper support, the shroud flange, and the shroud head flange.

(16) Provide the preload and gap calculations, similar to those provided for Quad Cities 1 and 2, in GENE-771-68-1094, Supplement A to Revision 4, April 1995.

(17) In GENE 771-84-1194, "Shroud Repair Seismic Analysis," (Enclosure 9) and GENE-523-A181-1294, "Primary Structure Seismic Models" (Enclosure 15), show the weights which form the basis for the masses in the model comprising the shroud.

(18) Provide an evaluation of the core spray piping for emergency and faulted loading combinations which include MSLB and RLB loads.