Mr. Christopher M. Crane, President
and Chief Executive Officer
AmerGen Energy Company, LLC
4300 Winfield Road
Warrenville, Illinois 60555

SUBJECT: CLINTON POWER STATION, UNIT 1 - REQUEST FOR ADDITIONAL INFORMATION RE: CORE SHROUD REPAIR RELIEF REQUEST (TAC NO. MC6448)

Dear Mr. Crane:

By letter dated March 15, 2005, AmerGen Energy Company, LLC, submitted a request for relief from the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components." The proposed relief would allow AmerGen to install radially acting stabilizers, mounted on four vertical preloaded tie rods. This alternative repair will be performed in lieu of the defined ASME Code, Section XI, 1989 Edition, for weld repair or replacement methods. Upon installation, this alternative repair will replace the structural functions of the core shroud horizontal welds H1 through H7 which currently contain cracks and have been postulated to propagate.

Based on our review of your submittal, the U.S. Nuclear Regulatory Commission staff finds that a response to the enclosed request for additional information is needed before we can complete the review. This request for additional information was previously forwarded to your staff; and on September 21, 2005, it was discussed with them. Your staff agreed that a response would be provided 45 days from the date of this letter.

If you have any comments or questions, please contact me at (301) 415-1496.

Sincerely,

Kahtan N. Jabbour, Senior Project Manager, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-461

Enclosure: As stated

cc: See next page

Clinton Power Station, Unit 1

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Springfield, IL 62701-1109

September 22, 2005

Mr. Christopher M. Crane, President
and Chief Executive Officer
AmerGen Energy Company, LLC
4300 Winfield Road
Warrenville, Illinois 60555

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/RA
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Project Directorate III
Division of Licensing Project Management
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Enclosure: As stated

cc: See next page

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REQUEST FOR ADDITIONAL INFORMATION

CORE SHROUD REPAIR RELIEF REQUEST

AMERGEN ENERGY COMPANY, LLC

CLINTON POWER STATION, UNIT 1

DOCKET NO. 50-461

1. The tie rod assemblies are installed with a cold pre-load to ensure that no vertical separation of any or all cracked horizontal welds will occur during normal operation. Vertical and horizontal displacements, if sufficiently large, could compromise fuel geometry and control rod insertion. Please confirm that with the repair, the estimated vertical and horizontal displacements during normal operating and transient conditions will not affect the fuel geometry, and therefore, control rod insertion is not impacted. Transient conditions include the operating basis earthquake, the safe shutdown earthquake (SSE), the main steam line break (MSLB), and the combined MSLB and SSE. Also, please specify the maximum vertical displacement value required for the top guide to clear the top of the fuel channels.

2. With the repair, please estimate the total leakage from all welds, H1 to H7, assuming 360 degrees through-wall cracks. Please confirm that the total leakage is a small fraction of the total core flow. Please discuss whether the leakage exceeds the minimum subcooling required for proper jet pump and/or recirculation pump operation, and whether the core bypass flow leakage requirements assumed in the reload fuel safety analysis are maintained.

3. Please specify the percent decrease in the available downcomer flow area and the calculated pressure drop due to the installation of the tie rod stabilizer assemblies.

4. Section 3.3.2 of the BWR Vessel and Internals Project, Core Shroud Repair Design Criteria, Revision 2, dated March 1999, states that "Loads due to anticipated operational occurrences which have the potential to increase shroud loads above normal operation should be considered. Typical events include: maximum system pressure, pressure regulator failure (open), recirculation flow control failure (maximum demand), loss of feedwater with feedwater restart without feedwater heating, and inadvertent activation of a safety/relief valve." Please confirm that these events were evaluated for the core shroud repair.

5. The March 15, 2005, submittal indicated that, following the completion of the stabilizer assemblies' installation, the area is vacuumed and a post-job visual inspection is performed to confirm the effectiveness of the clean-up process. Please describe the

process, if any, in addition to the visual inspection, to verify that there are no loose parts left in the reactor.

6. Please describe the roller slide element used in the analysis. Does this type of element allow a separation of connecting nodes especially due to the uplift force from a main steam line break exceeding the pre-load on the tie rods? The most critical annular pressurization (AP) loads are due to the main steam line break. Please discuss why the nonlinear analysis, considering the gap and separation at the cracks, was not performed in the seismic and AP dynamic time history analyses. As such, confirm whether and how the beam stick model is considered representative versus the shell element representation for a non-symmetric loading condition.

7. In Attachment 2 of the March 15, 2005, submittal (GENE-0000-0023-6259-05P, Revision 1 (GE Proprietary), March 2005), you stated that "This proposed alternative is considered a permanent repair of all horizontal circumferential core shroud welds. The repair hardware is designed for an effective design life of 60 years, including a 20-year license renewal period." Please provide the technical basis for making the above statement regarding a design life of 60 years for the repaired core shroud. Also, please provide the cumulative fatigue usage factors for the critical components such as tie rods for 60 years.

8. In Attachment 2 of the March 15, 2005, submittal (GENE-0000-0023-6259-01P, Revision 1 (GE Proprietary), February 2005), loads on the repair hardware and the existing reactor internal components are provided in Tables 8.1 and 8.2 for various loads, load combinations, and for various repair shroud configurations including the no crack base line case. It appears that loads for some of the repair configurations are higher than those relating to the "no crack" case. Please provide a comparison of the calculated loads for the repair configuration including the "no crack" case to the design-basis allowable loads for each component included in Table 8.1 and 8.2. Also, please provide comparison of calculated stresses in these components including the repair components to the code-allowable limits.

9. For the analysis of H4 roller and H7 roller models, please discuss whether there is relative motion between the upper and lower nodes at H4 and H7 elevations for each of the loading conditions. If yes, please provide the relative displacements at these locations. If not, please discuss why relative motion is not expected.

10. In Section 7.1.2 of Attachment 2 of the submittal (GENE-0000-0023-6259-01P, Revision 1 (GE Proprietary), February 2005), the internal pressure differential loads in the vertical direction on the shroud head and core plate were discussed and compared with critical events such as postulated recirculation, main steam, and feedwater nozzle safe-end design-basis pipe breaks. Please confirm whether these internal pressure differential loads are included in the final loads provided in Tables 8.1 and 8.2. Also, please confirm whether there are asymmetric pressure differential loads applied horizontally on the shroud due to pipe breaks at the feedwater nozzle safe-ends.

11. The rotation of the top guide ring due to failure of H-2 and H-3 welds could result in the loss of preload in the tie rods. This may result in unacceptable displacements of the cracked shroud during faulted events. Please provide additional information regarding the tie rod preload to preclude such consequences.

12. It is the staff's understanding that any rotational displacement of the cracked shroud during postulated accident conditions would be limited by the intermediate stops and other physical constraints within the vessel. Based on geometrical considerations, please provide an estimate of such limiting displacements and indicate what impact these displacements may have on the ability to insert the control rods.