

**PECO ENERGY**PECO Energy Company  
Nuclear Group Headquarters  
965 Chesterbrook Boulevard  
Wayne, PA 19087-5691

October 27, 1995

Docket No. 50-352

License No. NPF-39

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555Subject: Limerick Generating Station, Unit 1  
Submittal of Inspection Plan In Response to  
Generic Letter 94-03, "Intergranular Stress Corrosion  
Cracking of Core Shrouds in Boiling Water Reactors"

Dear Sir:

On August 24, 1994, PECO Energy Company responded to Generic Letter (GL) 94-03, dated July 25, 1994. Your letter dated March 7, 1995 provided a Safety Evaluation Report for Limerick Generating Station (LGS), Unit 1 concerning GL 94-03. Reporting Requirement 2 of the GL requested that an inspection plan of the core shroud be submitted to the U. S. Nuclear Regulatory Commission (USNRC) no later than 3 months prior to performing the inspections except for those plants whose inspections would occur less than three months from the receipt of the GL. Accordingly, attached is the core shroud inspection plan for Limerick Generating Station, Unit 1.

If you have any questions, please contact us.

Very truly yours,

G. A. Hunger, Jr.,  
Director - Licensing

Attachment

cc: T. T. Martin, Administrator, Region I, USNRC  
N. S. Perry, USNRC Senior Resident Inspector, LGS

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**LIMERICK GENERATING STATION, UNIT 1  
SECOND RESPONSE TO NRC GENERIC LETTER 94-03**

**CORE SHROUD INSPECTION PLAN**

**BACKGROUND:**

In accordance with Reporting Requirement Number 2 of NRC Generic Letter (GL) 94-03, dated July 25, 1994, and in response to the NRC Safety Evaluation (Reference 2), the following inspection plan for Limerick Generating Station (LGS), Unit 1, is provided. This plan was developed for implementation during the next refueling outage of LGS, Unit 1 (1R06), which is scheduled to begin on January 27, 1996.

The inspection methods, scope, and flaw evaluation criteria of this inspection plan satisfy the recommendations of the Boiling Water Reactor Vessel and Internals Project (BWRVIP), as specified in the "BWR Core Shroud Inspection And Flaw Evaluation Guidelines" - GENE-523-113-0894, Rev. 1, dated March 1995 (Reference 3).

This inspection plan was developed in response to "Requested Licensee Actions," Number 3, of the GL, based on the ongoing guidance provided by the BWRVIP, recommendations of General Electric Nuclear Energy (GENE), and site specific experience gained through previous shroud inspections at PBAPS, Units 2 & 3. The key factors considered in the development of the plan include: hot operating years, materials of fabrication, water chemistry history, and current industry experience (i.e., fall outages).

The LGS, Unit 1 shroud is considered to be moderately susceptible to Intergranular Stress Corrosion Cracking (IGSCC) due primarily to age, materials of fabrication, and water chemistry history.

Since the LGS, Unit 1 core shroud has experienced more than 8 hot operating years, and is fabricated with low carbon content stainless steel, it has been identified by Reference 3 as an Inspection Category B facility. For Inspection Category B, Reference 3 recommends a limited inspection of specific shroud welds. This limited inspection includes a sufficient length of the subject circumferential shroud welds to enable determination of the structural integrity of the weld, considering crack growth and NDE uncertainties. The inspection scope includes circumferential shroud welds H-3, H-4, H-5, and H-7.

**SCOPE OF INSPECTION:**

The LGS, Unit 1 shroud welds can be divided into four groups:

1. Shroud attachment welds (e.g., shroud head bolt lugs)
2. Shroud vertical welds
3. Shroud support structure welds
4. Shroud circumferential welds

The attachment welds, vertical welds, and support structure welds have been excluded from this initial inspection plan. The basis for exclusion of these welds from the initial inspection plan is addressed in Section 3.1 and Appendix A of Reference 3.

Therefore, the scope of welds included in this initial shroud baseline inspection plan for LGS, Unit 1 include shroud circumferential welds H-3, H-4, H-5, and H-7.

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EXTENT OF INSPECTION:

The extent of inspection of each of these four welds is based on accessibility for state-of-the-art inspection equipment.

The inspection technique planned for these initial inspections is Ultrasonic Testing (UT). This technique is intended to interrogate the volume of the subject welds and associated heat affected zones for cracking initiating on the inside surface (ID) and the outside surface (OD) of the shroud. The equipment planned for use during these inspections is the General Electric Nuclear Energy (GENE) OD Tracker. This equipment will maximize the ability to access the shroud welds. This NDE technology has already been successfully demonstrated for the BWRVIP, and has been effectively utilized for several BWR core shrouds inspections in the last 18 months, including PBAPS, Units 2 & 3. The evaluation of inspection results will be suitable for the inspection technique and delivery system used.

The extent of inspection of each circumferential weld may vary, depending on the specific weld characteristics (i.e., accessibility relative to vessel components and unexpected interferences). The initial extent of inspections planned, using the inspection system described above, is as follows:

<u>Weld Number</u>	<u>Extent Of Inspection Planned</u>
H-3, H-4, H-5, and H-7	100% examination of the accessible length in a 360° segment

If the cumulative indication length found in any weld is greater than or equal to 10% of the inspected weld length, the scope of the inspections will be extended to include welds H-1, H-2, and H-6.

EVALUATION:

The evaluation of the results of the inspections will include a combination of fracture mechanics methodologies. As recommended in Reference 3, for welds which have a projected neutron exposure (fluence) level greater than  $3 \times 10^{20}$  N/CM<sup>2</sup> through the next two operating cycles, the analysis will include both the Limit Load and Linear Elastic Fracture Mechanics (LEFM) methodologies. For welds with an exposure level below this threshold, the Limit Load technique will be used exclusively. The planned application of fracture mechanics analysis is as follows:

<u>WELD NUMBER</u>	<u>METHODOLOGIES</u>
H-3	Limit Load and LEFM
H-4	Limit Load and LEFM
H-5	Limit Load only
H-7	Limit Load only