10CFR50.55a(g)(5)(iii)

PHILADELPHIA ELECTRIC COMPANY

NUCLEAR GROUP HEADQUARTERS

955-65 CHESTERBROOK BLVD.

WAYNE, PA 19087-5691

(215) 640-6000

STATION SUPPORT DEPARTMENT

April 19, 1993

Docket No. 50-352

License No. NPF-39

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Subject: Limerick Generating Station, Unit 1
Relief Request for Performing Bolt Removal
Requirements

Gentlemen:

Attached for review and approval is Relief Request No. RR-20 for the Limerick Generating Station (LGS), Unit 1, American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Section XI, Class 2 pressure retaining bolting joining the Residual Heat Removal (RHR) Heat Exchanger shell flange to the tube sheet and channel head flange. Specifically, we are requesting relief from visual examination of every bolt in the flange connection.

As a result of leakage identified at a bolted connection of the RHR Heat Exchanger shell and channel head flanges during an ASME Section XI pressure test, we are now required by the 1986 ASME Code Section XI to visually inspect each bolt. However, this would require complete disassembly of the heat exchanger. Justification for the relief is explained in the attached relief request.

If you have any questions or require additional information, please do not hesitate to contact us.

Very truly yours,

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

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



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# RELIEF REQUEST NO. RR-20

## I. IDENTIFICATION OF COMPONENTS

Class 2 Residual Heat Removal (RHR) Heat Exchanger 1BE205, pressure retaining bolting joining the heat exchanger shell flange to the tube sheet and channel head flange.

## II. CODE REQUIREMENTS FROM WHICH RELIEF IS REQUESTED

ASME Section XI requires that when leakage is detected at a bolted connection during the conduct of a Section XI pressure test, the bolting shall be visually examined for degradation. Relief is requested from the requirement to visually examine every stud in the connection, due to hardship associated with the removal of a number of the studs in this situation.

## III. BASIS FOR RELIEF

During the performance of the periodic ASME Section XI pressure test of the Residual Heat Removal System, leakage was identified at the bolted connection joining the shell to channel head of the RHR Heat Exchanger (1BE205). Due to the design of the subject heat exchanger, sixteen (16) of the sixty four (64) studs in the flanged joint cannot be removed without complete disassembly of the vessel. Disassembly of this vessel would require substantial effort, including cutting a minimum of two 20" diameter safety related pipes.

The subject bolted connection is made up of sixty four, 1-1/8" nominal diameter all thread studs (8NC 2), located around a bolt circle of 58-5/8" diameter. The stud material is SA-193-B7, and the nut material is SA-194-2H. Every fourth stud around the bolt circle (16 total), contains a threaded washer located inside the flanged joint, which precludes removal of these studs unless the triple flanged joint is completely disassembled.

The remaining 48 studs were removed for examination using the VT-1 examination method. The load bearing threads on each end of the 48 studs showed no signs of degradation. However, because of a buildup of corrosion product in the non load bearing threads of the studs, a conclusive VT-1 examination of the thread root in this area was not possible.

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Several attempts were made at removal of this buildup, however radiological concerns precluded further processing of the studs.

Since the studs exhibited evidence of corrosion of the non load bearing threads, all 48 studs were replaced in kind. To quantify the extent of degradation due to corrosion, the stud representing the worst condition, as determined by visual examination, was selected for further cleanup. Following this additional cleanup, the areas of degradation were measured to determine the extent of material loss. Additionally, the cleaned stud was examined by a Level III visual examiner to determine the condition of the thread root areas. The examination found no adverse surface condition in this area. Measurements indicated that material loss was concentrated at the major diameter of the threads, with minimal loss at the minor diameter.

Analysis, considering the conditions described above, indicated that structural integrity of the bolted joint would be maintained, considering potential degradation of the studs which were not removed. Therefore, continued, safe operation of the RHR Heat Exchanger will not be compromised by this condition.

IV. ALTERNATE PROVISIONS

Forty eight of the original sixty four studs have been replaced, since all removed studs exhibited varying degrees of corrosion. Measurement and examination of the corrosion indicated that degradation, resulting from the corrosion, has had little impact on the structural capabilities of the bolting. Nevertheless, an analysis has been performed to confirm the structural integrity of the bolted connection considering potential degradation of the studs which were not replaced. Additionally, the 16 original studs will be removed and evaluated in conjunction with a planned modification for tube bundle replacement on this heat exchanger. This modification is currently planned for implementation during the fifth refueling outage (1R05), scheduled for the first quarter of 1994.

Although some leakage continues at the bolted connection, a monitoring program has been put in place to monitor the rate and nature of the leakage to assure that the basis and conclusions of the structural integrity evaluation are not invalidated.