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Nuclear Group Headquarters
965 Chesterbrook Boulevard
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July 25, 1996

Docket No. 50-352
License No. NPF-39

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

Subject: Limerick Generating Station, Unit 1
Comments Concerning Preliminary Accident Sequence
Precursor Analysis of Suction Strainer Clogging Event

Gentlemen:

By letter dated June 17 996, the NRC issued a preliminary Accident Sequence Precursor (ASP) analysis report for ar tional event that occurred at Limerick Generating Station (LGS), Unit 1, on September 1 995. This report was prepared by the Oak Ridge National Laboratory (ORNL) for the NRC's Office of Analysis and Evaluation of Operational Data (AEOD), and provides estimates relative to the conditional probability of core damage for the September 11, 1995, event. The results of this preliminary analysis indicate that this event may be an ASP for 1995, and therefore, be reported in NUREG/CR-4667, "Precursors to Potential Severe Core Damage Accidents." Accident sequences considered for inclusion in this NUREG are those associated with the failure on one (1) or more safety systems, the degradation of two (2) or more safety systems, or the occurrence of an initiator (i.e., loss-of-offsite-power, loss-of-coolant-accident, steam line break, or a transient with complications).

The NRC requested that PECO Energy review and provide comments, as appropriate, concerning the technical adequacy of the preliminary ASP analysis report, including the depiction of plant equipment and equipment capabilities. The NRC requested that we provide any comments within 30 days of receipt of this letter in order to support the preparation of the final report in a timely manner. PECO Energy received this report on June 25, 1996.

Therefore, in response to the NRC's request, the enclosure to this letter provides PECO Energy's comments on the preliminary ASP report regarding the suppression pool suction strainer clogging operational event that occurred at LGS, Unit 1, on September 11, 1995. The comments are formatted to match the specific sections identified in the ASP analysis report.

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

Very truly yours,

G. A. Hunger, Jr.

G. A. Hunger, Jr.
Director - Licensing

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Enclosure

cc: T. T. Martin, Administrator, Region I, USNRC (w/ enclosure)
N. S. Perry, USNRC Senior Resident Inspector, LGS (w/ enclosure)

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ENCLOSURE

PECO Energy Comments Concerning NRC
Preliminary Accident Sequence Precursor Analysis Report
for Limerick Generating Station, Unit 1

Enclosure

Comments to NRC's Preliminary Accident Sequence Precursor Analysis of SRV Fails Open, Scram, Suppression Pool Strainer Fails at Limerick Generating Station, Unit 1

The following comments are offered in response to the Preliminary Accident Sequence Precursor (ASP) Analysis performed by Oak Ridge National Laboratory (ORNL) regarding the SRV fail open event with subsequent suppression pool strainer failure which occurred at Limerick Generating Station, Unit 1 on September 11, 1995. The comments are formatted to match the section numbers of the ASP Analysis.

Event Summary

Page 1, first paragraph, third sentence. Change "RHR pump A was declared inoperable when ..." to "RHR pump A was **secured and** declared inoperable when ...".

Event Description

Page 2, first paragraph, first sentence. Change "operators observed a decrease in flow from the A RHR pump ..." to "operators observed a decrease **and fluxuation** in flow from the A RHR pump ...". Also, third and fourth sentences, delete "... at low flow rates. As operators increased flow through the A RHR pump, they observed a pressure drop across the pump's suction strainer." Per the text of the LER, page 2 of 5, "At 1345 hours, following initial evaluation by the System Manager, Shift Supervision directed a restart of the 'A' RHR pump (i.e., in SPC mode), and **no abnormal indications were observed**." [emphasis added] In addition, plant records indicate that the RHR 'A' pump was restarted and ramped up to 8500 gpm and returned to SPC mode, which is not a "low flow rate". Finally, pressure drop across the pump's suction strainer would be expected with increasing flow rate, but did not hinder operation of the 'A' RHR pump.

Additional Event-Related Information

Page 2, third paragraph, after third sentence starting, "Upon inspection, personnel ...". Add sentence "However, the 'B' RHR pump ran normally during and after the event." Also reword the fifth sentence from, "Utility personnel reported that they were unable to determine if effects attributable to the SRV blowdown increased the rate of accumulation of debris on the strainers." to "Utility personnel reported that the SRV blowdown resulted in deposition of additional material on the strainer." per the first paragraph of page 5 of 5 of the LER 352/95-008. Finally, second to last sentence, change "Approximately 1,400 pounds of debris was removed from the suppression pool." to "Approximately 1,400 pounds (wet weight, dry weight is roughly 1/3 of wet weight) of debris was removed from the suppression pool." The 1,400 pounds reported was a wet weight value. BWROG investigations have shown that the dry weight is roughly one-third of the wet weight.

Modeling Assumptions

Page 3, second paragraph. Change first sentence "and one train of RHR unavailable in all modes because ..." to "and one train of RHR unavailable in all modes except SDC because ...". Also change second sentence "Similar debris was found on other strainers and 1,400 pounds of debris ..." to "Debris was also found on other strainers and 1,400 pounds (wet weight, dry weight is roughly 1/3 of wet weight) of debris ..." for the same explanation as given above. Finally, add "the amount of debris in the suppression pool" to the list of factors in the last sentence.

Page 3, third paragraph. The low pressure core spray (LPCS) system should not be grouped with the RHR system since LPCS can also take suction from the CST, similar to the RCIC and HPCI systems. See LGS UFSAR Figures 6.3-7 and 6.3-9. The standard LPCS system operating procedure provides direction for alignment of LPCS to CST. Thus the "RHRSTRAINERS" event should not be added to the LPCS model. Additionally, the common cause strainer failure probability should be modeled as two populations of two

strainers each, RHR A and B, and RHR C and D, rather than as a single group which contains all four strainers. This is due to the distinctly different operating histories of the two groups. RHR A and B are normally used for suppression pool cooling in routine operations, whereas RHR C and D are only run for required pump, valve, and flow tests. As the failure mode is dependent upon the collection of material on the strainers over time as the pumps are used, these different profiles would clearly separate the two groups from a common cause perspective. The analysis for both the event and condition assessment should be reperformed with the increased common cause value affecting only the A and B strainers, and with a much lower common cause failure value affecting the C and D strainers (e.g. $\alpha_2 Q_T \approx 0.2 \times 1E\text{-}4$, or $\approx 2E\text{-}5$). Each group of RHR, the RHR A and B group and the RHR C and D group, can be used in each mode of RHR operation, LPCI, SPC, SDC, and Containment Spray.

Page 3, last paragraph (continued on page 4). The statement "Research cited in Reference 4 indicates that the sludge concentration ... were easily sufficient to obstruct multiple ECCS system strainers" is incorrect. Sludge by itself cannot cause the failure of an ECCS strainer due to the small particle size relative to the hole size of the strainer. A layer of fiber must be present to trap the sludge. From the results of diver inspections, it was found that no strainers other than the A and B RHR had any fiber matting the strainer surfaces. Therefore, initially, the strainers could not have plugged. A preliminary BWROG report indicates that appreciable settling of corrosion products could be expected in as little as 15 to 30 minutes following the end of LOCA blowdown. Based on this analysis, it would be expected that by the time a fiber bed formed on any other strainers, the corrosion products required to foul the bed would have largely settled out. Therefore, no other ECCS suction strainers would be expected to plug. Therefore, a common cause strainer failure could not occur.

Page 4, first paragraph (continued from page 3). The alpha factor used from Reference 5 should be recalculated for the event assessment using the actual failure situation found at the plant (i.e. 1 failed (A), 1 could fail (B), and with the remaining two strainers (C and D) having an extremely low likelihood of failing in the same manner).

Page 4, last paragraph. The common cause strainer failure probability should not be the same as in the event assessment, unless the A strainer is considered to be clogged in the condition assessment as well. The common cause strainer failure probability should be $0.135 \times Q_T$, Q_T being the random failure probability for the strainers. Unless the A RHR is assumed to be failed (as in the event assessment), Q_T is less than 1.

Analysis Results

Considering the previous comments of,

a) the appropriate use of the debris dry weight to estimate the strainer failure probability,
b) the grouping of LPCS with HPCI and RCIC instead of with RHR since LPCS can also take suction from the CST, and
c) modelling the common cause strainer failure probability as two populations of two strainers each (RHR A and B, and RHR C and D) with a much lower common cause failure value affecting the RHR C and D strainers of 2E-5,

a more realistic core damage probability for the transient event assessment below the current value would be obtained, and a more realistic core damage probability for the condition assessment would be less than 1.0 E-5.