

PHILADELPHIA ELECTRIC COMPANY

NUCLEAR GROUP HEADQUARTERS

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October 23, 1989

Docket No. 50-353
License No. NPF-85

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

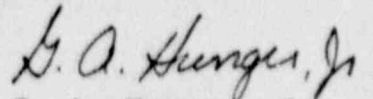
**SUBJECT: Limerick Generating Station, Unit 2
Independent Design Assessment
Inspection Report 50-353/89-201**

Gentlemen:

As part of the NRC's monitoring of Philadelphia Electric Company's (PECo's) "Program for the Independent Design and Construction Assessment (IDCA) of Limerick Generating Station (LGS) Unit 2," the NRC conducted a corrective action inspection of the Independent Design Assessment (IDA). The results of the inspection supported PECo's conclusions that LGS Unit 2 design had met its licensing commitments. The Inspection Report, No. 50-353/89-201, was sent to PECo on August 23, 1989. It requested that PECo provide a description of the evaluation details, conclusion and any corrective actions, regarding three specific Design Observation Reports (DOR), Nos. 103, 039 and 087.

The requested information is provided in the attachment. Please let me know if you have any questions or require additional information.

Very truly yours,



G. A. Hunger, Jr.
Director, Licensing Section
Nuclear Services Department

Attachment

cc: W. T. Russell, Administrator, Region I, USNRC
T. J. Kenny, USNRC Senior Resident Inspector, LGS

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ATTACHMENT 1

RESPONSE TO INSPECTION REPORT
NO. 50-353/89-201

1) Evaluate the effect of a grid voltage swing to ensure that spurious separation of the on-site safety-related buses from the grid does not occur for the condition defined in the inspection report (DOR-103).

RESPONSE - A revised voltage regulation study dated July 1989, included an evaluation of the effect of a grid voltage swing. In this evaluation, a minimum initial grid voltage of 99.5% of 230KV and a maximum voltage dip of 1.7% were used based on system studies. These conditions provided the most unfavorable startup transformer tap setting for the voltage regulation during shutdown following a Loss of Coolant Accident (LOCA). The study showed that upon trip of the unit experiencing a LOCA, the grid voltage dropped to 97.8% from the initial value of 99.5%. The voltage regulation of the Class 1E 4.16KV buses under the above scenario was considered unacceptable during the sequencing of the Emergency Core Cooling System (ECCS) loads concurrent with a system voltage dip of 1.7% due to trip of the unit experiencing a LOCA. Under the previous calculation, the LOCA load sequence initiated at time (t)=0, unit trip occurred at t=13 seconds, and the second set of Core Spray pumps cause the degraded grid voltage relays to initiate their timing at t=15 seconds. With the concurrent system voltage dip (at t=13 seconds), the voltage does not recover sufficiently to reset the degraded grid voltage relays, and the 4.16KV buses are isolated from the offsite source at t=25 seconds (i.e., 10 seconds following Core Spray pump start).

The isolation can be prevented by changing the transformer initial load tap changer (LTC) timer setting to 10 seconds. The LTC timer will initiate upon the addition of the first loads (t=0) and will compensate for the 1.7% voltage dip by t=19 seconds. By achieving this voltage correction in less than 19 seconds, the degraded grid voltage relays will reset during the ECCS load sequencing event and prevent separation between the offsite source and the emergency buses.

Administrative controls have been instituted to change the time dial setting on the startup transformer to 10 seconds when both units are in operation immediately after a loss of one offsite power source.

2) Evaluate the sizing of the thermal overload (TOL) heaters for safe-shutdown application (DOR-039).

RESPONSE - An evaluation of the sizing of the thermal overload (TOL) heaters for Class 1E 460V continuous duty motors was completed in August, 1989. The evaluation addressed the effects of high ambient temperature and the negative 10% tolerance of the TOL. Since the Motor Control Center (MCC) bus voltages are to be maintained at 1.03 pu (460V - 1.0 pu), inclusion of an allowance for undervoltage was determined to be unnecessary. The evaluation demonstrated that conservatism in the as-built design offset the effects of temperature and the negative 10% tolerance. Upon initial review, twenty-two TOL heaters were identified for closer inspection and were concluded to be acceptable based on the margin between the motor name plate currents

and the as-built running currents. Accordingly, no corrective action was required.

3) Evaluate the vital battery end-of-life capacity considering a nondetectable high impedance fault on the ac side of the inverter (DOR-087).

RESPONSE - In response to the DOR and the NRC inspection team concern, a calculation was completed on June 1, 1989, which used an end-of-life voltage of 108V instead of 105V to account for maximum cable lengths, and 105% inverter loading resulting from an undetectable high impedance fault on the load side of the inverter, respectively. The calculation demonstrated adequate end-of-life capacity of the vital batteries considering these conditions. Accordingly, no corrective action was required.

Summary

Items 1 and 2 were completed before Unit 2 exceeded 5% power on August 25, 1989, and item 3 was completed before loading fuel into the Unit 2 reactor on June 23, 1989.