



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

AUG 23 1989

Docket No. 50-353

Mr. George A. Hunger, Jr.
Director-Licensing
ATTN: Correspondence Control Desk
Philadelphia Electric Company
2301 Market Street
Philadelphia, Pennsylvania 19101

Dear Mr. Hunger:

SUBJECT: CORRECTIVE ACTION INSPECTION OF THE INDEPENDENT DESIGN
ASSESSMENT AT LIMERICK GENERATING STATION UNIT 2 REPORT
50-353/89-201

As part of its plan to monitor Philadelphia Electric Company's (PECO's) "Program for the Independent Design and Construction Assessment (IDCA) of Limerick Unit 2," the NRC staff conducted a corrective action inspection of the independent design assessment (IDA). This inspection took place at the offices of the architect-engineer, Bechtel Power Corporation, located in San Francisco, California, during the week of April 24, 1989. The exit meeting was held on April 28, 1989.

The purpose of this inspection was to assess the validity of the design assessment report issued by the independent contractor, Stone and Webster Engineering Company (SWEC), on April 12, 1989. The inspection team's approach included a review of 64 selected design observation reports (DORs) to ensure that each issue identified had received an appropriate response by the architect-engineer and that a proper evaluation of each response had been performed by the independent contractor. Also, the inspection team verified that the corrective actions resulting from the design observation reports had been performed or were scheduled to be completed by PECO.

The inspection team was satisfied with the methods, quality and comprehensive-ness of the IDA and concluded that the IDA provided the needed additional assurance that the design of Limerick Unit 2 met its licensing commitments. This conclusion was based on the NRC's multi-inspection overview of the IDA program, the independent contractor's similar conclusion, and commitments from PECO which were documented in letters to the NRC dated May 16 and May 25, 1989. As a result of the inspection team's review, PECO has committed to perform the following:

- (1) Evaluation of the effect of grid voltage swing to ensure that spurious separation of the onsite safety-related buses from the grid does not occur for the conditions defined in the inspection report (See DOR 103).
- (2) Evaluation of the sizing of the thermal overload relay heaters for safe-shutdown applications (See DOR 039).
- (3) Evaluation of the vital battery end-of-life capacity considering a nondetectable high impedance fault on the ac side of the inverter (See DOR 087).

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PECO has committed to complete the aforementioned activities before exceeding 5 percent power for items (1) and (2), and before loading fuel for item (3). For these three items, PECO is requested to respond in writing within 60 days describing the details of their evaluation, the conclusions, and the associated corrective actions, if any.

Additionally, the Hazards Program Evaluation Supplement which was distributed on May 17, 1989, was reviewed and found acceptable by the staff, and no associated inspection is planned.

If you have any questions, please contact me or the IDCA coordinator, Gene Imbro, at (301) 492-0954.

Sincerely,

Original signed by

Steven A. Varga, Director
Division of Reactor Projects I/II
Office of Nuclear Reactor Regulation

Enclosures:

- 1. Executive Summary
- 2. Inspection Report 50-353/89-201

cc w/enclosures:
See next page

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EXECUTIVE SUMMARY

INSPECTION REPORT 50-353/89-201 LIMERICK GENERATING STATION, UNIT 2

The NRC inspection team has monitored each of the design and construction aspects of the Limerick independent design and construction assessment (IDCA) in three phases: (1) preparation of review plans, (2) implementation of the review plans and performance of the review, and (3) evaluation of the final IDCA report, including assessment of the corrective actions. This inspection was the third phase of the independent design assessment (IDA) and was conducted at the offices of the architect-engineer, Bechtel Power Corporation, located in San Francisco, California.

The inspection team assessed the validity of the design assessment report by reviewing 64 of the 118 design observation reports (DORs). The review focused on the appropriateness of the Bechtel response to Stone and Webster Engineering Company (SWEC) findings as well as the appropriateness of SWEC's evaluation of Bechtel's response. Additionally, the inspection team reviewed implementation of associated corrective actions.

Of the 118 design observation reports, Bechtel and SWEC could not agree on resolution of 6 of these items. The inspection team reviewed these items, which are summarized below:

For DOR 015 regarding the generic qualification of a radiation shielding program, for DOR 043 regarding use of an exponential temperature decay for piping thermal analysis, and for DOR 097 regarding heat loads for control room cooling under emergency conditions, the inspection team decided that no additional action was necessary to resolve the issues identified, and these items are considered closed.

DOR 039 questioned the validity of not including heater tolerances and minimum operating voltages in the sizing of motor thermal overload relay heaters. The inspection team concurred with the finding and requested PECO to evaluate the sizing of thermal overload relay heaters, including the effects of low voltage, high ambient temperatures, and negative tolerances for all continuously running 480-volt motors required for safe shutdown. PECO's letter of May 16, 1989, committed to perform this evaluation before exceeding 5 percent power.

DOR 103 requested that the grid swing minimum voltages be analyzed to confirm that spurious separation of the onsite safety-related buses from the grid would not occur. The inspection team concurred with the finding and defined the condition to be analyzed as a single source of offsite power supplying both units, the load tap changer at its most unfavorable position before the event, a loss-of-coolant-accident (LOCA) in one unit and safe shutdown in the other unit, and a dip in the grid voltage as a result of a loss of another offsite unit when the voltage on the grid was at a normal minimum value. PECO's letter of May 16, 1989 committed to revise the voltage regulation study for a grid voltage swing evaluation before exceeding 5 percent power, and the staff expects the aforementioned scenario to be completely reviewed.

DOR 113 questioned the design of the diesel generator ground fault annunciation. The inspection team agreed that the current design does not violate any licensing commitment or regulatory requirement. However, the inspection team viewed this as a poor design practice because it was not consistent with standard industry practice, it increased the risk of a fire, and the associated annunciator circuit would be unreliable subsequent to a LOCA. PECO should re-evaluate the sizing of the associated diesel generator ground fault resistor, considering the aforementioned shortcomings of the present design.

In addition to the 6 open items identified by SWEC, the inspection team reviewed on a sampling basis 58 other DORs and was generally well satisfied with their resolution. As a result of the inspection team's review, two items were discussed at the exit meeting which required PECO action and are discussed below:

DOR 021 identified that no formally issued procedure existed for the performance of balance-of-plant safety-related instrument setpoint calculations. As a result of this finding, the inspection team identified related issues which were adequately addressed in PECO's letter dated March 25, 1989, and resulted in the need for a final safety analysis report (FSAR) change and revision to instrument setpoint data sheets for increased process tolerance. Based on PECO's response, this item is closed.

DOR 087 verified that the vital battery had sufficient end-of-life (EOL) margin. However, the inspection team identified that the effect of a high impedance fault on the discharge of the inverter was not considered in the EOL margin evaluation. PECO committed in its letter dated May 16, 1989, to perform the associated calculation before fuel load.

The inspection team concluded that the SWEC IDA review was thorough, and the results provide additional assurance regarding the adequacy of the Limerick Unit 2 design process.