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

September 29, 1988

Docket No. 50-353

Mr. William M. Alden
Director-Licensing
ATTN: Correspondence Control Desk
Philadelphia Electric Company
2301 Market Street
Philadelphia, Pennsylvania 19101

Dear Mr. Alden:

SUBJECT: INSPECTION OF REVIEW PLANS FOR THE INDEPENDENT DESIGN AND CONSTRUCTION ASSESSMENT, LIMERICK GENERATING STATION, UNIT 2

As part of its plan to monitor Philadelphia Electric Company's (PECO) "Program for the Independent Design and Construction Assessment (IDCA) of Limerick Unit 2," the NRC conducted an inspection of the associated review plans. The inspection took place at the Cherry Hill, New Jersey, offices of the independent contractor, Stone and Webster Engineering Company (SWEC), during the week of August 8, 1988, with the exit meeting on August 12, 1988. Enclosed are an executive summary of that inspection and the subject inspection report. As a result of this inspection, the NRC recommended additions and clarifications be included in the review plans to achieve an acceptable depth of review within the defined IDCA scope. All of the additions and clarifications are documented in the enclosed addenda to the inspection report and all were discussed with SWEC. Many of these additions were added to the review plans by SWEC prior to the exit meeting and all were agreed to be subsequently added to the review plans. With the inclusion of the items identified in the enclosed inspection report, the NRC finds the review plans to be acceptable and no other response is required.

The independent design assessment (IDA) review plans are generally comprehensive but require the addition of certain design attributes to be considered complete. All of the inspection disciplines require additions and clarifications to the review plans with most significant exacted in the electrical and instrumentation and controls areas. In the electrical discipline, the inspection team recommended that the review plans be expanded from a review of the 4 kV switchgear in the ac distribution system to a verification of the adequacy of the station ac and dc distribution system's ability to supply operating and control power for loads required for safe shutdown during all modes of plant operation. In the instrumentation and controls discipline, the inspection team recommended that the safety-related 120 Vac instrument power be reviewed for its apparent lack of an uninterruptible power supply. With the addition to the review plans of the design attributes identified in the enclosed inspection report, the scope of the IDA will be considered acceptable.

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The independent construction assessment (ICA) review plans represent a good first effort at identifying the kinds of installations and types of construction attributes that must be reviewed for an adequate assessment of construction practices. However, the NRC inspection team had two basic concerns with the ICA effort. Namely, the scope and depth of inspection were incompletely defined in the review plans; and the planning, preparation and training for the ICA were incomplete. The team noted that SWEC developed the review plans without a plant visit and system walkdown by the principal ICA personnel. The NRC team considered this omission a major contributor to the weaknesses identified in the review plans.

The SWEC ICA effort began on the Monday following the exit meeting for this inspection. Because of this schedule, all of the individual ICA review recommendations in the enclosed inspection report were discussed with the appropriate SWEC personnel. As a result of these discussions, SWEC committed to add two additional reviewers to their team. With the incorporation into the ICA review plans of attributes to address the NRC team's significant concerns, the plans will be adequate for their purpose.

In general, it is our understanding that all review plan attributes will be evaluated. If a certain attribute cannot be evaluated within the scope of review selected by SWEC, then that attribute should be evaluated by selecting another sample outside the approved scope of review. Otherwise, a justification will be required for omission of the attribute evaluation.

If you have any questions regarding this report or forthcoming inspection plans, please contact me or Gene Imbro. Mr. Imbro can be reached at (301) 492-0954.

Sincerely,

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

Enclosures:
1. Executive Summary
2. Inspection Report 50-353/88-200

cc w/enclosures: See next page

cc:
Troy B. Conner, Jr., Esquire
Conner and Wetterhahn
1747 Pennsylvania Ave., N.W.
Washington, D. C. 20006

Mr. Charles Mengers S7-1
Philadelphia Electric Company
2301 Market Street
Philadelphia, Pennsylvania 19101

Mr. Grahm M. Leitch, Vice President
Limerick Generating Station
Post Office Box A
Sanatoga, Pennsylvania 19464

Mr. James Linville
U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406

Mr. Thomas Kenny
Senior Resident Inspector
US Nuclear Regulatory Commission
P. O. Box 596
Pottstown, Pennsylvania 19464

Mr. Joseph W. Gallagher
Vice President, Nuclear Services
Philadelphia Electric Company
2301 Market Street
Philadelphia, Pennsylvania 19101

Mr. John S. Kemper
Senior Vice President-Nuclear
Philadelphia Electric Company
2301 Market Street
Philadelphia, Pennsylvania 19101

Mr. Robert Gramm
Senior Resident Inspector
U.S. Nuclear Regulatory Commission
Pottstown, Pennsylvania 19464

Mr. Ted Ullrich
Manager - Unit 2 Startup
Limerick Generating Station
P. O. Box A
Sanatoga, Pennsylvania 19464

Mr. John Doering
Superintendent-Operations
Limerick Generating Station
P. O. Box A
Sanatoga, Pennsylvania 19464

Thomas Gerusky, Director
Bureau of Radiation Protection
PA Dept. of Environmental Resources
P. O. Box 2063
Harrisburg, Pennsylvania 17120

Governor's Office of State
Planning and Development
ATTN: Coordinator, Pennsylvania
State Clearinghouse
P. O. Box 1323
Harrisburg, Pennsylvania 17102

Mr. Philip J. Duca
Superintendent-Technical
Limerick Generating Station
P. O. Box A
Sanatoga, Pennsylvania 19464

INPO
1100 Circle 75 Parkway
Atlanta, Georgia 30339

cc: B. K. Grimes, NRR
C. J. Haughney, NRR
E. V. Imbro, NRR
J. E. Konklin, NRR
R. W. Parkhill, NRR
S. R. Stein, NRR
Inspection Team Members
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EXECUTIVE SUMMARY

Inspection Report 50-383/88-200
Limerick Generating Station - Unit 2

The NRC has planned to monitor 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 covered the first phase, preparation of review plans, and was conducted at the Cherry Hill, New Jersey offices of the IDCA contractor, Stone and Webster Engineering Company (SWEC).

The inspection team found the independent design assessment (IDA) review plans to be comprehensive, explicit, and logically structured. The team found the SWEC reviewers contacted for the IDA to be experienced and technically competent. With the addition to the IDA review plans of the design attributes identified in Addendum I to the subject inspection report, the inspection team considers the scope of the IDA review to be acceptable. The more significant additions and clarifications to the IDA review plans recommended by the NRC inspection team include the following.

(1) IDA Mechanical Systems - the inputs and outputs of the ultimate heat sink sizing calculations should be verified. Residual heal removal (RHR) and spent fuel pool cooling heat exchangers, relief valve, control valve, and orifice sizing calculations are to be included in the review plans.

(2) IDA Mechanical Components - the seismic qualification of the RHR heat exchanger, piping analysis overlap techniques, internally generated missiles, and a multi-discipline hazards analysis review should be included in the review plans.

(3) IDA Electrical Power Systems - the scope of review should be expanded from a review of the 4 kV switchgear in the ac distribution system to a verification of the adequacy of the station ac and dc distribution system's ability to supply quality operating and control power for loads required for safe shutdown during all modes of plant operation. A review of electrical penetrations and cable pulling calculations should also be reviewed.

(4) IDA Instrumentation and Controls - review of the 120 Vac instrument power as an uninterruptible source of safety-related power, and review of the main control board internal wiring should be included. Also reviews of calculations should include calibration, flow element sizing, high pressure restricting orifice sizing (including cavitation damage assessment), and control valve sizing.

(5) IDA Civil/Structural - review should include an assessment of nonseismic and seismic building interactions, suppression pool swell loads on miscellaneous steel structures, and the effect of floor flexibility on the amplified response spectra.

The NRC construction team found the ICA review plans to be comprehensive in most areas. The review plans represented a good first effort at identifying the attributes necessary for an overall assessment of construction practices. However, the NRC inspection team identified two areas of concern from the initial evaluation of the ICA review plans: (1) the scope and depth of inspection were incompletely defined in the review plans and (2) the planning, preparation, and training for the ICA were incomplete. The NRC construction team noted that SWEC developed the review plans without a site visit and system walkdown by the principal ICA personnel. We believe this omission was a major contributor to the weaknesses identified in the review plans.

The following contributed to the team's concern regarding the scope of the ICA.

(1) The ICA review plans did not comprehensively identify all types of items and equipment which SWEC will inspect during the ICA, and in some instances, SWEC had not defined the applicability of identified equipment to the RHR system.

(2) Several plans did not include a minimum level of effort or a sample selection process.

(3) Important review plan attributes were missing or were incomplete. For example, Review Plan LK-C-1903 did not include an attribute to verify the strength of concrete through a review of concrete compressive test results; and the LK-C-1904 attributes for cable routing involved only a record review without a physical check of actual routing.

(4) Certain attributes were inapplicable to the RHR system because they addressed in-process characteristics and the system was essentially complete.

(5) The individual plans did not identify the types of items or information that the discipline reviewers were to provide to the procurement reviewer for traceability reviews. Also Review Plan LK-C-1906 did not provide any requirements to perform these material traceability reviews on samples identified by the other ICA members.

The following factors contributed to the team's concern regarding the preparation, planning, and training for the ICA.

(1) The SWEC ICA group had not reviewed the actual condition and status of the RHR system to determine its effect on the ICA effort and the review plans. For example, the installation of piping insulation can significantly reduce the number of welds and piping samples accessible for examination.

(2) The ICA group had not obtained all of the information required for an adequate preparation of the ICA effort. For example: SWEC had not identified the applicable ASME codes for welding and nondestructive examinations (NDE), and had not gathered sufficient detail drawings to determine samples and applicability of attributes.

(3) The staffing level appeared to be inadequate for the size of the on-site review effort defined by the plans.