



1881 - 1981

PHILADELPHIA ELECTRIC COMPANY

2301 MARKET STREET

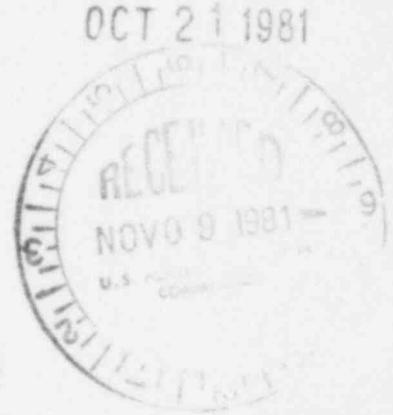
P.O. BOX 8699

PHILADELPHIA, PA. 19101

(215) 841-4502

JOHN S. KEMPER
VICE-PRESIDENT
ENGINEERING AND RESEARCH

Mr. Ronald C. Haynes, Director
Office of Inspection and Enforcement, Region I
United States Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406



SUBJECT: Significant Deficiency Report No. 52
Undervoltage Condition in Certain
Electrical Power and Control Circuits
Limerick Generating Station - Units 1 and 2
NRC Construction Permit Nos. CPFR-106, 107

REFERENCE: Telecon, H.R. Walters (PECo.) to
C. Cowgill (USNRC), September 24, 1981

FILE: @ual 2-10-2 (SDR 52)

Dear Mr. Haynes:

Attached is our final report on the above subject deficiency which was reported to the USNRC per the referenced telecon in accordance with 10CFR50.55(e).

If there are any questions on the matter we would be pleased to discuss them with you.

Sincerely,

Attachment

Copy to: Director of Inspection and Enforcement
United States Nuclear Regulatory Commission
Washington, D.C. 20555

J.P. Durr - Resident Inspector, LGS

8111100513 811021
PDR ADOCK 05000352
S PDR

1827
3/16

Limerick Generating Station - Units 1 and 2
Final Significant Deficiency Report No. 52
Undervoltage Conditions in Certain
Electrical Power and Control Circuits

October, 1981

1. INTRODUCTION

Electrically operated devices require a certain minimum voltage in order to operate reliably. The voltage available to operate a particular device depends on many variables, such as the source voltage, transformer impedances, wire sizes and lengths and current required by the device. During the initial circuit design, when all parameters are not yet finalized, it is necessary to make assumptions regarding circuit lengths, impedances and device current requirements. Later, when firm data is available, the design must be checked to verify that the assumptions were correct and that the circuit voltage drop does not result a voltage below the minimum required to operate the device. Bechtel Power Corporation has recently completed a review of LGS power and control circuits and has found that some circuits, as originally designed, would experience excessive voltage drop such that the associated electrical devices might not function correctly.

PECO believes this condition to be reportable and in compliance with 10CFR50.55(e) this Final Report is issued for the Limerick Generating Station to describe the deficiency, analyze the safety implications, and describe the corrective action taken to resolve it.

This significant deficiency was reported via telecon from H. R. Walters to C. Cowgill on September 24, 1981.

2. Description of the Problem

Bechtel reviewed all power and control circuits associated with Unit 1 at Limerick Generating Station. 166 safety related circuits were predicted to have excessive voltage drop if they had been installed as designed. 47 of these are power circuits while the remaining 119 are control circuits. This condition is attributable to several causes:

- a) longer circuit lengths than originally assumed.
- b) larger control power transformer impedances than originally assumed.
- c) larger device pickup (inrush) currents than originally assumed.

3. Analysis of Safety Implications

Some of the circuits that, as originally designed, have excessive voltage drop are nuclear safety related (Class 1E) circuits. Even though we expect these would have been discovered during start up and preoperational testing at LGS, it is possible that some of the affected circuits would function well enough to pass start up and preoperational tests, but may have failed to operate under minimum voltage conditions. This could have had adverse effects on plant safety.

4. Corrective Action Taken

Holds have been placed on field installation of those circuits which have been found to have excessive voltage drop until the design is revised to correct the problem.

For power circuits, cable sizes are being increased as appropriate to reduce the voltage drops to acceptable levels.

For control circuits, several changes are being made, as required, either singly or in combination, to reduce the voltage drops to acceptable levels:

- Control wire sizes are being increased.
- Control power transformers are being changed to larger sizes which have less transformer impedance.
- Auxiliary relays are being added to minimize the length of the contactor coil circuits, thereby minimizing voltage drop during contactor pick up.

The above corrective action is currently under way and will continue until all circuits with excessive voltage drop are corrected. Circuit installation will proceed based on the corrected design. Both the design changes and the installation of the affected circuits will be complete by January, 1984 for Unit I and June 1986 for Unit II.

5. Conclusions

The corrective action described above will eliminate potentially unacceptable voltage drops in electrical power and control circuits at LGS. No further action is planned.

RJL:ab