



1881 - 1981

PHILADELPHIA ELECTRIC COMPANY

2301 MARKET STREET

P.O. BOX 8699

PHILADELPHIA, PA. 19101

(215) 841-5001

SHIELDS L. DALTRUFF
VICE PRESIDENT
ELECTRIC PRODUCTION

February 13, 1981

Re: Docket Nos. 50-277
50-278

Mr. Robert W. Reid, Chief
Operating Reactors Branch #4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Reid:

In a telephone conversation with D. Verrelli and R. White of the NRC in November of 1980, two items were discussed concerning our November 13, 1980 submittal on the "Adequacy of Station Electric Distribution Systems Voltages". We were asked to respond formally to these items. The concerns raised by the NRC and our responses are listed sequentially below.

NRC Concern

The $\pm 5\%$ tolerance on the setpoint of the degraded voltage detection relays in the proposed Technical Specifications is too broad and could cause spurious operations.

Response

We propose to make the following modifications to the degraded voltage detection relays to address this concern:

- (1) The NGV instantaneous undervoltage relays originally proposed will be replaced with Gould-Brown Boveri relays Model ITE-27D which are capable of supplying narrower specified tolerances. These relays will be set at 90% of nominal with a $\pm 2\%$

A015
5
1/1

8102180 369
P

tolerance instead of the originally specified +5% tolerance.

The time delay associated with the instantaneous undervoltage relay will remain specified at +5%. There are no adverse consequences experienced if the time setting drifts to either end of the tolerance since the basis for the sixty second setpoint is to allow the automatic tapchanger to sense a voltage degradation (30 seconds) and make several voltage adjustments (3-5 seconds between adjustments) prior to actuation of the degraded voltage transfer.

- (2) The setpoint of the CV-6 inverse time-voltage relays will be lowered from 90% to an 87% setpoint with the same +5% tolerance. This will increase the time delay associated with operation of these relays. The consequences of the setpoint of the CV-6 drifting to the lower tolerance limit has the effect of adding between three to ten seconds to the setpoint over the entire operating range of the relay, however, the time delay would never be greater than the sixty second time delay associated with the sharp cutoff relay.

The above modifications result in an upper tolerance limit of 92% for both sets of relays. From the previous analyses, the lowest voltage level obtained from automatic operations was 91.5%, with the grid operating at 95%, the plant operating with a single offsite source and an accident in one unit (Case 5 from our 12/31/79 submittal). Under these circumstances, if the setpoint of either relay drifted to its upper tolerance, it could operate unnecessarily and its connected load would be transferred to the diesel generator. However, since the possibility of a spurious operation caused by setpoint drift within tolerance is remote and the consequences of that spurious operation are minimal, we recommend that the 92% upper tolerance limit be used.

NRC Concern

The proposed voltage protection does not include coincidence logic.

Response

We do not believe there is a need for coincidence logic for our proposed voltage protection scheme at Peach Bottom. The addition of coincidence logic would not add significantly to the reliability or availability of the emergency buses.

There are four emergency buses per unit at Peach Bottom. The attached Figure 2 from our previous submittal shows a typical emergency bus with our proposed degraded voltage detection relays. Presently, two of the four buses per unit are supplied from one of the two startup sources; while the other two buses per unit are supplied from the other startup source. If the voltage on one of the sources drops and remains at a level sufficient to actuate one of the proposed relays, the corresponding feeder breaker will trip open, the load will be shed, and the bus will be transferred to the alternate source if the alternate source voltage is adequate.

For normal plant operation, the failure of one of the voltage detection relays to operate will not cause the loss of an emergency bus because the operating characteristics of the relays overlap such that, for most single relay failures, one of the other two relays in each scheme would operate.

The failure of a relay to operate under degraded conditions would be identified by the transfer of at least three other emergency buses. Only three of the four emergency buses per unit are assumed operable for response to a Design Basis Accident. In addition, the procedures require that the operator analyze the emergency bus control console to assure that all the buses are energized. At this time, the operator can transfer the bus manually at the console if voltage conditions dictate.

There are other noncoincident items involved in the operation and control of each feeder breaker to each emergency bus. There is only one feeder breaker from each offsite source to each emergency bus. There is only one DC control feed to each bus; one set of load shed, transfer and reload logic on each bus; one diesel generator per bus; and only one set of single phase potential transformers installed on each feed to the emergency bus. The single failure of any of these items could result in the loss of the entire bus.

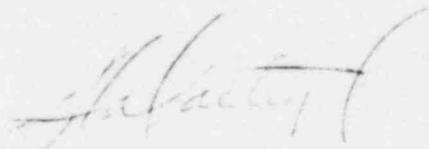
IEEE Standard 603-1980 states "(that the Single Failure Criterion) does not invoke coincidence (or multiple channel) logic within a safety group; however, the application of coincidence logic may evolve from other criteria or considerations to maximize plant availability or reliability." Since the failure of a relay could not cause the loss of the bus, there is no need to provide coincidence logic for the detection relays.

As part of the instrument functional test, the devices and the logic will be checked up to but not including the tripping of the feeder breaker. As part of the surveillance test, the tripping operation of the relays on one bus will be rendered ineffective; however, the length of time that these devices are under test is short compared to their time in normal

service. The exposure, then, to a degraded condition going undetected due to the testing on one feeder breaker is low. In addition, if the voltage would degrade, the control room operator would note that three of his four buses transferred automatically and he could transfer the fourth manually. The function of the relay would be restored by removing the test block.

Philadelphia Electric Company believes that the installation of thirty-two additional relays to provide coincidence logic would provide only marginal benefits and would not significantly increase the reliability or availability of the emergency buses. For these reasons, we believe coincidence logic is not necessary for our proposed voltage protection scheme and request your concurrence.

Very truly yours,

A handwritten signature in cursive script, appearing to read "H. B. ...", is written over the typed name "Very truly yours,".

Attachment

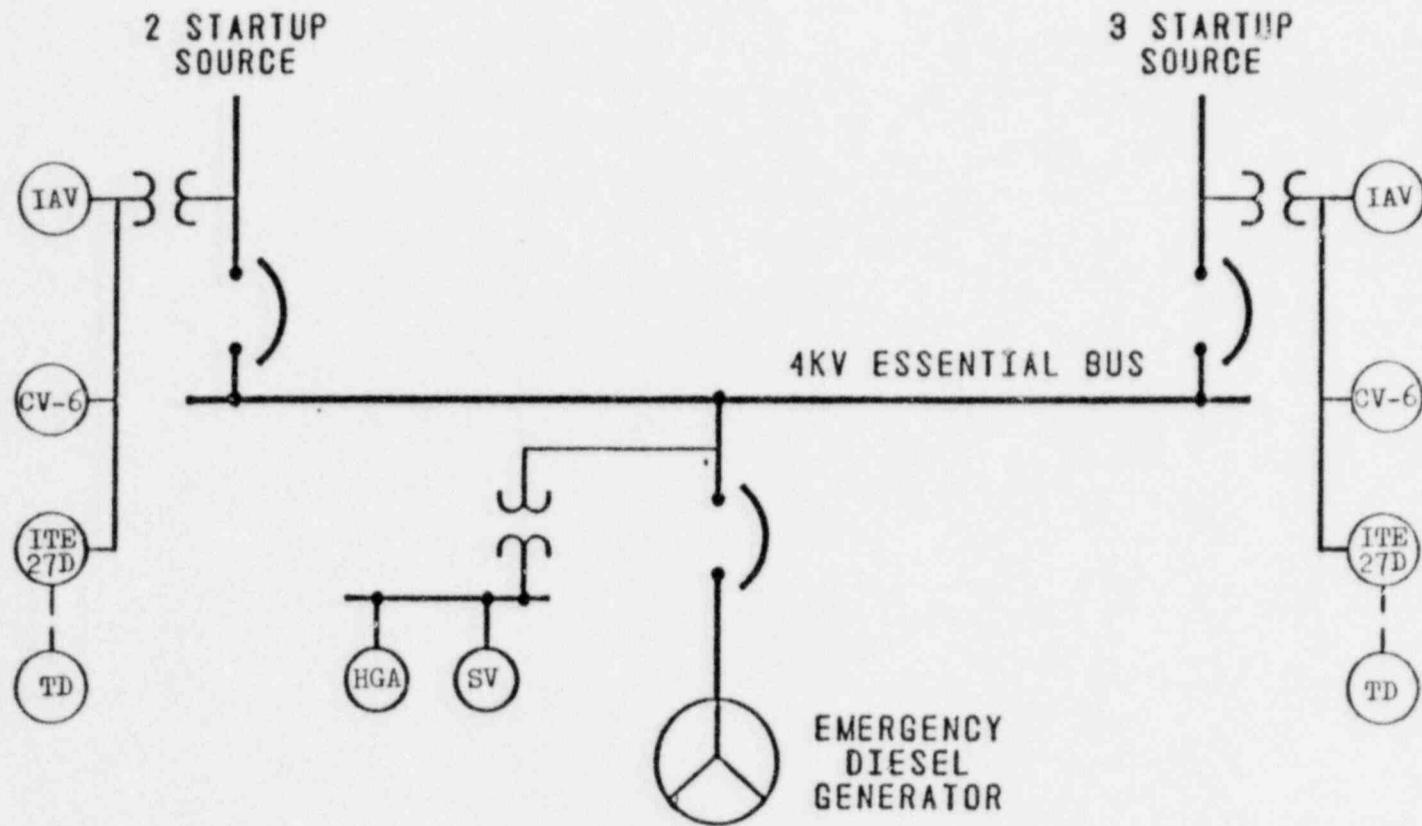


FIGURE 2