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DENTON,H.R. Office of Nuclear Reactor Regulation

SUBJECT: Submits info re undervoltage protection sys,in response to NRC ltr from A Schwencer.

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October 5, 1979
AEP:NRC:00270

Donald C. Cook Nuclear Plant Unit Nos. 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
Degraded Grid Voltage

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S.Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Denton:

This letter is in response to Mr. A. Schwencer's letter concerning the undervoltage protection system at the Donald C. Cook Nuclear Plant.

The second level of undervoltage monitors are installed in a manner which meets the functional requirements of IEEE 279-1971. The monitors trip the 4 kV circuit breakers which connect the safety buses to the non-safety buses only when the auxiliary system is supplied from the preferred offsite power source. At all other times, the monitors provide only a low voltage alarm function for the preferred offsite power source.

The voltage monitors are connected to the power source they monitor, that is, the preferred offsite power source. The connection is made at the 34.5 kV voltage level to provide sufficient selectivity and sensitivity to lower than normal auxiliary bus voltages without the need for long time delays. The voltage setpoints selected correspond to a 4 kV voltage level of 90% of nominal under worst steady state loading conditions. The 2 second time delay permits automatic corrective action to occur for transients on the high voltage system which could cause momentary voltage reductions of the measured voltage. The voltage level selected also permits large motor starting on the auxiliary bus, which represents a transient load, with its attendant voltage drop, while the motor accelerates to rated speed. In the case of the largest motor, the time required to override this transient is approximately two minutes.

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Two 34.5 kV circuits are provided from the 34.5 kV high voltage switchyard bus. Each circuit provides power to one of the two reserve transformers in each unit. Each of the transformers provides power for one of the two safety trains of each unit. The 34.5 kV potential transformers which convert the high voltage to a lower voltage are located at the primary terminals of the reserve transformers. Each set of potential transformers consists of 3 transformers. The primary winding of each transformer is connected phase to phase with two primary fuses. Four sets of potential transformers are provided, one set for each of the safety trains of each of the two units. The potential transformers are subjected to the same environment as the reserve transformers to which they are connected.

The three undervoltage relays and time delay relay for each safety train of each unit are located in the unit control room in safety related control panels. The trip logic requires undervoltage sensed by at least 2 of the 3 undervoltage relays for 2 seconds before initiation of the trip of the safety bus when it is fed from the preferred offsite power source. Undervoltage sensed by only one of the three relays operates an annunciator. Failure of any high or low voltage fuse or potential transformer in the voltage sensing circuit will result in operation of only one of the three relays which will not cause a spurious operation of the system. The single failure will cause operation of an alarm and therefore will not be undetected. The 34.5 kV potential transformers are dedicated to the second level trip and are not used by or shared with any unrelated non-safety system.

In addition to the above, undervoltage alarms have been installed on each of the 4 kV and 600 volt buses to alert the operator of a low voltage condition should it occur. These annunciators are active at all times.

We believe that the presently installed second level undervoltage trip which separates the safety bus from the non-safety bus when power is supplied from the preferred offsite source meets the intent of the requirements of IEEE 279-1971 as they apply to actuator systems and therefore meets the intent of Staff Position 1 (e) Relative to the Emergency Power Systems for Operating Reactors.

As the information contained herein supplements previously transmitted information and is being submitted in response to a written request by the NRC, AEP interprets 10 CFR 170 as requiring that no fee accompany this submittal.

Very truly yours,

R. S. Hunter
Vice President

cc: R.C. Callen
G. Charnoff
J. E. Dolan
R. W. Jurgensen
D. V. Shaller -Bridgman