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**DUKE POWER**

January 2, 1991

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D. C. 20555

Subject: Catawba Nuclear Station, Units 1 and 2  
Docket Nos. 50-413 and 50-414  
Special Report Supplement

H. B. Tucker's letter to the Document Control Desk dated June 20, 1990 transmitted a Special Report concerning invalid failures on Catawba Nuclear Station Unit 2 Diesel Generators 2A and 2B. This report was submitted pursuant to Catawba Technical Specifications 6.9.2 and 4.8.1.1.3. Attached is a supplement to the June 20, 1990 submittal.

Very truly yours,

M. S. Tuckman, Vice President  
Nuclear Operations

CRL/8/lcs

Attachment

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SUPPLEMENT TO SPECIAL REPORTS DATED  
MAY 17, 1990 AND JUNE 20, 1990  
CATAWBA NUCLEAR STATION

DIESEL GENERATOR 2A & 2B INVALID FAILURES  
DURING OPERABILITY TESTING OF ENGINE

This is a supplement to the Special Reports submitted following 3 Invalid Failures associated with a reverse power relay actuation on Diesel Generators (D/G) 2A and 2B (letters dated May 17, 1990 and June 20, 1990). A Special Testing Program was developed by the Transmission Department and Instrumentation and Electrical Section (IAE) to further evaluate the proper functioning of the components involved. This program checked the operation of the reverse power relay for D/G 2A and found it to be operating properly. Test equipment was connected to appropriate circuits to monitor for conditions that could cause reverse power relay actuation. Testing was scheduled along with the break-in runs following 2EOC3 maintenance for each engine. During the runs, different operators paralleled the engine several times to allow for evaluation of the techniques that each individual may have acquired.

D/G 2A was the first engine to be inspected during 2EOC3 outage. During its break-in runs on 7/12/90, Transmission and IAE monitored kW, kVAR, power factor, synchroscope operation, and the direction of phase angle on the reverse power relay. Several different operators successfully paralleled the generator to the essential bus and the protective systems performed as designed. On 7/17/90, the essential bus was ready to be swapped back from its alternate source to its normal source. The 2A D/G is used to maintain the loads on essential switch gear while the breaker is swapped back to its normal cubical. While D/G 2A was carrying the load on the essential switch gear, the load on the engine was 850 kW, 800 kVARs with a power factor of .76 lagging. When the breaker was closed to the essential switch gears normal source, the load on the D/G dropped to less than zero which indicated a reverse power condition. The phase angle meter connected across the reverse power relay confirmed the condition. The operator attempted to reduce load further following the normal procedural practice of reducing D/G load to 200 kW. Since the load was already at or below zero, this caused a reverse power relay actuation.

Based on this Special Testing/Evaluation of the D/G paralleling evolution by the Transmission Department and the IAE Section, all invalid failures that have occurred due to reverse power relay actuation can be directly attributed to Operator Error.

The Corrective actions taken, or to be taken, to reduce the potential for this type of invalid failure are:

The NLO's have been given additional training during Requal Segment on paralleling the D/G to the grid. This Operational Proficiency training involved both classroom and walk through exercises. The operators were refreshed on the generator and the effects of the controls for the generator and engine.

In addition, the layout of the controls may have been a contributing factor to the operator error. A Station Problem Report will be generated to request Design Engineering to perform a formal Human Engineering Design Review of the Diesel Generator and Engine Control Panels.

Operations procedures that address paralleling the D/G will be revised to provide the operator with additional information on the voltage to be maintained when paralleling the engine. Presently the procedure says "Adjust Voltage ("VOLTAGE CONTROL") to allow D/G voltage to be slightly higher than line voltage." This will be revised to provide a specific range within which the D/G voltage shall be held above the line voltage.