Consumers Power Company

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Operating Reactors Branch No 5
Nuclear Reactor Regulation
US Nuclear Regulatory Commission
Washington, DC 20555

DOCKET 50-155 - LICENSE DPR-6 -
BIG ROCK POINT PLANT - STATION ELECTRIC
DISTRIBUTION SYSTEM - STARTING VOLTAGE
FOR THE ELECTRIC FIRE PUMP MOTOR

By letter dated May 18, 1982, Consumers Power Company submitted a report which addressed the adequacy of station electric distribution system voltages for various operating conditions at the Big Rock Point Plant. As part of the submittal, Consumers Power Company evaluated the ability of the Electric Fire Pump (EFP) to start when supplied by the Emergency Diesel Generator (EDG) preloaded with 160kVA. Although the evaluation indicated that the EFP will start when supplied by the preloaded EDG, Consumers Power Company committed to performing a test to verify such. Since the commitment was made, however, Consumers Power Company has reevaluated the EFP starting conditions and has initiated appropriate procedural revisions to better control such conditions. As a result, it is the opinion of Consumers Power Company that the aforementioned test is no longer required and the commitment is being retracted. The following paragraphs describe the reevaluation and the procedural revisions as well as summarize Consumers Power Company's conclusion which serves as the basis for retracting the commitment.

Included as part of the aforementioned report was a determination of the magnitude of the EFP motor starting voltage when supplied by the EDG preloaded with 160kVA. The purpose for the determination was to resolve a Consumers Power Company concern that the available EDG voltage might not be adequate to support a successful EFP start at some point in time after an appreciable plant load is manually added to the EDG following a loss of offsite power (LOOP). As documented in the report, it was determined that the EFP motor terminal voltage decreases to a minimum value of 66% of nameplate voltage during the transient starting condition. Since the minimum transient voltage was determined to be less than the assumed 70% minimum starting voltage rating of the motor, Consumers Power Company considered it prudent not only to

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conduct an analysis to show that the EFP would start given the minimum voltage condition, but also to perform a test to verify such.

The EFP starting analysis (which was included in the report) showed that the initial 66% motor terminal voltage is sufficient to provide adequate breakaway torque and begin accelerating the fire pump. The analysis revealed that a motor terminal voltage of 65% develops a motor starting torque of 42% of full load torque (FLT). Because the pump manufacturer (Worthington) indicated that the fire pump requires only 20% FLT to breakaway, Consumers Power Company concluded that the fire pump motor would begin to rotate its pump when supplied with 66% voltage from the preloaded EDG.

Although the aforementioned analysis provided an indication that the EFP would start and accelerate to running speed when supplied by the EDG preloaded with 160kVA, Consumers Power Company committed to performing a test designed to verify such. Accordingly, the test was scheduled for the 1983 refueling outage. Although Consumers Power Company committed to such a test of its own volition, the NRC was notified of this commitment in the aforementioned May 18, 1982 report.

Since committing to perform the EFP verification test, however, Consumers Power Company has reevaluated its concern regarding the ability of the EFP to successfully start when supplied by the EDG preloaded with 160kVA. As a result of its reevaluation, Consumers Power Company has elected to revise appropriate emergency and standard operating procedures to ensure that the EFP is started prior to the operator manually applying load to the EDG following a LOOP. Such procedural revisions provide assurance that, prior to starting the EFP, the maximum load on the EDG will only be that of the EDG's initial step load which is automatically applied as soon as its output breaker closes in on the emergency bus. Considering a LOOP condition without a concurrent loss of coolant accident (LOCA), the initial step load (and thus the EDG preload at the time of EFP start) is approximately 52kVA. (See our 8/28/79 letter to NRC - Loads are lighting, gland seal exhauster, I&C Transformer and air locks). Considering a LOOP condition concurrent with a LOCA, the EFP is automatically started as part of the EDG initial step load. Therefore, the EDG can be considered as only being preloaded with a certain portion of its initial step load, which in the case of LOOP with LOCA is 58kVA (see 8/28/79 letter - Loads are same as above plus core spray valves). In effect, the procedural revisions significantly reduce the EDG preload prior to EFP start. This reduction in generator preload will assure sufficient generator exciter capacity to restore voltage after the EFP is started and in turn provide adequate voltage to accelerate the EFP to full load speed.

Because analysis indicates that EFP breakaway torque and acceleration can be achieved given only 65% of nameplate voltage at its motor terminal and procedural modifications are being initiated to assure that the EFP is started prior to the operator manually applying load to the EDG, we have concluded adequate voltage exists, following a LOOP, to support a successful EFP start. Furthermore, a diesel fire pump (DFP) exists to backup the EFP resulting in at

least one fire pump (either the EFP or the DFP) always being available for service.

Given the above, Consumers Power Company considers the EFP verification test to be unnecessary and has, therefore, cancelled plans to conduct such a test during the upcoming 1983 refueling outage.

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