GULF STATES UTILITIES COMPANY

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U. S. Nuclear Regulatory Commission
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Gentlemen:

River Bend Station - Unit 1
Docket No. 50-458

Enclosed is Revision 1 to Gulf States Utilities Company's Special Report concerning a valid failure of the Division III diesel generator at River Bend Station. The original report was issued on May 9, 1991. This revised report is submitted to change the description of the field flash relay timing. The calibration check revealed that it was set too long, not too low as was indicated in the original report.

Sincerely,

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LAE/DNL/DCH

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SPECIAL REPORT

At 0133 on 04/09/91 during performance of scheduled monthly STP 309-0203, "Division III Diesel Generator Operability Test", the initial start timing for voltage exceeded the Technical Specification 10 second maximum. In accordance with Regulatory Guide 1.108, position C.2.e.1, this is considered a valid failure. Consequently, this Special Report is submitted pursuant to Regulatory Guide 1.108, position C.3.b and Technical Specification 4.8.1.1.3.

INVESTIGATION

At 0133 on 04/09/91 the start time of the Division III emergency diesel generator (DG) to reach minimum voltage was 10.16 seconds. The diesel was secured and restarted at 0140 with voltage timing at 10.02 seconds which was also unacceptable; however, the diesel was loaded and operated for greater than 30 minutes. Test equipment was installed to verify correct voltage indication and a test start was performed at 1800. The start timing was still unacceptable.

A calibration check of the timing on the field flash relay time delay found that it was set too long. It was reset from 4.9 seconds to 3.9 seconds because it had drifted above its setpoint of 4.0 seconds +/- 5 percent. A test start at 0205 on 04/10/91 revealed that the diesel now achieved its voltage in 9.7 seconds. A re-performance of STP 309-0203 with starts at 0330 and 0350 was performed. However, recorded time to achieve voltage was 10.16 and 10.08 seconds, respectively, which remained unacceptable. Further investigation was done by replacement of four (4) air start motors. The diesel had started 38 times since these starters had been replaced/overhauled during November, 1990. Additional test equipment was also installed to verify the sequence of relay closure which is based on start signal, various RPM speed levels, as well as field flash timing and voltage. Calibration was performed on the speed switch but this was found acceptable and was not adjusted.

A test start at 2112 found timing for voltage to be at 9.67 seconds. A second test start at 2127 duplicated acceptable start timing at 9.62 seconds. STP 309-0203 was satisfactorily performed with a start at 2306 with a voltage timing of 9.68 seconds. Following this STP the diesel was declared operable.

Two factors which affected diesel start timing were the field flash relay time delay and the air start motors. The field flash relay time delay was adjusted to bring it into normal calibration range. Restart after this indicated that it was not the major factor. The air start motors were replaced. After the diesel had been declared operable, overhaul of the old motors began on site. During this work it was determined that one of the air start motors had been rotating left-handed or counter-clockwise. These motors must turn right-handed or clockwise due to the left-handed (counter-clockwise) rotation of the engine.

CAUSE OF FAILURE

The air start motors include a Bendix gear assembly which engages the main engine flywheel gear on each start until the engine reaches 150 RPM. It then returns by spring, to a standby disengaged position while the engine accelerates and operates. The Bendix assembly is ratcheted which allows the engine flywheel to spin ahead of the air start motors. For the starter which rotated left-handed, the Bendix assembly immediately began ratcheting as other motors started the rotation of the flywheel. This failed to add rotating force to the flywheel which is necessary to perform the 10 second start.

The malfunctioning air start motor had been overhauled by GSU in November 1990, during the third refueling outage. Three of the four starters were included in this work. The fourth starter had been obtained from Ingersoll Rand after a vendor shop overhaul. The root cause of this event was that the site procedure for starter overhaul, CMP-9208, was unclear in several reassembly steps which could easily permit improper reassembly resulting in improper starter rotation. This procedure is being revised to eliminate ambiguities and add an operational step to ensure right-handed starter rotation.

The two start failures which occurred on 11/9/90 and were submitted under the Special Report dated 12/10/90, occurred with this starter turning in the incorrect direction. The Division III diesel has satisfactorily started, in less than 10 seconds, 20 times with this condition.

Since this is the 5th valid failure within the last 100 valid tests, the Division III diesel surveillance test procedure frequency has been increased from once in 31 days to once in 7 days.

CORRECTIVE ACTION

A calibration check of the timing on the field flash relay time delay found that it was set too long. It was reset from 4.9 seconds to 3.9 seconds because it had drifted above its setpoint of 4.0 seconds +/- 5 percent. Subsequent tests showed that the timing results were repeatable. As a conservative measure to ensure reliability, the time delay relay will be replaced during the next scheduled Division III diesel generator outage.

The start time failures occurred due to the installed configuration of one of the air start motors. All of the air start motors were replaced. This corrected the problem and a satisfactory start time was obtained.

To address the root cause of this event, the site procedure for starter overhaul, CMP-9208, is being revised to eliminate ambiguities and add an operational step to ensure right-handed starter rotation.

OPERATING START/TEST DATA

Note: The data below was current at the time of the original submittal of the Special Report.

DIESEL GENERATOR MARK NUMBER:

1E22*EGS001

LENGTH OF TIME DIESEL GENERATOR
WAS OUT OF SERVICE:

25 HOURS

SURVEILLANCE INTERVAL FOLLOWING FAILURE:

DIVISION I: MONTHLY
DIVISION II: MONTHLY
DIVISION III: WEEKLY

TEST INTERVALS CONFORM TO TECHNICAL SPECIFICATIONS? YES

FAILURES FOR DIVISION I:

1 VALID FAILURE IN THE LAST 20 VALID TESTS

2 VALID FAILURES IN THE LAST 100 VALID TESTS

FAILURES FOR DIVISION II:

0 VALID FAILURES IN THE LAST 20 VALID TESTS

2 VALID FAILURES IN THE LAST 100 VALID TESTS

FAILURES FOR DIVISION III:

2 VALID FAILURES IN THE LAST 20 VALID TESTS

5 VALID FAILURES IN THE LAST 100 VALID TESTS

CUMULATIVE FAILURES FOR ALL RIVER BEND DIESEL GENERATORS:

5 VALID FAILURES IN THE LAST 100 VALID TESTS