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

Please find enclosed an Informational Report concerning electrical device failures in the standby cooling tower fan circuits at River Bend Station - Unit 1. This report is submitted to inform the NRC of these failures and document GSU's investigation and corrective actions. Note that previous failures that occurred during the period from 10/5/90 to 10/6/90 were reported in an Informational Report dated 11/7/90 and a supplement dated 2/15/91.

Sincerely,

W.H. Odell
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LAE/PDG/JRH/DCH/JFM/HAK/AS/kvm

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INTRODUCTION

During the period from 10/02/90 to 10/03/91, [illegible] the unit shutdown for the mid-cycle outage (Operational Condition 4), four standby cooling tower (SBCT) fans tripped due to various electrical device failures. Fans 1SWP*FN1C and 1SWP*FN1Q experienced failures in 62X relays. Failures in the contactor and the timing module for the timing relay occurred in fans 1SWP*FN1G and 1SWP*FN1U, respectively.

INVESTIGATION

The 62X relays which experienced failures are Gould J10 relays. In each case, the coil failed. The 62X relays are the timer auxiliary relays and are energized by the timing module on manual initiation (starting) by the operator. Note that the timing relay associated with the failed timing module was an ITE Gould J16. The failure of either the timing relay or the corresponding 62X relay will require operator action to transfer control from remote to local to permit starting of the fans from the motor control centers (MCCs). The failure of the 62X relays in fans 1SWP*FN1C and 1SWP*FN1Q and the timing module failure in fan 1SWP*FN1U disabled operation of the fans from the control room. However, the fans remained operable locally from the MCCs. The contactor for fan 1SWP*FN1G is energized by a 42X (Gould J10) relay in the starting circuit of the fan. The contactor failure disabled both remote and local control of fan 1SWP*FN1G.

Previous failures of ITE Gould J10 relay coils during the period from 10/05/90 to 10/06/90 were reported in an Informational Report (dated 11/07/90) and a supplement (dated 02/15/91). In this previous case, two 42X relays and two 62X relays experienced failures. Both of these types of relays are Gould J10 r[illegible] A failure analysis performed by Wyle Laboratories following the 10/90 relay failures co[illegible]luded that the most likely cause of failure was the environmental conditions to which the r[illegible]s were subjected. The MCCs for the SBCT fans are located in the SBCT pump room. The temperatures in this room typically drop below 40 degrees Fahrenheit during winter months when the outside ambient temperature is sufficiently low. Note that 40 degrees F is the lower operating limit specified for the SBCT pump room. Prior to the 10/90 relay failures, the environment was not adequately controlled to maintain temperatures consistent with the specified service conditions of the relays. Exposure of Gould J10 relays to low temperatures can result in damage to the coil encapsulant. This condition can prevent insertion of the relay armature into the coils, thus creating a binding condition. This binding condition can cause the coil to draw an inrush current for a longer time period than normal for relay operation, resulting in shorted windings due to overheating of the coil.

Note that there are numerous Gould J10 relays in the plant where the temperature variance remains within the specified limits. Following the 10/90 relay failures, a review of other plant areas where Gould J10 relays are used was performed to identify where similar conditions might exist and none were identified. GSU concluded that Gould J10 relays do not represent a generic safety concern as the failure mode described above is limited to relays subjected to lower temperatures than specified by the vendor.

The cause of the timing module failure is not known; however, failure of a timing module or its associated timing relay will not prevent local operation of the SBCT fans. In addition, the timing relay has an internal fuse to protect the remainder of the circuit. The contactor failure is considered to be a random failure at this time. There is only one other known failure of this type of contactor device in the SBCT fan starting circuits at RBS.

CORRECTIVE ACTION

The failed components have been replaced. Following the 10/90 Gould J10 relay failures, the magnetic block assemblies for the failed relays were replaced during the third refueling outage (note that the coil is a part of the magnetic block assembly). As corrective action for the 10/91 relay failures, GSU has replaced the magnetic block assemblies of all of the remaining Gould J10 relays used in starting applications for the SBCT fans. This includes the failed relays as well as the non-failed relays.

As a result of the 10/90 relay failures, the daily log report, Operations Section Procedure (OSP)-0012 was revised to require temperature monitoring of the SBCT pump rooms and switchgear rooms. In the event that the temperature readings are below 40 degrees F, the procedure requires that Design Engineering be contacted. This would be followed by corrective measures to elevate the room temperatures. Infra-red temperature monitoring (thermographic) has been implemented as a part of the monthly surveillance test procedure. However, no correlation between the data and relay failures has been observed to date. Therefore, GSU plans to discontinue this practice.

The resolution of the SBCT relay problem, identified herein and in GSU's previous revised Informational Report dated February 15, 1991, includes the following:

- Redesign of the ventilation system in the SBCT pump room and electrical switchgear rooms to assure that the temperatures can be maintained above 40 degrees F.

- As an interim measure, until the redesign of the ventilation system is implemented, the magnetic block assemblies of the affected relays will be replaced every 5 years.

OPERATIONAL IMPACT

The contactor failure disabled remote and local operation of 1SWP*FN1G. Therefore, Division I was rendered inoperable since Technical Specification 3.7.1.2 requires all fans to be operable. However, fans 1SWP*FN1Q, 1SWP*FN1U, and 1SWP*FN1C were all operable from MCCs as the associated electrical device failures disabled remote operation only. Thus, only one cell of the Division I SBCT fans was rendered inoperable by the contactor failure. Note that there are two cells per Division. While Division I must be considered inoperable in its entirety, the remaining cell was available to provide cooling if required. Therefore, a minimum of 50 percent

cooling capacity was available from Division I. Furthermore, Division II was operable during this time. GSU concludes that adequate cooling was available during this time period (10/02/91 to 10/03/91) to maintain the plant in a safe shutdown condition.