



GULF STATES UTILITIES COMPANY

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

Gentlemen:

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

Please find enclosed an Informational Report regarding a recent test of Thermo-Lag fire barrier material which is used at River Bend Station. This report is being submitted to provide information regarding our ongoing investigation of this matter and interim actions taken.

Sincerely,

J. E. Booker
for J. E. Booker
Manager-River Bend Oversight
River Bend Nuclear Group

TFP
JEB/TFP/RGW/CMC/ch

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REPORTED CONDITION

At approximately 1100 hours on 10/28/89, with the unit in Operational Condition 1, a problem was reported in a test of plant-specific Appendix R fire barriers as described herein. Since the results of this test placed into question the qualification of Thermo-Lag fire barrier material, Condition Report (CR) 89-1144 was initiated which detailed the areas in the plant protected by these fire barriers. All of these areas, with the exception of the piping tunnels and the upper elevations of the reactor building, were being covered by preexisting firewatch patrols. As a conservative precaution, the other areas were added to the firewatch routes satisfying the action statement of section 3/4.7.7 of the plant Technical Specifications.

This condition is currently determined not to be reportable pursuant to 10CFR50.73 because the test results are indeterminate and thus the impact on installed River Bend Station (RBS) equipment is unknown. If the evaluation determines that RBS equipment has been inoperable due to inadequate fire barriers appropriate reporting requirements will be evaluated and satisfied.

INVESTIGATION

The fire barrier test was conducted to verify barrier performance and to compare the three hour rated fire barrier products of two competing manufacturers. One material used in the test, Thermo-Lag, produced by Thermal Science, Inc. is the material typically used at River Bend Station for one and three hour Appendix R fire barriers. The other material was undergoing initial qualification testing and is not currently in use at RBS. Standard site installation procedures were used to install the Thermo-Lag material on the test apparatus. Both materials were applied and inspected by Gulf States Utilities (GSU) personnel on identical 30 inch wide aluminum cable trays. Both barrier materials were also used to protect the tube steel support underneath the trays, coming into contact near the midpoint of the support. Testing was performed in accordance with the American Nuclear Insurers test standard, including monitoring of circuit integrity.

During the performance of the test, it was noticed that thermocouples inside the Thermo-Lag tray enclosure were experiencing abnormally high temperatures in one area. At approximately 41 minutes into the test, the Thermo-Lag covering the bottom of the support fell off, exposing the steel support. As the test continued, temperatures inside the cable tray enclosure continued to increase, with a loss of circuit integrity at 47 minutes.

As a result of GSU's ongoing investigation some generic issues have been revealed during a recent conference with the vendor, Thermal Science, Inc. as follows:

1. Use of Aluminum Conduit - No testing has been performed to evaluate the effect of aluminum conduit penetrating the protective envelope. The typical "18 inch rule" where Thermo-Lag covering limits heat transfer due to penetrants may or may not be sufficient.

2. Joints in Protective Envelopes - Two methods for sealing joints are shown in the TSI installation manual. One method involves coating board butt edges prior to installation, called "prebuttering". The second method allows all board material to be dry fitted and the joints covered with trowel grade material once in the final position, called "skin coating". This second method, although sanctioned in the TSI manual, has not been tested.
3. Size of Tested Configurations - Until the most recent test series conducted with GSU, the maximum size of barrier tested is apparently a 12 inch wide cable tray. However, enclosures of much larger sizes are typically used at River Bend Station, based on extrapolation of data from tests on 12 inch wide trays. The effect on barrier performance due to this larger size is unknown.

The results of the testing performed on the Thermo-Lag barrier continue to be studied by GSU and the vendor, Thermal Science, Inc. The influence of the dissimilar material joint on the overall results of the fire test is in question. This application is not typical at River Bend Station. Evaluation of the test will continue until the results are attributed to either test article construction or test performance. At that time, the applicability of the results to the barriers installed at RBS will be determined.

CORRECTIVE ACTION

In addition to conservatively satisfying the firewatches specified by the action statement of Technical Specification 3/4.7.7, GSU Engineering has specified when stationary firewatches will be posted for inoperative fire suppression systems or fire detection zones in safety related areas of the plant which utilize Thermo-Lag fire barriers. This action conservatively exceeds the current Technical Specification requirements for fire suppression and detection systems. The procedure governing control of transient combustibles has been revised to require that all combustible liquids brought into the power block remain in the possession of the worker until they are removed from the building. As an alternative to removal from the building, small amounts of liquids may be stored in the flammable storage lockers in the plant.

GSU will continue to evaluate the test results and will provide an updated report by March 31, 1990.

SAFETY ASSESSMENT

Fire safety was and is an integral part of the design of RBS. This process begins in the selection of the cable used, which is IEEE rated and fire resistive. (Electrical cable insulation forms the majority of the fixed fire load in the plant). Fire detection systems cover the entire power block, giving early warning of fires. Fire suppression systems are provided in areas such as cable chases and diesel rooms with large concentrations of combustibles. The various buildings are subdivided into discrete fire areas, usually by concrete walls and floors. This 'defense in depth' philosophy is crafted to detect fires in the early stages, contain fires in one area and provide control and extinguishment. Thermo-Lag barriers form a small fraction of the total number of fire barriers.

Based on the interim actions implemented, the fire protection design features at RBS and the generally low combustible loadings in the fire areas, GSU concludes that continued operation is justified.