October 31, 1991

[redacted]

Docket No. 50-458

MEMORANDUM FOR: Frank J. Miraglia, Jr., Deputy Director
Office of Nuclear Reactor Regulation

FROM: Loren R. Plisco, Section Chief
Performance and Quality Evaluation Branch, NRR

K. Steven West, Senior Project Manager
Planning, Program, and Management Support Branch, NRR

SUBJECT: FACT FINDING VISIT TO RIVER BEND STATION

In support of our special review assignment, we visited River Bend Station (RBS) on October 7 and 8, 1991 to obtain facts related to the use of Thermo-Lag fire barriers. We were accompanied by Joseph Ulie, Reactor Inspector, Region III. Enclosure 1 is a summary of technical issues. Enclosure 2 is our full trip report.

During our visit, we noted plant specific concerns related to Appendix R compliance and possible violations of GSU facility operating license No. NPF-47. We recommend that these concerns, which are outside the scope of our assignment, be referred to Region IV for detailed review. Enclosure 3 is a proposed package for referring these concerns to Region IV. [redacted]

/S/
Loren R. Plisco, Section Chief
Performance and Quality Evaluation
Branch, NRR

/S/
K. Steven West, Senior Project Manager
Planning, Program, and Management Support
Branch, NRR

Enclosures:
As stated

cc w/enclosures:
[redacted]

b:trip.rbs
DISTRIBUTION:
TSI file
LPlisco
SWest

NRR SW
SWest
10/31/91

NRR LP
LPlisco
10/31/91

ENCLOSURE 1

SUMMARY OF ISSUES

Facility: River Bend Station, Unit 1
Licensee: Gulf States Utilities
Docket No.: 50-458
Trip dates: October 7 and 8, 1991
Review Team: Loren Plisco, NRR and Steven West, NRR

| | Issue | Status |
|---|---|---|
| 1. | Nonconservative ampacity derating factors are being used by the licensee. | 1. Will be tracked by the review team pending receipt of additional information from the licensee. May be referred to Region IV following receipt of the requested information. |
| 2. | Apparent failure of Thermo-Lag during June 18, 1985 penetration seal fire test at SwRI was not reported. | 2. Test exceeded design basis for Thermo-Lag, therefore, not reportable. Issue closed in trip report. |
| 3. | Fire test acceptance criteria used by licensee for November/December 1990 upgrade tests deviates from NRC criteria provided in GL 86-10. | 3. Refer to Region IV. |
| 4. | Installation of Thermo-Lag fire barriers at RBS may not be supported by licensing bases. | 4. Will be tracked by the review team pending receipt of additional fire test data from the vendor. Issue may be referred to Region IV following receipt and review of the data. |
| 5. | Barrier configurations in F and G tunnels and control building not supported by tests or analyses. Unprotected structural steel. USAR commitment not met. | 5. Apparent violations of Appendix R to 10 CFR Part 50 and facility operating license. Refer to Region IV. |

| | | |
|---|---|---|
| 6. | Weaknesses in procurement specifications and receipt inspection process. | 6. Refer to Region IV. |
| 7. | Fire barrier system installation and construction deficiencies. | 7. Deficiencies may be generic. Issue will be tracked by review team. (Supplemental Information Notice adressing installation problems currently being prepared.) |
| 8. | Licensee failed to submit LER following July 29, 1988 fire test failure of in-situ barrier configuration. | 8. Apparent violation of 10 CFR Part 50.73. Refer to Region IV. |
| 9. | Licensee failed to submit Part 21 report following discovery of Thermo-Lag defects and fire test failures. | 9. Possible violation of 10 CFR Part 21. Refer to Plant Systems Branch for technical review. |

ENCLOSURE 2

# TRIP REPORT

Facility: River Bend Station, Unit 1
Licensee: Gulf States Utilities
Docket No.: 50-458
Trip dates: October 7 and 8, 1991
Review Team: Loren Plisco, NRR and Steven West, NRR

## Background

Information Notice 91-47, "Failure of Thermo-Lag Fire Barrier Material To Pass Fire Endurance Test," identified problems that could result from the use of or improper installation of Thermo-Lag material to satisfy the requirements of Section III.G.2 of Appendix R to 10 CFR Part 50. NRR has established a special review team to assess the potential safety significance and generic applicability of the issues related to the use of Thermo-Lag. To obtain additional facts related to this effort, Loren Plisco and Steven West conducted a fact finding visit to River Bend Station (RBS) on October 7 and 8, 1991. Joseph Ulie, Reactor Inspector, Region III, accompanied the review team. The team reviewed Gulf States Utilities (GSU) purchase specifications, purchase orders, and receipt inspection reports for Thermo-Lag fire barrier materials; inspected Thermo-Lag panels and trowel grade material in the RBS warehouse; conducted walkdowns in the control building, F tunnel, and G tunnel to review field installations of Thermo-Lag fire barriers; and discussed generic and plant specific safety and technical issues related to Thermo-Lag fire barriers with the licensee. Mr. John Maher, Engineer - Nuclear Licensing, was the team's GSU point of contact.

The review team's activities and findings are discussed below. The attachment to this trip report identifies the GSU employees interviewed by the review team.

## Ampacity Derating

By Mailgram dated October 26, 1986, Thermal Sciences, Inc. (TSI), St. Louis, Missouri, informed the NRC of the results of ampacity derating tests performed at Underwriters Laboratories. The ampacity derating factors obtained from the tests, which TSI claimed to have sent to all TSI customers, exceeded those previously reported by TSI. At the time of the site visit, the licensee could not provide the ampacity derating factors used at RBS. Moreover, the license did not know if either Stone & Webster, the architect-engineer, or GSU received a copy of TSI's Mailgram and, therefore, whether or not the ampacity derating at RBS was reviewed in response to the Mailgram. The reviewers gave the licensee a copy of the Mailgram (a PDR document). The licensee agreed to review this issue and provide the results of the review.

During telephone calls on October 16, 1991 and October 25, 1991, Mr. Maher informed the reviewers that GSU could not determine if they had received TSI's

Mailgram. He stated that the licensee was using the following ampacity derating factors for RBS:

| | | | |
|---|---|---|---|
| 1-hour cable tray | 12.5% | 3-hour cable tray | 20.55% |
| 1-hour conduit | 7.3% | 3-hour conduit | 9.7% |

These ampacity derating factors appear to have come from ampacity tests conducted by Industrial Testing Laboratory (ITL) for TSI between 1982 and 1984. The factors used by the licensee for cable trays are less conservative than those reported in TSI's Mailgram. Mr. Maher also informed the review team that the revised factors would be reviewed. The reviewers will continue to track this item pending receipt of additional information from the licensee.

Qualification Fire Testing

On June 18, 1985, the licensee conducted fire tests at Southwest Research Institute (SwRI) to determine if LDSE seals penetrated by PVC covered flexible aluminum conduits protected with Thermo-Lag 330-1 would withstand a three hour fire exposure. During the test the Thermo-Lag on the fire side of the penetration seal disintegrated. Prior to visiting RBS, the reviewers believed this test represented a documented failure of Thermo-Lag. During the site visit the review team discussed this test with the licensee. The licensee stated that the test was part of a program to develop fire rated penetration seals for PVC coated flexible aluminum conduits. Although Thermo-Lag had never been tested or approved for use in such a configuration, the licensee investigated Thermo-Lag as a potential seal assembly component based on its purported fire performance capabilities. A GSU witness to the test stated that shortly after the start of the test, the PVC coating and then the aluminum conduit melted away from the Thermo-Lag. Consequently, both the inside and the outside surfaces of the Thermo-Lag were exposed to the fire. This severe fire exposure resulted in the disintegration of the Thermo-Lag on the fire side of the penetration seal. On the bases of the review of the test report and consideration of the information provided verbally by the licensee, the review team concluded that the fire exposure experienced by the Thermo-Lag during the June 18, 1985 penetration seal test at SwRI exceeded the design basis for Thermo-Lag and, therefore, that the test was not valid for assessing the ability of Thermo-Lag 330-1 to provide a fire rated barrier. This issue is, therefore, closed.

Fire Test Acceptance Criteria

During November and December 1990, the licensee conducted fire tests intended to qualify proposed upgrades for RBS Thermo-Lag fire barriers that deviate from approved installation procedures. NRC's acceptance criteria for fire barrier qualification, which were detailed in Generic Letter 86-10, stipulate that the temperature on the fire barrier's unexposed surface should not exceed 250°F above ambient temperature. The licensee, however, used 325°F above ambient temperature as its acceptance criterion for the upgrade fire tests. The review team provided the licensee with a copy of Generic Letter 86-10. The licensee acknowledged familiarity with the generic letter, but could not provide the basis for their criteria or explain the deviation from the NRC's acceptance criteria. The use of incorrect acceptance criteria could impact the

acceptability of the proposed fire barrier upgrades. In addition, if the licensee uses erroneous acceptance criteria, they may violate GSU facility operating license No. NPF-47, which states that GSU shall comply with the requirements of the fire protection program. The review team recommended that the licensee review their acceptance criteria and test results for compliance with NRC criteria prior to installing the upgrades. The licensee stated that the upgrade modifications have not been started and agreed to advise the reviewers of the basis for their acceptance criteria. The reviewers recommend referral of this issue to Region IV for followup action.

Differences Between Tested and As-Built Configurations

Licensees are required to substantiate the ratings of all fire barrier designs used to achieve compliance with the requirements of Appendix R to 10 CFR Part 50 by subjecting test specimens representative of the construction for which classification is desired to a standard fire test (ASTM E-119). To ensure that the level of fire protection intended is achievable in the event of a fire, the barriers installed in the field should replicate the tested configurations. (Generic Letter 86-10 provided NRC guidance with respect to qualification fire testing and analyzing deviations between tested and field configurations.)

Prior to the licensee finding the installation problems, ITL test Reports 82-11-80 and 82-11-81, which document fire endurance tests of Thermo-Lag applied by both direct application methods (e.g., spraying and brushing) and prefabricated panels, were considered the licensee's design bases for installing Thermo-Lag fire barriers at RBS. However, the Thermo-Lag barriers installed at RBS are constructed of prefabricated panels and shapes and, therefore, may not replicate the tested configurations. Therefore, the Thermo-Lag fire barriers installed at RBS may not have been adequately supported by the design basis when the plant was licensed. Copies of the test reports available to the review team do not include information required to determine whether or not the RBS field installations match the tested configurations. Subsequent to the RBS site visit, the vendor (TSI) met with the reviewers at NRC Headquarters. During this meeting the vendor agreed to provide the detailed backup information on the subject tests. The review team will continue to track this issue pending receipt and review of the full test reports.

During the plant tour, the review team observed three fire barrier configurations that the licensee could not justify by either fire tests or analyses. These were (1) a large horizontal barrier separating Fire Area PH1 from Fire Area PT1 in G tunnel, (2) a large cable tray enclosure in F tunnel, and (3) an instrument rack enclosure at elevation 98 of the control building. In addition, structural steel forming parts of the barriers are not protected to provide fire resistance equivalent to that required of the barriers. These configurations do not appear to comply with the requirements of Appendix R to 10 CFR Part 50. Moreover, Section 9.5.1.2.14 of the RBS USAR states: "Exposed structural steel which is part of the barriers is fireproofed." The review team recommends that this issue be referred to Region IV.

Fire Barrier System Materials

The review team found inconsistencies in the thickness tolerances for prefabricated Thermo-Lag panels between the two specifications reviewed. For example, Purchase Specification 228.410 (Drawing 12210-EE-34YA-3) identified the thickness tolerances as 0.500", +0.250", -0.00" for 1-hour panels and 1.00", +0.500", -0.00" for 3-hour panels. Conversely, Specification 211.161 (nonengineered item data sheet) identified the thickness tolerances as 0.500", +0.125", -0.00" for 1-hour panels and 1.00", +0.250", -0.00" for 3-hour panels. Panel thickness may impact fire rating, ampacity derating, and seismic analysis.

Sample measurements by the review team of prefabricated panels stored in the RBS warehouse found 1-hour panels with areas from 0.375" up to 0.875" thick and 3-hour panels with areas up to 1.75" thick. These thicknesses exceed the RBS specifications cited above. The licensee stated that material thicknesses are not verified to be within tolerances during the receipt inspection, but are checked during installation. (This requirement is documented in Specification 228.410.) Panel sections that exceed the thickness specifications would not be installed. It was not possible to measure thicknesses on installed barriers during the visit because the configuration enclosures made them inaccessible.

Thermo-Lag materials received at RBS are inspected by a QC inspector against inspection attributes assigned by the receipt engineer. The results of the receipt inspection, which address items such as physical condition upon receipt and shelf life requirements, are documented in a receipt inspection report. The team reviewed receipt inspection reports 90RIR00096 (Purchase Order 89L73580, Rev. 0), 91RIR00223 (P.O. 91D71460), and 91RIR00454 (P.O. 91480590) for Thermo-Lag trowel grade material and the receipt inspection report (number not noted) for P.O. 89M006304 for Thermo-Lag prefabricated panels. The review team noted inconsistencies in the inspection attributes assigned to the four purchases. In several cases, the incorrect specification was cited. In addition, some specific material requirements were not verified. For example, trowel grade Thermo-Lag 330-1 has minimum (32°F) and maximum (100°F) allowable temperature limitations. A temperature recorder is used to verify that the limits were not exceeded during shipment. The licensee inspects and records the minimum temperature experienced in transit, but not the maximum temperature. The weaknesses observed in the licensee's procurement and receipt inspection processes may violate RBS quality assurance requirements. Moreover, these weaknesses may not be limited to Thermo-Lag, but may be generic in nature at RBS. The team recommends referral of this issue to Region IV for appropriate followup action.

Installation Problems

ANCO Insulations, Incorporated, Baton Rouge, Louisiana, installers, trained by TSI, performed the initial installation of the Thermo-Lag fire barriers at RBS. ANCO also provided quality control for the Thermo-Lag fire barrier installations. During initial construction, ANCO installers deviated from the installation procedures by removing stress skin and ribs from the preformed Thermo-Lag panels. If ANCO installed Thermo-Lag fire barriers at other nuclear power plants, similar installation problems may exist at those facilities. A

former ANCO installer informed the review team that he was not aware of ANCO having installed Thermo-Lag barriers at any other facility.

Aluminum cable trays are installed throughout RBS. The licensee has adapted TSI Technical Note (TN) 20684 (TSI's generic installation procedure) as its procedure for installing Thermo-Lag fire barriers at RBS. However, TN 20684-AL dated October 1989 provides TSI's procedures for installing Thermo-Lag fire barriers on aluminum cable trays. The procedures specified in TN 20684-AL differ from those specified in TN 20684 in several significant respects. For example, TN 20684-AL requires that the prefabricated panel sections be mounted to the cable trays with 0.5" x 0.020" stainless steel bands, whereas TN 20684 specifies the use of either stainless steel bands or 18 gauge stainless steel tie wire. In addition, TN 20684-AL specifies (1) that stainless steel edge guards be placed on all edges between the Thermo-Lag panels and the stainless steel banding, (2) that butt joints be covered with stress skin and trowel grade material, and (3) that stainless steel bands be placed 2 inches from the edges of each butt joint. None of these requirements are specified in TN 20684. Moreover, the licensee informed the review team that the procedures set forth in TN 20684-AL are not followed at RBS. During plant walkdowns, the review team confirmed that there are discrepancies between TN 20684-AL and actual site installation practices. For example, stainless steel straps and tie wires appear to be used interchangeably at RBS, and edge guards are not used consistently.

By letter dated August 23, 1991, TSI provided comments on Information Notice 91-47 to some licensees. (The licensee informed the review team that they did not receive a copy of the letter.) With respect to installation details, TSI implied that there is a maximum allowable gap width that can be filled with trowel grade material and that stress skin must be replaced across cuts to ensure a continuous layer of stress skin. Subsequent to the RBS site visit, the vendor (TSI) met with the reviewers at NRC Headquarters and confirmed that these elements of installation are required to ensure the integrity of the fire barrier. The vendor stated that these requirements are covered by TSI's training program, but acknowledged that they are not documented in the various TSI installation procedures. It appears that weaknesses in the installation procedures may have generic implications. Installation problems will, therefore, be addressed by the review team.

During the site visit, the review team also observed the degraded conditions identified in various RBS condition reports. These included construction deficiencies (ribs and stress skin removed), wear conditions, surface cracks, and severe deterioration of Thermo-Lag on a floor mounted conduit due to repeated water exposure (G tunnel).

Reportability Issues

During performance of surveillance test procedures, the licensee identified Thermo-Lag fire barriers that did not meet acceptance criteria due to surface cracks, wear conditions, and incomplete construction. In response to these deficiencies, the licensee declared the subject barriers inoperable and established fire watch patrols in accordance with RBS Technical Specification 3.7.7.a. By letter dated March 25, 1987, the licensee submitted LER 87-005 to

report the nonconforming conditions pursuant to 10 CFR Part 50.73. Subsequently, the licensee identified additional significant fire barrier deficiencies including removal of the inner layer of stress skin and ribs from the preformed panel. On July 29, 1988, the licensee conducted a 3-hour fire endurance test on a cable tray assembly covered with 1 inch Thermo-Lag panels with the stress skin and ribs removed. The test results, which are documented in ITL Report 88-07-5982 and the licensee's Condition Reports 88-0687 and 88-0608, show that the "as-installed" barrier failed on temperature rise in less than two hours. Although the licensee identified significant additional nonconforming conditions and declared additional barriers inoperable, as evidenced by numerous condition reports prepared after submittal of LER 87-005, and conducted an unsuccessful qualification fire test of an "as-installed" fire barrier configuration, which resulted in the licensee declaring all RBS fire barriers inoperable, the licensee did not submit additional LERs or supplemental LERs to report the nonconforming conditions. This may be a violation of 10 CRF Part 50.73. During the site visit, the licensee informed the review team that it believed the reportability aspect of the nonconforming conditions discovered after submittal of LER 87-005 were still covered by LER 87-005. The team recommends that this reportability issue be referred to Region IV for appropriate action.

In response to questions concerning the reportability of Thermo-Lag test failures under 10 CFR Part 21, the licensee provided a copy of GSU Engineering Evaluation and Assistance Request Report 90R0037, dated April 1990. The author of the report concluded that elements of the station fire protection program are not safety-related and, therefore, do not require reporting under the requirements of 10 CFR Part 21. Thermo-Lag fire barriers are considered elements of the fire protection program by the licensee. Therefore, based on EEAR 90R0037, the licensee has not submitted any Part 21 reports in response to the Thermo-Lag problems identified at RBS. The reviewers recommend that EEAR 90R0037 be reviewed by the Plant Systems Branch [redacted] r validity and acceptability.

Conclusions

In response to installation and construction deficiencies found during maintenance activities and surveillance test procedures since 1987, and as a result of subsequent fire test failures, the licensee has declared all Thermo-Lag fire barriers installed at RBS inoperable. Fire watches have been established as compensatory measures in accordance with the RBS Technical Specifications. Therefore, there does not appear to be an immediate public health and safety concern at RBS. However, despite efforts to develop and implement corrective actions, it is the review teams view that the licensee has not fully recognized the scope and depth of the fire barrier problems at RBS, has not developed corrective actions for the identified problems, and has not established viable schedules for completing corrective actions. Moreover, it appears that the licensee does not realize that there are areas at RBS that may not be in compliance with the requirements of Appendix R to 10 CFR Part 50 for reasons unrelated to the identified installation deficiencies, such as the configurations not supported by test or analysis.

ATTACHMENT

PERSONS CONTACTED

L. Ballard, Supervisor of Contract Services
D. Beauchamp, QC Inspector III
B. Chustz, Senior Mechanical Engineer
R. Kerar, Fire Protection Engineer
D. Lorfing, Supervisor - Nuclear Licensing
J. Maher, Engineer - Nuclear Licensing
D. McCarter, Director, Loss Prevention
L. Roshell, Materials Foreman
R. Skaggs, QC Inspector - II
J. Sporacino, Insulator
R. Whitley, Senior QC Inspector

ENCLOSURE 3

DRAFT

Docket No. 50-458

MEMORANDUM FOR: Robert D. Martin, Regional Administrator
Region IV

FROM: Frank J. Miraglia, Jr., Deputy Director
Office of Nuclear Reactor Regulation

SUBJECT: RIVER BEND STATION - FIRE PROTECTION PROGRAM CONCERNS

Information Notice 91-47, "Failure of Thermo-Lag Fire Barrier Material To Pass Fire Endurance Test," identified problems that could result from the use of or improper installation of Thermo-Lag material to satisfy the requirements of Appendix R to 10 CFR Part 50. To obtain additional facts related to the use of Thermo-Lag, Loren Plisco and Steven West of my staff recently visited River Bend Station. During their visit, they noted plant specific concerns related to Appendix R compliance and possible violations of GSU facility operating license No. NPF-47. Enclosure 1 is a summary of these issues. There were additional technical issues identified that appear to be generic in nature. These will be referred to you after we have reached a determination on their significance, as appropriate. Enclosure 2 is a list of the GSU representatives Loren and Steven contacted during their visit.

The licensee has declared all Thermo-Lag fire barriers inoperable and established fire watches as compensatory measures in accordance with the RBS Technical Specifications. Therefore, there does not appear to be an immediate public health and safety concern. Please review the identified concerns and advise me of your proposed course of action. If your staff have any questions concerning the issues, have them contact either Loren Plisco (FTS 492-1013) or Steven West (FTS 492-1220).

Frank J. Miraglia, Jr., Deputy Director
Office of Nuclear Reactor Regulation

Enclosures:
As stated

cc: S. Black

ENCLOSURE 1

SUMMARY OF ISSUES

Facility: River Bend Station, Unit 1
Licensee: Gulf States Utilities
Docket No.: 50-458
Trip dates: October 7 and 8, 1991
Review Team: Loren Plisco, NRR and Steven West, NRR

1. During November and December 1990, the licensee conducted fire tests intended to qualify proposed upgrades for RBS Thermo-Lag fire barriers that deviate from approved installation procedures. These tests are addressed in Information Notice 91-47, "Failure of Thermo-Lag Fire Barrier Material to Pass Fire Endurance Test." NRC's acceptance criteria for fire barrier qualification, which were detailed in Generic Letter 86-10, stipulate that the temperature on the fire barrier's unexposed surface should not exceed 250°F above ambient temperature. The licensee, however, used 325°F above ambient temperature as its acceptance criterion for the upgrade fire tests. A copy of Generic Letter 86-10 was provided to the licensee during the site visit and they acknowledged familiarity with the generic letter. However, the licensee could not provide the basis for their acceptance criteria or explain the deviation from the NRC's acceptance criteria. The use of incorrect acceptance criteria could impact the acceptability of the proposed fire barrier upgrades. This concern was expressed to the licensee. If the licensee uses erroneous acceptance criteria, they may violate Appendix R to 10 CFR Part 50 and GSU facility operating license No. NPF-47, which states that GSU shall comply with the requirements of the fire protection program. (Generic Letter 86-10 provided detailed NRC guidance on qualification fire testing, including specific acceptance criteria.)

2. Three fire barrier configurations were observed during the plant tour that the licensee could not justify by either fire tests or analyses. These were (1) a large horizontal barrier separating Fire Area PH1 from Fire Area PT1 in G tunnel, (2) a large cable tray enclosure in F tunnel, and (3) an instrument rack enclosure at elevation 98 of the control building. In addition, structural steel forming parts of the barriers were not protected to provide fire resistance equivalent to that required of the barriers. These configurations do not appear to comply with the requirements of Appendix R to 10 CFR Part 50. Moreover, Section 9.5.1.2.14 of the RBS USAR states: "Exposed structural steel which is part of the barriers is fireproofed." (Generic Letter 86-10 provided detailed NRC guidance on qualification fire testing and analyzing deviations between tested and field configurations.)

3. Inconsistencies were found in the thickness tolerances for prefabricated Thermo-Lag panels between two specifications reviewed. For example, Purchase Specification 228.410 (Drawing 12210-EE-34YA-3) identified the thickness tolerances as 0.500", +0.250", -0.00" for 1-hour panels and 1.00", +0.500", -0.00" for 3-hour panels. Conversely, Specification 211.161 (nonengineered item data sheet) identified the thickness tolerances as 0.500", +0.125", -0.00" for 1-hour panels and 1.00", +0.250", -0.00" for 3-hour panels. Panel thickness can impact fire rating, ampacity derating, and seismic analysis.

   Thermo-Lag materials received at RBS are inspected by a QC inspector against inspection attributes assigned by the receipt engineer. The results of the receipt inspection, which address items such as physical condition upon receipt and shelf life requirements, are documented in a receipt inspection report. Receipt inspection reports 90RIR00096 (Purchase Order 89L73580, Rev. 0), 91RIR00223 (P.O. 91D71460), and 91RIR00454 (P.O. 91480590) for Thermo-Lag trowel grade material and the receipt inspection report (number not noted) for P.O. 89M006304 for Thermo-Lag prefabricated panels were reviewed. Inconsistencies were noted in the inspection attributes assigned to the four purchases. In several cases, the incorrect specification was cited. In addition, some specific material requirements were not verified. For example, trowel grade Thermo-Lag 330-1 has minimum (32°F) and maximum (100°F) allowable temperature limitations. A temperature recorder is used to verify that the limits were not exceeded during shipment. The licensee inspects and records the minimum temperature experienced in transit, but not the maximum temperature. The weaknesses observed in the licensee's procurement and receipt inspection processes may violate RBS quality assurance requirements. Moreover, these weaknesses may not be limited to Thermo-Lag, but may be generic in nature at RBS.

4. During performance of surveillance test procedures, the licensee identified Thermo-Lag fire barriers that did not meet acceptance criteria due to surface cracks, wear conditions, and incomplete construction. In response to these deficiencies, the licensee declared the subject barriers inoperable and established fire watch patrols in accordance with RBS Technical Specification 3.7.7.a. By letter dated March 25, 1987, the licensee submitted LER 87-005 to report the nonconforming conditions pursuant to 10 CFR Part 50.73. Subsequently, the licensee identified additional significant fire barrier deficiencies including removal of the inner layer of stress skin and ribs from the preformed panel. On July 29, 1988, the licensee conducted a 3-hour fire endurance test on a cable tray assembly covered with 1 inch Thermo-Lag panels with the stress skin and ribs removed. The test results, which are documented in ITL Report 88-07-5982 and the licensee's Condition Reports 88-0687 and 88-0608, show that the "as-installed" barrier failed on temperature rise in less than two hours.

Although the licensee identified significant additional nonconforming conditions and declared additional barriers inoperable, as evidenced by numerous condition reports prepared after submittal of LER 87-005, and conducted an unsuccessful qualification fire test of an "as-installed" fire barrier configuration, which resulted in the licensee declaring all RBS fire barriers inoperable, the licensee did not submit additional LERs or supplemental LERs to report the nonconforming conditions. This may be a violation of 10 CRF Part 50.73. During the site visit, the licensee informed the review team that it believed the reportability aspect of the nonconforming conditions discovered after submittal of LER 87-005 were still covered by LER 87-005.

ENCLOSURE 2

## PERSONS CONTACTED

L. Ballard, Supervisor of Contract Services
D. Beauchamp, QC Inspector III
B. Chustz, Senior Mechanical Engineer
R. Kerar, Fire Protection Engineer
D. Lorfing, Supervisor - Nuclear Licensing
J. Maher, Engineer - Nuclear Licensing
D. McCarter, Director, Loss Prevention
L. Roshell, Materials Foreman
R. Skaggs, QC Inspector - II
J. Sporacino, Insulator
R. Whitley, Senior QC Inspector