August 19, 1992

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE DIRECTOR, OFFICE OF NUCLEAR REACTOR REGULATION

In the Matter of	)	
	)	
GULF STATES UTILITIES COMPANY	)	Docket No. 50-458
(River Bend Station, Unit 1)	)	
	)	

RESPONSE OF GULF STATES UTILITIES COMPANY
TO NIRS § 2.206 PETITION TO
SHUT DOWN RIVER BEND STATION

I. INTRODUCTION

On July 21, 1992, the Nuclear Information and Resource Service ("NIRS" or "Petitioner") filed a "Petition for Emergency Action and Issuance of Generic Letter" ("Petition") in the captioned matter. Petitioner requests, pursuant to 10 C.F.R. § 2.206, that the Nuclear Regulatory Commission ("NRC") take emergency enforcement action against Gulf States Utilities Company ("GSU"), including immediate suspension of the operating license for the River Bend Station ("RBS").[1]

Petitioner asserts that RBS is not in compliance with certain of the NRC's fire protection requirements applicable to the

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[1] On August 12, 1992, NIRS distributed an "Emergency Addenda to NIRS' Petition for Emergency Action of July 21, 1992 and Addenda to the Original Petition Based on New Information." As it relates to River Bend Station, this "Emergency Addenda" provides no new information and seeks no new relief. This additional filing is not specifically addressed further below.

station. Petitioner cites, as the basis for its assertions, NRC Bulletin 92-01, "Failure of Thermo-Lag 330 Fire Barrier System To Maintain Cabling in Wide Cable Trays and Small Conduits Free From Fire Damage," June 24, 1992. Thermo-Lag 330, referred to herein as Thermo-Lag, is a material, manufactured by Thermal Science, Inc. ("TSI"), that is utilized as a fire barrier at RBS and a number of other nuclear plants as one element of a carefully engineered, multi-faceted program to protect the nuclear power plant from the risks of a fire. GSU previously proactively discovered and reported deficiencies in certain applications of Thermo-Lag fire barriers. GSU also instituted Technical Specification compensatory fire watches as a means to identify and correct conditions which may initiate a fire and to assure that fires that might occur are promptly detected and suppressed, such that the fire protection program for the facility is not compromised.

For the reasons stated herein, the Petition should be denied. This response provides the technical basis for the conclusion that, notwithstanding the ongoing resolution of issues associated with Thermo-Lag at RBS and other plants, River Bend Station can be and is being safely operated.[2] The plant is sufficiently protected against the risks of onsite fire to meet NRC requirements and

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[2] Under the Commission's regulations, licensees are not required to respond to 10 C.F.R. § 2.206 requests absent a specific request by the NRC pursuant to 10 C.F.R. § 50.54(f). However, licensees may respond to such petitions voluntarily. See Duke Power Co. (Catawba Nuclear Station, Units 1 and 2), DD-84-16, 20 NRC 161, 163 at n.1 (1984).

applicable guidance, and to assure that the health and safety of the public is protected.

II. BACKGROUND: THERMO-LAG ISSUES AT RIVER BEND STATION

The picture painted by Petitioner of neglect and delay by GSU, the NRC, and the nuclear industry in identifying and pursuing the Thermo-Lag issue is completely at odds with the truth. A review of the historical development of this issue shows that GSU has been at the forefront in responsibly addressing the issue, and has consistently been open and frank in its communications with the NRC. With the adequate measures presently in place to assure continued safe operation, as discussed later in this Response, GSU, the NRC, and the nuclear power industry are working to resolve the underlying technical issue on a schedule justified by the scope and complexity, and commensurate with the safety significance, of the matter.

Problems with Thermo-Lag material within the nuclear industry were first identified and brought to the attention of the NRC by GSU. In the course of conducting a surveillance procedure in February 1987, RBS personnel found instances of minor cracks and wear conditions in Thermo-Lag fire barrier material manufactured by TSI. This self-identified condition was reported to the NRC in Licensee Event Report ("LER") 87-005 (March 25, 1987). GSU made the conservative assessment that, based on the existence of minor cracks and installation deficiencies, it could not definitively determine that Thermo-Lag barriers would meet 1-hour and 3-hour

requirements, as appropriate, for protection against fire. Consequently, GSU declared the Thermo-Lag fire barriers that failed to meet the surveillance test procedure acceptance criteria to be inoperable.[3] As discussed below, a finding of inoperability under plant Technical Specifications ("TS") does not mean that the barriers provided no protection. In addition, upon identifying these conditions, GSU promptly established -- as an authorized compensatory measure -- hourly fire watches in the affected areas per RBS Technical Specification 3.7.7.a.[4]

While subsequently implementing its commitment made in LER 87-005 to inspect 100% of the Thermo-Lag installations, GSU found a Thermo-Lag panel from which the stress skin had been removed during installation.[5] This condition appeared to be common for 3-hour barriers in the fuel building. Accordingly, fire watches were established in the fuel building. GSU conferred with the Thermo-Lag vendor, TSI, and received assurances that Thermo-Lag would function adequately without the stress skin. To verify those

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[3] The pertinent surveillance test procedures required visual inspection of each fire barrier assembly for (1) observable missing or loose attaching devices; (2) cover bolts or screws not covered with grouting compound; or (3) gouges, holes or openings in fire barrier material.

[4] A fire watch utilizes plant personnel whose sole designated responsibility is to monitor specified areas of the plant for fire or fire hazards, either continuously or at regular, specified intervals.

[5] Stress skin is a metallic mesh applied to Thermo-Lag by the manufacturer to improve the structural integrity of the fire barrier material.

assurances, GSU and TSI jointly developed a test procedure to evaluate a 12-inch cable tray protected by Thermo-Lag without stress skin or structural ribs. This test was first performed in March 1988. The initial test was invalidated because of a furnace malfunction. The test was repeated in July 1988, and the fire barrier failed to meet the test acceptance criteria. Based on those test results, GSU established fire watches for all 3-hour cable tray barriers, and thereby remained in full conformance with plant Technical Specifications.

GSU continued to proactively investigate various options for identifying the full scope of Thermo-Lag issues and for resolving those issues. In the third quarter of 1988, GSU contracted with Southwest Research Institute ("SWRI") to conduct fire tests on several of the original design configurations, as well as several proposed Thermo-Lag fire barrier upgrades.[9] After developing a test procedure with SWRI, the test was deferred when TSI offered to run "informational" testing on various proposed upgrades as well as a full qualification test on a 30-inch cable tray using the facilities of Construction Technologies Laboratory ("CTL").

During the same time period (March 1989), while conducting maintenance on Thermo-Lag-protected conduits and trays, GSU discovered stress skin and structural ribs missing from some 1-hour Thermo-Lag fire barriers. Contrary to the allegation of the

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[9] Upgrades proposed by GSU to Thermo-Lag include, for example, application of additional layers of stress skin over Thermo-Lag joints and stitching of joints.

Petitioner on page 9 of the Petition that, after the submittal of LER 87-005, "there were no additional LERs," this self-identified condition was reported to the NRC in LER 89-009. Additional fire watches were established. GSU included in LER 89-009 a commitment to further inspect certain 1-hour fire barriers.

TSI completed its "informational" testing in the spring of 1989, and several of the upgraded configurations passed, as did the 30-inch tray. GSU noted in its inspection of the test article, however, that differences existed between the construction of the 30-inch test article and the standard construction details prescribed in the TSI installation manual. As a result, GSU resumed discussions with SWRI, leading to an independent test by SWRI of a 30-inch cable tray in October of 1989. As reported in Condition Report ("CR") 89-1144, the tests demonstrated that 3-hour barrier material supplied by TSI for the test failed to meet established standards. Consequently, GSU categorized all 1-hour and 3-hour Thermo-Lag barriers at RBS as being of "indeterminate" status and immediately instituted fire watches as appropriate.

Extensive discussions were then held with TSI concerning the SWRI test results (which TSI regarded as invalid) and related GSU concerns. These concerns were communicated to the NRC in an Informational Report dated December 20, 1989 (and revised on January 10, 1990). As noted in the Informational Report, an LER was not filed regarding the test results because Thermo-Lag installed at RBS was considered to be of indeterminate status,

pending further evaluation of the test results to determine whether the failure should be attributed to the way in which the material was tested or the way in which the test material was constructed.[7] A safety assessment was conducted by GSU on the implications of the test and was included in the Informational Report. GSU concluded at the time that, with the compensatory fire watches in place and given the fire protection design features and generally low combustible loadings in the fire areas at RBS, continued operation was justified.

The Petitioner makes several allegations on page 10 of the Petition regarding GSU's knowledge of test results and alleges slowness in addressing the issue and communicating information to the NRC. Specifically, the Petitioner states:

> GSU has known of a Thermo-Lag problem since 1987, and has known that the fire barrier was inoperable since 1988. It was not until January 1990 that the NRC was presented with the evidence that Thermo-Lag was inoperable.

It is inaccurate to suggest, as Petitioner does, that all Thermo-Lag issues were known in 1987. As can be seen from the foregoing, the development of this issue has been evolutionary. In the first LER (LER 87-005), submitted by GSU in 1987, GSU had concluded only that certain minor cracks and wear conditions "rendered the fire barriers inoperable." LER 87-005 at 1. GSU

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[7] The NRC has specifically concluded in Inspection Report 92-04 (March 27, 1992), at page 5, that it has no outstanding concerns regarding GSU's handling of reportability on Thermo-Lag issues.

conservatively declared certain fire barriers inoperable, immediately implemented compensatory fire watches where appropriate, and undertook corrective actions. The TSI and SWRI testing followed, triggering some technical discussion of the significance of the various test results. Throughout, GSU appropriately and conservatively declared fire barriers inoperable based on any evidence of problems, and consistently kept the NRC informed. GSU's Informational Report dated December 20, 1989, and revised on January 10, 1990, was a full and timely report on ongoing Thermo-Lag testing.[8]

To resolve the TSI question about the validity of the SWRI test results and to address other GSU concerns, GSU and TSI agreed to jointly conduct fire tests on existing configurations as well as simplified upgrades. The test procedure was developed in the Spring and Summer of 1990, and the testing completed in November of 1990. Test results indicated that five out of eight of the existing configurations failed to meet the acceptance criteria, while four out of five of the proposed upgrades passed.

Contrary to the Petitioner's suggestion, GSU has been forthcoming with information on this issue. In addition to the two LERs already discussed (87-005 and 89-009), and the Informational Report, a third LER (and four associated revisions) concerning

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[8] Informational reports to the NRC of this type are not required by NRC regulations. GSU proactively provided this report to the NRC to advise the regulator of developments of interest in this area.

Thermo-Lag was submitted. This series of LERs began with LER 90-003, dated March 8, 1990, which informed NRC of additional Thermo-Lag deficiencies discovered by RBS personnel during the conduct of a surveillance procedure. Revisions 1 through 4 to LER 90-003 were submitted on July 12, 1990, February 4, 1991, July 1, 1991, and December 27, 1991, respectively. These revisions provided updates on Thermo-Lag issues including the scheduling of fire endurance tests and the test results. GSU also thoroughly briefed the NRC on Thermo-Lag issues at RBS during a meeting held with the NRC at the site on April 20, 1992. This meeting was open to and attended by members of the public.[9]

GSU also cooperated fully with NRC's inquiries and investigations into Thermo-Lag issues and testing. Throughout the evolution of this matter GSU followed applicable site procedures for identifying, documenting, and dispositioning non-conforming conditions. All records related to this matter were made available to the NRC inspectors. Petitioner's allegation that GSU "made it impossible for the public or the NRC to know of the seriousness of the fire barrier problem" is simply incorrect.

III. APPLICATION OF LEGAL STANDARD FOR SHUTDOWN

The institution of a proceeding or the initiation of an enforcement action in response to a request for action under 10

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[9] The NRC's meeting summary, a public document, included GSU's presentation materials. The summary was issued by the NRC on May 8, 1992.

C.F.R. § 2.206 is appropriate only when substantial health and safety issues have been raised. Arizona Public Service Co. (Palo Verde Nuclear Generating Station, Units 1, 2, and 3), DD-92-1, 35 NRC 133, 143-44 (1992); Consolidated Edison Co. of New York (Indian Point, Units 1, 2, and 3), CLI-75-8, 2 NRC 173, 176 (1975); Washington Public Power Supply System (WPPSS Nuclear Project No. 2), DD-84-7, 19 NRC 899, 923 (1984). "A mere dispute over factual issues does not suffice." Northern Indiana Public Service Co. (Bailly Generating Station, Nuclear-1), CLI-78-7, 7 NRC 429, 433 (1978). This standard has been recognized by the courts. Florida Power & Light Co. v. Lorion, 470 U.S. 729, 732 (1985).

Particularly germane to the NIRS Petition, courts have recognized that the NRC's acknowledgement of potential safety concerns and/or pending issues does not equate with a finding of a "substantial health and safety issue."

> The Commission's precedents make it clear that it is not obligated to take enforcement action "whenever we receive information adverse to the integrity of existing nuclear power safety . . . ." In re Nuclear Regulatory Comm'n, 5 NRC 16, 21 (1977), citing, Nader v. Nuclear Regulatory Comm'n, 513 F.2d 1045, 1054-55 (D.C. Cir. 1975).

Lorion v. Nuclear Regulatory Comm'n, 785 F.2d 1038, 1041 (D.C. Cir. 1986). "[S]afety should be properly assessed on the basis of whether present systems can assure reasonable protection of the public health and safety." Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit 1), ALAB-729, 17 NRC 814, 828 (1983).

> Absolute certainty or 'complete,' 'entire,' or 'perfect' safety is not required by the Atomic Energy Act, nor does nuclear safety technology admit of such a standard. The Supreme Court recognized in the Power Reactor case that nuclear technology is subject to change. What constitutes 'reasonable assurance of adequate protection' is also subject to change, as the state of the nuclear safety art advances. It is for the Commission to weigh the state of that art, the risk of accidents, the record of past performance, the need for further improvement in nuclear safety matters, and other considerations. Balancing these factors calls for the exercise of discretion by the expert agency.

Id. at 828, citing, Nader v. Ray, 363 F. Supp. 946, 954 (D.D.C. 1973) (citations omitted). See also Rochester Gas and Elec. Corp. (R.E. Ginna Nuclear Power Plant), DD-82-11, 16 NRC 1473, at 1488 (1982) ("Although additional analyses and studies of such issues as pressurized thermal shock, steam generator degradation and tube rupture transients are under way, [petitioner's] letter provides no new information that would lead the staff to alter its conclusions . . . or that would require suspension of plant operation pending the completion of ongoing and planned studies").

These cases make clear that an extreme enforcement action such as a shutdown order or license suspension is not justified by the mere allegation of a problem, by ongoing studies of either real or potential issues, or by every degraded or non-conforming condition that might exist in a nuclear power plant. Rather, the standard is whether -- notwithstanding any such issues or uncertainties -- reasonable assurance continues to exist that operation can be conducted safely. With respect to Thermo-Lag, issues have indeed

been raised by GSU and others. All are being addressed by GSU, the nuclear industry, and the NRC. The unresolved technical issues related to Thermo-Lag are reflected in NRC Bulletin 92-01, which required a response from, among others, GSU.[10] In addition, compensatory fire watches have been in place since the first issues were identified. Moreover, as will be discussed below, these pending issues do not undermine the necessary reasonable assurance that operations have been and will be conducted safely, with adequate means of fire protection in place.

In considering a request under 10 C.F.R. § 2.206, the NRC Staff's proper focus is on its overriding regulatory responsibilities to ensure adequate protection of the public health and safety. See Houston Lighting and Power Co. (South Texas Project, Unit 1), DD-88-9, 27 NRC 648, 649 (1988), citing Power Reactor Development Co. v. Int'l Union of Elec., Radio, and Machine Workers, 367 U.S. 396, 406 (1961). "When assessing the significance of allegations, the Staff makes an initial determination whether an allegation, if true, is relevant to the safe operation of the facility." Houston Lighting and Power, 27 NRC at 649. The Petitioner in the present case asserts that "[b]ecause the River Bend Station violates the Commission's requirements for fire protection, the Commission can make no finding that there is reasonable assurance of no undue risk to public health and safety." Even if it were true that the plant is

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[10] GSU filed a response to NRC Bulletin 92-01 on July 24, 1992.

in violation of NRC requirements, a point which is incorrect, the Petitioner's assertion runs counter to the prior decisions of the agency. The Commission has plainly stated that "a violation of a regulation does not of itself result in a requirement that a license be suspended." Petition for Emergency and Remedial Action, CLI-78-6, 7 NRC 400, 405 (1978); see also Petition for Shutdown of Certain Reactors, CLI-73-31, 6 A.E.C. 1069, 1071 (1973).[11]

Petitioner cites two NRC Atomic Safety and Licensing Appeal Board decisions, Maine Yankee Atomic Power Co., ALAB-161, 6 AEC 1003, and Vermont Yankee Nuclear Power Corp., ALAB-138, 6 AEC 520, (Petition, at p. 16), apparently in support of the proposition that failure to comply with an NRC regulation requires suspension of a facility's operating license. Contrary to Petitioner's assertion, however, those decisions establish that "in order for a facility to be licensed to operate, the applicant must establish that the facility complies with all applicable regulations." Vermont Yankee Nuclear Power Corp., 6 AEC at 528 (emphasis added). These decisions, from initial licensing proceedings, are clearly not of relevance to the matter at hand, which involves a licensed, operating reactor. To the contrary, as noted above, in a Section 2.206 setting, neither a violation of a regulation nor a degraded condition would of itself automatically result in a requirement

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[11] See also NRC General Enforcement Policy, 10 C.F.R. Part 2, Appendix C, Section VI.C(2) (February 1992) ("Ordinarily, a licensed activity is not suspended . . . for failure to comply with requirements where such failure is not willful and adequate corrective action has been taken").

that a license be suspended. Ohio v. Nuclear Regulatory Comm'n, 814 F.2d 258, 264 (6th Cir. 1987) ("we recognize that it may be more difficult to shut a plant down than to prevent initial licensing") ("NRC acted reasonably in denying [petitioner's] request to intervene in the full-power licensing proceedings"). Precedent further establishes that, when faced with an identified safety concern, so long as the NRC (and licensee) is pursuing measures to address the concern, it is proper for the NRC to allow plants to continue operation -- provided there is continued assurance of adequate protection of the public health and safety while the concern is addressed. Nader v. Nuclear Regulatory Commission, 513 F.2d 1045 (D.C. Cir. 1975).

In at least two previous Section 2.206 decisions involving compliance with fire protection criteria, the Director has applied the principle that noncompliance with a regulation does not itself require that a license be suspended, and that public health and safety must be threatened before such action is appropriate. Although RBS is presently in compliance with applicable requirements and its license authority, this same logic applies to the admittedly degraded conditions created by deficiencies in Thermo-Lag barriers. First, in Consumers Power Co. (Big Rock Point Plant), DD-80-34, 12 NRC 711 (1980), petitioners demanded, through a Section 2.206 petition, that "minimum requirements as established by the Nuclear Regulatory Commission for the Fire Protection System be met" at the Big Rock Point plant. Id. at 718. The Director

acknowledged that the licensee had previously amended its license by adding limiting conditions of operation and surveillance requirements to assure that existing fire protection equipment was operable and to require that modifications be made in accordance with a specified time schedule to further enhance fire protection at the plant. Id. at 718-719. Despite the fact that the licensee was not wholly in compliance with these license conditions, the Director determined that "sufficient measures have been taken to permit continued plant operation prior to full implementation of all identified improvements identified [sic] in License Amendment No. 25." Id. at 719. Thus, the Director concluded that there was no adequate basis for the issuance of a show cause order, and the petition was denied. Id. at 720.

Similarly, in the matter of Arizona Public Service Co., 32 NRC 273, the petitioner alleged that serious violations existed at the licensee's Palo Verde nuclear plant regarding, among other things, fire protection. The NRC requested that the licensee justify continued operation of the plant after evaluation of its fire protection program. Arizona Public Service Co. (Palo Verde Nuclear Generating Station, Units 1, 2, and 3), DD-90-7, 32 NRC 273 (1990). The licensee's evaluation "identified deficiencies in the application of its QA Program to fire protection equipment," including "failure to comply fully with the QA requirements for [the plant] fire protection systems (e.g., fire detection and alarm, fire barriers, lube oil collection, in-plant communications,

ventilation, manual fire-fighting equipment, and emergency lighting systems) called for by the QA guidelines of Branch Technical Position Auxiliary Power Conversion System Branch (BTP APCSB) 9.5-1, Appendix A."[12] Id. at 276 (emphasis added). In the wake of these findings, the licensee submitted to the NRC the details of and schedules for planned corrective actions; however, a number of these corrective actions had not been completed at the time of the Director's Section 2.206 decision. Nevertheless, the Director ruled that "[u]ntil these remaining actions are completed, there is reasonable assurance that the facility can be operated with adequate protection of the public health and safety, based on the adherence to existing administrative procedures governing the fire protection program, the completion of ongoing inspections and testing, assurances that the design basis is complied with based upon extensive walkdowns by the Licensee of its fire protection systems, and the increased frequency of preventive maintenance." Id. at 277. The Director stated:

> Although many of the deficiencies noted above were identified as a result of rigorous NRC oversight and were not initially acknowledged and resolved by APS, it appears that APS recognizes the importance of NRC fire protection requirements and is now approaching full compliance. . . . [T]here is reasonable assurance that PVNGS can be operated with adequate protection of the public health and

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[12] BTP APCSB 9.5-1, Appendix A, is an NRC document entitled "Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976." As discussed in Section IV below, BTP APCSB 9.5-1, Appendix A, defines fire protection criteria applicable to RBS.

> safety pending completion of ongoing corrective actions. Based on the foregoing, I find that the institution of a proceeding pursuant to 10 C.F.R. § 2.202 to modify, suspend, or revoke the NRC licenses held by APS is not warranted.

Arizona Public Service Co., 32 NRC at 278.

The Consumers Power and Arizona Public Service Director's Decisions illustrate the point that a failure to satisfy specific fire protection criteria need not result in plant shutdown, as long as there is reasonable assurance that operation of the plant will not threaten the adequate protection of the public health and safety. Similarly, in Commonwealth Edison Co., 12 NRC 593, a petitioner alleged, through a Section 2.206 petition, that the Dresden and Quad Cities nuclear plants were endangering the health and safety of the public by operating without certain required monitoring equipment. Commonwealth Edison Co. (Dresden Station, Units 2 and 3) (Quad Cities Station, Units 1 and 2), DD-80-32, 12 NRC 593 (1980). Prior to filing of the petition, the NRC had requested the licensee to install such monitoring equipment, to provide a firm commitment for an installation date, and to provide equipment changes and/or additional surveillance requirements to provide adequate assurance of system operability in the interim until installation of the new equipment was complete. Id. at 595. In denying the petitioner's request for issuance of a shutdown order, the Director concluded that "the administrative procedures [requested by the Staff] provide an effective basis for continued safe operation of the plants until additional remedial measures are

in place." Id. at 596. The Director ruled that "there is reasonable assurance [that the plants] can continue to operate without undue risk to the public health and safety prior to the installation" of the requested monitoring equipment. Id. at 597.

In the present case Petitioner has failed to meet the threshold required by NRC precedents to justify the extraordinary relief requested. River Bend Station, despite degraded Thermo-Lag fire barriers, remains in compliance with applicable standards and license conditions, based on compensatory fire watches in place and the rest of the RBS fire protection program. Taken together, there presently exist substantial means of fire protection at RBS to assure, with margin, that operation can be conducted safely. The Petitioner has identified no information that was not already available to GSU and the NRC Staff. Nevertheless, with the above considerations in mind, GSU addresses below each of the Petitioner's allegations to demonstrate that no "substantial health and safety issue" has been raised.

IV. EXISTING RIVER BEND FIRE PROTECTION MEASURES

River Bend Station is designed and operated in accordance with a "defense-in-depth" approach to fire protection. Fire resistant barriers surrounding cables to insulate them from fire damage under certain scenarios are only one small part of the fire protection program at RBS. That program includes measures to prevent fires, to quickly detect and suppress fires, and to assure that safety functions can and will be performed even in the unlikely event that

a fire occurs and is not extinguished for some considerable time. Because of this defense-in-depth approach, the defi iencies identified and being addressed with regard to Thermo-Lag fire barriers do not present a safety hazard. Reasonable assurance exists, and has always existed, that the plant can be operated safely while the timely resolution of the matter is proceeding.

To explain this fire protection design philosophy in more detail, it is necessary to understand the overall fire protection requirements that apply to RBS. RBS docketed its construction permit application in 1973. Accordingly, under 10 C.F.R. § 50.48, "Fire Protection," the fire protection "requirements" applicable to RBS are Appendix A to NRC BTP APCSB 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976,"(February 24, 1977). Further, Condition 10 of the RBS operating license, issued August 29, 1985, requires that the RBS fire protection program comply with the River Bend Final Safety Analysis Report ("FSAR") through Amendment 22, the Safety Evaluation Report ("SER") dated May 1984, and Supplement 3 to the SER ("SSER 3") dated August 1985. SSER 3 specifically states on page 9-13 that "the Staff finds that the applicant's fire protection program . . . is in conformance with the guidelines of BTP CMEB 9.5-1, Sections III.G, III.J and III.O of Appendix R to 10 C.F.R. 50, and GDC 3, and is, therefore, acceptable."[13]

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[13] Section III.G of 10 C.F.R. Part 50, Appendix R, generally provides that when portions of redundant trains of systems (continued...)

The broad defense-in-depth concept applied to nuclear power plant fire protection is aimed at achieving an adequate balance among three echelons (levels of protection). These echelons are: (1) prevention of fires; (2) detection, suppression, and prompt extinguishment of fires, and limitation of their damage; and (3) design of safety systems such that if a fire does occur despite (1) and (2) above, it will not prevent the performance of essential plant safety functions.[14] Fire barriers and fire watches are both included within the second echelon.

Petitioner argues on page 17 that each echelon "is required to meet a minimum requirement." This assertion is at odds with the plain language of BTP CMEB 9.5-1, which is fire protection guidance applicable to RBS. When read in context, paragraph B.1 of BTP CMEB

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[13] (...continued)
necessary to achieve and maintain nuclear plant shutdown are located within the same fire area outside of containment, one of the following means shall be provided to ensure that one of the redundant trains remains free of damage in the event of a fire:

(1) separation of cables and equipment of redundant trains by a fire barrier having a 3-hour rating;

(2) separation of cables and equipment of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. (Fire detectors and an automatic fire suppression system should be installed in the fire area);

(3) enclosure of cable and equipment of one redundant train in a fire barrier having a 1-hour rating. (Fire detectors and an automatic fire suppression system should be installed in the fire area).

[14] BTP CMEB 9.5-1, at para. B.1.

9.5-1 provides a significantly different position than that suggested by the isolated segment quoted in the Petition:

> No one of these echelons can be perfect or complete by itself. Each echelon should meet certain minimum requirements; however, strengthening any one can compensate in some measure for weaknesses, known or unknown, in the others.

Thus, although the design of each echelon should meet certain minimum requirements, meeting such minimum requirements is not mandatory and is not necessary to assure that operation can be conducted safely. In fact, the quoted language specifically recognizes that a weakness in one echelon may be compensated for by strengthening another echelon.

Furthermore, and perhaps even more importantly, GSU does meet the minimum requirements for echelon two. The purpose of a fire watch (to detect a fire quickly), and the purpose of a 1 or 3-hour fire barrier (to limit damage), are both within the same echelon of the defense-in-depth design philosophy, specifically, the second echelon. That is, fire watches and fire barriers serve similar functions. Thus, the use of a fire watch to compensate for an inoperable or degraded fire barrier satisfies defense-in-depth requirements, contrary to the allegation of the Petitioner.[15]

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[15] The Petitioner makes two further, and similarly erroneous, allegations concerning defense-in-depth. The first is on page 2 of the Petition and suggests that a fundamental difference exists between fire watches and fire barriers by asserting that "a fire watch is an additional way to detect a fire," while a fire barrier is "a different mode of safeguarding a reactor against fire." The second allegation (continued...)

Petitioners also are incorrect that the degraded fire barriers equate to a violation of fire protection requirements. With the compensatory measures in place, RBS remains in compliance with its license, including the Technical Specifications. Technical Specifications define the limiting conditions for operation of a facility. They are part of the operating license for the facility and are legally binding. Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit 1), ALAB-772, 19 NRC 1193, 1257 at n.89 (1984), rev'd in part on other grounds, CLI-85-2, 21 NRC 282 (1985). NRC regulations state that "[w]hen a limiting condition for operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met." 10 C.F.R. § 50.36(c)(2) (emphasis added).[16]

For River Bend Station, the plant's Technical Specifications governing fire-rated assemblies (TS 3/4.7.7) establish, as the limiting condition for operation, that in the event that fire barrier assemblies are deemed inoperable, the licensee need not

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[15](...continued)
is on page 18 and asserts that "[e]xemptions to an operable fire-barrier, e.g., fire watch, eliminate an echelon of defense-in-depth." These two allegations again demonstrate a lack of understanding of the second echelon.

[16] According to NRC guidance, "[i]f an NRC-approved action (such as provided in an LCO action statement) is immediately taken to compensate for failed equipment . . . continued operation of the facility is permitted." NRC Inspection Manual, Part 9900, "Operable/Operability: Ensuring the Functional Capability of a System or Component," October 31, 1991, at 9.

shut down the plant. The Technical Specification provides for other "remedial action," as contemplated by Section 50.36(c)(3) of the NRC regulations. Specifically, the Technical Specification action statement states:

> With one or more of the above required fire-rated assemblies or sealing devices inoperable, within 1 hour establish a continuous fire watch on at least one side of the affected assembly and/or sealing device or verify the OPERABILITY of fire detectors on at least one side of the inoperable assembly or sealing device, and establish an hourly fire watch patrol.

River Bend Technical Specification 3/4.7.7, LCO 3.7.7 (emphasis added). By establishing fire watches in accordance with this action statement, GSU has remained within the limiting condition for operation and therefore in compliance with the River Bend operating license.

The fallacy of Petitioner's argument is perhaps best manifest by an analysis of the following assertion in the Petition, at page 18:

> No valid analysis has been performed showing that equivalent margins of safety have been achieved substituting a fire-barrier for a fire watch, thus justifying continued operation. The Staff has failed to justify continued operation through findings that River Bend achieves margins of safety equivalent to compliance with regulations.

This argument starts with the erroneous proposition that River Bend Station is not presently in compliance with NRC requirements. As demonstrated above, that assertion is false. We set that aside here for the sake of argument. The Petitioner then asserts that

there must be equivalent margins of safety between fire watches and fire barriers. Petitioner offers neither a basis for this assertion nor a technical analysis to show that the two are indeed not equivalent. Moreover, neither the license nor the Technical Specifications require GSU to demonstrate equivalence on a case-by-case basis. Fire watches are authorized generally as an acceptable compensatory action. Petitioner suggests that continued operation can only be justified by a demonstration of equivalence to full compliance with the RBS licensing basis. This is not an accurate statement of the standard for issuance of an order precluding operation. As discussed in Section III above, continued operation can be justified so long as there is reasonable assurance that operation will involve no undue risk -- given the compensatory or permanent measures presently in place.

The Director has previously relied on the existence of compensatory measures in denying a Section 2.206 petition, and allowing plant operation during an interim period prior to implementation of certain fire protection modifications. In Detroit Edison Co., 21 NRC 546, a petitioner, under Section 2.206, questioned the NRC's decision to allow the Fermi-2 nuclear plant to operate, for a limited time, without a fire protection alternate shutdown system in place. The Director concluded that the licensee met the applicable fire protection requirements of GDC 3 of Appendix A to 10 C.F.R. Part 50, based on, inter alia, the adequacy of the interim compensatory measures to be implemented. Detroit

Edison Co. (Enrico Fermi Atomic Power Plant, Unit 2), DD-85-4, 21 NRC 546, 556 (1985). The Director observed that "[c]ompensatory measures [had] been taken to limit the fire damage in the control room to one electrical division." Id. The credited compensatory measures included a fire watch in the control room and modifications to the control room panels to limit fire damage. Id. Relying in part on these compensatory measures, the Director ruled that the licensee remained in compliance with fire protection requirements, and denied the petitioner's request.[17] A similar result is warranted in the present case.

V. RESPONSE TO SPECIFIC CONCERNS

A. General Principles and Fire Risks

Deficiencies in Thermo-Lag fire barriers as referenced in NRC Bulletin 92-01 do not necessitate plant shutdown. Within the context of the broad strategy of defense-in-depth as applied to fire protection discussed above, it is clear that RBS has been and will be operated without undue fire risk. The Petitioner makes a

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[17] In a Section 2.206 petition seeking to prevent restart of the Three Mile Island Nuclear Station, Unit 1, petitioners alleged several deficiencies related to the plant's emergency feedwater system. GPU Nuclear Corp. (Three Mile Island Nuclear Station, Unit 1), DD-84-22, 20 N.R.C. 1033 (1984). Although the licensee did not plan to complete certain upgrades to this system until the first refueling outage following plant restart, the Director determined that, "with the interim compensatory measures instituted by the Licensee, there is reasonable assurance" that the plant could continue to operate safely and that enforcement action therefore was not justified. GPU Nuclear Corp., 20 N.R.C. at 1054 (emphasis added).

number of specific allegations that misstate or misrepresent the risks of continued operation of RBS.

Generally speaking, as alluded to above, fire risks are minimized by design and operational practices. Plant structures are built overwhelmingly using noncombustible material such as concrete and steel. In buildings containing safety-related systems, the presence of combustible materials is minimized. Any combustible materials have been analyzed in a detailed, plant-specific fire analysis that has determined the scope of potential fires in defined areas throughout the plant. This analysis allows for determination of appropriate means of fire detection and suppression, as well as the need for fire barriers. The primary contributor to fire loading in most areas within the plant is the installed electrical cable. Even this cable is generally flame retardant, which means that while it can be burned, it will not support fire by itself. In addition, procedures are in effect that strictly limit the introduction and use of combustible materials and ignition sources in the plant.

At River Bend Station, fire watch personnel are also assigned to relevant areas of the plant to monitor fire risks on either a continuous or hourly basis. Fire watch personnel are assigned, as their sole responsibilities, to eliminate fire hazards, to detect fire conditions, and, where feasible, to suppress fires. Fire brigades and automatic fire suppression equipment are also available to suppress fires where needed. In accordance with plant

procedure, fire watch and fire brigade personnel are appropriately trained and tested before being assigned these tasks.

Gulf States Utilities has already determined that some Thermo-Lag fire barriers at RBS contain construction deficiencies and, as a result, would not meet the stringent acceptance criteria during 1-hour and 3-hour fire endurance tests. The tests have shown, however, that the fire barriers, although degraded, are generally more than adequate to protect against the actual fire hazards of the areas in which they are installed. That is, the conditions of an actual fire at RBS would be much less severe than the conditions applied during testing of the Thermo-Lag barriers. The prescribed fire tests are of an intensity, duration, and temperature profile that far exceed the type of fire that reasonably could be expected to occur in the plant.[18] The Thermo-Lag fire barriers, as installed at RBS, do provide significant fire protection, and there is reasonable assurance that the fire barriers can and will provide for fire protection until an automatic detection system is actuated, and either automatic suppression has actuated or the fire brigade has responded to suppress the fire.[19] In conjunction with

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[18] For example, the prescribed time-temperature profile for the 1-hour test exposed Thermo-Lag to temperatures in excess of 1400°F for most of the test period, and by 1 hour Thermo-Lag was exposed to temperatures as high as 1700°F.

[19] The fact that Thermo-Lag barriers will provide protection for some period of time is supported by, among other tests, the fire endurance tests conducted for the NRC at the National Institute of Standards and Technology. See Information Notice

(continued...)

the other fire protection features and programs in effect at RBS, the installed fire barriers provide adequate protection of the public health and safety.[20]

The Petitioner asserts that, despite the many significant improvements in fire protection resulting from the promulgation of Appendix R in 1980, "there is still a great risk of core meltdown due to conflagration." Petitioner then refers to NUREG-1150 for the statement that if there were a core melt, there is up to a 50% chance that it was caused by fire.[21] These statements are inaccurate and misleading as they apply to River Bend Station.

As part of its response to the Petition, GSU reviewed five nuclear plant probabilistic risk assessments ("PRA") that cover

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[19](...continued)
92-55, "Current Fire Endurance Test Results for Thermo-Lag Fire Barrier Material" (July 27, 1992).

[20] In addition, issuance of an operating license that permits continued operation with an inoperable fire barrier as long as the limiting condition for operation prescribed in the Technical Specifications for that condition (establishment of a fire watch) is met, provides, by definition, reasonable assurance of continued safe operation. This understanding of reasonable assurance of safe operation is described in the NRC Inspection Manual, which states that "Technical Specifications (TS) address the safety systems and provide Limiting Conditions for Operation (LCOs) and Allowed Outage Times (AOTs) required to ensure public health and safety." NRC Inspection Manual, Part 9900, "Resolution of Degraded and Nonconforming Conditions," October 13, 1991, at 3. Recognition that licensees can operate with reasonable assurance of safe operation if the LCO is met is inherent in the concept of establishi ~ LCOs.

[21] NUREG-1150, "Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants" (December 1990).

internal and external risks, including fire.[22] For those five plants, the estimated frequency of core damage due to fires ranged from a high of 2.3E-5 per year (i.e., core damage due to fire may occur once every 43,480 years) to a low of 1.0E-5 per year (core damage due to fire may occur once every 100,000 years). These results clearly show that the estimated frequency of core damage due to fires does not constitute a "great risk."

Further, the five PRAs reviewed showed a percentage contribution of fires to overall core damage frequency of 4%, 5%, 6.5%, 10%, and 20%. These are relatively small contributions to overall core melt frequency. The two PRAs referenced in NUREG-1150 referred to by Petitioner were for Limerick and Seabrook. What NUREG-1150 actually states is that on the basis of PRAs for Limerick and Seabrook, the contribution of fires to total core damage frequency has varied from 7% in one case to 50% in the other. This is not a sufficient basis to extrapolate results to RBS or any other plant. Limerick was the plant with the 50% contribution due to fires. However, the cited PRA results did not credit fire protection improvements at the plant. A subsequent evaluation which did take fire protection improvements into account showed a significantly lower contribution due to fires. (In any event, a 50% contribution to the overall core damage frequency is, in itself, a misleading number. The more relevant number is the

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[22] The five PRAs reviewed were for Peach Bottom, Surry, Kuosheng, Seabrook and Oconee.

actual core damage frequency due to fire, which, as we have seen, for representative plants is a very low number.)

The Petitioner continues a general discussion on the risk of fire by asserting, on page 8, that "the inoperability of the fire barrier Thermo-Lag increases the already high probability of fire-initiated core damage." Again, this statement is misleading. The Petitioner seems to implicitly neglect or discount all risk reduction provided by compensatory fire watches, administrative procedures (e.g., limiting transient combustibles or controlling ignition sources), or the as-installed Thermo-Lag barriers. Furthermore, as shown by the occurrence figures above, fire-initiated core damage is in reality a very low probability event.

The Petitioner also refers, on page 7, to a statement in NUREG-1150, observing that "a typical reactor will have three to four significant fires over its operating lifetime." The suggestion appears to be that any Thermo-Lag deficiencies will therefore exacerbate these fires. The potential contribution of a "significant" fire to core damage, however, is highly dependent upon the location and duration of the fire. A review of the Electrical Power Research Institute ("EPRI") fire event database covering past fires at nuclear power plants shows that only 5% of those fires occurred in locations and with sufficiently long durations to potentially challenge Thermo-Lag fire barriers as

tested for RBS.[23] A conservative, bounding evaluation of fire occurrence frequency at RBS taking into consideration the RBS testing results and the limited locations at which Thermo-Lag is used at RBS, shows that the frequency of a fire at RBS that could potentially challenge Thermo-Lag fire barriers is one over the life of the plant, as opposed to the Petitioner's estimate of three or four.[24]

In the second paragraph on page 7, Petitioner attempts again to inflate the risks of fire by erroneously extracting information from NUREG-1150. With no attempt to correlate the information to River Bend Station, Petitioner recites effects of a hypothetical fire in the emergency switchgear room, cable/vault tunnel and auxiliary building, coupled with a reactor coolant pump seal loss of coolant accident and the effects of a control room fire with subsequent stuck-open power operated relief valve as the dominant fire-induced core melt scenarios. However, in reality all of these referenced scenarios involve pressurized water reactor ("PWR") failure modes that are not applicable to the RBS boiling water

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[23] For purposes of this discussion, a fire would be viewed as "potentially challenging" if it burned for more than fifteen minutes in an area protected by Thermo-Lag.

[24] With respect to the one fire over plant life that might be estimated for RBS, it should be emphasized that this does not equate to a fire leading to core damage. (That very low frequency is discussed above.) Rather, this is the estimated frequency of occurrence of fires that would challenge the Thermo-Lag barriers installed at RBS. Only a small fraction of fires challenging Thermo-Lag barriers would potentially affect the plant's shutdown capability.

reactor ("BWR") design. Therefore, the scenarios are not applicable or relevant to RBS. This error in the basis for the Petition renders the argument meaningless. One cannot extrapolate the results of a plant-specific PRA to draw generic conclusions, particularly from one type of plant to another (i.e., PWR to BWR).

Despite the fact that Petitioner clearly overstates the fire risks at River Bend Station, GSU has compared the "equivalency" of margins of safety for fire barriers versus fire watches. GSU reviewed information related to fire suppression probabilities as a function of available time as found in the Fire Risk Scoping Study (NUREG\CR-5088), and data from the EPRI fire events database. GSU then compared fire suppression failure probabilities using a conservative minimum value of 15 minutes of protection to be provided by the Thermo-Lag barriers (based on the worst case fire endurance test results) and including the availability of both automatic and manual fire suppression systems. GSU specifically analyzed the probability of failing to suppress a fire potentially affecting safe shutdown equipment. The probability of failing to suppress the fire before damage occurs where the equipment is protected by 15-minute rated Thermo-Lag with a fire watch in effect is comparable to the probability of failing to suppress a fire before damage occurs to safe shutdown equipment where equipment is protected by the normal configuration of 1-hour rated Thermo-Lag, automatic suppression, and no fire watch. Thus, the use of a fire

watch in conjunction with degraded Thermo-Lag barriers at RBS does not reduce any margin of safety.

B. Specific Issues Raised by Petitioner

1. Combustibility

The Petition questions, on page 14, the effect of the possible combustibility of Thermo-Lag on "combustion loading and fire propagation." This matter, however, does not present a legitimate safety concern for River Bend Station.

No requirement exists that 1-hour and 3-hour fire barriers be noncombustible: Thermo-Lag does not provide fire protection by thermally insulating but by subliming, i.e., passing from a solid to a vapor state without going through a liquid state. As a result, a portion of the Thermo-Lag material is consumed during the fire rating period. Thus, combustibility does not pose a problem -- rather it is part of the product design and anticipated reaction during the course of a fire.

NRC guidelines do not preclude the use of materials with some combustion characteristics (e.g., gypsum board). Helpful to understanding this point is a comparison of the flame spread rate (per ASTM E-84) of Thermo-Lag with some common fire protection barriers as defined in the Building Materials Directory published by Underwriters Laboratories. The flame spread rate scale was developed using oak wood, which has a flame spread rate of 100, as an index. Concrete has a flame spread rate of 0. Gypsum board, a common material used for fire barrier construction, has a flame

spread rate of 10 to 25. Thermo-Lag, according to vendor information, has also been tested per the E-84 standard by an independent testing laboratory and was found to have a flame spread rate of only 5. This rate is obviously well within industry standards for fire protection material.

2. Seismic Adequacy

At RBS, the conduits and trays to which Thermo-Lag is applied have been analyzed in accordance with specific structural design criteria. Supports are placed at required intervals to withstand seismic loads, including loads imposed by the Thermo-Lag itself. Thus, the Petitioner's implicit claims that additional seismic testing is necessary and that Thermo-Lag could "shatter" a cable tray during a seismic event are unfounded.

Petitioner likewise provides no technical basis for its position that, during a seismic event, the fire barrier could act as a "shear, severing cables necessary in safe shutdown."[25] Based

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[25] Section 2.206 requires that a petition submitted thereunder "set forth the facts that constitute the basis for the request." In the absence of factual detail, the petition is to be denied. "Allegations deemed not relevant to safe operation of the facility and allegations determined to be frivolous, or too vague or general in nature to provide sufficient information for the Staff to investigate, receive no further consideration." Union Elec. Co. (Callaway Plant, Unit 1), DD-85-7, 21 NRC 1552, 1555 (1985); see also Houston Lighting and Power Co. (South Texas Project, Unit 1), DD-88-9, 27 NRC 648, 649 (1988). "In the absence of such specific factual basis, [the Director] need take no further action with respect to Petitioners' claims." Philadelphia Elec. Co. (Limerick Generating Station, Units 1 and 2), DD-85-11, 22 NRC 149, 154 (1985). Petitioner's several postulated seismic accident scenarios, which are not supported by either reason (continued...)

upon information provided in TSI Technical Note 12584, "Stress Analysis of Thermo-Lag Subliming Coating Applied to Electrical Power Trays and Conduit," and given the support systems in place, the attachment hardware used for installation of Thermo-Lag barriers, and the method in which Thermo-Lag is installed, reasonable assurance exists that Thermo-Lag has the capability to survive seismic events without detriment to the safety-related cables that it is protecting, or to other safety-related equipment in the area of the installation. Also, contrary to Petitioner's statement, Thermo-Lag is not a "heavy cementitious" material, but rather a plasticized, polymeric-based compound weighing only slightly more than half as much as concrete. Even supposing for a moment the occurrence of an improbable event such as that hypothesized by Petitioner, the plant design includes redundant divisional cable, where divisions are generally physically separated so that at least one division would be available to perform the intended safe shutdown function. See generally RBS Updated Safety Analysis Report ("USAR") Section 8.3.1.4.4.2.

Finally, evaluation of a seismic event concurrent with a transient fire is not required by Appendix R. See Appendix R, Section III.L.6. Nonetheless, RBS does maintain seismically supported manual fire fighting systems throughout safety related

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[25] (...continued)
or technical analysis, fall within this category of allegations which are too vague to merit further consideration by the Director. We nevertheless respond to these assertions.

buildings. See generally RBS USAR Section 9A.3.2.4. Thus, it is not necessary to consider Petitioner's unfounded assertion that safe shutdown would be "further jeopardized by fire incidence" during a seismic event.

3. TU Electric 1-Hour Fire Tests

Petitioner discusses certain TU Electric (TU) test failures for 1-hour Thermo-Lag fire barriers and notes that although the 5-inch conduit and the 12-inch cable tray passed, the tests were "done in optimal conditions, unlike the conditions in the plant." This is a misleading description of the tests.

In reality, the fire endurance test procedure for fire barriers, as utilized by TU, prescribed a temperature profile that, in the opinion of many fire protection engineers, exceeds fire conditions that reasonably would be expected to occur in a nuclear plant.[26] Based on conversations with representatives of TU, it

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[26] The NRC Staff has also generally recognized that fire testing is very conservative relative to actual fire risks at a nuclear plant. In Information Notice 92-46, "Thermo-Lag Fire Barrier Material Special Review Team Final Report Findings, Current Fire Endurance Tests, and Ampacity Calculation Errors" (June 23, 1992), the NRC included a "Final Report - Special Review Team for the Review of Thermo-Lag Fire Barrier Performance" (April 21, 1992). The NRC Staff Review Team in that report, at pages 33-34, recognizes the conservatism inherent in the requirements for 1-hour and 3-hour barriers. The report notes that:

> The fire test standard maximizes fire severity by subjecting the barrier to a fire of rapid temperature rise in a confined space that totally engulfs the test specimen. In an actual fire situation, the fire resistance required of a barrier depends on the expected

(continued...)

also appears that the conditions of the test were selected expressly to allow a careful evaluation of the limiting cases. The test conditions were most limiting for the small conduits and 30-inch cable tray, since these are known to be the most demanding configurations, based on surface-to-volume ratios and large unsupported areas of Thermo-Lag.

The Petitioner also objects to what it characterizes as TU's treatment of the test results as proprietary, and interprets this action as "an industry desire to deceive, mislead, or hoodwink the public." Despite Petitioner's assertion, it is abundantly clear that the portion of the test results of interest were promptly provided by TU to the NRC (which accepted TU's invitation to observe the tests), rapidly disseminated to the public in Bulletin 92-01, and quoted by the Petitioner itself in its Petition.

4. Hose Stream Test

Petitioner states, on page 14, that Thermo-Lag did not meet the acceptance criteria for the hose stream test during the June

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[26] (...continued)

> severity of the fire to which it may be exposed. Typical nuclear plant fire loads are not great enough to produce a fire approaching the severity of a test fire. In addition, an actual nuclear power plant fire would have a much slower temperature rise than the test fire. In large open volumes, such as most nuclear plant fire areas, a fully developed fire may occur in one part of the area, but it is not probable that the entire volume (fire area) would flashover. Unless a fire reaches this stage, it is not likely to present a credible challenge to any nuclear power plant fire barrier.

1992 TU fire tests and that, therefore, "there is a high probability that fire suppression systems could 'short circuit' cables." This assertion indicates a misunderstanding of the purpose of the hose stream test and unfamiliarity with pertinent design requirements. The TU hose stream test results do not undermine reasonable assurance that River Bend Station can be safely operated.

First, a hose stream test is one in which building construction material and associated fire barriers are subjected to a high pressure stream of water to simulate the impact, erosion, and cooling effects of a hose stream during manual fire suppression. However, electrical cabling at RBS is designed "to allow wetting down with fire suppression water without electrical faulting." BTP CMEB 9.5-1, Paragraph 5.e.(2). Accordingly, a failure of the hose stream test in and of itself does not imply a likelihood of short circuits. (During conduct of both the fire endurance test and the hose stream test, electrical continuity is monitored. Any loss of continuity is deemed a test failure.)

Moreover, in essentially all the hose stream test failures referred to by Petitioner, the test has been conducted at the end of the 1-hour or 3-hour testing period. The test procedure specifically provides, however, that the test may be run halfway through the rating period and no later than 1 hour (even for a 3-hour rated item). Performing the hose stream test earlier, as these provisions allow, would significantly increase the likelihood

of passing the test. (Hose stream tests are ordinarily performed at the end of the testing period only to obviate performing the complete fire barrier test twice. This significantly decreases the cost of the test.)

Finally, hose stream test results do not focus on electrical performance. NRC guidance suggests that cable trays should be designed to meet the provisions of ASTM E-119, "Fire Test of Building Construction and Materials." See BTP APCSB 9.5-1, Appendix A, Section D.3.(d). Since ASTM-119 was developed to test building construction and materials, however, it contains no test standard for cable fire barriers. The Staff attempted to provide a standard by informally indicating that licensees should use the tests applicable to nonbearing walls and partitions for purposes of the hose stream test for cable fire barriers. The pertinent condition of acceptance for the test is that the wall or partition shall withstand the hose stream "without passage . . . of the hose stream." Thus, as might be expected in a test designed for building construction, the hose stream test acceptance criteria focus on structural rather than electrical integrity. The significance of this test for cable fire barriers is questionable.

5. Ampacity Calculations

Petitioner asserts, on page 13, that an error in ampacity derating was made by TSI in its calculations and that such an error could cause electrical cables to "prematurely age, or worse, overheat and ignite." The ampacity rating of an electrical cable

refers to its capacity to carry electric current. Because heat is generated from current flowing through the cable's internal resistance, the amount of current carried by a cable must be limited so that resulting cable temperatures will not exceed the temperature rating of (and potentially cause deterioration of) the cable insulation. Heat is normally conducted away from the cable; however, when a current-carrying cable is enclosed in a wrapping such as Thermo-Lag, more heat is retained in the cable, raising its temperature. Therefore, in order to stay within the temperature rating of the cable insulation, the allowable current must be reduced. This is called ampacity derating.

Increases in cable temperature can, as Petitioner asserts, cause gradual deterioration of the cable insulation. This deterioration, however, proceeds very slowly and is generally considered insignificant for the increases in temperature associated with the use of Thermo-Lag if correct ampacity derating values re applied. GSU has relied on the ampacity derating factors provided by TSI in its calculations for RBS installations. As discussed in its response to Inspection Report 92-04, dated May 6, 1992, GSU has recently checked those calculations using revised ampacity derating values provided by TSI. Based on analysis or modification, all cables presently are adequately sized for the TSI-provided derating factors.

As to Petitioner's assertion that an error in ampacity derating could cause cables to ignite, such a result appears to be

so unlikely as to be fanciful. GSU cannot identify a single case in which ignition of cables protected in a Thermo-Lag enclosure has occurred at a nuclear power plant, despite the use of Thermo-Lag on untold miles of cable at scores of nuclear plants over a period of many years.[27] To be certain that no ampacity problems exist, however, GSU plans to revalidate its ampacity derating calculations once it determines the final course of action on its Thermo-Lag installation.

6. Toxicity

Petitioner next asserts that Thermo-Lag "has been shown to emit extremely high amounts of hydrogen cyanide gas when exposed to fire." However, Petitioner has offered no explanation of the safety significance of this assertion with respect to the matter at hand. In addition, Petitioner quotes part of 10 C.F.R. Part 50, Appendix R, dealing with fire brigade training, but does not explain the purpose of its reference. Assuming that these statements are intended as an assertion that GSU has somehow failed to adequately consider the potential impact of any toxicity associated with Thermo-Lag on the health and safety of plant personnel, that assertion would be incorrect and raises no recognizable safety concern.

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[27] At RBS alone, approximately 2200 cables are enclosed in Thermo-Lag. In addition, even supposing that a cable within a Thermo-Lag-enclosed conduit or tray were to ignite, the cable insulation material is "non-propagating," meaning that the fire would not spread once the source of the fire was removed.

Petitioner does not raise any concerns not previously addressed by NRC. In a letter dated June 20, 1989, the NRC Staff responded to essentially the same concern as that raised by Petitioner (i.e., that "release of potentially lethal quantities of toxic substances" from Thermo-Lag, including hydrogen cyanide, could "prove fatal to fire fighters or others in the vicinity of a fire"). The NRC Staff provided several reasons in support of its conclusion that "continued use of TSI Thermo-Lag material as a fire protection barrier . . . does not pose an unacceptable risk to personnel in nuclear power plants." Among the reasons cited by NRC for its position are the following:

1. Any fire releases toxic products of combustion. [For example, incineration of electrical cable insulation releases hydrogen chloride.]

2. The tests referenced by the party raising the toxicity concern assumed a fire large enough to bring an entire room to an equilibrated temperature of 1900°F for one hour. "This condition itself would have caused flash over burning of all combustibles in the enclosure and would be lethal for fire fighters without proper protection. Due to fire protection provisions at nuclear power plants, a severe exposure fire of the type in the test procedure is unlikely."

3. Fire brigade members in nuclear power plants are equipped with complete protective gear including self-contained breathing apparatus.

4. NRC fire protection guidance and requirement documents specify that the fire brigades will be trained to properly cope with any fire emergency they may encounter in their plant.

Letter from Conrad McCracken, Chief, Chemical Engineering Branch, Division of Engineering and Safety Technology, NRR, dated June 20, 1989.

The precautionary measures credited by the NRC Staff in its 1989 letter as [illegible]ing the impact of combustion toxicity are fully implemented by GSU at RBS. Fire watch personnel are assigned to discover fire in its incipient stage, before toxic gases are produced. In the unlikely event of a fire, automatic detection would be actuated before sufficient heat was generated to produce toxic fumes. As detailed in Chapter 13 of the RBS Updated Safety Analysis Report, fire protection is one of seven key areas covered in the plant's General Employee Training Program. RBS USAR, Section 13.2.2. Training in airborne hazards and the use of respirators is provided to indoctrinate personnel in the proper methods of protecting themselves from inhaling toxic or radiologic materials. RBS USAR, Section 13.2.2.2.

In addition to this General Employee Training, more intensive Fire Protection Training is provided to (1) employees designated to be members of the station fire brigade; (2) employees assigned to fire protection staff; and (3) offsite fire departments. RBS USAR, Section 13.2.3. The Fire Protection Training program, which includes both classroom instruction and field exercises, satisfies RBS commitments to BTP CMEB 9.5-1 and is consistent with other NRC

guidance documents.[28] This specialized training focuses on such specific issues as the toxic and corrosive characteristics of expected products of combustion; proper use of emergency breathing equipment; and the correct methods for fighting fires involving flammable and combustible liquids or hazardous process chemicals. RBS USAR, Section 13.2.3.1. These extensive fire protection training programs at RBS are designed to ensure that plant personnel are capable of responding appropriately and safely in the event of a fire at the station. Thus, the Petitioner's vague assertions do not alter the conclusion that the public health and safety will be protected during continued operation of the plant.

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[28] The Fire Brigade Training course subject matter is selected to satisfy BTP CMEB 9.5-1; Regulatory Guide 1.120; and NRC Document, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls, and Quality Assurance." RBS USAR, Section 13.2.3.1.

VI. CONCLUSION

For the reasons stated above, the River Bend Station currently maintains fire protection which is more than adequate to allow it to continue to operate within NRC requirements and guidance and to assure that the health and safety of the public is protected. Petitioner's request that the NRC issue a shutdown order u[illegible] C.F.R. § 2.206 should be denied.

Respectfully submitted,

WINSTON & STRAWN

Mark J. Wetterhahn
David A. Repka

COUNSEL FOR GULF STATES
UTILITIES COMPANY

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE DIRECTOR, OFFICE OF NUCLEAR REACTOR REGULATION

In the Matter of:	)	
	)	Docket No. 50-458
GULF STATES UTILITIES COMPANY	)	
	)	
(River Bend Station, Unit 1)	)	
	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing "Response of Gulf States Utilities Company to NIRS § 2.206 Petition to Shut Down River Bend Station" served on the following by hand delivery as indicated by an asterisk, or otherwise through deposit in First Class United States Mail, this 20th day of August, 1992:

James Taylor*
Executive Director for Operations
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Thomas E. Murley*
Director, Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Douglas V. Pickett*
NRC Project Manager
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Office of the Secretary*
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
Attn: Docketing and Service Section

Michael Mariotte
Executive Director
Nuclear Information and Resource Service
1424 16th Street, N.W.
Suite 601
Washington, D.C. 20036

David A. Repka

David A. Repka
Counsel for Gulf States Utilities Company

August 20, 1992

Note to Jim McKnight:

Please enter this into the RIDs system. Copies should go the public document rooms, Project Director, Project Manager, Licensing Assistant, OGC, Division of Systems Technology Director, Plant Systems Branch, and A. Masciantonio. The attached is responding to the 2.206 Petition filed by the Nuclear Information and Resource Service.

Suzanne C. Black

Suzanne C. Black, Director
Project Directorate IV-2
Division of Reactor Projects III/IV/V

		Ltr	Encl
	PM - Doug Pickett	1	1
	PD4-2 LA	1	1
	PD4-2 PD	1	1
ZZZZ	OGC	1	1
1/1	A. Masciantonio	1	1
	NRR/DST	1	1
	NRR/SPLYB	1	1
	S. Black	1	1
	Reg File - 01	1	1
	NRC PDR	1	1
	LPDR	1	1

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