NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

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TITLE (4)
Overcurrent Protection of Containment Penetrations

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
									N/A	0 5 0 0 0
1 1	3 0	8 4	8 4	— 0 5 5	— 0 0	0 1	0 5	8 5		0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
4		20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
0 0 0		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	X OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	Voluntary Report

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
Ronald W. Byrd/Licensing Engineer	6 0 1 — 4 3 7 - 2 1 4 9

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

In late November and early December, the Architect Engineer (Bechtel) identified discrepancies between the Unit 1 design and commitments to Regulatory Guide 1.63 as they relate to overcurrent protection of containment penetrations. A detailed review revealed the noncompliances to be limited to low voltage control or instrumentation circuits with relatively small diameter conductors and low energy levels. An engineering analysis of these discrepancies has indicated that no substantial safety hazard existed. Plant modifications were implemented prior to plant restart, in accordance with applicable regulations, to address these discrepancies.

Based on the results of this effort and the circuits considered, MP&L concluded that, with the described plant modifications complete, such circuits are in compliance with MP&L's commitments to the overcurrent protection provisions of Regulatory Guide 1.63.

These noncompliances were discussed in MP&L letter AECM-84/0530 on December 18, 1984. Specific followup to that letter is being provided concurrent with this voluntary LER in MP&L letter AECM-85/0003 dated January 5, 1985.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

PREVIOUS HISTORY

When the GGNS Construction Permit was issued in 1974 the Preliminary Safety Analysis Report (PSAR) did not include commitments to provide the penetration overcurrent protection of Regulatory Guide 1.63. Since there was no commitment to meet Regulatory Guide 1.63, the Containment Electrical Penetration Assembly Specification issued in 1975 did not reference the regulatory guide. In 1976, the need was recognized to provide appropriate overcurrent protection to certain penetrations and manifested in the issuance of the purchase specification for the Containment Electrical Penetration Protection Cabinet which included requirements to provide redundant circuit protection for 480V power circuits. This design change indicated a recognition of the potential for penetration damage from power circuits and the emphasis placed by Bechtel, at the time, in meeting the intent of Regulatory Guide 1.63 as it pertained to overcurrent protection on these circuits. In April of 1978 a commitment was made to meet the objectives of Revision 0 to Regulatory Guide 1.63. A response was provided to the first round FSAR question 040.5 in August of 1978. This question requested a description of compliance to portions of Revision 1 of Regulatory Guide 1.63. A review of 480V and 6.9kV circuits was made and a commitment was made to review 120/125V circuits. In preparing the response, it was assumed that instrument circuits were of no safety concern, and no additional evaluation was performed in this area. The response stated this assumption. In May of 1979 the review of 120/125V control circuits was made, and coordination curves for these circuits were added to the FSAR.

The first noncompliance between the Unit 1 design and the commitments to Regulatory Guide 1.63 pertained to motor operated valve (MOV) space heaters and was identified during ongoing design activities by Bechtel Unit 2 personnel in July 1984. As a result, at MP&L's request, Bechtel reviewed similar electrical penetration configurations which led to the discovery of a second noncompliance concerning Standby Liquid Control System (SLCS) heat tracing circuits in August 1984. At that time, it was believed by Bechtel that the cause of these noncompliances was that these circuits did not fit into any of the compliance categories in FSAR Q&R 040.5. To confirm that there were no other such noncomplying circuits, a review was performed of power and control circuits penetrating containment to verify that they had been properly categorized per FSAR Q&R 040.5. No additional circuits were found to be miscategorized. Since no additional noncompliances were found during that review, Bechtel believed that no additional noncompliances existed. Bechtel reported these results to MP&L, and based thereon, MP&L concurred in the conclusion. No review was performed on the circuits for adequacy of design since nothing had been discovered which brought into question design adequacy.

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BACKGROUND OF EVENT

In late November 1984, Bechtel Unit 2 personnel discovered a noncompliance with regard to SLCS pump control circuits. Further evaluation by Bechtel Unit 1 personnel confirmed this noncompliance and uncovered that another noncompliance regarding containment penetration circuits existed with Reactor Protection System scram solenoid circuits. Neither of these two findings dealt with miscategorization. MP&L was notified by Bechtel in a timely manner following each discovery. The finding of these additional noncompliances caused MP&L to direct a detailed review of design adequacy of overcurrent protection for circuits penetrating containment for compliance to commitments made in FSAR Q&R 040.5. The results of that review indicated no noncompliances in power circuits, but some additional noncompliances were identified in control circuits and instrumentation circuits. This review differed significantly from the August 1984 review in that this review confirmed design adequacy as well as categorization.

The results of the latter review were discussed with NRC Region II staff in a meeting held on December 17, 1984 and were documented in MP&L's December 18, 1984 submittal (AECM-84/0530).

ROOT CAUSES OF NONCOMPLIANCES IDENTIFIED

An evaluation of the underlying or root causes of the subject noncompliances is facilitated by considering each circuit type individually (i.e., power, control, and instrumentation). All noncompliances identified in the July-August and November-December 1984 periods have been included in this evaluation.

1. Power Circuits

No noncompliances to our commitments to the overcurrent protection provisions of Regulatory Guide 1.63 were identified in the review of power circuits. Further evaluation of root cause is, therefore, not necessary. Circuits in this category have the greatest potential for penetration damage given an uninterrupted overcurrent condition. The absence of noncompliances in this important category indicates proper application of the Regulatory Guide to areas most critical to the protection of containment penetration integrity. (It was determined that an FSAR clarification was needed. This material will be added in the initial FSAR update.)

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2. Instrumentation Circuits

The December 1984 circuit review identified some noncompliances in the instrumentation area. In that review, certain instrumentation circuits were determined to lack a second level of overcurrent protection. Prior to that determination, instrumentation circuits were considered by Bechtel to be inherently self-limiting and of such low power that they were not capable of generating sufficient short circuit current to damage the penetration. This position or assumption was discussed in MP&L's response to NRC Question 040.5 (FSAR Amendment 25, August 1978).

In view of the results of the December 1984 review, this assumption is appropriate for the majority of instrumentation circuits; however, the review has determined that there were certain instrumentation circuits for which a second level of protection should have been provided. It should be noted that none of the noncompliances represented a substantial safety hazard.

Bechtel's evaluation of the noncompliances in the instrumentation area concluded that the root cause was the application of the subject assumption to all instrumentation circuits when, in fact, the assumption was not appropriate in a few instances. MP&L concurs with Bechtel in this conclusion.

The December 1984 circuit review quantitatively evaluated instrumentation circuits for compliance to our commitments to the overcurrent protection provisions of Regulatory Guide 1.63. Because of this review and the subsequent addition of redundant overcurrent protection devices, no additional corrective actions in this category are considered necessary. The FSAR will be revised to clarify the protection afforded instrumentation circuits. This FSAR revision will be included in the initial FSAR Update.

3. Control Circuits

The design basis for GGNS did not originally include commitments to Regulatory Guide 1.63. However, recognizing the need to provide appropriate overcurrent protection to certain penetrations, an internal Bechtel GGNS project position was established as early as 1976 to provide this protection. This position was manifested in 1976 by the issuance of a purchase specification for the Containment Electrical Penetration Protection Cabinet. This cabinet design provided redundant circuit

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protection for 480V power circuits. This design change indicated a recognition of the potential for penetration damage from power circuits and the emphasis placed by Bechtel on these circuits at the time in meeting the intent of Regulatory Guide 1.63 as it pertains to overcurrent protection.

With the initial submittal of the GGNS FSAR in April, 1978, MP&L presented its formal position on Regulatory Guide 1.63, namely that the objectives of this guide would be met. MP&L's response to the subsequent NRC Question 040.5 provided more specific commitments to the Regulatory Guide, encompassing control and instrumentation circuits. Based on an appraisal of the results of recent reviews on this subject, Bechtel concludes that the design evaluation and implementation of the subject commitments was adequate for power circuits but was not sufficiently thorough for control circuits. Bechtel, therefore, has concluded that the root cause of the noncompliances in the area of control circuits was the inadequate implementation of design requirements. Bechtel believes this matter may have been partially attributable to an apparent uncertainty within the industry during this time as to NRC intentions concerning the applicability and appropriate method of implementation of Regulatory Guide 1.63 to circuits other than power circuits.

As reported by MP&L letter AECM-84/0530 on December 18, 1984 a detailed review of circuits penetrating the GGNS Unit 1 containment was performed. Additional overcurrent protection was provided in those instances where noncompliances with MP&L's commitments to Regulatory Guide 1.63 were identified. This detailed circuit review and subsequent circuit modifications are considered adequate corrective actions to address the specific implications of the identified root cause, i.e., inadequate implementation of design commitments to Regulatory Guide 1.63. (As in the case of instrumentation circuits, certain revisions to the FSAR will be provided in the initial FSAR Update to clarify the overcurrent protection afforded to control circuits.) MP&L considers these corrective actions to be sufficient in addressing the specific implications of these noncompliances to overcurrent protection of containment penetrations. MP&L is in agreement with Bechtel as to the identification of the root cause. Further discussion on MP&L's position is provided in the next section.

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IMPLICATIONS ON DESIGN CONTROL PROCESS

Recent circuit reviews (July through December 1984) revealed certain noncompliances with MP&L's commitments to Regulatory Guide 1.63. However, no noncompliances were identified in the area of power circuits where the most significant potential exists for penetration damage. All noncompliances identified were limited to low voltage control and instrumentation circuits and have been evaluated not to represent a substantial safety hazard.

In consideration of the more generic implications, it is noted that the plant design and design control process over the project's history have undergone many evaluations, reviews, and walkdowns by Bechtel and MP&L engineering, as well as audits by Bechtel and MP&L Quality Assurance organizations and independent technical reviews/audits by Bechtel, MP&L, and NRC contractors. The successful completion of the reviews and evaluations provide confidence that the design control process is adequate in implementing design requirements having substantial safety significance.

As a further action to ascertain the implications of the noncompliances to areas beyond the scope of Regulatory Guide 1.63, a limited technical review of the implementation on Grand Gulf of four other regulatory guides was recently performed by Bechtel at the request of MP&L. This review, independent of the Bechtel GGNS project organization, was conducted to establish additional confidence that the design control process effectively implemented FSAR commitments in the area of the subject regulatory guides (Regulatory Guides 1.6, 1.9, 1.75, and 1.106).

Regulatory Guide 1.106 was selected because it exhibited some characteristics which were similar to Regulatory Guide 1.63, in that, it was implemented into already existing design. The other Regulatory Guides were selected because they have significant implications for overall plant design.

The review evaluated the effectiveness of the design process to implement MP&L's commitments to these guides into design drawings, specifications, etc. The Bechtel review concluded that adequate design controls were in place to provide confidence that FSAR commitments have been met. As an independent check, MP&L engineering performed a review of the above Bechtel effort. Also, MP&L engineering performed additional limited evaluations of the implementation of Regulatory Guides 1.6, 1.75, and 1.106. MP&L's evaluation of the Bechtel review supports Bechtel's conclusion regarding the adequacy of the design control process.

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As discussed above, the root causes were identified to be: 1) Instrumentation circuit noncompliances--application of assumption which, in retrospect, was not appropriate in a few instances and 2) Control circuit noncompliances--inadequate implementation of design requirements. Based on the above, Bechtel has concluded that these root causes are isolated and represent no generic implications to the design control process.

MP&L is in agreement with the identification of the root causes and concurs with Bechtel's conclusions regarding generic implications. MP&L is confident that the design control process was and is adequate in implementing design requirements having substantial safety significance. We consider the detailed circuit review of December 1984 to confirm this conclusion.

OTHER FINDINGS

An additional finding of the overcurrent protection review was that 52 low voltage control circuit breakers for which credit was taken for penetration protection, are not in the plant technical specifications. The root cause of this noncompliance is related to the control circuit evaluation against Regulatory Guide 1.63 that was accomplished by Bechtel in 1978 and 1979. At that time, the requirement to include control circuits in the technical specifications was not anticipated, and there was not a complete documentation or listing of all control circuit breakers for which credit was taken in meeting Regulatory Guide 1.63. In retrospect, the absence of this complete documentation led to the omission of these breakers from the list that was subsequently included in the technical specifications.

The corrective action for this finding was to add appropriately sized fuses to these control circuits.

SAFETY SIGNIFICANCE OF NONCOMPLIANCES AND REPORTABILITY CONSIDERATIONS

As discussed above, the detailed review confirmed power circuits penetrating containment were provided appropriate overcurrent protection. Circuits in this category are those of the greatest potential for penetration damage given an interrupted overcurrent condition. Instrumentation and control circuits have relatively small diameter conductors and low current levels.

MP&L has concluded, through analysis, that the subject noncompliances do not constitute a substantial safety hazard and therefore are not reportable under 10 CFR 21. The analysis concluded that a penetration failure would result in a leakage rate based on FSAR post-LOCA pressure profiles that, when

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combined with corrected Type A test results, is less than 0.75 L_a over any 24 hour period. Since the profile during the first 24 hours is more severe than any subsequent 24 hour period, this approach is conservative.

These noncompliances were also considered for potential reportability under 10 CFR 50.73. Since the noncompliances did not result in Grand Gulf Unit 1 being in an unanalyzed condition that significantly compromised plant safety or in a condition that was outside the design basis, the matter was not considered reportable under 10CFR 50.73(a)(2)(ii). In addition, the noncompliances could not have alone prevented the fulfillment of the safety function of structures or systems that are needed to: shut down the reactor and maintain it in a safe shutdown condition, remove residual heat, control the release of radioactive material, or mitigate the consequences of an accident; therefore, the matter is not reportable under 10CFR 50.73(a)(2)(v). Other reporting paragraphs of 10 CFR 50.73 were considered not applicable; therefore, the condition was considered not reportable as a Licensee Event Report (LER). Although an LER is not required, due to the potential interest of this subject to other utilities and prior commitments made by MP&L to NRC Region II, a voluntary LER is being submitted.

MISSISSIPPI POWER & LIGHT COMPANY
Helping Build Mississippi
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January 5, 1985

NUCLEAR LICENSING & SAFETY DEPARTMENT

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

Gentlemen:

SUBJECT: Grand Gulf Nuclear Station
Unit 1
Docket No. 50-416
License No. NPF-29
File: 0260/L-835.0
Overcurrent Protection of
Containment Penetrations
LER 84-055-0
AECM-85/0005

Attached is Licensee Event Report (LER) 84-055-0 which is a final report.

The noncompliances described in LER 84-055-0 were discussed in MP&L letter AECM-84/0530 on December 18, 1984. Specific followup to that letter is being provided concurrent with this voluntary LER in MP&L letter AECM-85/0003 dated January 5, 1985.

Yours truly,

S H Hobbs

for L. F. Dale
Director

CBS/SHH:rg
Attachment

cc: Mr. J. B. Richard (w/a)
Mr. R. B. McGehee (w/a)
Mr. N. S. Reynolds (w/a)
Mr. G. B. Taylor (w/o)

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