



MISSISSIPPI POWER & LIGHT COMPANY

Helping Build Mississippi

P. O. BOX 1640, JACKSON, MISSISSIPPI 39205

September 28, 1984

J. B. RICHARD
SENIOR VICE PRESIDENT - NUCLEAR

U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, D. C. 20555

Attention: Mr. Harold R. Denton, Director

Dear Mr. Denton:

SUBJECT: Grand Gulf Nuclear Station
Unit 1
Docket No. 50-416
License No. NPF-13
File: 0290/L-800.0
Response to Generic Letter 84-15
AECM-84/0473

This letter provides the Mississippi Power & Light Company (MP&L) response to Generic Letter (GL) 84-15, dated July 2, 1984, pertaining to proposed staff actions to improve and maintain diesel generator (D/G) reliability. Attached to this letter is MP&L's response to each of the items addressed in GL-84-15, with respect to Grand Gulf Nuclear Station (GGNS) Unit 1.

MP&L recognizes the significant safety benefit of maintaining high reliability of diesel generators at operating nuclear plants to mitigate the consequences of a loss of offsite power event. To realize this benefit, MP&L has developed a long term D/G maintenance testing program (attached) to maintain the high reliability experienced to date.

Also, included in the attached response are MP&L's comments/recommendations on the proposed staff actions of GL-84-15.

Please contact this office if questions arise concerning this submittal.

Yours truly,

JBR:rg
Attachments

cc: See next page

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MISSISSIPPI POWER & LIGHT COMPANY

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Office of Inspection & Enforcement
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Mr. J. P. O'Reilly, Regional Administrator (w/a)
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BEFORE THE
UNITED STATES NUCLEAR REGULATORY COMMISSION

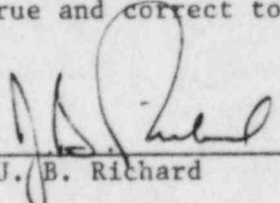
LICENSE NO. NPF-13

DOCKET NO. 50-416

IN THE MATTER OF
MISSISSIPPI POWER & LIGHT COMPANY
and
MIDDLE SOUTH ENERGY, INC.
and
SOUTH MISSISSIPPI ELECTRIC POWER ASSOCIATION

AFFIRMATION

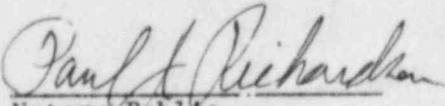
I, J. B. Richard, being duly sworn, stated that I am Senior Vice President, Nuclear of Mississippi Power & Light Company; that on behalf of Mississippi Power & Light Company, Middle South Energy, Inc., and South Mississippi Electric Power Association I am authorized by Mississippi Power & Light Company to sign and file with the Nuclear Regulatory Commission, this response to Generic Letter 84-15 for the Grand Gulf Nuclear Station in accordance with 10CFR50.54(f); that I signed this submittal as Senior Vice President, Nuclear of Mississippi Power & Light Company; and that the statements made and the matters set forth therein are true and correct to the best of my knowledge, information and belief.


J. B. Richard

STATE OF MISSISSIPPI
COUNTY OF HINDS

SUBSCRIBED AND SWORN TO before me, a Notary Public, in and for the County and State above named, this 28th day of September, 1984.

(SEAL)


Notary Public

My commission expires:

October 27, 1987

MP&L RESPONSE TO GENERIC LETTER 84-15

1. NRC REQUEST No. 1:

Reduction in Number of Cold Fast Start Surveillance Tests for Diesel Generators

This item is directed towards reducing the number of cold fast start surveillance tests for diesel generators which the staff has determined results in premature diesel engine degradation. The details relating to this subject are provided in Enclosure 1. Licensees are requested to describe their current programs to avoid cold fast start surveillance testing or their intended actions to reduce cold fast start surveillance testing for diesel generators.

MP&L RESPONSE:

MP&L has in place procedures which serve to reduce the number of cold fast starts experienced by the diesel generators (D/Gs) at the Grand Gulf Nuclear Station (GGNS). These procedures were developed based on recommendations by the diesel manufacturers and include the following practices:

- (1) The engines are maintained in a warm condition with heated lube oil and jacket water circulating. This keeps some of the internal components lubricated and warm reducing friction and thermal stresses during startup.
- (2) Prior to each planned surveillance, the Division I and II diesel engines are air rolled to inspect for water accumulation in the cylinders. Drip systems have also been added to the lubrication systems of the turbochargers on Division I and II to maintain the thrust bearings in a lubricated condition while the engines are in standby. The Division I, II, and III diesel engines and turbochargers are prelubed prior to planned starts for surveillance testing to ensure that critical engine components are well lubricated.
- (3) The Division III diesel is also hand rolled and prelubed on a weekly basis to ensure that critical components are lubricated if an unplanned automatic start occurs and the independent air start systems are tested on a rotating basis to assure operability of each system.

MP&L considers that the current GGNS D/G design and maintenance practices described above reduces the number of cold starts more than the proposed changes incorporated in the attachment to Enclosure 1 of Generic Letter 84-15.

MP&L Comments/Recommendations on NRC Proposed D/G Technical Specifications

Cold starts (without prelubing the diesel engine and in some instances turbochargers) are not recommended. To avoid unnecessary demands, wear and stress on the diesel-generator system, all preplanned starts should be preceded by appropriate prelubes, with the exception that a cold fast (non prelubed) start should be demonstrated at least once each 18 months. The ability of the engine, generator and support systems to operate properly is adequately demonstrated with the 31 day and 18 month surveillance tests.

MP&L recommends that the footnote requiring cold fast (non-prelubed) starts once each six months be deleted and the above recommendation for a 18 month surveillance period be adopted. This action will further serve to avoid unnecessary cold fast start surveillances.

In addition, the "continuous rating" referenced in Section 4.8.1.1.2.a.5 should be based on the maximum expected load following a loss of coolant accident (LOCA) or loss of offsite power (LOSP) and not on the maximum rating of the diesel generator.

Note that loading to the continuous rating within 60 seconds (as required by the GGNS Technical Specification) produces high stress levels on the diesels. MP&L recommends that fast starts and loading to "continuous rating" within 60 seconds should be performed on a six month schedule as part of Section 4.8.1.1.2.a.5 instead of on the frequency as specified in Table 4.8-1 (once every 31 days). Thirty-one day surveillances should be performed during "fast starts and slow loading". By loading the diesel generators over a 10 to 15 minute time frame the stress levels would be greatly reduced and the ability of the diesels to carry the required LOCA/LOSP loads would be adequately demonstrated. MP&L's recommendations are summarized in Table 1 attached.

TABLE 1

SUMMARY OF MP&L RECOMMENDATIONS ON NRC PROPOSED D/G TECH SPECS

ITEM	NRC PROPOSED		MP&L RECOMMENDATIONS		JUSTIFICATION
1. <u>31 Day Surveillances</u>	<u>Failures</u> ≤ 1	<u>Frequency</u> 31 days	≤ 1	31 days	The NRC proposal requires testing at four times the frequency if more than 1 failure occurs. Doubling the frequency of testing for subsequent failures adequately tests the diesels and will reduce the testing demands on the D/G system.
Ref: T.S. 4.8.1.1.2.a (Test Frequency)	≥ 2	7 days	2	14 days	
Table 4.8.1			≥ 3	7 days	
2. <u>Ambient Starts</u>					
Ref: T.S. 4.8.1.1.2.a.4 and asterisk subnote					
(a) Prelubed Starts	(a)	Perform "ambient" prelubed starts every 31 days minimum	(a)	Same	(a) No change proposed
(b) Non-prelubed Starts	(b)	Perform "ambient" non-prelubed starts once each 184 days minimum	(b)	Perform "ambient" non-prelubed starts at least once each 18 months	(b) There is no justification for subjecting D/Gs repeatedly to non-prelubed starts. This should be performed on a less frequent basis than the NRC proposal because of the added wear and stresses on critical D/G components. Unplanned LOSP/LOCA starts and 18 month test adequately demonstrate ability to start the diesel "dry".

TABLE 1

SUMMARY OF MP&L RECOMMENDATIONS ON NRC PROPOSED D/G TECH SPECS

ITEM	NRC PROPOSED	MP&L RECOMMENDATIONS	JUSTIFICATION
3. Generator Synchronization Ref: T.S. 4.8.1.1.2.a.5			
(a) Continuous Rating	(a) Verify generator synchronization by loading to "continuous rating"	(a) "Continuous rating" should be defined as maximum expected site LOSP/LOCA Load (not engine rating).	(a) There is no justification for loading diesels to 100% of their engine or generator loading rating after pre-operational and shop testing has demonstrated their capability. Tests performed during surveillance only need to demonstrate load carrying capacity to maximum expected emergency loads.
(b) Time to Load	(b) Verify loading to "continuous rating in () seconds"	(b) Current GGNS T.S. requires ≤ 60 seconds. All planned starts should verify fast start (≤ 10 seconds to volts/frequency) and slow loading to above continuous rating in ≤ 15 minutes.	(b) One of the most severe transients on diesel generator equipment is fast loading to full rated power. Once the capability of the D/G to perform this function has been demonstrated, it is not necessary to reverify this capability each 31 days. Slow loading is preferred which reduces thermal transients and stresses. Fast loading in ≤ 60 seconds should only be demonstrated at least once each 18 months.

2. NRC REQUEST No. 2:

Diesel Generator Reliability Data

This item requests licensees to furnish the current reliability of each diesel generator at their plant(s), based on surveillance test data. Licensees are requested to provide the information requested in Enclosure 2.

MP&L RESPONSE:

The GGNS procedures include a detailed set of instructions on the start and run history of the Division I, II, and III diesel generators. All starts and attempted starts are logged and run time/loads are recorded. A diesel generator valid start/failure determination sheet based on the criteria in Regulatory Guide 1.108 position C.2.e is completed for all failures. At least each 18 months the cumulative operating data and any trends are reviewed and documented. Repeat failure mechanisms, repeat human errors, or common mode failures are described in the documentation process.

The reliability data for the GGNS Division I, II and III diesel generators through September 20, 1984 is provided in Table 2. The combined reliability of the diesel generators at GGNS is 98% over the last 100 valid tests, which demonstrates that the current GGNS program is effective in maintaining high diesel generator reliability.

TABLE 2
GGNS DIESEL GENERATOR RELIABILITY¹

DIVISION	VALID FAILURES ² IN LAST 20 VALID TESTS	TIME PERIOD OF 20 VALID TESTS	TOTAL VALID TESTS ² FROM DATE OF ³ OL TO 9/20/84	TOTAL VALID FAILURES ² FROM DATE OF ³ OL TO 9/20/84	RELIABILITY BASED ON TOTAL VALID TESTS AND VALID FAILURES
I	2	1/28/84 to 9/20/84	93	3	97%
II	0	2/3/84 to 9/20/84	69	0	100%
III	0	1/26/84 to 9/20/84	78	2	97%

¹Data as of September 20, 1984.

²Valid tests and valid failures based on criteria in Regulatory Guide 1.108.

³Operating License received 6/16/82.

3. NRC REQUEST No. 3:

Diesel Generator Reliability

Licensees are requested to describe their program, if any, for attaining and maintaining a reliability goal for their diesel generators. An example of a performance Technical Specification to support a desired diesel reliability goal has been provided by the staff in Enclosure 3. Licensees are requested to comment on, and compare their existing program or any proposed program with the example performance specification.

MP&L RESPONSE:

The GGNS program for improving the reliability of the diesel generators is based on a planned schedule of inspections and tests developed to provide a high degree of reliability while maintaining the diesels available for use if needed. The reliability goal of the program is to maintain the diesel generator reliability as high as possible. This program meets or exceeds the intent of Regulatory Guide 1.108 and is based on manufacturers' recommendations and past operating experience. Frequent sampling of lube oil and cooling water is performed to provide early warning of potential problems. Table 3 provides the long term GGNS D/G Maintenance Testing Program for the two standby diesel engines and Table 4 the program for the Division III diesel engines. The effectiveness of this program has been empirically shown by the high reliability experienced to date as presented in Table 2 of this submittal.

The recommendations of NUREG/CR-0660, "Enhancement of Onsite Emergency Diesel Generator Reliability, February 1979" were considered in the development of the diesel generator reliability program. Each of the recommendations is addressed in Chapter 9 of the GGNS FSAR.

Section 3.8.1.1 of the proposed Technical Specifications would allow a delay up to 24 hours under certain conditions before demonstrating diesel generator operability, given that one offsite a.c. source or one diesel generator is inoperable. This additional delay provides greater opportunity for a determination to be made of the cause of inoperability, if unknown, without placing undue demands on the operable diesel generator(s). The recently amended Full Power GGNS Technical Specifications allow only a 2 hour delay. The proposed change to the Action statement also indicates that only one start is required within 24 hours while in the 72 hour Limiting Condition for Operation (LCO). GGNS Technical Specifications require a start within 2 hours and then once every 8 hours thereafter while in the LCO. Thus, this proposed Technical Specification change is expected to significantly reduce the number of starts experienced.

MP&L comments on Section 4.8.1.1.2 of the proposed Technical Specification are discussed in response to NRC Request No. 1. Table 4.8.1, however, does require some clarification. It should be explicitly stated that in the event that a diesel generator has two or more valid failures in the last twenty valid demands, only that diesel generator is tested on a more frequent basis. If the other diesel generators at a given unit have not experienced a higher failure frequency there is no need for more frequent testing of those diesels.

A comparison of the proposed test frequencies with the current GGNS test frequencies is given in Table 5.

The GGNS Technical Specifications contain specific reporting requirements in the event of a valid or non-valid diesel generator failure. The information listed in Section 6.3.b of Regulatory Guide 1.108 is required to be sent to the NRC. This information is similar to that being proposed. In addition, a statement on the basis for continued operation is required as well as the length of time that the diesel generator was unavailable. Only the evaluation of the recommendations of NUREG/CR-0660 is not included. Because the reporting requirements currently embodied in the GGNS Technical Specifications exceed the proposed requirements, no changes are deemed necessary to keep the NRC abreast of any diesel generator problems.

The proposed requalification of a diesel generator as described in Attachment 2 to Table 4.8-2 provides a reasonable means for obtaining evidence that the diesel generator in question is again reliable and able to perform its intended function. Currently no standard requalification scheme is contained in the GGNS Technical Specifications, although MP&L is participating in the Transamerica Delaval Incorporated, Diesel Generator Owners' Group diesel requalification/revalidation effort.

TABLE 3

LONG TERM
CGNS D/G MAINTENANCE TESTING PROGRAM
DIVISION I & II DIESELS

Maintenance Action	Frequency
Observe and record lubricating oil and jacket water temperatures.	Every 8 hr.
Drain all low point water collectors, "Y" strainers and air receiver tanks in starting air system.	Once/24 hr.
Check engine and auxiliary equipment for oil, water, and fuel oil leaks.	Once/24 hr.
Check level of lubricating oil in sump tank, governor, and pedestal bearing.	Once/24 hr.
Check fuel pump racks for freedom of movement through full limit of travel.	Once/24 hr.
Check air butterfly valve(s) and actuating cylinders for freedom of operation.	Weekly
Turn on electrical fuel oil booster pump for a short time and circulate fuel through system. Check strainers for clean fuel.	Weekly
Clean and inspect "Y" strainers in starting air system. NOTE: If fouling of strainers is such that more frequent inspection is indicated, shorten inspection interval.	6 months
Check lubricating oil filter pressure differential.	1 month
Inspect and clean air filter in starting air distributor. If conditions warrant, inspect more frequently.	1 month
Drain water and/or sludge from lubricating oil full flow filter.	1 month
If differential pressure indicates, check strainer screens in fuel oil and lubricating oil pressure strainer.	1 month

TABLE 3
(CONTINUED)

Maintenance Action	Frequency
Check lubricating oil for fuel dilution with a viscosimeter.	1 month
Send lubricating oil sample to laboratory for analysis.	1 month
Drain lubricating oil system. Clean sump and strainers, refill with new oil.	18 months (1)
Check pH factor of jacket water.	1 month
Remove alternate left side doors and examine inside of engine for any abnormal conditions.	18 months
Check hydraulic valve lifters for operation and proper adjustment.	18 months
Remove fuel injector nozzles, clean, reset, and reinstall.	18 months
Check connecting rods and link rod bearing clearance.	18 months (2)
Check and record crankshaft deflections.	18 months
Visually inspect foundation for breaks in bond between sole plates and grout.	18 months (3)
Check foundation bolts for correct torque. Retorque as necessary then recheck crankshaft deflections.	18 months
Check lubricating oil jets at gears for plugged or broken lines.	18 months
Remove can covers and cylinder head covers. Inspect cams, tappets, rollers, rocker arms, push rods, springs, and valve guides.	18 months
Drain governor oil, clean, flush, refill with new oil. If necessary, replace governor drive coupling.	18 months

NOTE 1: This item performed only if deemed necessary as a result of lube oil analysis.

NOTE 2: Bearing wear is determined by analysis of metal concentration in lube oil analysis.

NOTE 3: This inspection is performed during foundation bolt torque check and crankshaft deflection check.

TABLE 3
(CONTINUED)

Maintenance Action	Frequency
Remove turbocharger(s). Disassemble and clean.	5 years
Check cold compression pressures, maximum firing pressures. If indicated, remove cylinder heads, grind valves. Check valves and liners.	18 months
Inspect gears for general condition. Check backlash and replace worn gears exceeding maximum clearance.	18 months
Remove fuel injection pumps. Disassemble, clean, repair, and adjust as necessary.	18 months
Remove end plates from heat exchangers and intercoolers. Examine and clean as necessary.	18 months
Check main bearings.	18 months
Inspect intake air filter oil distribution plate. Change oil in filter.	18 months (4)

NOTE 4: Oil in the air filter is sampled and changed only when deemed necessary by oil analysis results.

TABLE 4
GGNS D/G MAINTENANCE TESTING PROGRAM
DIVISION III DIESELS

Check jacket water coolant level	Every 8 hours
Check starting air pressure	Every 8 hours
Drain low point water collector, "Y" strainers and air receiver tanks in starting air system	Once/24 hr.
Check pH and alkalinity of jacket cooling water	1 month
Inspect starting air compressor	3 months
Clean and inspect starting air lubricator	6 months
Clean and inspect "Y" strainers in starting air system	6 months
Take oil sample in air intake filter reservoir	6 months
Clean and change oil in air intake filter	6 months
Sample crankcase lube oil	1 month
Inspect, clean, and calibrate lube oil relief valves	3 years
Remove condensate from fuel oil storage tanks	3 months
Take oil sample from starting air compressor	3 months
Inspect lube oil separator	1 year
Adjust valves on starting air compressor	1 year
Inspect and lubricate Woodard governor	18 months
Inspect and clean fuel oil and auxiliary fuel oil strainers	18 months
Replace fuel and auxiliary fuel filters	18 months
Replace turbocharger lube oil filter element	18 months
Clean lube oil strainers	18 months
Test fuel injectors	18 months
Inspect and adjust fuel injector linkage	18 months
Inspect turbochargers	5 years

TABLE 5

DIESEL GENERATOR TEST SCHEDULE

GENERIC LETTER 84-15		CURRENT GGNS TECH. SPEC.	
<u>No. of Failures in Last 20 Valid Tests</u>	<u>Test Frequency</u>	<u>No. of Failures in Last 100 Valid Tests</u>	<u>Test Frequency</u>
≤ 1	once/31 days	≤ 1	once/31 days
≥ 2	once/7 days	2	once/14 days
		3	once/7 days
		≥ 4	once/3 days