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Helping Build Mississippi
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NUCLEAR PRODUCTION DEPARTMENT

June 10, 1982

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
Units 1 and 2
Docket Nos. 50-416 and 50-417
File 0272/M-018.0/0862
Transmittal of Responses to NRC Power Systems Branch SER Open Items
AECM-82/262

In response to informally transmitted concerns of the Power System Branch Reviewer, Mr. R. Giardina, Mississippi Power & Light Company is submitting the enclosed materials updating information pertaining to the above referenced items.

This information includes proposed revisions and additions to the Grand Gulf Nuclear Station Final Safety Analysis Report (FSAR).

These proposed FSAR revisions will be incorporated into the next available amendment to the FSAR unless noted otherwise. If you have any questions, please contact this office.

Yours truly,

L. F. Dale
Manager of Nuclear Services

NSM/JGC/JDR:nll

Attachment: Responses to NRC Power Systems Branch SER Open Items

cc: Mr. N. L. Stampley
Mr. G. B. Taylor
Mr. R. B. McGehee
Mr. T. B. Conner

B001

Mr. Richard C. DeYoung, Director
Office of Inspection & Enforcement
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

cc: Mr. J.P. O'Reilly, Regional Administrator
Office of Inspection & Enforcement
U.S. Nuclear Regulatory Commission
Region II
101 Marietta St., N.W., Suite 3100
Atlanta, Georgia 30303

SER Open Items

I. HPCS Diesel Generator Room Temperature

Concern: Alarm and annunciate HPCS diesel generator room low temperature.

Response: Concerns raised by Power Systems Branch regarding the adequacy of support systems to keep the HPCS diesel engine warm while in the standby mode were addressed in AECM-81/321, dated August 27, 1981.

The HPCS diesel engine cooling water system allows quick start and load acceptance of the diesel generator after shutdown. An immersion heater warms the engine to maintain a standby condition. The NRC Power Systems Branch has recently advised MP&L that testing performed by General Motors, Electromotive Division, indicated that the natural convection circulation used by the HPCS diesel generator cooling heater system relies upon an air temperature of 65°F or greater. The NRC further stated that 65°F is the lower limit, past which credit for warm engine starts may not be taken.

The temperature in the HPCS diesel generator room is monitored by the balance-of-plant computer. Currently, a non-Q, type "T" thermocouple, instrument number 1X77-TE-N021, is tied into the computer and alarms at high room temperature. The alarm is displayed in blinking red on a CRT and printed on an alarm typer. A programming change is required to establish a low temperature alarm for this room.

The above noted programming change to provide the control room operator notification of low room temperature will be implemented prior to October 1, 1982. The alarm set point will be set such that the operator has ample time to take appropriate corrective actions. Alarm response interactions associated with low HPCS diesel generator room temperature will also be implemented prior to October 1, 1982.

II. Communications Systems

Concern: Identify all working stations in the plant where it may be necessary for plant personnel to communicate with the control room during or following transients or accidents in order to mitigate the consequences of the event and to attain a safe cold plant shutdown. Provide for each of these areas the maximum sound levels that could exist, the types of communication available, ability of the systems to provide adequate communication with maximum background noise, and performance requirements and tests needed to assure adequate communications.

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Response: The design criteria and bases of the installed Grand Gulf communications systems conform to the acceptance criteria in Section 9.5.2 of the Standard Review Plan. The communications systems are designed to provide reliable communications between plant personnel in all vital areas under both normal plant operation and accident conditions.

Originally, MP&L committed in Section 14.2 of the FSAR to perform a functional test of the communications systems during the preoperational phase. The test would have been conducted under conditions that simulate the maximum plant noise levels being generated during various operating conditions. The commitment contained in Section 14.2 of the FSAR was later modified in a letter to the NRC (reference AECM-82/145, dated April 9, 1982). As stated in this letter, the startup schedule and the availability of operating equipment were considered in order to determine the optimum time for testing. Although the test conditions were unchanged, it was determined that more meaningful sound level measurements could be performed during the power ascension phase rather than the preoperational phase. The commitment to perform power ascension phase testing conforms to the criterion presented
in Part III of Section 9.5.2 of the Standard Review Plan.

Additional information will be provided prior to 5% power and will include:

1. A list of working stations from which it may be necessary for plant personnel to communicate with the control room or the remote shutdown panel in order to mitigate the consequences of an event and maintain a safe cold plant shutdown;

2. Types of communication systems available at or accessible from each working station;

3. Discussion on the extent to which the subject communications have been exercised to date and additional justification as to why MP&L concludes that these systems have been adequately designed.

III. Diesel Generation Auxiliary System

A. Concern: Design of HPCS and standby diesel engine mounted piping and components has not been defined.

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Response: Diesel engine mounted piping and components normally furnished with the diesel generator are designed to seismic Category I requirements and conform to the guidelines of the Diesel Engine Manufacturers Association (DEMA) standards. The diesel engine mounted piping and components conform to the requirements of IEEE Standard 387-1977, "Standard Criteria for Diesel Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations," which endorses the Diesel Engine Manufacturers Association (DEMA) standard and guidelines of Regulatory Guide 1.9, "Selection, Design and Qualification of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Plants."

HPCS diesel engine mounted piping and components are designed to seismic Category I requirements and conform to the guidelines of ANSI B31.1 Standard.

Design Specifications require that standby diesel engine mounted piping and components be designed to ANSI B31.1, "Code for Power Piping."

Transamerica DeLaval has been requested (reference VB-82/0126, dated May 28, 1982) to define the industry standards employed in the design of standby diesel engine mounted piping and components.

Upon receipt of information regarding design standards for standby diesel engine mounted piping and components, Table 3.2-1 of the FSAR will be revised.

B. Concern: Fuel oil drip return system is not designed as seismic Category I, Quality Group C.

Response: The design function of the emergency diesel generator fuel oil storage and transfer system is to provide a separate and independent fuel oil supply train for each standby diesel generator. The design of the emergency fuel oil storage and transfer system conforms to the guidance provided in ANSI N-195 (1976), "Fuel Oil Systems for Standby Diesel Generators." The requirements of ANSI N-195 are supplemented by the guidance contained in Regulatory Guide 1.137, Revision 0, "Fuel Oil Systems for Standby Diesel Generators." Grand Gulf conformance to the guidance contained in ANSI N-195 and Regulatory Guide 1.137 is presented in the FSAR as the response to Question 040.44.

The fuel oil storage and transfer system has been designed to afford a storage capacity sufficient to power a standby diesel generator for a period of seven days while supplying post-LOCA maximum load demands. The capacity was calculated in accordance with ANSI N-195, Section 5.4. The calculation considers: 1) time dependent loads, as provided in FSAR Tables 8.3-1 and 8.3-2; 2) fuel consumption required for diesel generator testing; and 3) a minimum margin of 10%.

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In equation form, this calculation is represented as:

$$C = \sum_i [F(l_i)]\, t_i + T$$

$$\sum_i t_i = 7 \text{ days}$$

where C = minimum storage capacity
$F(l_i)$ = fuel consumption rate for load "l" during time interval "i"
t_i = length of time interval "i"
T^i = fuel volume consumed by testing

In addition, a 10% margin must be added to the capacity calculated with the above equation.

Using a Transamerica DeLaval Test Report dated February 9, 1977, a curve was developed (i.e., fuel oil consumption in gpm versus diesel output in kw) based on the following input:

diesel output (kw)	fuel consumption (gpm)
7000	8.3
5250	6.0
3500	4.1

Using the appropriate fuel oil consumption rate for time dependent loading yields the data for variable "$[F(l_i)]t_i$" of the ANSI N-195 equation (i.e., approximately 42,000 gallons). Correspondingly, the 10% margin is 4200 gallons. The fuel volume consumed by testing was determined based upon a 50% diesel generator loading for a period of 60 minutes. This time period conforms to the Technical Specification requirement. The variable "T" in the ANSI N-195 equation thus is calculated to be approximately 250 gallons. As an additional conservatism, an extra 1500 gallons was added to the minimum fuel oil capacity. For Grand Gulf, the calculated minimum storage capacity is 48,000 gallons (reference Subsection 9.5.4.2 of the FSAR).

The fuel oil drip return portion of the standby diesel generator is non-essential to the proper operation of the diesel generator. The fuel oil drip return system is low capacity, approximately 8 gallon/hour. Failure of this portion of the fuel oil system is inconsequential as the quantity of fuel oil "lost" to the fuel oil system would be insignificant compared to that consumed during diesel operation. Assuming an 8 gallon/hour fuel oil drip return line leak over a 7 day period (i.e., approximately 1400 gallons), the additional conservatism of approximately 1500 gallons would adequately compensate for the leak.

The time dependent loads for the standby diesel generators were revised in FSAR Amendment 55. A preliminary calculation based on the above methodology indicated that the associated minimum fuel oil storage capacity has increased to approximately 52,000 gallons. The FSAR will be revised to reflect the new capacity in the next available amendment.

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The fire protection concern regarding the failure of fuel oil drip return lines has been addressed in the MP&L letter AECM-81/324, dated August 26, 1981.

Based on the non-essential function of the fuel oil drip return system, as substantiated above, the existing Quality Group D classification is justified for overall emergency diesel generator system operation.

C. Concern: The diesel engine cooling water system, starting air system and the lubricating oil system are designed as Quality Group D.

Response: In a January 16, 1975 meeting between representatives of Mississippi Power & Light Company and the Nuclear Regulatory Commission staff and in subsequent communications, it was agreed that MP&L would provide the design criteria to be used in the purchase of the diesel generator auxiliaries (Divisions I and II) for the Grand Gulf Nuclear Station.

On February 14, 1975, MP&L provided the NRC (reference AECM-75/11), with information which stated that the following diesel generator auxiliary systems would be designed as seismic Category I and Quality Group D:

1. starting air
2. lube oil
3. jacket cooling

Additionally, MP&L committed to augment the Quality Group D design requirements of these diesel generator auxiliary systems as follows:

1. The assembly of the diesel generator auxiliary systems will be performed by qualified welders under the provisions of the QA program covering the design and fabrication of the diesel generators.

2. Hydrostatic testing of system piping and valves will be in accordance with requirements of ANSI B31.1.

3. Liquid penetrant examination of welds in piping 4" in diameter and larger will be performed.

Although these requirements are ASME Section III Class 3 requirements, the piping and components do not adhere to all ASME Section III Class 3 requirements and, therefore, cannot be listed as Quality Group C. The requirements which are imposed serve to augment the normal Quality Group D requirements.

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Subsequent to submittal of AECM-75/11 to the NRC, Amendment 22 to the PSAR was filed on April 4, 1975. Amendment 22 incorporated the supplementary information contained in AECM-75/11. On July 11, 1975 (reference MAEC-75/360), the NRC transmitted to MP&L the results of a review of PSAR Amendment 22. In part, MAEC-75/360 stated:

> "...During our initial review of the PSAR, you were not required to classify the diesel generator auxiliary systems as Regulatory Guide 1.26 Quality Group C because the review of the Grand Gulf construction permit application preceded the NRC staff's classification of these systems. Therefore, in order to establish a quality level for the components of the diesel generator auxiliary systems which in general correspond to that of Quality Group C, we will require that the Grand Gulf design comply with the following requirements in addition to the codes and standards identified in Amendment 22 of the PSAR:
>
> 1. Note 1 of Item 3b (PSAR Table 3.2-1) shall be revised to require liquid penetrant examination of welds in piping greater than 2" nominal pipe size.
>
> 2. The assembly of the Diesel Generator Auxiliary Systems shall be performed by qualified welders under the provisions of Section VIII of the ASME Code and the QA program covering the design and fabrication of the diesel generators.
>
> 3. All inspection records shall be maintained for the life of the plant. These records should include data pertaining to qualification of inspection personnel, examination procedures, and examination results...."

The NRC concluded that:

> "...the codes and standards identified in PSAR Amendment 22 including those additional requirements proposed by the NRC staff and the Seismic Category I design requirements for the Diesel Generator Auxiliary Systems will provide a component quality level that in general corresponds to Regulatory Guide 1.26 Quality Group C and is commensurate with the importance of the safety function of the Diesel Generator Units and are, therefore, acceptable...."

Piping and components for the HPCS diesel starting air system and the lubricating oil system are designed as augmented Quality Group D. The supplemental requirements defined in AECM-75/11 and MAEC-75/360 have been implemented for the HPCS diesel starting air system and the lubricating oil system. The HPCS diesel engine cooling water system piping and components are designed as Quality Group C. The pertinent portions of the FSAR will be revised to reflect this information.

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Piping and components for the standby diesel engine cooling water system, the diesel engine starting air system and the diesel engine lubricating oil system are designed as augmented Quality Group D. The supplemental requirements defined in AECM-75/11 and MAEC-75/360 have been implemented for the standby diesel starting air system, lubricating oil system, and cooling water system. Table 3.2-1 of the FSAR includes these supplemental requirements.

Concern: Standby diesel engine combustion air intake and exhaust system piping and components are designed and classified as Quality Group D.

Response: During the course of discussions related to diesel generator auxiliary systems (reference Concern III.C of this enclosure), additional supplemental requirements for the combustion air intake and exhaust system were not imposed.

During this same period, Section 3.2.2 of the Standard Review Plan (NUREG-75/087), "System Quality Group Classification," stated that diesel generator auxiliary systems were important to safety for BWRs. These "auxiliary systems" were not defined by the NRC. Additionally, Section 9.5.8 of the Standard Review Plan (NUREG-75/087), "Emergency Diesel Engine Combustion Air Intake and Exhaust System," did not specify a Quality Group C classification. In July 1981, Standard Review Plan Sections 3.2.2 and 9.5.8 were revised. Section 3.2.2 defined auxiliary systems and specifically called out combustion air intake and exhaust. Section 9.5.8 required that piping associated with the combustion air intake and exhaust system be classified as Quality Group C.

On August 21, 1981, MP&L received NRC Question 260.2, which required the addition of the diesel engine combustion air intake and exhaust piping to the operational quality assurance program. FSAR Amendment 51, dated November 1981, stated that although this piping was nonsafety related, it would be added to the operational quality assurance program. On August 26, 1981 (reference AECM-81/324), MP&L responded to draft NRC Safety Evaluation Report concerns. This response stated in part:

> "...Unlike these other diesel generator auxiliary systems which benefit from higher quality requirements imposed on the pressure boundary, the combustion air intake and exhaust system would not benefit from higher quality due to the mild service conditions.

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> The existing Quality Group D and seismic Category I classification is commensurate with the service conditions imposed on the combustion air intake and exhaust system and adequately ensures the integrity of the system..."

It is apparent that the licensing basis for the diesel generator auxiliary systems has been in a state of evolution. The scope of higher quality group systems (i.e., jacket water, lube oil and starting air) was previously agreed upon by MP&L and the NRC. The standby diesel engine combustion air intake and exhaust system was not included in the group of systems for which augmented Quality Group D requirements were imposed.

The standby diesel generator combustion air intake and exhaust system conforms to those commitments previously made by MP&L.

NOTE: The HPCS diesel engine combustion air intake and exhaust system is designed as Quality Group C. The appropriate portions of the FSAR will be revised to reflect this information.