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October 9, 1981

NUCLEAR PRODUCTION DEPARTMENT

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 0260/L-334.0/L-350.0
Response to SER Items 1.10(10)
and 1.10(23)
AECM-81/389

In accordance with your request for additional information in support of the Grand Gulf Nuclear Station Safety Evaluation Report, NUREG-0831 (SER), Mississippi Power & Light Company is submitting the enclosed information pertaining to noise levels at working stations and effects of the New Madrid fault extension; SER items 1.10(23) and 1.10(10), respectively.

A revised response to the staff's question 40.40 (Attachment 1) is provided which indicates certain areas in the plant where communications may be necessary in order to mitigate the consequences of an event and attain a safe plant shutdown. Results of communication systems tests performed during preoperational tests will be submitted at a later date.

Also included at the staff's request is an analysis to estimate the response spectrum at Grand Gulf from a New Madrid type earthquake centered 240 km (150 miles) from the site (Attachment 2). Furthermore, a discussion is provided which compares the above spectrum curve generated to the one used for the design of the facility and to the response spectrum curve developed by the NRC staff.

If you have any questions or require further assistance, please contact this office.

Yours truly,

L. F. Dale
Manager of Nuclear Services

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Attachments (See Next Page)

AE301

Attachment 1: Question and Response 40.40
SER Item 1.10(23)

Attachment 2: Effects of New Madrid Earthquake & Fault Extension
SER Item 1.10(10)

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

Mr. Victor Stello, Jr., Director
Office of Inspection & Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

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040.40 9.5.2 The information regarding the onsite communications system (Section 9.5.2) does not adequately cover the system capabilities during transients and accidents. Provide the following information:

(a) Identify all working stations on the plant site where it may be necessary for plant personnel to communicate with the control room or the emergency shutdown panel during and/or following transients and/or accidents (including fires) in order to mitigate the consequences of the event and to attain a safe cold plant shutdown.

(b) Indicate the maximum sound levels that could exist at each of the above identified working stations for all transients and accident conditions.

(c) Indicate the types of communication systems available at each of the above identified working stations.

(d) Indicate the maximum background noise level that could exist at each working station and yet reliably expect effective communication with the control room using:

1. the page party communications systems, and

2. any other additional communication system provided that working station.

(e) Describe the performance requirements and tests that the above onsite working stations communication systems will be required to pass in order to be assured that effective communication with the control room or emergency shutdown panel is possible under all conditions.

(f) Identify and describe the power source(s) provided for each of the communications systems.

(g) Discuss the protective measures taken to assure a functionally operable onsite communication system. The discussion should include the considerations given to component failures, loss of power, and the severing of a communication line or trunk as a result of an accident or fire.

RESPONSE

A. The following is a list of areas developed from a review of the Grand Gulf emergency procedures where the procedure indicates that it may be necessary for plant personnel to communicate with the control room or the remote shutdown panel following transients

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and/or accidents including fires in order to mitigate the consequences of the event.

1. Control Room
2. Remote Shutdown Panel Areas
3. Diesel Generator Building
4. Technical Support Center
5. Post-Accident Sampling Station
6. Rad/Chem. Laboratory
7. Rad-Waste Control Room
* 8. Personnel Access Hatch to Containment
*10. Fire Water Pump House

*NOT SPECIFICALLY IDENTIFIED BY PROCEDURES

B. Maximum sound levels at each of the above locations cannot be accurately predicted at this time, however, the actual sound levels will be measured during the preoperational testing phase.

C. Please see Table 40.40-1

D. Preliminary analysis indicates that the public address system will successfully operate with background noise levels $\leq$ 80 db. The performance tests described in FSAR subsection 14.2.12.1.57 will demonstrate successful communication system operation and/or provide for any adjustments to the communication system in order to achieve successful operation under actual conditions.

E. Communication system preoperational testing is described in Subsection 14.2.12.1.57.

F.

1.	Public address system with evacuation alarm (EA)	120 V ac uninterruptible power (UPS)
2.	Sound-powered telephone system	No power required
3.	Commercial dial telephone system	Supplied by South Central Bell
4.	Radio communication system	120 V ac uninterruptible power (UPS)
5.	Microwave link	125 V dc

G. 1. In the event of component failure or loss of power to the public address system, the sound-powered telephone system will be utilized as a primary backup system and the two-way portable radios will be used as an alternate backup.

2. Only sound-powered telephones can be considered completely functional under emergency conditions, although portable two-way radios (see Subsection 9.5.2.2.2) may be utilized as much as possible, wherever they are needed.

3. The communication cables shall be run entirely in conduit to provide isolation from other systems and to provide for physical protection of the cables.

Table 40.40-1

Area/Description	Elevation	Installed Communication Available
Control Room/Upper Cable Spreading Room	189 ft.	P. A. Handsets (4)
Control Room/Operator Controls	166 ft.	P. A. Handsets (8) Telephones (4)
Control Room/Lower Cable Spreading	148 ft.	P.A. Handsets (4)
Control Room/Technical Support Center	177 ft.	P. A. Handset (1-desk) Sound Powered (circuits under development
Remote Shutdown Panels	111 ft.	P. A. Handset (2-dedicated circuit, RSS to Control Room)
Diesel Generator Room	3 rooms	P. A. Handset, 2 per room
Post Accident Sample Station		P. A. Handset
Rad-Chem Laboratory		P. A. Handset, Public Telephone
Rad-Waste Control Room		P. A. Handset, Public Telephone
Personnel Access Hatch to Containment	208'10" 119'	P. A. Handset (1) P. A. Handset (1)
Fire Water Pump House		P. A. Handset (1)

BRANCH: Structural Engineering Branch

CONCERN: SER Confirmatory Issue 1.10(10)

RESPONSE: Design response spectra have been selected assuming a body wave magnitude 7.2 earthquake in the Mississippi Embayment at a distance of 240 km(150 miles) from the Grand Gulf Nuclear Power Plant site. This estimate, and the manner in which it has been made, are discussed briefly below.

To place the derivation of the estimated design response spectra in the context of a complete design procedure, it is recommended that the method of Newmark and Hall (1978) be used. In this method, design response spectra are based on "effective" values of the ground acceleration, velocity and displacement. These are values that occur several times during the design ground motions rather than isolated peak values. Estimates of ground velocity and displacement may be made directly from magnitude/distance formulas or from relationships between velocity and acceleration and between displacement, velocity and acceleration recommended in Newmark and Hall. The relationships specified are a velocity to acceleration ratio of 48 in/sec/g for competent soil conditions, and a displacement roughly equal to six times the square of the ground velocity divided by the ground acceleration. These design ground motion parameters are multiplied by empirical spectral amplification factors that are a function of percent critical damping and the statistical level of acceptable hazard. Eighty-four percentile response spectra amplification factors for two percent critical damping are 3.66 times ground accelerations, 2.92 times ground velocity and 2.42 times ground displacement. Values for other damping levels may be found in Newmark and Hall (1978).

The design response spectrum, for two percent critical damping, developed using this method, is attached. The recommended ground motion design values and response spectrum are the lowest and middle curves in this figure, respectively. The design acceleration was derived from a recent graphical representation (Nuttli, 1979) showing sustained horizontal ground acceleration in the central United States. Also shown in this figure is the present Grand Gulf design response spectrum for the same damping value (the uppermost curve shown). As may be seen, this curve envelops the body wave magnitude 7.2 spectrum for all frequencies. Results were found to be comparable at five and seven percent critical damping values.

An alternate approach to design response spectra development was considered. In particular, peak acceleration and velocity values derived from studies of central United States strong ground motion attenuation (Nuttli, 1979; Herrmann, 1981) were also used to scale spectral amplification factors. The results of this approach were found to be comparable to the first approach for frequencies greater than two cycles per second, but generally exceeded current Grand

Gulf design response spectra for lower frequencies. This alternate approach, and the results, are qualitatively consistent with the current NRC staff position as noted in the Grand Gulf SER (U.S. Nuclear Regulatory Commission, 1981).

In conclusion, a recommended design response spectrum at Grand Gulf from a body wave magnitude 7.2 earthquake at a distance of 240 km is attached. This and the NRC staff estimates are in close agreement for higher frequencies. Divergence of the estimates occurs for frequencies less than two cycles per second. Detailed review of Grand Gulf structures indicates that the lower frequencies are not important to evaluation of project structural responses.

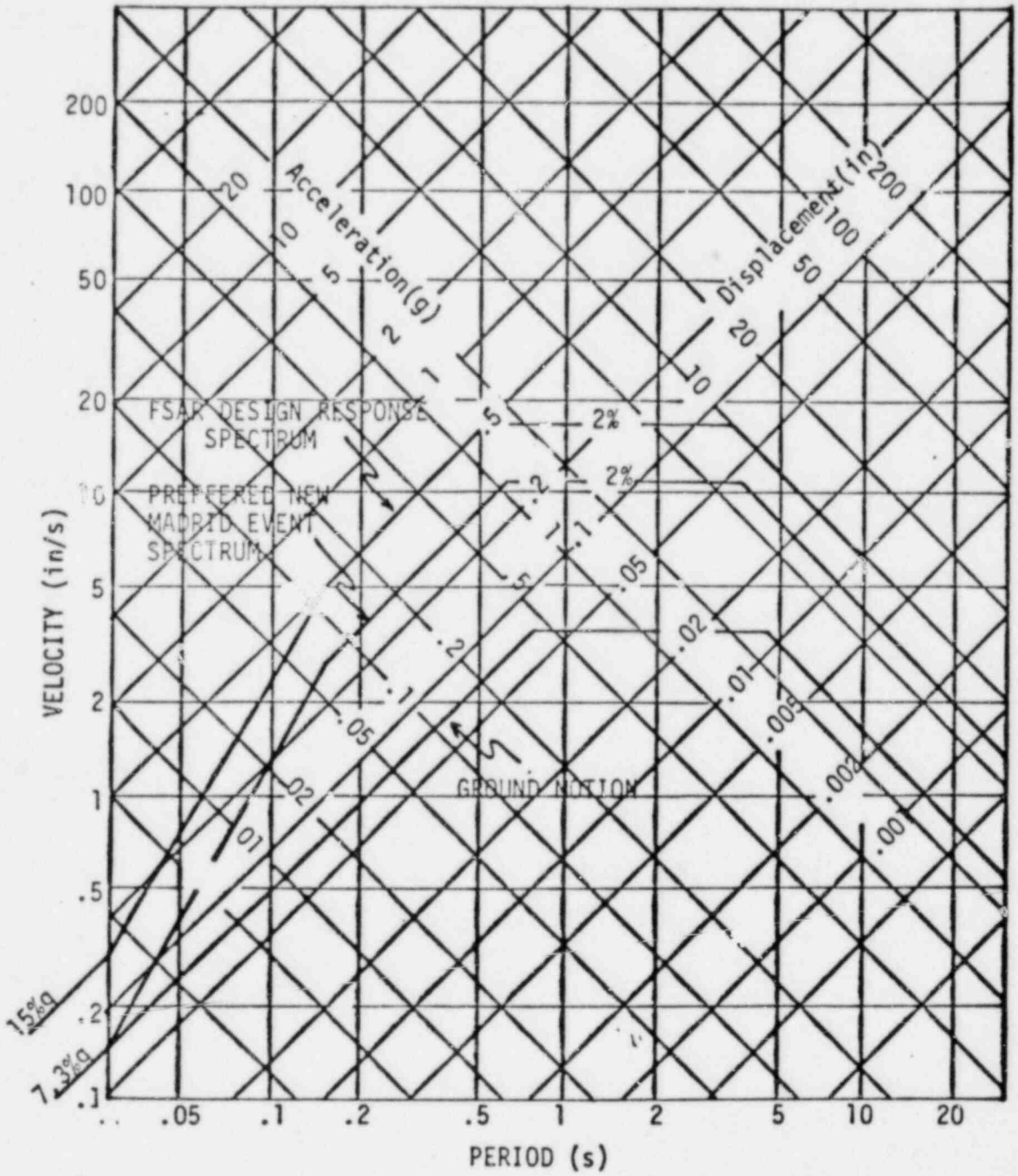
References

Newmark, N. M. and W. J. Hall (1978). Development of Criteria for Seismic Review of Selected Nuclear Power Plants, U. S. Nuclear Regulatory Commission, NUREG/CR-0096, 49pp.

Nuttli, D. W. (1979). The Relation of Sustained Maximum Grand Acceleration and Velocity to Earthquake Intensity and Magnitude, U. S. Army Engineer Waterways Experiment Station, MISC. Paper S-73-1, Report 16, 74 pp.

Herrmann, R. B. (1981). Progress in Modeling the Ground Shaking Hazard, Proc. Conf. on Earthquakes and Earthquake Eng. Eastern United States, Vol. 1, pp. 337-347.

U. S. Nuclear Regulatory Commission (1981). Safety Evaluation Report Related to the Operation of Grand Gulf Nuclear Station Units 1 and 2, Docket Numbers 50-416 and 50-417, NUREG-0831.



Ground Motion and 2% Design Response Spectrum after Newmark and Hall(1978) Recommended Method - 7.3%g

15%g Design Response Spectrum at the same damping value from the Grand Gulf FSAR