MISSISSIPPI POWER & LIGHT COMPANY
Helping Build Mississippi
P. O. BOX 1640, JACKSON, MISSISSIPPI 39205

NUCLEAR PRODUCTION DEPARTMENT

June 11, 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 0260/0756
Local Detonations
AECM-82/266

Representatives of Mississippi Power & Light Company (MP&L) met with Sandia on Wednesday, May 19, 1982, to discuss the Sandia Local Detonation Evaluation of GGNS in progress for the NRC.

In this meeting, a local detonation size was agreed upon as the best representative volume for the above evaluation. This volume was agreed to by the NRC and an evaluation was carried out by Sandia.

Based upon our review of the Sandia evaluation, no compromise in containment integrity resulted. The MP&L evaluation is attached for your information.

It is our understanding that this completes the efforts in the local detonation area; and, as satisfactory results have been achieved, no further action is required by MP&L.

Yours truly,

L. F. Dale
Manager of Nuclear Services

RMS/SHH/JDR:nll
Attachment

cc: (See Next Page)

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cc: Mr. N. L. Stampley (w/o)
Mr. R. B. McGehee (w/o)
Mr. T. B. Conner (w/o)
Mr. G. B. Taylor (w/o)

Mr. Richard C. DeYoung, Director (w/a)
Office of Inspection & Enforcement
U. S. Nuclear Regulatory Commission
Washington, D. C. 10555

Mr. J. P. O'Reilly, Regional Administrator (w/a)
Office of Inspection & Enforcement
Region II
101 Marietta Street, N.W., Suite 3100
Atlanta, Georgia 30303

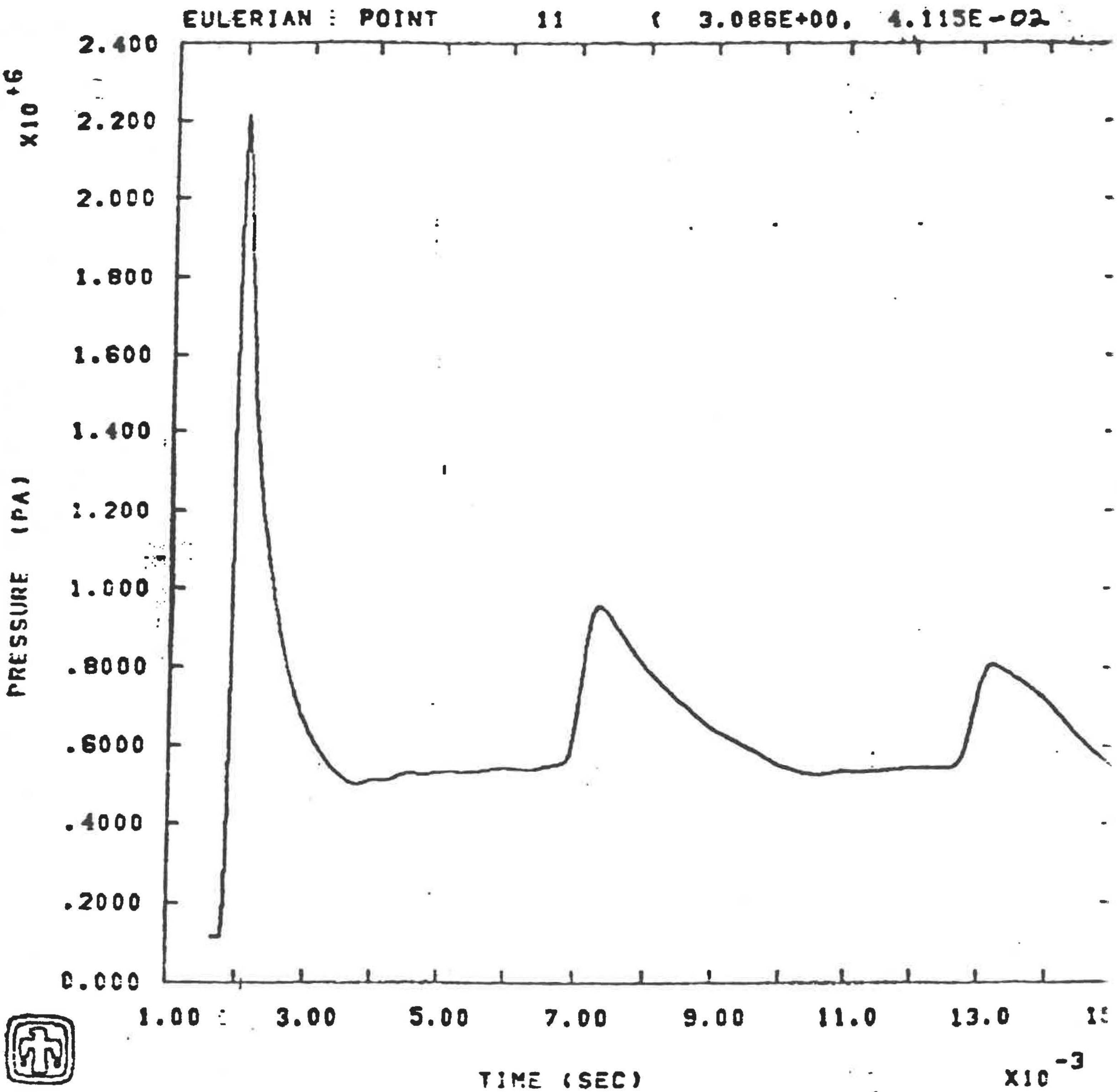
Attachment to AECM-82/262

Structural Response Due to Local Hydrogen Detonation

The Grand Gulf containment shell has been evaluated for structural adequacy regarding the ability to withstand a postulated local hydrogen detonation. The Impulsive Pressure-Time (IPT) curve associated with the local detonation was defined by Sandia National Laboratory and is presented in Figure 1 in terms of absolute pressures. This impulse will act on the containment shell in the region bounded by the suppression pool water level and the bottom of the HCU floor. Although the IPT curve in Figure 1 is shown abruptly truncated at fifteen milliseconds (msec), in reality, according to the responsible Sandia researcher, Dr. M. Sherman, the curve does extend beyond 15 msec and will eventually attenuate to atmospheric pressure. This information has been accounted for in the present evaluation by extending the IPT curve in Figure 1 with a constant pressure line beyond 15 msecs.

The response of the containment shell is evaluated by modelling it as an elasto-plastic, Single Degree of Freedom (SDOF) dynamic system and subjecting it to the given IPT curve. The stiffness of the SDOF system is calculated based on the radial deformation of the shell assuming membrane action. The mass of the system is calculated by equating its frequency to the breathing mode frequency of the shell. The peak static pressure at which the hoop reinforcements in the shell will yield is also calculated to determine the yield resistance of the SDOF system. The minimum yield strength of the reinforcement, based on representative material test reports, has been used in the evaluation.

The SDOF system described above was analyzed for the augmented Sandia IPT curve utilizing a computer program which employs step-by-step numerical integration technique to solve the equation of dynamic equilibrium. The results of the analysis indicate that the containment shell is capable of withstanding the Sandia pressure impulse resulting from a local hydrogen detonation by mobilizing its yield resistance. The resulting ductility ratio is calculated to be less than three, which conforms to the guidance provided in ACI 349-80, "Code Requirement for Nuclear Safety Related Concrete Structures," Appendix C.



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