TERA

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

August 8, 1980

NUCLEAR PRODUCTION DEPARTMENT

U.S. Nuclear Regulatory Commission
Licensing Branch No. 3
Division of Licensing
Office of Nuclear Reactor Regulation
Washington, D.C. 20555

Attention: Mr. A. Schwencer, Acting Chief

Dear Mr. Schwencer:

SUBJECT: Grand Gulf Nuclear Station
Units 1 and 2
Docket Nos. 50-416/417
File 0272/0277/L-344.0
Transmittal of Responses to
MEB Draft SER Open Items
AECM-80/183

The NRC letter to Mississippi Power and Light (MP&L) dated April 22, 1980, transmitted the Draft Safety Evaluation Report (DSER) from the Mechanical Engineering Branch (MEB). This DSER identified the open items resulting from the review of the Grand Gulf Final Safety Analysis Report (FSAR), Sections 3.6 through 3.10, inclusive.

Our preliminary responses to these open items were transmitted in two letters to you, AECM-80/149, dated July 2, 1980, and AECM-80/150, dated July 8, 1980.

We met with MEB reviewers and consultants from Pacific Northwest Laboratory on July 8, 9, and 10, 1980 to resolve the MEB DSER open items. Our revised responses, as per the discussions of that meeting, are attached for your review. These responses will be incorporated into the upcomi _ August amendment to the FSAR.

Additional information, as requested at the above referenced meeting, will be provided to you by separate letter. The attached responses indicate which open items required additional information.

Please note that a numbering system was devised by MP&L to distinguish open items. That system serializes the items presented in the MEB DSER according to the referenced FSAR section and the order of appearance in the MEB DSER. All open items are identified and serialized in our letter to you, AECM-80/136, dated J .e 20, 1980. This letter transmitted the proposed meeting agenda. Each attached response also provides the appropriate page reference to the MEB DSER.

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1/1

8008110438

We feel the meeting with MEB and the DSER approach was very successful, providing an efficient vehicle for identifying and resolving open items. Furthermore, we welcome similar approaches in the review of the Grand Gulf FSAR.

Yours truly,

L. F. Dale
Nuclear Project Manager

JGC/JDR:lm

Attachments: a) DSER Open Item Numbers

1.	3.6.2-1	12.	3.9.1-2	23.	3.9.3-1
2.	3.6.2-2	13.	3.9.1-3	24.	3.9.3-2
3.	3.6.2-3	14.	3.9.1-4	25.	3.9.3-3
4.	3.6.2-4	15.	3.9.2-1	26.	3.9.3-4
5.	3.6.2-5	16.	3.9.2-2	27.	3.9.3-5
6.	3.6.2-6	17.	3.9.2-3	28.	3.9.3-6
7.	3.6.2-7	18.	3.9.2-4	29.	3.9.3-7
8.	3.6.2-8	19.	3.9.2-5	30.	3.9.5-1
9.	3.7.3-1	20.	3.9.2-6	31.	3.9.5-2
10.	3.7.3-2	21.	3.9.2-7	32.	3.9.6-1
11.	3.9.1-1	22.	3.9.2-8		

b) Interface Control Procedures Between Contractors (Additional information requested at MEB DSER meeting.)

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

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

Mr. Merv Bampton
Pacific Northwest Laboratory
Richland Boulevard
Richland, Washington 99351

-3.6.2-1
DSER Page 2

OPEN ITEM

response of Question 110.15 is not satisfactory. The applicant should provide e
ist of all locations where the restraint of one end of a postulated circumferential break was used to reduce the jet force and reaction by reducing the flow area. applicant should provide justification in each instance that restraint of only end of a postulated circumferential pipe break would prevent the other end from placing more than one pipe diameter."

f

RESPONSE

restraint of one end of a postulated circumferential pipe break is not used to ice the jet force and reaction by reducing the flow area.

MP&L ACTION

subsection 3.6A.2.1.c.4(a), Page 3.6A-16, will be revised to clarify this tion.

DSER-3.6.2-5
MEB DSER Page 3

OPEN ITEM

"The applicant has stated that, after a postulated failure of high energy piping, some non-Category I equipment would be used to bring the plant to a safe shutdown. The applicant must provide assurance that the failure of the seismic Category I piping would not cause failure of the non-Category I equipment."

RESPONSE

No credit has been taken for non-Category I equipment to achieve a safe shutdown.

MP&L ACTION

FSAR Page 3.6A-4 will be revised to incorporate this response.

DSER 3.6.2-6
MEB DSER Page 3

OPEN ITEM

"The applicant states that the use of non-seismic piping inside containment was permitted only on a case-by-case basis with the necessary justification. A list of all non-seismic piping inside containment is requested along with the necessary justification."

RESPONSE

Portions of systems located inside the containment are designed as non-seismic, because they are not required for safe shutdown of the reactor, or to mitigate the consequences of postulated accidents. However, pipe support for these lines are designed to seismic requirements in accordance with Regulatory Guide 1.29.

Following is the list of such piping located inside containment:

a) Floor & Equipment Drains	-	6", 4", 3" and 2" & smaller
b) Component Cooling Water	-	10", 8", 6", 4", and 2" & smaller
c) Service Air	-	3", 2 1/2" and 2" & smaller
d) Fire Protection	-	6", 4", 2 1/2" and 2" & smaller
e) Plant Chilled Water	-	4", 2 1/2" and 2" & smaller
f) Containment Leak Rate Test	-	4" and 2" & smaller
g) Combustible Gas Control	-	6" and 2" & smaller
h) Plant Service Water	-	4", 3" and 2" & smaller
i) Condensate & Refueling Water	-	4", 3", 2 1/2" and 2" & smaller
j) Reactor Water Cleanup	-	10", 8", 6", 4", 3" and 2" & smaller
k) Nuclear Boiler	-	16", 14", 12", 10" and 2" & smaller
l) Instrument Air	-	2 1/2" and 2" & smaller

Other non-seismic equipment located inside the containment are HVAC ducting, cable trays, and conduits.

The piping is analyzed for normal as well as faulted loads including "New Loads." The computer code (ME-101) and loading combinations used in the stress analysis are the same as those used for class 1, 2 and 3 piping. The stress levels in the piping systems are kept below the faulted Code allowable limits.

Pipe supports are designed using total maximum faulted loads. The stress allowables for supporting members do not exceed the limits specified in ASME Section III, Subsection NF. A randomly selected sample calculation (NSP64G006H34) is attached to demonstrate conservatism in the pipe support design.

Other non-seismic equipment located inside the containment, such as HVAC ducting, conduits, and cable trays, are also supported to seismic requirements as are the above piping systems.

The above design criteria are used to ensure that non-seismic equipment located inside containment will not compromise the integrity of safety-related equipment.

Attachment: Calculation NSP64G006H34, Revision A

DSER 3.6.2-6
MEB DSER Page 3

MP&L ACTION

As stated in DSER item 3.6.2-5, FSAR Page 3.6A-4 is being revised to clarify the use of non-seismic piping.

SURANCE PROGRAM
ION COVER SHEET
STATION UNITS NO. 1 AND NO. 2

NO. OF SHEETS 1
DISCIPLINE Plant Design Hgr. Egr.

JOB. NO.

TITLE

MISSISSIPPI POWER & LIGHT COMPANY
GRAND GULF NUCLEAR STATION UNITS 1 & 2

SUBJECT

Pipe Supports required for Iso. No. M-0146 F
Piping System FIRE PROTECTION
CTMT

STATEMENT OF PROBLEM

Check Pipe Hangers for Structural Stability Hgr. No. NSP64G006H34

SAR CHECKED ☑ SAR CHANGE REQ'D ☐ SAR CHANGE NOTICE INITIATED ☐

SOURCES OF DATA

- ☒ Computer Program Data - (if applicable) - Problem No. CE 901 (STRUDL) NONE / ME 101 299
- ☐ Bergen & Paterson Pipe Support Corp - Catalog
- ☒ Bergen & Paterson Pipe Support Corp L.C.D. Sheets.
- ☒ Drawings used are stated on Design Sketches

ATTACHMENTS: A-PISES 1 (INCLUDED FOR INFORMATION ONLY)

SOURCES OF FORMULAE & REFERENCES

- ☒ Design Specification M-300.3 Revision 9
- ☒ Ansi B 31.1 -73
- ☒ AISC Manual - Seventh Edition
- ☒ Hanger Engineering Standard
- ☐ ASME Sect. III, Subsection NF/Appendix XVII -74
- ☐ Design Specification M-300.2 Revision

*PRELIMINARY CALC ☐ FINAL CALC ☑ SUPERSEDES CALC. NO. —

REV. NO.	DATE	DESCRIPTION	CALC. BY	**CHECKED BY	DATE	APPROVED BY	DATE
7	10/29/79	TO INSURE STRUCTURAL STABILITY DUE TO "NEW LOADS"	[signature]	R. Klein	11/6/79	[signature]	11/29/79

*Preliminary calcs checked only at Group Supervisors Request.

**Criteria: PSAR Codes & Standards, Redundancy & Separation, Operability, Maintainability & Technical adequacy, accuracy & clarity.

ULATION SHEET

CALC. NO. NSP64G006H34 REV. NO. A

ORIGINATOR E.L. Monteblanco DATE 10-29-79 CHECKED R. L. Locke DATE 11/6/79

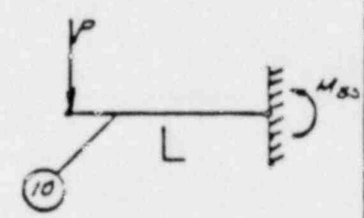
PROJECT Mississippi Power & Light Company Grand Gulf Nuclear Station Unit 1 & 2 JOB NO. 9645

SUBJECT CALCULATION M-0146F SHEET NO. 1

STRESS

$L = 6''$ $P = 2.050^{K}$

$W4 \times 13\ (S_S = 5.45,\ I_S = 11.3)$



$M_{BS} = PL = 2.050^{K} \times 6'' = 12.3^{K\text{-}IN}$

$\sigma_{BS} = \frac{M_{BS}}{S_S} = \frac{12.3}{5.45} = 2.2568^{KSI} < 18.5^{KSI*}$ OKAY

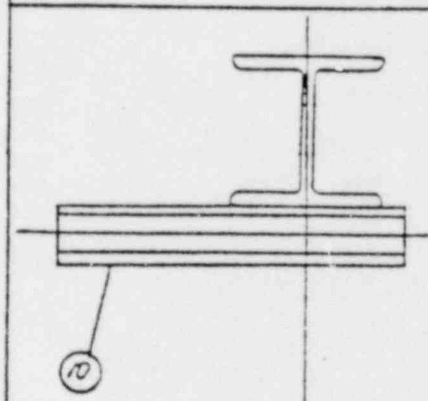
*ASME CODE, SECT III SUBSECTION NF

DEFLECTION

$\Delta_S = \frac{PL^3}{3EI_S} = \frac{2.050^{K} \times 6^3}{3 \times 27{,}000 \times 11.3} = .0004'' < 1/16''^{**}$ OKAY

** BECHTEL HANGER DESIGN SPECIFIED LIMIT

WELD



$R = P = 2.050^{K}$

$M_{BS} = 12.3^{K\text{-}IN}$

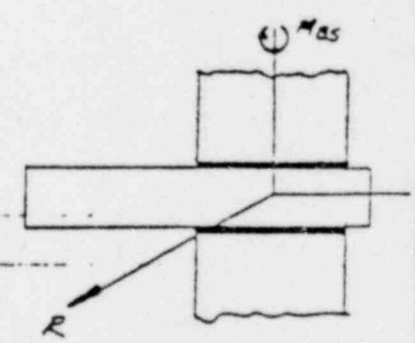
$LWT = 20$

$SM = \frac{d^2}{3} = 33.3333$

$F_1 = \frac{R}{LWT} = \frac{2.050}{20} = .1025^{K/IN}$

$F_2 = \frac{M_{BS}}{SM} = \frac{12.3}{33.3333} = .3690^{K/IN}$

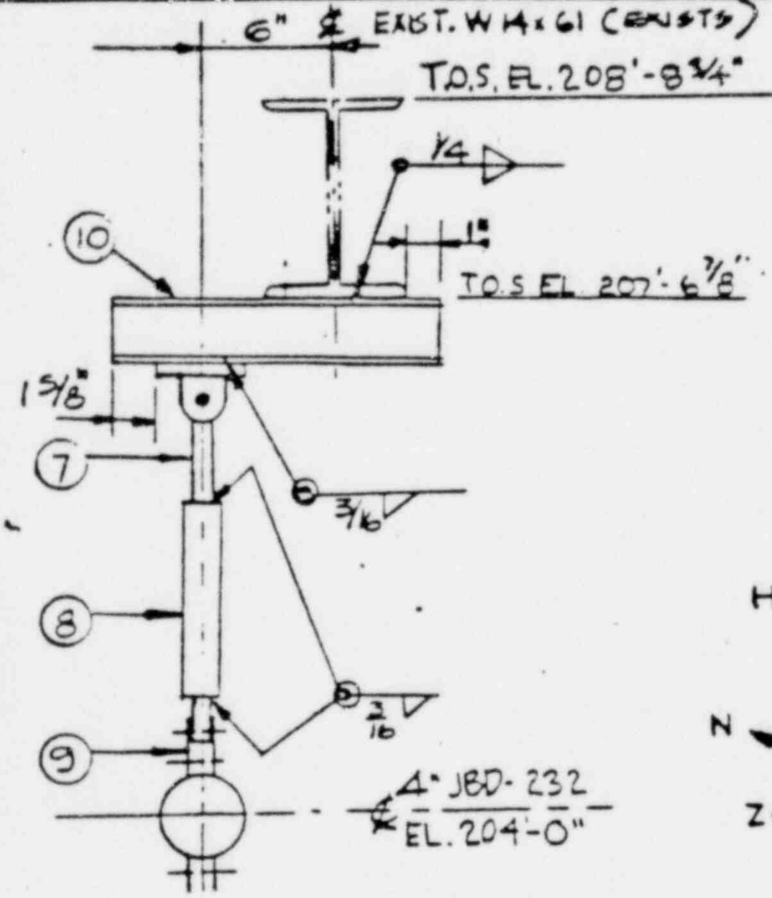
$F_R = F_1 + F_2 = .4715^{K/IN}$

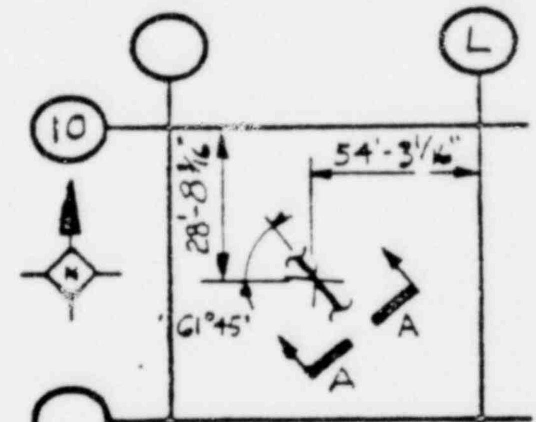


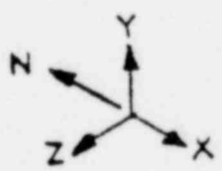
$\omega = \frac{.4715}{12.4} = .0380''$ — 1/4" WELD SHOWN ON SKETCH IS OKAY.

NOTE: NO WELD CALC REQUIRED ON OTHER JOINTS.

				DESCRIPTION	MATERIAL
7	1	SP-2100	2.5	PIPE STRUT, LESS PIPE, P-P= 2'-6" Y=3 3/4, X=5 3/4"	
8	1	-	1 1/4"	PIPE SCH. 80 20 1/2" LONG	SA.106 GR. B
9	1	2600-2.5	4"	PIPE CLAMP E=7"	-
10	1	-		W6x13 x 13 1/2" LONG	







SRVA	.040"	—	.055"

H-0146F REV. F

LOCATION PLAN

AREA 11

FORCES	FX	FY	FZ
POS	—	2050	—
NEG.	—	1200#	—

MVMTS.	X	Y	Z
THERMAL	.060"	—	-.033"
SEISMIC	.022"	—	.044"

PROB. NO. 299 STRESS NO. S-4

ISSUE 02

DATA PT. 70 (FMA)

ELEVATION A-A

REV	DATE	REVISIONS	BY	CH'K	DESIGN SUPV'R	ENG'R	PROJ ENG'R	APP'R
6		REV ITEM 7 & 8 IN B/M, ADD ITEM 10 IN B/M, REV ELE AA (SUPERSEDES REV 5)						N/R
5		REV STRESS INFO & REF DWGS PER "NEW LOADS"						N/R
A		ISSUED FOR CONSTRUCTION (FMA)						N/R

MISSISSIPPI POWER & LIGHT COMPANY
GRAND GULF NUCLEAR STATION
UNIT 1 + 2

PARKERSBURG

REF. DWGS.
ISO M-0146F REV. 15
PIPE M-1304 REV. 5
STEEL C-1078 REV. 6

PIPE SUPPORTS
FIRE PROTECTION
CTMT.

JOB NO.	DRAWING NO/MARX NO.	REV
9645	NSP64G006H34 SHT 1 OF 1	5

DSER 3.6.2-6

DSER-3.6.2-7
MEB DSER Page 3

OPEN ITEM

"The applicant has chosen break and crack locations in non-seismic Category I piping at terminal ends and fittings. We require that such breaks and cracks be chosen at worst-case locations."

RESPONSE

Breaks and cracks were chosen at worst-case locations for non-Category I piping. The evaluations in FSAR Appendix 3C, Sections 3C.2 and 3C.3 are based on a worst-case location selection criteria. The selection of worst-case locations was made by performing room-by-room examination of essential equipment, evaluating the effects from the worst break/crack location.

MP&L ACTION

FSAR Pages 3.6A-13a and 3.6A-17 will be revised to indicate that the worst-case locations were considered in the selection criteria for break/crack locations in non-Category I piping.

DSER-3.6.2-8
MEB DSER Page 4

OPEN ITEM

"It should be noted that BN-TOP-2, Rev. 2, has not been accepted. Revision 3 of this report has been accepted; therefore, the FSAR should be clarified to reflect the difference between the two versions."

RESPONSE

BN-TOP-2, Revision 2, May, 1974, entitled "Design for Pipe Break Effects," was accepted by the Atomic Energy Commission (AEC). A revision 3 has not been prepared. Reference the letter, R. W. Klecker, AEC, to R. M. Collins, Bechtel, dated June 17, 1974.

MP&L ACTION

None.

DSER 3.7.3-1
MEB DSER Page 7

OPEN ITEM

"Standard Review Plan Section 3.7.3, "Seismic Subsystem Analysis," requires five OBEs with a minimum of 10 cycles each to be utilized in fatigue evaluation. This requirement has not been met. The applicant must justify this deviation from Standard Review Plan 3.7.3 or commit to meet our requirements."

RESPONSE

One OBE with 10 cycles has been approved as a licensing basis for other plants. The basis for acceptance is the low probability of occurrence of a single earthquake of OBE intensity. During a 40-year life, it is probable that five earthquakes with intensities one-tenth of the SSE intensity, and one earthquake with approximately 20% of the proposed SSE intensity, may occur. Therefore, the probability of even one OBE intensity earthquake (50% of SSE intensity) occuring is extremely low. The probability of a lesser intensity earthquake is more realistic to consider. However, a sample study has shown that a total of twenty 25% SSE events would be required to produce the stress levels experienced during one OBE event.

Further study of strong motion in earthquakes shows that the use of 10 cycles is conservative. Studies show that the number of stress cycles between 1/2 peak stress and peak stress is less than 4% of the total number of cycles.

By the above arguments, it is concluded that a fatigue evaluation basis of one OBE event with 10 cycles over the life of the plant is conservative.

MP&L ACTION

None.

LSER 3.7.3-2
MEB DSER Page 7

OPEN ITEM

"Regulatory Guide 1.92, "Combining Modal Responses and Spatial Components in Seismic Response Analysis," outlines the procedures for combining modal responses. Specifically, modes having frequencies falling within 10% of each other are defined as closely spaced modes and must be combined by the absolute sum method. Our review of FSAR Section 3.7.3 cannot be completed until assurance is provided that this criterion has been met or that an equivalent level of safety has been achieved."

RESPONSE

The Grand Gulf commitment to Regulatory Guide 1.92 is presented in FSAR Page 3A/1.92-1. As indicated there, the treatment of closely spaced modes is discussed in FSAR Subsection 3.7.3.7.2.2, Page 3.7-38.

In general, either time-histories or response spectrum methods of analyses are used for seismic analysis. When the time history method is used, the vector sum at every time step will be used to calculate the maximum response. The use of the time-history analysis method precludes the need to consider closely spaced modes. When the response spectrum method is used, the responses for closely spaced modes are combined using the double sum method as described in Reference 8[1] of FSAR Section 3.7.5 (Reference 2 of Regulatory Guide 1.92). This method was approved by the NRC on the GESSAR 251 docket.

MP&L ACTION

A review of FSAR Subsection 3.7.3.7.2.2 has revealed an editorial error in the equation describing the double sum method used by Grand Gulf. Subsection 3.7.3.7.2.2 will be amended to correct that error.

The corrected equation, consistent with Reference 8 of FSAR Section 3.7.5, is presented below:

$$R = \left(\sum_{k=1}^{N} \sum_{s=1}^{N} R_k \quad R_s \qquad \epsilon_{ks} \right)^{1/2}$$

where

R = Representative maximum value of a particular response of a given element to a given component of excitation

R_k = Peak value of the response of the element due to the k^{th} mode

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[1] Singh, A.K., et at., "Influence of Closely Spaced Modes in Response Spectra Method of Analysis, " published in ASCE Specialty Conference on Structural Design of Nuclear Plant Specialties, December, 1973.

DSER 3.7.3-2
MEB DSER Page 7

MP&L ACTION (Continued)

N = Number of significant modes considered in the modal response combination

R_s = Peak value of the response of the element attributed to s^{th} mode

ϵ_{ks} = As currently defined in FSAR Subsection 3.7.3.7.2.2

Additional information was requested for Grand Gulf and Susquehanna Nuclear Stations regarding this open item at the Susquehanna DSER meeting with the Mechanical Engineering Branch, July 14-16, 1980. This additional information will be provided for Grand Gulf by a General Electric generic letter.

DSER 3.9.1-1
MEB DSER Page 9

OPEN ITEM

"Computer programs were used in the analysis of specific components. A list of the computer programs that were used in the dynamic and static analyses to determine the structural and functional integrity of these components is included in the FSAR along with a brief description of each program. Design control measures, which are required by 10 CFR Part 50, Appendix B, require that verification is provided for most computer programs, it is lacking for several. The applicant must provide verification for all of the listed computer programs."

RESPONSE

A review was conducted of FSAR Section 3.9.1.2 to identify those programs which lacked required verification. Programs "ME913," "TRHEAT," and all NSSS related programs were found to require additional statements of verification.

MP&L ACTION

FSAR Section 3.9.1.2 will be revised to include the required verification for the above mentioned computer programs.

The FSAR will be revised to incorporate verification statements by referencing GESSAR 251 for:

a) Dynamic analysis of piping system

b) Plate, panel, space structural analysis

c) Shell analysis program

d) Time-dependent pipe force

e) Pipe dynamic analysis

The FSAR will be revised to indicate the following programs provided by the vendor, where the verification statement is not given. Compliance with 10 CFR 50, Appendix B is assured by contract requirements between GE and the vendor. The two sets of codes listed below are proprietary programs used in the design of N-Stamped equipment.

a) Byron-Jackson

"RTRMEC"
"FMAP"
"FLTFLG"
"MULTISPAN"
"2DFMAP"
"CRISP"
"HEAT05"

MP&L ACTION (Continued)

b) CB&I

7-11 "GENOZZ"
9-48 "NAPALM"
1027
8-46
7-81 "KALNINS"
979 "ASFAST"
7-66 "TEMAPR"
7-67 "PRINCESS"
9-28 "TGRV"
9-62 "E0962A"
984
992 "GASP"
1037 "DUNHAM'S"
1335
1606 & 1657 "HAP"
1635
953
1666
1684
"E1702A"

The FSAR will be revised to delete the following GE programs not used for Grand Gulf design:

"SEISM"
"CODE"

The verification of the three GE programs for RHR heat exchangers, WBHFN, ED-6, and ED-8, has been accomplished in compliance with 10 CFR 50, Appendix B. The review and verification of the input, output, and methodology are contained in GE design record files. FSAR sections referencing these three programs will be revised to discuss the general method of verification.

As per the MP&L meeting with Mechanical Engineering Branch on July 8-9, 1980, additional information pertaining to this DSER open item will be provided by separate letter. This information includes discussions and/or documentation of this verification for programs "MULTISPAN" and "GASP." This information is being provided to demonstrate typical verification techniques for the proprietary programs discussed above.

DSER 3.9.1-2
MEB DSER Page 10

OPEN ITEM

"It is stated that, when ME-632 was verified, it did not compute tee stresses per ASME Code, Section III. The applicant should provide assurance that ME-632 now computes tee stresses per ASME Code, Section III, or that the computed tee stresses are conservative with respect to the ASME Code."

RESPONSE

The ME-632 code properly computes tee stresses per ASME Code, Section III, except where there are two consecutive tees in the piping system. However, the moments calculated at the tees have been verified to be correct. Therefore, whenever two consecutive tees are present in the piping system, the stress levels at the tees are hand calculated using ASME Code, Section III, and documented with the problem summary.

Approximately 95% of the total work on Grand Gulf has been analyzed using the ME-101 code. For the remaining work the ME-632 code has been used. But the "Consecutive tees" situation does not exist on Grand Gulf for any of the piping systems analyzed by ME-632.

MP&L ACTION

FSAR page 3.9-19 will be revised to reflect the above response.

DSER 3.9.1-3
MEB DSER Page 10

OPEN ITEM

"Experimental stress analysis was used to verify the design adequacy of piping seismic shock suppressors, pipe whip restraints, and the BWR 6 Orificed Fuel Support. More information on how stresses were determined during the load tests on the BWR 6 Orificed Fuel Support is required. The remainder of the discussion on the experimental stress analysis is adequate."

RESPONSE

Two separate tests were conducted, and each test was designed to be in conformance with Appendix II of the ASME Code, Section III. The first test series verified the structural capability of the fuel support casting to sustain vertical design loads. A production fuel support was stresscoated and subjected to an extremely high vertical load to identify the location and principal stress directions of the highest stressed regions. A second fuel support was instrumented with strain gauges: 12 uniaxial gauges were used where the principal stress directions were known from the previous stresscoat test. Six rosettes were used where the principal stress axies could not readily be determined. (All the gauges used in the experimental stress analysis were put in the regions of highest stress as determined by the previous stresscoat test.) The fuel support was mounted in a fixture simulating the geometric characteristics of both the load and support in the reactor. Vertical loads only were applied, simulating the weight load of the fuel assemblies.

It was found that the fuel support could sustain a vertical load of 104,000 lbs. before the onset of yielding in the highest stressed region. This 104,000 pound load represents a safety factor in excess of 35 based on yielding over the normal applied vertical load.

A second series of tests were conducted to investigate the resulting stresses induced in the fuel support by a horizontal (or lateral) load applied by the fuel assemblies during a seismic event. A fuel support was instrumented with 15 three-element rosette strain gauges. The location of these gauges were determined from an initial computer analysis, and represented the areas of highest stress plus a few key locations of minimal material thickness.

The test fixtures used were designed to apply equal loads on all four pods. This was achieved by using two hydraulic cylinders to load two spreader bars. The load was transmitted into each spreader bar through balls which prevented moment build-up. Each spreader bar then loaded two arms, which in turn loaded dummy fuel lower tie plates. At the interface of the tie plates in the fuel support, the dimensions of these dummy tie plates were identical to those used in the production components. During loading, weight was placed at the top of the load arms approximately in the center of the fuel support. This loading simulated a vertical load which would be present due to the fuel assembly weight.

During the initial phases of the testing, it was discovered that the stresses induced by a horizontal load were a maximum when the applied vertical load was a minimum. Because the fuel support is not attached to the guide tube and sits on a chamfered seat on the guide tube provided for that purpose, it was found that an

RESPONSE (Continued)

increased downward vertical load actually enhanced the fuel support's ability to sustain a horizontal load. (With increased vertical load, additional rigidity was provided to the fuel support casting by the guide tube.)

A load cell was calibrated and installed on the lower hydraulic cylinder. Load data was recorded on a continuous recorder, and strain gauge data was recorded on a multi-channel recorder. The total applied load was twice the load cell readings.

The first horizontal loading applied simulated the ASME Code upset condition. For this condition the total vertical load was calculated to be just under 1,000 lbs. with a horizontal load of 2,600 lbs. being applied. The calculated vertical load applied to the fuel casting included its weight, the upward component of a 1/2g seismic load, and the differential pressure across the fuel and the fuel support. The 2,600 pound load was taken from the fuel support design specification for the upset event. A horizontal test load of 3,000 lbs. was applied to compensate for possible increased hydraulic piston friction, changes in friction due to a small amount of misalignment and/or cocking of the load arm in relation to the piston travel direction.

The test results simulating the upset horizontal loading conditions produced a maximum stress of 10,833 psi. The differential pressure stresses across the castings were computed. The 1,580 psi value obtained from the computation was then added to the test results. (Differential pressures across the fuel support were not simulated in the test program.) The total resultant stress was 12,413 psi for the upset condition. The total stress resultant was less than the ASME Code allowable of 15,380 psi for the upset condition.

A second series of test loading were applied to the support casting and were designed to simulate the faulted conditions. No vertical load was applied during this phase of the testing because of the net result of 1g downward force due to gravity and the 1g upward component of force due to the safe shutdown seismic faulted event. The horizontal test load was applied to simulate 5,200 lbs. of force for the faulted event. Testing simulating the faulted horizontal loading produced a maximum stress intensity of 21,225 psi. A computed stress value of 1,580 psi for the internal pressure was added to the test result similar to that of the upset event described above. The addition of these two stresses resulted in a maximum stress intensity of 23,505 psi, which is significantly less than the 35,440 psi allowed by ASME Code for the faulted conditions.

Paragraph 3228.4 of the NG section of the ASME Code and Paragraph F-1320 of Appendix F of the ASME Code provide a means by which a maximum loading may be determined such that if the fuel support sustains this loading satisfactorily it will automatically confirm that A, B, and D service limits will be automatically met. For example, Paragraph 3228.4 of Section NG of the ASME Code states that service level A and B stress limits are automatically met if it can be shown in the test of a proto-type that the specified design loads do not exceed 44% of the maximum loads applied and used in the test. The value of the load applied must take into consideration actual yield and ultimate strengths of the material used, RESPONSE (Continued)

actual wall thicknesses of the highest stress regions, code allowable yield strength at 550°F (if tests are conducted at room temperature), design minimum wall thickness, a 0.65 quality factor (factor is applied when all of the castings are not subjected to 100% volumetric examination), a .44 stress factor for the upset events, and a .8 stress factor for the faulted condition.

Both the upset and faulted conditions were evaluated, and it was found that the faulted code requirements were more limiting. A maximum load value of 18,875 lbs. was computed and applied as a horizontal test load to the fuel support. The formula used to calculate the load value is shown below.

Calculation of Maximum Horizontal Load to show
Conformance with Faulted Code "D" Limits

$$P = \frac{5{,}200 \text{ lbs.}}{.8 \times 0.65} \times \frac{39{,}500}{18{,}800} \times \frac{(0.327)^2}{(0.345)^2}$$

$P = 18{,}875$ lbs.

5,200 lbs. Design Faulted Load

0.65 Quality Factor (Reduction in strength to account for the fact that all the castings from one heat are not fully volumetrically examined.)

0.8 Reduction Factor on Collapse Load per Paragraph F-1280, Appendix F, Section III, ASME Code

0.327" Maximum Wall Thickness of Casting Actually Tested

0.345" Minimum Design Wall Thickness for Fuel Support Casting (The stress produced at the most highly stressed region is in bending and is assumed to be directly proportional to the inverse of the thickness squared.)

39,500 Room Temperature Yield Strength of Material Tested (from Material Cert.)

18,800 Section III Yield Strength at 550°F (Collapse assumed to be a function of yield strengths.)

The results of the 18,750 pound test indicated that the load was less than the plastic instability load called for in ASME, Section III, Subsection NA, Article F-1321.3(a), and defined in Article F-1321.1(e). The loading information below confirmed that plastic instability was not reached. First, the applied load did not require continued hydraulic pumping pressure to maintain. Second, the horizontal tangent of the load definition curve had not been reached since a further increase to applied load was possible.

MP&L ACTION

None.

DSER 3.9.1-4
MEB DSER Page 10

OPEN ITEM

"Elastic-plastic stress analysis methods were used in the evaluation of certain components for the faulted conditions. In general, the information provided on the faulted condition analysis was adequate. More information on the procedures and assumptions used in elastic-plastic analysis of the hydraulic control unit under the SSE faulted condition is requested."

RESPONSE

The HCU analysis, as described in the FSAR, Para. 3.9.2.2.1.6.4, is not an "elastic-plastic" analysis. GE elastic analysis considered a total of 18 individual HCUs (two back-to-back rows of 9 each) in a three-dimensional model compatible with the computer program "SAMIS." A full detailed model of two back-to back HCUs was inserted at the midspan for detailed study of the components and frame of an HCU. The detailed model includes the pipe frames, piston accumulators, nitrogen bottles, scram valves, brackets and main piping. Loads were calculated using response spectrum curves for SSE conditions.

MP&L ACTION

None.

DSER 3.9.2-1
MEB DSER Page 13

OPEN ITEM

Reference: NRC Question 110.33

"(1) The applicant must verify that the types of piping systems included in the test program meet our criteria. We require further information concerning the transient events which could affect these lines."

RESPONSE

The Grand Gulf preoperational vibration test program was developed for all ASME Class 1, 2 and 3 systems except for the following:

1. Suppression Pool Makeup System
2. Diesel Fuel Oil Transfer System
3. Instrument Air System Associated with the pneumatic air supply to Main Steam Safety/Relief Valves
4. Condensate Refueling Storage & Transfer System associated with alternate suction to HPCS and RCIC
5. Scram Portion of CRD Hydraulic System

Our experience has been that systems with low velocity flow (that is, less than 10 ft./sec. for water or less then 100 ft./sec. for air) and with low temperature (less than 200°F) have not experienced flow induced vibration problems. The criteria is applicable to Items 1 through 4, above. In the case of the Scram portion of the CRD Hydraulic System, the piping designer, Reactor Controls, Inc., recommended that monitoring was not required because their experience, which is extensive has shown no vibration problems. The conditions of the fluid are normally less than 10 ft./sec. and less than 200°F. However, during a Scram, the fluid velocity is in excess of 10 ft./sec. for less than five (5) seconds.

These systems have also been reviewed with respect to mechanically induced external vibration from equipment such as pumps. Items 1, 3, 4 and 5, above, have been isolated from all sources of mechanical vibration. The diesel fuel oil transfer piping has been designed such that the pump has been isolated from the portion of the system that could possibly experience fatigue caused by mechanical vibration. The diesel fuel oil transfer pumps are submersible pumps located inside the fuel oil storage tank. The discharge piping is located underground from the tank to the Diesel Generator Building. Vents, drains, components, instrumentation, etc. are located inside the Diesel Generator Building.

Non-ASME systems that are either high energy or seismic Category I moderate energy were also reviewed and were not included in the preoperational vibration test program. These systems were not included because their failure will not impair safe shutdown of the plant.

DSER 3.9.2-1
MEB DSER Page 13

RESPONSE (Continued)

In Appendix 3C of the FSAR, high energy systems have been evaluated for the effects of pipe whip and jet impingement, moderate energy systems were evaluated for spraying caused by cracks, and high and moderate energy systems were evaluated for the effects of flooding. This evaluation included the most limiting cases for ASME and non-ASME systems. Failure of lines excluded from the monitoring program would not affect the ability to achieve a safe shutdown, nor would it increase offsite boundary doses in excess of 10 CFR 100 limits.

MP&L ACTION

None.

DSER 3.9.2-2
MEB DSER Page 13

OPEN ITEM

"We do not approve the GE acceptance criteria for steady-state piping vibration or for transient snubber loads. GE stated that the piping stress due to vibration would be maintained below the ASME Code upset limit for primary stress. We believe that the allowable piping stress due to steady-state vibration should be set at some percentage of the material endurance limit. Since the transient events in this test program are expected to occur repeatedly throughout the plant life, we believe that the acceptable snubber load should be the snubber's upset load rating, not its ultimate capacity."

RESPONSE

The piping systems are tested for both steady-state vibration and vibration due to operating transients. A different acceptance criteria is established for each type of vibration.

For steady-state vibration the piping peak stress (zero to peak) due to vibration only (neglecting pressure) will not exceed 10,000 psi for Level 1 criteria and 5,000 psi for Level 2 criteria. These limits are below the piping material fatigue endurance limits as defined in Design Fatigue Curves in Appendix I of ASME Code for 10^6 cycles. For carbon steel and stainless steel, these material endurance limits from the ASME Code are 13,000 psi and 25,000 psi, respectively.

For operating transient vibration the piping bending stress (zero to peak) due to operating transients only will not exceed $1.2S_m$ or pipe support loads will not exceed the Service Level D ratings for Level 1 criteria. The $1.2S_m$ limit insures that the total primary stress, including pressure and dead weight, will not exceed $1.8S_m$, the new Code Service Level B limit. Level 2 criteria are based on pipe stresses and support loads not to exceed design basis predictions. Design basis criteria require that operating transient stresses and loads not to exceed any of the Service Level B limits including primary stress limits, fatigue usage factor limits, and allowable loads on snubbers.

If Level 2 limits for either steady-state vibration or operating transient vibration are violated, detailed engineering evaluation is needed to develop corrective action or to show that the measured results are acceptable. Any resolution must be properly documented and approved.

MP&L ACTION

None.

DSER 3.9.2-3
MEB DSER Page 13

OPEN ITEM

Reference: NRC Question 110.33

"(5) The only listed transient is turbine stop valve closure. The applicant should also include other pump and valve transients."

RESPONSE

The Grand Gulf preoperational vibration test program will be expanded to include the following:

1. Turbine Stop Valve Closure,
2. Main Steam Isolation Valve Closure,
3. Main Steam Safety/Relief Valve Operation,
4. Pump Starts and Stops for the systems identified in FSAR Table 110.33-1.

MP&L ACTION

FSAR Table 110.33-1 will be revised to reflect the above response.

DSER 3.9.2-4
MEB DSER Page 13

OPEN ITEM

Reference: NRC Question 110.33

"(6) The applicant has not answered the question, which asked for a list of any BOP piping systems which would be instrumented."

RESPONSE

All systems identified in FSAR Table 110.33-1 as Inaccessible will be instrumented. In many cases, visual checks would be adequate, but the system had to be instrumented due to the high radiation levels in the area where the piping is located.

MP&L ACTION

FSAR Table 110.33-1 will be revised to clarify which systems will be instrumented.

DSER 3.9.2-5
MEB DSER Page 14

OPEN ITEM

"Comparing measured values against calculated values is a generally acceptable approach. The applicant must verify that Bechtel has calculated thermal displacements, steady-state vibration, and transient vibration for all the piping systems for which instrumented measurements will be made."

RESPONSE

Calculated thermal displacements and transient vibration either have been or are being done now for the instrumented systems identified in Table 110.33-1.

The acceptance criteria for pre-operational transient vibrations (such as these due to pump start) shall be as follows:

1. 0.125 inch (peak-to-peak) for nuclear piping
2. 0.25 inch (peak-to-peak) for non-nuclear piping

These limits are established based on previous experience.

Steady-state vibration in the piping systems is primarily induced by the flow in the pipe and the equipment motion. In general, the nature of the steady-state vibration is not known a priori. Therefore, qualified design engineers with stress analysis experience and familiarity with the subject piping system will evaluate the monitored vibration to determine the system response.

For the instrumented systems identified in Table 110.33-1, acceptance criterion for steady-state vibration is that the maximum measured amplitude shall not induce a stress in the pipe more than one half the endurance limit of the pipe material.

Material Endurance limits will be obtained from the ASME Code, Section III, Appendix I. A stress level corresponding to 10^6 cycles will be used as the endurance limit. Since only one half the endurance limit is used as the acceptance criterion, the possibility of fatigue failure is considered remote.

The acceptance stress level will be converted into an equivalent displacement value using the flexure formula for a simply supported beam. The measured amplitude will be compared against the equivalent displacement values desired from the flexure formula.

MP&L ACTION

None.

DSER 3.9.2-6
MEB DSER Page 14

OPEN ITEM

"Also, we will require the applicant to provide a summary of the results of this test program upon its completion."

(This item refers to the Grand Gulf preoperational and startup vibration monitoring program.)

RESPONSE

This program has been divided into three phases: preoperation, initial startup, and power ascension testing.

The preoperational vibration monitoring program consists chiefly of visual observation and measurements by hand held monitoring equipment. The detailed procedures for this program are currently in draft form and will be formalized in September, 1980. The program is scheduled for implementation from September, 1980, through mid-March, 1981. The program ends with the completion of the testing of the recirculation system at normal operating temperature.

The initial startup and power ascension testing programs commence on or before the initial fuel load date. As each phase testing plateau is completed, the monitoring data will be available for review.

MP&L ACTION

The test results summary and evaluation will be submitted as a part of the Startup Report, in accordance with Regulatory Guide 1.16. A copy of the Startup Report will be provided to Mechanical Engineering Branch.

DSER 3.9.2-7
MEB DSER Page 17

OPEN ITEM

"We require the applicant to provide a brief summary of the results of this test program upon its completion."

(This item refers to the vibrational measurement and inspection program during preoperational and startup testing for components internal to the reactor vessel.)

RESPONSE

The vessel internals vibration test program is performed in two phases. The first is done during the preoperational test phase with no fuel in the vessel coincident with the recirculation system normal operating temperature preoperational test. An inspection of vessel internals is scheduled to immediately precede the commencement of the measurement program. This test is tentatively scheduled for mid-March, 1981. Procedures, now in draft form, will be issued by January, 1981.

The second phase of testing is performed during power testing with data taken during heat up, at intermediate, and at full power/flow conditions. These tests confirm acceptable vibration with fuel installed in the vessel. At the completion of each test plateau data will be available for review.

This testing will be conducted in accordance with Regulatory Guide 1.20.

MP&L ACTION

Summary results of this program will be provided as requested. The reporting of these results will be in accordance with Regulatory Guide 1.20.

DSER 3.9.2-8
MEB DSER Page 18

OPEN ITEM

"The applicant has analyzed the reactor, its internals, and unbroken loops of the reactor coolant pressure boundary, including the supports, for the combined loads due to a simultaneous loss-of-coolant accident and safe shutdown earthquake. We cannot complete our review in this area until the applicant submits the information requested in Question 110.29."

RESPONSE

The New Loads program for Grand Gulf will provide the analyses results requested.

MP&L ACTION

Submit analyses results upon completion of New Loads program.

DSER 3.9.3-1
MEB DSER Page 20

OPEN ITEM

"This one exception is that the applicant has not included the combined stresses due to SRV and OBE loads in its fatigue calculations. We realize that a position such as the applicant's was accepted during the review of GESSAR. Upon reconsideration, however, we feel that the fatigue contribution attributable to combined SRV and OBE loads should be addressed for those lines whose failure may result in unacceptable consequences such as bypass of the suppression pool. We consider this to be an open issue."

RESPONSE

We believe that the loading combination OBE + SRV (Load Case 2) should be considered as an Emergency condition. The classification of this low probability combination of loads as Emergency (Service Level C requirements) is consistent with the encounter frequency of the OBE and the number of combined stress cycles expected over the plant lifetime. The probability of even one OBE intensity earthquake (50% of SSE) occuring is extremely remote. See the response to DSER 3.7.3-1. The occurrence probability of the Load Case 2 event is even further remote. As a conservative measure, we have agreed to meet Upset limits (Service Level B requirements) without fatigue analysis. The considerations for not conducting the fatigue analysis involve the same justifications presented above.

Regarding the specific concern mentioned in the open item statement, for Grand Gulf Nuclear Station steam cannot bypass the suppression pool because all SRV discharge lines pass through sleeves embedded in the drywell wall. The open end of each sleeve opens below the water level in the suppression pool. Reference FSAR Figure 3.6A-19.

MP&L ACTION

In accordance with meeting agreements of July 8-9, 1980, additional information regarding this open item will be provided to Mechanical Engineering Branch by separate letter.

DSER 3.9.3-2
MEB DSER Page 21

OPEN ITEM

"Another open issue related to load combinations is the applicant's method for combining peak responses to multiple dynamic loads. The applicant has used the "square root of the sum of the squares" method (SRSS) for all dynamic responses Our position, as outlined in NUREG-0484, "Methodology for Combining Dynamic Responses," is that the SRSS method is acceptable for combining peak dynamic responses due to LOCA and SSE for the RCPB. For other dynamic loads and for other ASME Class 1, 2, and 3 components and supports, we are currently preparing a generic position which should be available in the near future."

RESPONSE

NUREG-0484, Revision 1, provides the criteria that must be satisfied to allow the use of the "Square Root of the Sum of the Squares" method (SRSS) for combining peak dynamic responses. As justification for employing the SRSS method in Grand Gulf design and evaluation, compliance with NUREG-0484 will be demonstrated on a case-by-case basis or a topical report will be generated in support of the SRSS method similar to that prepared for MK-II containment application (NEDE-24010-P). Justification for employing the SRSS method may take the form of a combination of both methods described above.

MP&L ACTION

Provide compliance demonstration as required.

DSER 3.9.3-3
MEB DSER Page 21

OPEN ITEM

"Some of the data in FSAR Table 3.9-2 are missing and the applicant indicates that the data will be supplied in amendment to the FSAR. We cannot complete our review until this data is available."

RESPONSE

The New Loads program for Grand Gulf will provide the analyses results requested.

MP&L ACTION

Complete FSAR Table 3.9-2 upon completion of New Loads program.

DSER 3.9.3-4
MEB DSER Page 22

OPEN ITEM

"As discussed in our letter to General Electric Company dated January 28, 1980, we have accepted the applicant's proposal to cut and cap the control rod drive return line. More detailed discussions of these issues will be found in the Task Action Plan A-10 final report to be published shortly as NUREG-0619."

RESPONSE

Design changes are presently in progress or have been completed to incorporate modifications proposed by the General Electric generic resolution in this issue. Present design or design changes in progress include, as a minimum:

- two CRD pump availability without NPSH or electrical supply limitations,
- equalizing valves in CRD system to prevent excessively fast control rod movement,
- stainless steel exhaust water header,
- valved capped vents on the exhaust water header piping system high points,
- replacement of carbon steel pipe in the flow stabilizer loop with stainless steel and rerouting directly to the cooling water header,
- new flow element to be installed,
- vessel nozzle to be capped per ASME Code, Section XI.

MP&L ACTION

All necessary design changes required for compliance with the generic resolution will be accomplished. FSAR revisions will be accomplished as required by these design changes.

DSER 3.9.3-5
MEB DSER Page 25

OPEN ITEM

"In Question 110.5, we asked the applicant to provide information concerning its design and use of hydraulic snubbers. We require the applicant to supply similar information for its mechanical snubbers."

RESPONSE

The criteria for selecting the location, required load capacity, and structural and mechanical performance parameters of safety related BOP mechanical snubbers are described in the following paragraphs.

a) Snubber Load Capacity and Snubber Location

Snubbers are generally used in situations where dynamic support is required because thermal growth of the piping prohibits the use of rigid supports. Snubber locations and support directions are first established using engineering judgment. The snubber locations and loading directions are then refined by performing a computer analysis on the piping system. Using an iterative process, the pipe support is provided in such a manner that the stresses in the piping system meet code requirements.

The entire piping system is mathematically modeled for computer analysis. The model considers all spring supports, rigid supports and snubbers. The analysis determines the forces and moments acting on each component and the forces acting on the snubbers due to all dynamic loading conditions defined in the piping design specification. The design load is based on the loading combinations specified in FSAR Table 3.9-17.

b) Design Specification Requirements

To assure that the required structural and mechanical performance characteristics and product quality are achieved, the following requirements for design and testing are imposed.

1. The snubbers are required by the suspension design specification to be designed in accordance with all of the rules and regulations of the ASME Boiler and Pressure Vessel Code, Section III, Subsection NF. This design requirement includes analysis wherein the stresses in the snubber component parts are calculated under normal, upset, emergency and faulted loads. These calculated stresses are then compared against the allowable stresses of the material as given in the ASME Code Section III, to make sure that they are below the allowable limit.

2. The snubbers are tested to insure that they can perform as required during the operating basis earthquake (OBE), the safe shutdown earthquake (SSE), and under anticipated operational transient loads or other mechanical loads associated with the design requirements for the plant. The test requirements include:

DSER 3.9.3-5
MEB DSER Page 25

RESPONSE (Continued)

a. Snubbers are subjected to force or displacement versus time loading at frequencies within the range of significant modes of the piping system.

b. Displacements are measured to determine the performance characteristics specified.

c. Peak test loads in both tension and compression will be equal to or higher than the rated load requirements.

d. The snubbers are also tested for abnormal environmental conditions. Upon completion of the above abnormal environmental transient test, the snubber shall be tested dynamically within a specified frequency range. The snubber must operate normally during the dynamic test.

c) Snubber Installation Requirements

An installation instruction manual is required by the suspension design specification. This manual is required to contain instructions for storage, handling, erection and adjustments (if necessary) of snubbers. Each snubber has an installation location drawing, which contains the installation location of the snubber on the pipe and structure, the hot and cold settings, and additional information needed to install the particular snubber.

d) Inspection, Testing, Repair and/or Replacement of Snubbers

To the extent practical, easy access to individual snubbers has been provided for the inspection, testing, and replacement of safety related mechanical snubbers.

MP&L ACTION

None.

DSER 3.9.3-6
MEB DSER Page 25

OPEN ITEM

"In its response to Question 110.39, the applicant stated that its BOP mechanical snubbers were submitted to a 100% rated load between 15 and 33 Hz by application of a single load pulse in both tension and compression. We require a better description of this load pulse."

RESPONSE

The load pulse used for testing the snubbers was of sinusoidal form. Units were loaded alternately in tension and compression to 100% rated load at frequencies between 15 and 33 Hz.

MP&L ACTION

None.

DSER 3.9.3-7
MEB DSER Page 26

OPEN ITEM

"Since some NSSS and BOP snubbers will be subjected to suppression pool related dynamic loads at frequencies greater than 33 Hz, the applicant should describe how its snubbers were qualified for these higher frequencies."

RESPONSE

BOP Snubbers

Selected BOP Snubbers have been subjected to force versus time loading at frequencies through the 100 Hz range. A PSA-1 snubber (1,000 lbs. capacity) was tested at 60 Hz and 100 Hz frequencies using 100% rated load. Another unit (PSA-10, capacity 15,000 lbs.) was also tested at 60 Hz with 75% of rated load and at 100 Hz with 40% of rated load. The 100% rated load was attained at 3 Hz. The capability of the test apparatus (MTS machine) prevented attaining full rated load at higher frequencies.

Additionally, all snubbers have been qualified by test for lateral loads up to 6g.

Snubbers were disassembled and inspected after the test. Inspection revealed that all units were in satisfactory condition.

NSSS Snubbers

General Electric requires that snubbers be qualified for the intended service by the vendor by testing them for bleed rate, lock-up rate, drag or friction force and response to dynamic loading conditions. The dynamic loading test is accomplished by subjecting the snubber to a force that is equal to the rated load of the snubber and that varies approximately as the sine wave. The force is applied at frequencies within the range of 3 Hz to 33 Hz at increments of 5 Hz. The dynamic loading tests are conducted with the snubber at both room temperature and at 200°F. Dynamic testing of the snubbers is more fully described in the response to Question 110.39. An analysis of this testing indicates that snubber performance improves with higher frequencies.

In addition to the dynamic testing of the snubbers, General Electric has subjected safety relief valve piping systems of various BWR plants to safety relief valve discharge loads while monitoring the piping system for stresses. The safety relief valve discharge creates acoustic waves that propagate through the safety relief valve piping and impose momentary forces on the pipe at each change in direction These loads have a high frequency content above 33 Hz equivalent to suppression pool dynamic loads. The results of the above testing of the piping systems demonstrate a satisfactory correlation between the actual stresses monitored in the pipe and the analytically predicted stresses in the pipe. The above analyses and testing conclude that the snubbers have been adequately qualified to ensure that they will function in a predicted manner when subjected to various dynamic loads including those at frequencies higher than 33 Hz.

It is concluded that the NSSS snubbers will function properly when subjected to suppression pool related dynamic loads.

DSER 3.9.3-7
MEB DSER Page 26

MP&L ACTION

As per the meeting agreement of July 8-9, 1980, additional information supporting the NSSS snubber position will be provided to the Mechanical Engineering Branch by separate letter.

DSER 3.9.5-1
MEB DSER Page 29

OPEN ITEM

"Modes having frequencies failing within 10% of each other are defined as closely spaced modes and should be combined by the absolute sum method. Our review of FSAR Section 3.9.5 cannot be completed until assurance is provided that this criterion has been met or that an equivalent level of safety has been achieved."

RESPONSE & MP&L ACTION

See response to DSER Item No. 3.7.3-2.

DSER 3.9.5-2
MEB DSER Page 29

OPEN ITEM

"The applicant states that the fact that no plastic deformation occurs in the reactor internals components during emergency or faulted conditions demonstrates that no mechanical interferences exist. We do not necessarily agree that not allowing plastic deformations will assure no mechanical interference. It is our position that even elastic deformation must be checked to provide this assurance."

RESPONSE

Elastic displacement is considered in the design of reactor internal components in which deflection can affect control rod insertability. No plastic deformation occurs in any permanent core support structure components or the reactor vessel. Radiation induced deformation can occur in the fuel channel over core life; these effects are considered in control rod insertability.

MP&L ACTION

FSAR Subsection 3.9.5.4.4 will be revised to incorporate the above response.

DSER 3.9.6-1
MEB DSER Page 31

OPEN ITEM

"The applicant has not yet submitted its program for the preservice and inservice testing of pumps and valves, as requested by Question 110.40; therefore, we have not yet comple ed our review."

RESPONSE

Preservice testing of safety related pumps and valves will be accomplished as part of preoperational equipment testing. Preservice testing provides the baseline information required for inservice inspection program. Currently, the initial 120 month inservice inspection program for pumps and valves will be submitted in February, 1981.

MP&L ACTION

Submit pump and valve inservice inspection program as requested.

MEB DSER Meeting, Additional Open Item[1]

OPEN ITEM

Provide a short summary of the interface control procedures used between contractors.

RESPONSE

INTERFACE CONTROL PROCEDURE (BECHTEL)

For safety-related items a written interface control procedure has been established to ensure proper exchange of design information with contractors. All safety-related communications requiring action are tracked and controlled through the Automated Document Control Register (ADCR) to assure proper close out.

Any (Outgoing or Incoming) correspondence requiring (Bechtel or contractor) action is assigned a control number. The control number is entered in the ADCR and is carried as an open item until closed out by appropriate action. The open item report is updated at least once a month.

INTERFACE CONTROL PROCEDURE (GENERAL ELECTRIC)

Design requirements are specified through purchase part design specifications/data sheets and/or purchased part drawings that specify quality requirements in reviews and quality audits are conducted to assure that both internal and external interfaces are properly specified. Quality requirements are catagorized to identify important engineering requirements, which if discrepant, would cause the failure of the system to meet its intended function.

Suppliers of engineered procured safety related equipment are required by contract to submit manufacturing drawings, procedures, processes, material specifications, test reports, code certification calculations, and stress analyses for GE technical review and approval at various stages of the manufacturing process.

DDR's (Deviation Disposition Requests) activities are carefully controlled as to responsibility, procedures (including maintaining of permanent records), and final disposition.

Quality audits are performed by GE on external suppliers to insure full compliance as described above.

MP&L ACTION

None.

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[1]This additional information was requested by the Mechanical Engineering Branch in the MEB DSER meeting with MP&L to resolve MEB open issues (July 8-9, 1980).