cc:	Judge Lawrence Brenner	(w/enclosure 1)
	Judge Richard F. Cole	(w/enclosure 1)
	Troy B. Conner, Jr., Esq.	(w/enclosure 1)
	Ann P. Hodgdon, Esq.	(w/enclosure 1)
	Mr. Frank R. Romano	(w/enclosure 1)
	Mr. Robert L. Anthony	(w/enclosure 1)
	Charles W. Elliot, Esq.	(w/enclosure 1)
	Zori G. Ferkin, Esq.	(w/enclosure 1)
	Mr. Thomas Gerusky	(w/enclosure 1)
	Director, Penna. Emergency Management Agency	(w/enclosure 1)
	Angus R. Love, Esq.	(w/enclosure 1)
	David Wersan, Esq.	(w/enclosure 1)
	Robert J. Sugarman, Esq.	(w/enclosure 1)
	Spence W. Perry, Esq.	(w/enclosure 1)
	Jay M. Gutierrez, Esq.	(w/enclosure 1)
	Atomic Safety & Licensing Appeal Board	(w/enclosure 1)
	Atomic Safety & Licensing Board Panel	(w/enclosure 1)
	Docket & Service Section	(w/enclosures)
	Martha W. Bush, Esq.	(w/enclosure 1)
	Mr. James Wiggins	(w/enclosure 1)
	Mr. Timothy R. S. Campbell	(w/enclosure 1)
	Ms. Phyllis Zitzer	(w/enclosure 1)
	Judge Peter A. Morris	(w/enclosure 1)

RDC/gra/08068402

Attachment 1

Responses to NRC MEB Questions 1, 2, 3, and 4, from NRC letter dated June 11, 1984, including 8 Related Draft FSAR and DAR Page Changes.

RDC/gra/08068403

1. SER Confirmatory Issue # 3 - Startup Test Specification for BOP Piping

The response to MEB SER Question 210.58 concerning the startup test specification for BOP piping as contained in FSAR, Revision 28 stated that interim test specifications governing the scope of startup testing of BOP piping have been prepared and will be made available to the NRC for review when requested. Provide the staff a copy of the interim test specifications.

Response

The following test specifications are provided as Attachment 2:

a) Specification 8031-P-362, Specification for Test Requirements for Hot Deflection Testing of ASME Section III Nuclear Class 1, 2, 3 and ANSI B31.1 Bechtel Piping for the Limerick Generating Station, Units 1 and 2.

b) Specification 8031-P-363, Specification for Requirements for Steady State Vibration Testing of ASME Section III Nuclear Class 1, 2, 3 and ANSI B31.1 Bechtel Piping for the Limerick Generating Station, Units 1 and 2.

c) Specification 8031-P-364, Specification for Test Requirements for Dynamic Transient Testing of ASME Section III Nuclear Class 1, 2, 3 and ANSI B31.1 Bechtel Piping for the Limerick Generating Station, Units 1 and 2.

2. SER Confirmatory Issue # 5 - Suppression Pool Hydrodynamic Load Reconciliation

The response to MEB Question 210.69, suppression pool hydrodynamic load reconciliation, as contained in FSAR Revision 27 stated that Section 3.9 has been changed to provide the New Loads Adequacy Evaluation. Based on a review of the information provided in FSAR Section 3.9, Revision 27 and the Design Assessment (DAR) of Limerick, we have determined that the following areas are incomplete.

a. Provide additional information to clearly define the scope of the suppression pool hydrodynamic load reconciliation program for Limerick. Specifically, clarify the statement in Section 7.2.1.10 of DAR, Revision 5 that "as described in Section 7.1.5, all seismic Category I BOP piping systems located inside the containment, reactor enclosure and control structure are analyzed for seismic and hydrodynamic loads " and the statement in Section 7.2.1.11 of DAR, Revision 8 that, "all seismic Category I BOP equipment is re-assessed for hydrodynamic and seismic loads (Section 7.1.7)." Sections 7.1.5 and 7.1.7 only address the design assessment methodology and do not clearly define the scope of the design assessment program as to whether all of the BOP piping components, equipment and their supports have been included in the design assessment.

   With respect to NSSS, Section 7.2.1.12 of DAR, Revision 5 stated that NSSS piping and safety-related equipment have been assessed for hydrodynamic and seismic loads. It is not clear whether all of the NSSS piping components, equipment and their supports have been included in the design assessment. It is the staff's position that all safety-related BOP and NSSS piping components, equipment and their supports affected by the hydrodynamic load, both inside and outside containment have to be re-assessed in the hydrodynamic load reconciliation program. Provide a commitment to comply with this position. Indicate the methods employed for the design re-assessment program such as actual reanalysis or spectra comparison.

b. Provide additional information to clearly identify the status and the results of the design re-assessment for suppression pool hydrodynamic loads. Specifically, identify whether changes in design such as additional supports, modification of existing supports or any other plant modifications are required as a result of the suppression pool hydrodynamic load reconcilation and provide a commitment and schedule of completion of design changes for all the affected safety-related piping components, equipment and their supports for both BOP and NSSS. Currently, FSAR Section 3.9, Revision 27 and Sections 7.2.1.11 and 7.2.1.12 of DAR, Revision 8 do not contain this information and Section 7.2.1.10 of DAR, Revision 5 does not address the status of implementation of design changes.

Response

a) The text in DAR Sections 7.2.1.10, 7.2.1.11, and 7.2.1.12 will be revised to clarify the scope of the hydrodynamic load reconcilation program. Specifically, these sections will reflect that all safety-related piping, components, equipment, and their supports have been included in the design assessment. DAR Sections 7.1.5, 7.1.6 and 7.1.7 describe the design assessment methodology used in the BOP and NSSS evaluation.

b) The assessment of all safety-related BOP and NSSS piping, components, equipment, and their supports has been completed. DAR Sections 7.2.1.10, 7.2.1.11, and 7.2.1.12 and FSAR Section 3.9 will be revised to reflect that all structural modifications necessitated by reconciliation of the suppression pool hydrodynamic loads have been completed. A summary of those modifications is given below:

  - Addition of the downcomer bracing system as discussed in DAR Section 7.1.2.2.

  - Addition or modification of pipe supports as required to accommodate the hydrodynamic loads.

  - Modification of safety-related equipment and associated supports where required to sustain the additional hydrodynamic loads, e.g., additional bracing was provided for all the safety-related motor control centers.

The above referenced FSAR and DAR draft page changes are attached.

Pressure time histories in the wetwell are used to investigate the reactor enclosure and control structure response to SRV and LOCA loads. Maximum time history force responses and broadened response spectra curves are approximately used to assess the adequacy of associated structural components. The assessment methodology of the reactor enclosure and control structure is presented in Section 7.1.1.2.

The mode shapes, modal frequencies, and hydrodynamic response spectra of the reactor enclosure and control structure are presented in Appendix B.

The results of the structural assessment are summarized in Appendix E.

2.2.2 CONTAINMENT SUBMERGED STRUCTURES ASSESSMENT SUMMARY

Load combinations for the downcomer bracing and suppression chamber columns are presented in Table 5.3-1. Load combinations for the downcomers are presented in Table 5.5-1. The hydrodynamic design assessment methodology for the downcomers, bracing, and columns is presented in Sections 7.1.2 and 7.1.4. The results of the analysis are presented in Appendix D.

The suppression pool liner plate loads are combined in accordance with Table 5.2-1. Results from the analysis indicate that no structural modification is required (see Sections 7.1.3 and 7.2.1.5).

2.2.3 BOP PIPING SYSTEMS ASSESSMENT SUMMARY

Containment and reactor enclosure BOP piping systems ~~are being~~ were analyzed by the methods presented in Section 7.1.5. The load combinations for piping are described in Table 5.6-1. The results of the analysis are presented in Appendix F.

2.2.4 NSSS ASSESSMENT SUMMARY

2.2.4.1 <u>Introduction</u>

General Electric Company performed a design assessment of Limerick Unit 1 to demonstrate that the NSSS piping and safety-

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(and associated supports)

related equipment have sufficient capability to accommodate combinations of seismic and hydrodynamic loadings. The scope of the evaluation included the reactor pressure vessel (RPV), RPV internals and associated equipment, main steam and recirculation piping, and GE-supplied floor mounted equipment, pipe mounted equipment, and control and instrumentation equipment, (and all associated supports.)

The methodologies described in Section 7.1.6 were used to perform the evaluation. Load combinations and acceptance criteria listed in Table 5-7.1 were used for the evaluation of ASME Class 1, 2 and 3 piping, equipment, and supports.

2.2.4.2 Design Assessment Results

The results of the assessment have demonstrated that the NSSS piping and safety-related equipment have sufficient capability to accommodate combinations of seismic and hydrodynamic loadings for the normal, upset, emergency and faulted conditions.

Detailed results of the NSSS piping and major safety-related equipment evaluations are given in FSAR Sections 3.9 and 3.10.

2.2.5 BOP EQUIPMENT ASSESSMENT SUMMARY

Safety related BOP equipment in the containment, reactor enclosure, and control structure are assessed by the methods contained in Section 7.1.7. Loads are combined as shown in Table 5.8-1.

2.2.6 ELECTRICAL RACEWAY SYSTEM ASSESSMENT SUMMARY

The electrical raceway system located in the containment, reactor enclosure, and control structure is assessed for load combinations in accordance with Table 5.9-1. The assessment methodology and analysis results are presented in Chapter 7.

2.2.7 HVAC DUCT SYSTEM ASSESSMENT SUMMARY

The HVAC duct system located in the containment, reactor enclosure, and control structure is assessed for load combinations in accordance with Table 5.10-1. The assessment methodology and analysis results are presented in Chapter 7.

The refueling head and flange were found to have no stresses exceeding the specified allowable limits.

The leaktightness of the flanged joint is investigated for the combined effect of temperature, pressure, seismic, SRV, LOCA and jet forces. Vertical separation at the flange faces is prevented by providing sufficient bolt preload to offset uplift due to the applied loads. Similarly, relative horizontal movement between the flange faces is prevented by the bolt preload induced frictional forces. A preload of 157K per bolt is required to maintain leaktightness at the flange joints.

7.2.1.9.2 Suppression Chamber Access Hatch, CRD Removal Hatch, and Equipment Hatch

For these components, CBI's analysis indicated that there are no stresses in excess of the specified allowable limits when considering the additional hydrodynamic loading.

7.2.1.9.3 Equipment Hatch-Personnel Airlock

The equipment hatch with personnel airlock has been assessed for hydrodynamic and seismic loads. Modifications to some cap screws of the attachment brackets are required to accommodate the additional hydrodynamic loading. The equipment hatch with personnel airlock and all related components are within the specified allowable limits.

components and their supports

7.2.1.10 <u>BOP Piping and MSRV Systems Margins</u>

As described in Section 7.1.5, all Seismic Category I BOP piping ~~systems~~ located inside the containment, reactor enclosure, and control structure ~~are~~ analyzed for seismic and hydrodynamic loads. The loads from the analyses are combined as described in Table 5.6-1. Additional supports and modification of existing supports ~~are required at selected locations~~ to accommodate the hydrodynamic and seismic loads for some piping systems. Stresses and stress margins for selected BOP piping systems are summarized in Appendix F. The stress reports for the evaluation of the BOP piping will be available for NRC review.

have been included in the design assessment and have been

where required

have been completed.

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Insert ① sec. 7.2.1.11

Structural modifications necessitated by the addition of the suppression pool hydrodynamic loads have been completed.

Insert ② sec 7.2.1.12

Structural modifications necessitated by the addition of the suppression pool hydrodynamic loads have been completed.

(and their supports have been included in the design assessment and analyzed)

7.2.1.11 BOP Equipment Margins

All Seismic Category I BOP equipment [illegible] for hydrodynamic and seismic loads (Section 7.1.7) via the Limerick Seismic Qualification Review Team (SQRT) program. For each piece of BOP equipment, a five-page SQRT summary form has been prepared documenting the re-evaluation of the equipment.

(Insert 1)

7.2.1.12 NSSS Margins

(section 7.1.6).

(Insert 2)

NSSS piping, and safety-related equipment (and their supports) have been assessed for hydrodynamic and seismic loads. Detailed results of the evaluation are given in FSAR Sections 3.9 and 3.10. In addition, General Electric Co. has prepared Seismic Qualification Reevaluation (SQR) Program forms, NSSS Loads Adequacy Evaluation (NLAE) Program Summary reports, and design stress reports to document the assessment of seismic and hydrodynamic loads on NSSS piping and safety-related equipment (and all related supports). These forms and reports will be available for NRC review.

7.2.2 ACCELERATION RESPONSE SPECTRA

7.2.2.1 Containment Structure

The method of analysis and load description for the acceleration response spectrum generation are outlined in Section 7.1.1.1.1.6.1. From a review of the acceleration response spectra curves for the containment structure, the maximum spectral accelerations are tabulated for 1 percent damping of critical. For SRV and LOCA loads, the maximum spectral accelerations are presented in Table 7.2-1.

The hydrodynamic acceleration response spectra of the containment structure are presented in Appendix A.2.

7.2.2.2 Reactor Enclosure and Control Structure

The method of analysis and load applications for the computation of the hydrodynamic acceleration response spectrum in the reactor enclosure and the control structure are described in Section 7.1.1.2. The response spectra of the reactor enclosure and the control structure are shown in Appendix B.

no change
info only

There are no open discharge pressure relieving devices with limited runs of discharge piping mounted on ASME Code Class 1, 2, and 3 systems.

b. Closed Discharge

A closed discharge system is characterized by piping between the valve and a tank, or some other terminal end. Under steady-state conditions, there are no net unbalanced forces. The initial transient response and resulting stresses are determined by using either a time-history computer solution, or a conservative equivalent static solution. In calculating initial transient forces, pressure and momentum terms are included. Water slug effects are also considered.

Time-history dynamic analysis is performed for the discharge piping and its supports. The effect of the loading on the header is also considered. The design load combinations for a given transient are shown in Table 3.9-11, and the design criteria and stress limits are shown in Tables 3.9-12 and 3.9-16.

3.9.3.4 Component Supports Furnished with the NSSS

3.9.3.4.1 Piping

Hangers are designed in accordance with ANSI B31.7. In general, the load combinations for the various operating conditions correspond to those used to design the supported pipe. Design transient cyclic data are not applicable to hangers because no fatigue evaluation is necessary to meet the code requirements. All hangers are designed, fabricated, and assembled so that they cannot become disengaged by the movement of the supported pipe or equipment after they are installed. The design load on hangers is the load caused by dead weight. The hangers are calibrated to ensure that they support the design load at both their hot and cold load settings. Hangers provide a specified down travel and up travel in excess of the specified thermal movement.

Snubbers are not supplied by GE; however, required load capacity and snubber location for NSSS piping systems are determined by GE as a part of the NSSS piping system design and analysis scope.

The entire piping system, including valves and the suspension system between anchor points, is mathematically modeled for complete structural analysis. In the mathematical model, the snubbers are modeled as springs with a given stiffness depending on the snubber size. 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 on snubbers includes those loads caused by seismic forces (OBE and SSE), system anchor movements, and reaction forces caused by relief valve discharge, turbine stop valve closure, and other hydrodynamic forces (SRV, LOCA, AP).

Insert (new ¶) (3)

The snubber location and loading direction are decided by estimation so that the stresses in the piping system have acceptable values. The snubber locations and direction are refined by performing the computer analysis on the piping system as described above.

The spring constant required by the suspension design specification for a given load capacity snubber is compared against the spring constant used in the piping system model. If the spring constants are not in agreement, they are brought into agreement, and the system analysis is redone to confirm the snubber loads.

If the stiffness of the backup structure for the snubber is not large compared to that of the snubbers, the reduced effective snubber stiffness (spring constant) is used in the analysis to account for backup structure flexibility.

Snubber design is discussed in Section 3.9.3.5.2.

3.9.3.4.2 NSSS Floor-mounted Equipment (Pumps, Heat Exchangers, and RCIC and HPCI Turbines)

The ECCS pumps, RCIC and SLC pumps, RHR heat exchanger, and RCIC and HPCI turbines are analyzed to verify the adequacy of their support structure under various plant operating conditions. In all cases, the stress loads in the critical support areas are within ASME Code allowables. The loading conditions, stress criteria, and allowable and calculated stresses in the critical support areas are summarized in Tables 3.9-6(l), (m), (n), (o), (q), (r), (t), and (ae).

Insert (4)

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Insert (new 4) (3) see 3.9.3.4.1

The assessment of all affected piping including their supports, and structural modifications necessitated by reconciliation of the suppression pool hydrodynamic loads have been completed.

Insert (4) see 3.9.3.4.2

The assessment of all affected equipment including their supports. and structural modifications necessitated by reconciliation of the suppression pool hydrodynamic loads have been completed.

3. SER Confirmatory Issue #6 - Pressure Isolation Valves Leak Testing

The Surveillance Requirement pertaining to leak testing of pressure isolation valves (PIVs) presented in Section 4.4.3.2.2 of Limerick Draft Technical Specification is not complete. In addition to the two requirements currently identified in Limerick draft Technical Specification, Section 4.4.3.2.2, the staff requires the PIVs to be leak tested (a) prior to entering the Hot Shutdown whenever the plant has been in Cold Shutdown for 72 hours or more and if leakage testing has not been performed in the previous 9 months and (b) within 24 hours following valve actuation due to automatic or manual action or flow through the valve. Provide additional information to assure that the Limerick plant has the following plant features: (1) full closure of PIV's is verified in the control room by direct monitoring position indicators, (2) inadvertent opening of PIV's is prevented by interlocks which require the primary system pressure to be below subsystem design pressure prior to openings, and (3) gross intersystem leakages into the low-pressure core spray, residual heat removal/low-pressure coolant injection, and residual heat removal/shutdown cooling return and suction lines would be detected by high-pressure alarms and increases in the suppression pool level. With these plant features in place, the PIV's are controlled and verified continuously rather than at the intervals specified in (a) and (b) above and then, the exception for relief from the surveillance requirements (a) and (b) could be accepted.

Response

The Limerick Generating Station Technical Specifications (Section 4.4.3.2, as modified during the NRC meetings, held June 11-15, 1984) and the Limerick Pump and Valve Inservice Testing Program Plan require that Reactor Coolant System Pressure Isolation Valves (RCS-PIV) be leak tested:

a) At least once per 18 months, and

b) Prior to returning the valve to service following maintenance, repair or replacement work on the valve which could affect its leakage rate.

The additional surveillance requirements (a) and (b) listed in the question above are not required because Limerick has the following features:

1) All RCS-PIV's listed in Tech. Spec. Table 3.4.3.2-1 have position indication in the control room.

2) All low pressure piping systems isolated by the RCS-PIV's listed in Tech. Spec. Table 3.4.3.2-1 are protected by interlocks which require the reactor coolant system pressure to be below the low pressure system design pressure before a direct path may be achieved to the reactor. These interlocks are described along with all safety related high pressure/low pressure system interlocks in FSAR Section 7.6.1.2.

3) Any pressure increase caused by leakage past the Core Spray RCS-PIV's listed in Tech. Spec. Table 3.4.3.2-1 will be sensed and alarmed in the control room when the set point listed in the table is exceeded. After the first refueling outage, any pressure increase caused by leakage past the RHR system RCS-PIV's in Tech. Spec. Table 3.4.3.2-1 will be sensed and alarmed in the control room as above. Before the first refueling outage, the RHR pump discharge line pressure will be observed and recorded once per shift from indicators in the auxiliary equipment room to inform the operators of any pressure increase.

4. SER Open Issue #29 - Stiff Pipe Clamps

For all safety-related piping in the NSSS and BOP scope, identify all locations where stiff pipe clamps are used (Ref. IE Information Notice, No. 83-80, Use of Specialized Stiff Pipe Clamps). Indicate whether or not stiff clamps are located at or near welds on elbows. For those stiff clamps located at or near welds on elbows, provide information to assure that the effects of the clamp-induced pipe loadings have been adequately considered in the Limerick piping design and show that the calculated piping stresses for these situations are within applicable code allowables. The information on E-System pipe clamps for the core spray line and feedwater line provided in the letter from J. Kemper to R. Purple dated May 4, 1983 is acceptable. In addition, for such clamps, we will require a commitment to ensure post-installation control of the clamp preload.

Response

A list of E-System clamps installed on BOP and NSSS piping is attached. This list identifies hanger numbers, part numbers and clamp locations for each piping system. Stress evaluations to consider clamp induced stresses for E-System clamps located at or near elbow welds have been completed. These stress evaluations were performed for BOP piping. The evaluation results showed that piping stresses are within the applicable code allowables. These results concur with investigations by both General Electric Company and Bechtel Corporation which indicated that "stiff" pipe clamps do not cause stresses or fatigue levels higher than the governing stresses or fatigue levels in these piping systems.

Preload requirements for the E-System clamp installation are controlled by specification 8031-P-143-30-7. This specification is also used to control post installation preload of the E-System clamps.

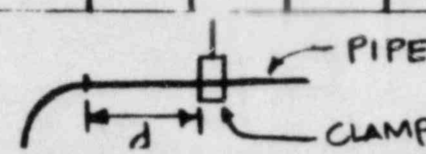
LIMERICK UNIT-1

LIST OF 'STIFF' CLAMPS USED ON SAFETY RELATED SYSTEMS

I. BECHTEL PIPING

	SYSTEM	PIPE				CLAMP			LOCATION				REMARKS
		LINE NO.	OD (INCH)	THICKNESS (INCH)	$\sqrt{rt}$ (INCH)	HGR. NO.	PART NO.		ON STRAIGHT PIPE	ON ELBOW	ON ELBOW WELD	CLOSE TO ELBOW*	
1	MSRV	GBC-101	12	.375	1.524	GBC-101-H103	157760		✓				
2	MSRV	GBC-101	12	.375	1.524	GBC-101-H122	157760		✓				
3	MSRV	GBC-101	12	.375	1.524	GBC-101-H170	157760		✓				
4	MSRV	GBC-101	12	.375	1.524	GBC-101-H148	157760		✓				
5	MSRV	GBC-101	12	.375	1.524	GBC-101-H172	157760		✓				
6	MSRV	GBC-101	12	.375	1.524	GBC-101-H176	157760		✓				
7	MSRV	GBC-101	12	.375	1.524	GBC-101-H86	157740		✓				
8	MSRV	GBC-101	12	.375	1.524	GBC-101-H139	157760		✓				
9	MSRV	GBC-101	12	.375	1.524	GBC-101-H142	157740		✓				
10	MSRV	GBC-101	12	.375	1.524	GBC-101-H159	157760		✓				
11	MSRV	GBC-101	12	.375	1.524	GBC-101-H165	157760		✓				

*$d \leq \sqrt{rt}$ WHERE: r = MEAN RADIUS
t = NOMINAL THICKNESS OF PIPE



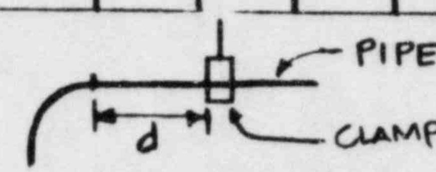
LIMERICK UNIT-1

LIST OF 'STIFF' CLAMPS USED ON SAFETY RELATED SYSTEMS

I. BECHTEL PIPING

	SYSTEM	PIPE				CLAMP			LOCATION				REMARKS
		LINE NO.	OD (INCH)	THICKNESS (INCH)	$\sqrt{rt}$ (INCH)	HGR. NO.	PART NO.		ON STRAIGHT PIPE	ON ELBOW	ON ELBOW WELD	CLOSE* TO ELBOW	
12	MSRV	GBC-101	12	.375	1.524	GBC-101-H187	157760		✓				
13	MSRV	GBC-101	12	.375	1.524	GBC-101-H192	157760			✓			
14	RHR	DLA-112	12	1.218	3.725	DLA-112-H11	157760		✓				
15	RHR	DLA-112	12	.687	2.036	DLA-112-H16	157760		✓				
16	RHR	DLA-112	12	.687	2.036	DLA-112-H17	157760		✓				
17	RHR	DLA-112	12	.687	2.036	DLA-112-H24	157760		✓				
18	RHR	DCA-318	12	.687	2.036	DCA-318-H2	157760		✓				
19	FW	DLA-106	24	1.812	4.484	DLA-106-H3	157762		✓				
20	FW	DLA-107	12	.687	2.036	DLA-107-H22	157760		✓				
21	FW	DLA-105	24	1.812	4.484	DLA-105-H3	157762		✓				

*$d \leq \sqrt{rt}$ WHERE: r = MEAN RADIUS
t = NOMINAL THICKNESS OF PIPE



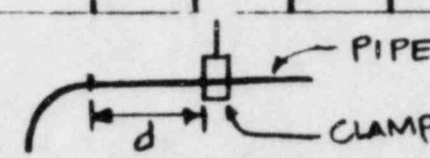
LIMERICK UNIT-1

LIST OF 'STIFF' CLAMPS USED ON SAFETY RELATED SYSTEMS

I. BECHTEL PIPING

	SYSTEM	PIPE				CLAMP			LOCATION				REMARKS
		LINE NO.	OD (INCH)	THICKNESS (INCH)	$\sqrt{rt}$ (INCH)	HGR. NO.	PART NO.		ON STRAIGHT PIPE	ON ELBOW	ON ELBOW WELD	CLOSE* TO ELBOW	
22	FW	DLA-107	24	1.218	3.725	DLA-107-H10	157762		✓				
23	FW	DLA-107	24	1.218	3.725	DLA-107-H11	157762					✓	1/2" FROM WELD
24	FW	DLA-107	24	1.218	3.725	DLA-107-H25	157762		✓				SPRING
25	FW	DLA-108	24	1.218	3.725	DLA-108-H1	157762		✓				SPRING
26	FW	DLA-108	24	1.218	3.725	DLA-108-H11	157762		✓				
27	FW	DLA-108	24	1.218	3.725	DLA-108-H12	157762		✓				
28	FW	DLA-107	12	.687	2.036	DLA-107-H23	157760		✓				
29	CS	DCA-319	12	.687	2.036	DCA-319-H2	157760				✓		
30	CS	DCA-320	12	.687	2.036	DCA-320-H2	157760				✓		

*$d \leq \sqrt{rt}$ WHERE: r = MEAN RADIUS
t = NOMINAL THICKNESS OF PIPE



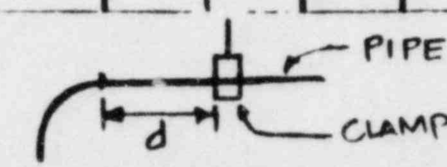
LIMERICK UNIT-1

LIST OF 'STIFF' CLAMPS USED ON SAFETY RELATED SYSTEMS

II. G.E. PIPING

	SYSTEM	PIPE				CLAMP			LOCATION				REMARKS
		LINE NO.	OD (INCH)	THICKNESS (INCH)	$\sqrt{rt}$ (INCH)	HGR. NO.	PART NO.		ON STRAIGHT PIPE	ON ELBOW	ON ELBOW WELD	CLOSE TO ELBOW*	
1	RECIRC. LOOP 'A'	—	28	1.285	4.143	VRR-1RD-H1	157703		✓				
2	RECIRC. LOOP 'A'	—	28	1.285	4.143	VRR-1RD-H2	157703		✓				
3	RECIRC. LOOP 'A'	—	22	1.009	3.255	VRR-1RD-H3	157701		✓				
4	RECIRC. LOOP 'A'	—	22	1.009	3.255	VRR-1RD-H4	157701		✓				
5	RECIRC. LOOP 'A'	—	22	1.009	3.255	VRR-1RD-H5	157701		✓				
6	RECIRC. LOOP 'A'	—	22	1.009	3.255	VRR-1RD-H6	157701		✓				
7	RECIRC. LOOP 'A'	—	22	1.009	3.255	VRR-1RD-H7	167701		✓				
8	RECIRC. LOOP 'A'	—	28	1.285	4.143	VRR-1RD-H8	157703		✓				
9	RECIRC. LOOP 'A'	—	28	1.285	4.143	VRR-1RD-H9	157768		✓				
10	RECIRC. LOOP 'A'	—	28	1.285	4.143	VRR-1RD-H10	157703			✓			
11	RECIRC. LOOP 'B'	—	28	1.285	4.143	VRR-1RD-H11	157703		✓				

* $d \le \sqrt{rt}$ WHERE: r = MEAN RADIUS, t = NOMINAL THICKNESS OF PIPE



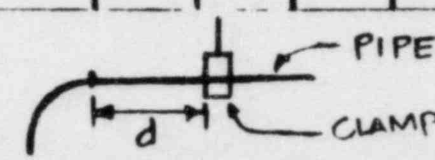
LIMERICK UNIT-1

LIST OF 'STIFF' CLAMPS USED ON SAFETY RELATED SYSTEMS

II. G.E. PIPING

	SYSTEM	PIPE				CLAMP			LOCATION				REMARKS
		LINE NO.	OD (INCH)	THICKNESS (INCH)	$\sqrt{rt}$ (INCH)	HGR. NO.	PART NO.		ON STRAIGHT PIPE	ON ELBOW	ON ELBOW WELD	CLOSE* TO ELBOW	
12	RECIRC. LOOP 'B'	–	28	1.285	4.143	VRR-1RD-H12	157703		✓				
13	RECIRC. LOOP 'B'	–	22	1.009	3.255	VRR-1RD-H13	157701		✓				
14	RECIRC. LOOP 'B'	–	22	1.009	3.255	VRR-1RD-H14	157701		✓				
15	RECIRC. LOOP 'B'	–	22	1.009	3.255	VRR-1RD-H15	157701		✓				
16	RECIRC. LOOP 'B'	–	22	1.009	3.255	VRR-1RD-H16	157701		✓				
17	RECIRC. LOOP 'B'	–	22	1.009	3.255	VRR-1RD-H17	157701		✓				
18	RECIRC. LOOP 'B'	–	28	1.285	4.143	VRR-1RD-H18	157703		✓				
19	RECIRC. LOOP 'B'	–	28	1.285	4.143	VRR-1RD-H19	157768		✓				
20	RECIRC. LOOP 'B'	–	28	1.285	4.143	VRR-1RD-H20	157703			✓			
21	RECIRC. LOOP 'A'	–	28	1.285	4.143	VRR-1RS-H1	157703		✓				
22	RECIRC. LOOP 'A'	–	28	1.285	4.143	VRR-1RS-H2	157703		✓				

*$d \leq \sqrt{rt}$ WHERE: r = MEAN RADIUS
t = NOMINAL THICKNESS OF PIPE



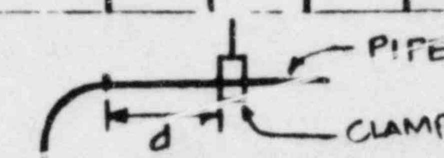
LIMERICK UNIT-1

LIST OF 'STIFF' CLAMPS USED ON SAFETY RELATED SYSTEMS

II. G.E. PIPING

	SYSTEM	PIPE				CLAMP			LOCATION				REMARKS
		LINE NO.	OD (INCH)	THICKNESS (INCH)	$\sqrt{rt}$ (INCH)	HGR. NO.	PART NO.		ON STRAIGHT PIPE	ON ELBOW	ON ELBOW WELD	CLOSE* TO ELBOW	
23	RECIRC. LOOP 'A'	-	28	1.285	4.143	VRR-1RS-H3	157703		✓				
24	RECIRC. LOOP 'A'	-	28	1.285	4.143	VRR-1RS-H4	157768					✓	1 7/8" FROM ELBOW WELD
25	RECIRC. LOOP 'A'	-	28	1.285	4.143	VRR-1RS-H5	157703		✓				
26	RECIRC. LOOP 'B'	-	28	1.285	4.143	VRR-1RS-H6	157703		✓				
27	RECIRC. LOOP 'B'	-	28	1.285	4.143	VRR-1RS-H7	157703		✓				
28	RECIRC. LOOP 'B'	-	28	1.285	4.143	VRR-1RS-H8	157703		✓				
29	RECIRC. LOOP 'B'	-	28	1.285	4.143	VRR-1RS-H9	157768					✓	2" FROM ELBOW WELD
30	RECIRC. LOOP 'B'	-	28	1.285	4.143	VRR-1RS-H10	157703		✓				
31	MS 'A'	-	26	1.013	3.558	APE-1MS-H1	157702		✓				
32	MS 'A'	-	26	1.013	3.558	APE-1MS-H2	157702					✓	1/4" FROM ELBOW WELD
33	MS 'A'	-	26	1.013	3.558	APE-1MS-H3	157702		✓				

*$d \leq \sqrt{rt}$ WHERE: r = MEAN RADIUS
t = NOMINAL THICKNESS OF PIPE



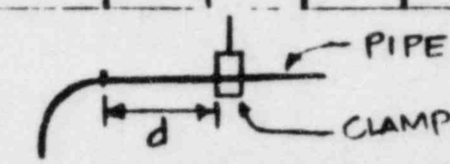
LIMERICK UNIT-1

LIST OF 'STIFF' CLAMPS USED ON SAFETY RELATED SYSTEMS

II. G.E. PIPING

	SYSTEM	PIPE				CLAMP			LOCATION				REMARKS
		LINE NO.	OD (INCH)	THICKNESS (INCH)	$\sqrt{rt}$ (INCH)	HGR. NO.	PART NO.		ON STRAIGHT PIPE	ON ELBOW	ON ELBOW WELD	CLOSE TO ELBOW*	
34	MS 'A'	–	26	1.013	3.558	APE-IMS-H4	157702		✓				
35	MS 'A'	–	26	1.013	3.558	APE-IMS-H5	157702		✓				
36	MS 'A'	–	26	1.013	3.558	APE-IMS-H6	157702		✓				
37	MS 'A'	–	26	1.013	3.558	APE-IMS-H7	157702		✓				
38	MS 'A'	–	26	1.013	3.558	APE-IMS-H8	157702		✓				
39	MS 'B'	–	26	1.013	3.558	APE-IMS-H9	157702		✓				
40	MS 'B'	–	26	1.013	3.558	APE-IMS-H10	157702		✓				
41	MS 'B'	–	26	1.013	3.558	APE-IMS-H11	157702		✓				
42	MS 'B'	–	26	1.013	3.558	APE-IMS-H12	157702		✓				
43	MS 'B'	–	26	1.013	3.558	APE-IMS-H13	157702		✓				
44	MS 'B'	–	26	1.013	3.558	APE-IMS-H14	157702		✓				

*$d \leq \sqrt{rt}$ WHERE: r = MEAN RADIUS
t = NOMINAL THICKNESS OF PIPE



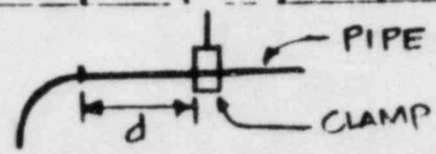
LIMERICK UNIT-1

LIST OF 'STIFF' CLAMPS USED ON SAFETY RELATED SYSTEMS

II. G.E. PIPING

	SYSTEM	PIPE				CLAMP			LOCATION				REMARKS
		LINE NO.	OD (INCH)	THICKNESS (INCH)	$\sqrt{rt}$ (INCH)	HGR. NO.	PART NO.		ON STRAIGHT PIPE	ON ELBOW	ON ELBOW WELD	CLOSE* TO ELBOW	
45	MS 'B'	-	26	1.013	3.558	APE-IMS-H15	157702		✓				
46	MS 'B'	-	26	1.013	3.558	APE-IMS-H16	157702		✓				
47	MS 'B'	-	26	1.013	3.558	APE-IMS-H17	157702		✓				
48	MS 'C'	-	26	1.013	3.558	APE-IMS-H18	157702		✓				
49	MS 'C'	-	26	1.013	3.558	APE-IMS-H19	157702		✓				
50	MS 'C'	-	26	1.013	3.558	APE-IMS-H20	157702		✓				
51	MS 'C'	-	26	1.013	3.558	APE-IMS-H21	157702		✓				
52	MS 'C'	-	26	1.013	3.558	APE-IMS-H22	157702					✓	½" FROM ELBOW WELD
53	MS 'C'	-	26	1.013	3.558	APE-IMS-H23	157702		✓				
54	MS 'C'	-	26	1.013	3.558	APE-IMS-H24	157702		✓				
55	MS 'C'	-	26	1.013	3.558	APE-IMS-H25	157702		✓				

*$d \leq \sqrt{rt}$ WHERE: r = MEAN RADIUS
t = NOMINAL THICKNESS OF PIPE



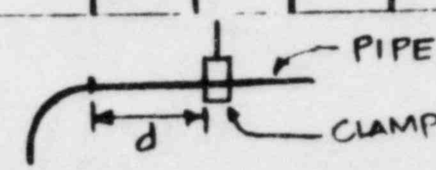
LIMERICK UNIT-1

LIST OF 'STIFF' CLAMPS USED ON SAFETY RELATED SYSTEMS

II. G.E. PIPING

	SYSTEM	PIPE				CLAMP			LOCATION				REMARKS
		LINE NO.	OD (INCH)	THICKNESS (INCH)	$\sqrt{rt}$ (INCH)	HGR. NO.	PART NO.		ON STRAIGHT PIPE	ON ELBOW	ON ELBOW WELD	CLOSE* TO ELBOW	
56	MS 'C'	–	26	1.013	3.558	APE-1MS-H26	157702		✓				
57	MS 'D'	–	26	1.013	3.558	APE-1MS-H27	157702		✓				
58	MS 'D'	–	26	1.013	3.558	APE-1MS-H28	157702		✓				
59	MS 'D'	–	26	1.013	3.558	APE-1MS-H29	157702		✓				
60	MS 'D'	–	26	1.013	3.558	APE-1MS-H30	157702		✓				
61	MS 'D'	–	26	1.013	3.558	APE-1MS-H31	157702		✓				
62	MS 'D'	–	26	1.013	3.558	APE-1MS-H32	157702		✓				
63	MS 'D'	–	26	1.013	3.558	APE-1MS-H33	157702		✓				
64	MS 'D'	–	26	1.013	3.558	APE-1MS-H34	157702		✓				

*$d \leq \sqrt{rt}$ WHERE: r = MEAN RADIUS
t = NOMINAL THICKNESS OF PIPE



Attachment 2

Response to NRC MEB Question 1
from NRC Letter Dated June 11, 1984

Including the following specifciations:

Specification 8031-P-362, Specification for Test Requirements for Hot Deflection Testing of ASME Section III Nuclear Class 1, 2, 3 and ANSI B31.1 Bechtel Piping for the Limerick Generating Station, Units 1 and 2.

Specifiction 8031-P-363, Specification for Requirements for Steady State Vibration Testing of ASME Section III Nuclear Class 1, 2, 3 and ANSI B31.1 Bechtel Piping for the Limerick Generating Station, Units 1 and 2.

Specification 8031-P-364, Specification for Test Requirements for Dynamic Transient Testing of ASME Section III Nuclear Class 1, 2, 3 and ANSI B31.1 Bechtel Piping for the Limerick Generating Station, Units 1 and 2.

RDC/gra/08068403