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MURRAY R. EDELMAN
VICE PRESIDENT
NUCLEAR

October 1, 1984
PY-CEI/NRR-0144 L

Mr. B. J. Youngblood, Chief
Licensing Branch No. 1
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Perry Nuclear Power Plant
Docket Nos. 50-440; 50-441
Response to NRC Question
No. 210.15 - Request for
Additional Information
Pertaining to the Use of
"Stiff" Piping Clamps

Dear Mr. Youngblood:

This letter and its attachments are provided in response to your request for additional information dated March 19, 1984, regarding the use of the "stiff" piping clamps in ASME piping systems at the Perry Nuclear Power Plant, Units 1 & 2.

Attachment A to this response lists the "stiff" pipe clamp applications at Perry. The results of our evaluation of the effects of "stiff" piping clamps is also provided.

If you have any additional questions, please feel free to contact me.

Very truly yours,

M. Kaplan for M. Edelman
Murray R. Edelman
Vice President
Nuclear Group

Attachments

MRE:njc

cc: Jay Silberg, Esq.
John Stefano
J. Grobe

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PDR ADOCK 05000440
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Boo!
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Q210.15 In order for the staff to review the pipe-to-pipe clamp interface design in cases where "stiff" pipe clamps are used in the Perry design, it is requested that the following information be furnished for NRC staff consideration:

1. Identify the "stiff" pipe clamps installed, or expected to be installed in Perry, Units 1 & 2.
2. Also identify the systems in which "stiff" pipe clamps are installed, and the vendor for each clamp.
3. Describe, in detail, how the localized loads from these "stiff" pipe clamps to the piping system are accounted for in the analyses performed for all ASME Code, Class 1, 2 and 3 piping systems.
4. Discuss how the special installation and post-installation requirements are controlled for "stiff" pipe clamps.

RESPONSE

Items 1. & 2.

Attachment A lists all "stiff" (E-Systems or Western) pipe clamps installed or to be installed at Perry. The support mark number, system, ASME code class and vendor is identified for each.

Item 3.

The effects of the local stresses induced in piping at the location of pipe clamps (and other non-welded attachments) are considered minor relative to those occurring at other locations in the system, for which explicit ASME Class 1 evaluations are performed. This implicit consideration is based on the nature of the clamp-induced stresses and their relative significance in comparison to similar stress effects at other discontinuity locations within a piping system.

The ASME Code Section III does not require detailed analysis for all types of loadings a given piping system may undergo. Those loadings and components which exhibit unique stress intensification and certain other design concerns receive special treatment in the Code. Other components, such as attachments, must be taken into account relative to their effect on the overall design qualification. Based on the engineering judgement that clamp-induced stresses are relatively minor, no detailed calculations have been performed by our architect engineer, GAI (Gilbert Associates, Inc.). This approach is consistent with the current industry practice and meets the intent of the ASME code and current staff requirements, stated in the Standard Review Plan, Section 3.9. However, in order to provide analytical justification that clamp-induced stresses are adequately considered, CEI has completed an evaluation of the effects of "stiff" pipe clamps of ASME Code piping systems

and have determined that use of these components does not affect the safety of the plant.

Ten specific clamp applications were selected for detailed analysis on the basis of magnitude of pre-load, system safety function, design pressure and temperature, and stress level in the pipe. This group of clamps evaluated is a representative sample of all clamp applications specified by both NSSS (General Electric) and BOP (Gilbert Associates) design scopes. The clamp-induced stress in the piping, resulting from clamp preload, pipe internal pressure, thermal effects and applied dynamic load, were compared to stresses determined at other specifically analyzed locations in the piping systems, and found to be acceptable.

Item 4.

Installation Controls

During the construction phase, installation contractors perform their work in accordance with detailed approved procedures. These contractor procedures are based on approved manufacturer's installation manuals and drawings, as well as pipe support design drawings and erection standards. All work is monitored, inspected and verified by the contractors' ASME Section III Quality Assurance Programs.

Post-Installation Controls

In performing the evaluation described in item 3, it became apparent that the preloads specified by the vendor might be unnecessarily high for many clamps. As a result of discussions with E-Systems Inc. we have determined that many of the specified torque values can be significantly reduced without compromising load rating. Given the relatively low torque values now specified for these clamps we do not consider it necessary to implement special requirements for post-installation/operational verification of these components.

ATTACHMENT A

List of "Stiff" Pipe Clamp Applications
at
Perry Nuclear Power Plant

SYSTEM DESIGNATIONS

<u>B</u>		<u>STEAM GENERATOR SYSTEM</u>
B21	-	Nuclear Boiler System
<u>E</u>		<u>CORE COOLING AND CONTAINMENT SYSTEM</u>
E12	-	Residual Heat Removal System
E21	-	Low Pressure Core Spray System
E22	-	High Pressure Core Spray System
E31	-	Reactor Core Isolation Cooling System
<u>F</u>		<u>SERVICE & HANDLING EQUIPMENT</u>
F42	-	Fuel Transfer Equipment
<u>G</u>		<u>CLEAN-UP AND FILTERING SYSTEM</u>
G33	-	Reactor Water Clean-up System
G41	-	Fuel Pool Cooling and Clean-up System
G43	-	Suppression Pool Make-up System
<u>M</u>		<u>HVAC</u>
M14	-	Containment Vessel and Drywell Purge Systems
M17	-	Containment Vacuum Relief System
M51	-	Combustible Gas Control System
<u>N</u>		<u>MAIN LOOP SYSTEM</u>
N27	-	Feedwater System
<u>P</u>		<u>AUXILIARY SYSTEMS</u>
P42	-	Emergency Closed Cooling System
P43	-	Nuclear Closed Cooling System
P45	-	Emergency Service Water System

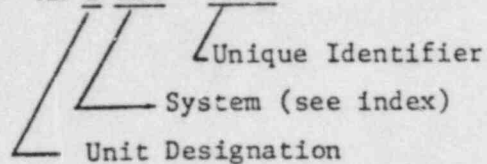
GAI SCOPE OF SUPPLY

FORMAT

1.

1. Support Mark Number:

Example: Mk-1 E12 - H002



2. ASME Code Class:

3. Type:

CLC = E-Systems

CLD = Western

4. Quantity:

5. Unit Category (Designation)

1 PNPP Unit 1

2 PNPP Unit 2

0 Common

PERRY NUCLEAR POWER PLANT
PIPE SUPPORT DATA BASE
CLAMPS

SUPT. MK. NO.	DM	ASME CLSS	TYPE	QTY	BLDG/ ELEV	VOID	UNT CAT
MK-1E12-H0055	01	1	CLC	01	RB612		1
MK-1E12-H0267	01	1	CLC	01	RB601		1
MK-1E12-H0270	01	1	CLC	01	RB612		1
MK-1E21-H0001	01	1	CLC	01	RB634		1
MK-1E21-H0002	01	1	CLC	01	RB634		1
MK-1E22-H0001	01	1	CLC	01	RB635		1
MK-1E22-H0002	01	1	CLC	01	RB634		1
MK-1G33-H0090	01	1	CLC	01	RB588		1
MK-1G33-H0211	01	1	CLC	01	RB588		1
MK-1N27-H0001	01	1	CLC	01	RB630		1
MK-1N27-H0002	01	1	CLC	01	RB630		1
MK-1N27-H0004	01	1	CLC	01	RB625		1
MK-1N27-H0005	01	1	CLC	01	RB625		1
MK-1N27-H0006	01	1	CLC	01	RB625		1
MK-1N27-H0007	01	1	CLC	01	RB625		1
MK-1N27-H0008	01	1	CLC	01	RB625		1
MK-1N27-H0009	01	1	CLC	01	RB625		1
MK-1N27-H0013	01	1	CLC	01	RB630		1
MK-1N27-H0014	01	1	CLC	01	RB630		1
MK-1N27-H0016	01	1	CLC	01	RB625		1
MK-1N27-H0017	01	1	CLC	01	RB625		1
MK-1N27-H0018	01	1	CLC	01	RB625		1
MK-1N27-H0019	01	1	CLC	01	RB625		1
MK-1N27-H0020	01	1	CLC	01	RB625		1
MK-1N27-H0021	01	1	CLC	01	RB625		1
MK-1N27-H0025	01	1	CLC	01	RB625		1
MK-1N27-H0026	01	1	CLC	01	RB625		1
MK-1N27-H0028	01	1	CLC	01	RB625		1

PERRY NUCLEAR POWER PLANT
 PIPE SUPPORT DATA BASE
 CLAMPS

SUPT. MK. NO.	DM	ASME CLASS	TYPE	QTY	BLDG/ ELEV	VOID	UNT CAT
MK-1E12-H0073	01	2	CLC	01	RB659		1
MK-1E12-H0035	01	2	CLC	01	RB589		1
MK-1E12-H0169	01	2	CLC	01	AX571		1
MK-1E12-H0170	01	2	CLC	01	AX571		1
MK-1E12-H0219	00	2	CLC	01	AX583		1
MK-1E12-H0258	00	2	CLC	01	AX590		1
MK-1E12-H0261	00	2	CLC	01	AX590		1
MK-1E12-H0288	01	2	CLC	01	AX572		1
MK-1E12-H0292	01	2	CLC	01	AX572		1
MK-1E12-H0295	01	2	CLC	01	AX586		1
MK-1E12-H0313	01	2	CLC	01	AX579		1
MK-1E12-H0315	01	2	CLC	01	AX575		1
MK-1E12-H0323	01	2	CLC	01	AX615		1
MK-1E12-H0361	01	2	CLC	01	AX575		1
MK-1E12-H0365	01	2	CLC	01	AX572		1
MK-1E12-H0367	01	2	CLC	01	AX572		1
MK-1E12-H0373	01	2	CLC	01	AX588		1
MK-1E12-H0386	01	2	CLC	01	AX618		1
MK-1E12-H0388	01	2	CLC	01	AX618		1
MK-1E12-H0392	01	2	CLC	01	AX606		1
MK-1E12-H0423	01	2	CLC	01	AX590		1
MK-1E12-H0425	01	2	CLC	01	AX614		1
MK-1E12-H0431	01	2	CLC	01	AX605		1
MK-1E12-H0491	01	2	CLC	01	AX617		1
MK-1E12-H0524	01	2	CLC		AX594		1
MK-1E12-H0533	01	2	CLC	01	AX602		1
MK-1E21-H0022	01	2	CLC	01	AX581		1

PERRY NUCLEAR POWER PLANT
PIPE SUPPORT DATA BASE
CLAMPS

SUPT. MK. NO.	DM	ASME CLSS	TYPE	QTY	BLDG/ ELEV	VOID	UNT CAT
MK-1E22-H0047	01	2	CLC	01	AX584		1
MK-1E22-H0053	01	2	CLC	01	AX584		1
MK-1E22-H0055	01	2	CLC	01	AX590		1
MK-1E22-H0057	01	2	CLC	01	AX592		1
MK-1E22-H0060	01	2	CLC	01	AX598		1
MK-1E22-H0107	01	2	CLC	01	AX584		1
MK-1E22-H0123	01	2	CLC	01	AX624		1
MK-1E32-H0192	01	2	CLC	01	AX629		1
MK-1E32-H0211	01	2	CLC	01	RB618		1
MK-1E32-H0215	01	2	CLC	01	RB618		1
MK-1E51-H0055	01	2	CLC	01	AX590		1
MK-1E51-H0086	01	2	CLC	01	RB597		1
MK-1E51-H0087	01	2	CLC	01	RB590		1
MK-1F42-H0001	01	2	CLC	01	RB621		1
MK-1F42-H0002	01	2	CLC	01	RB621		1
MK-1F42-H0003	01	2	CLC	01	RB621		1
MK-1G43-H0006	01	2	CLC	01	RB663		1
MK-1G43-H0012	01	2	CLC	01	RB664		1
MK-1M14-H0005	01	2	CLC	01	RB674		1
MK-1M14-H0006	01	2	CLC	01	RB674		1
MK-1M14-H0007	01	2	CLC	01	RB701		1
MK-1M14-H0008	01	2	CLC	01	RB701		1
MK-1M17-H0001	01	2	CLC	01	RB693		1
MK-1M17-H0004	01	2	CLC	01	RB693		1
MK-1M17-H0007	01	2	CLC	01	RB693		1
MK-1M17-H0010	01	2	CLC	01	RB693		1
MK-1M51-H0040	01	2	CLC	01	RB629		1
MK-1M51-H0041	01	2	CLC	01	RB629		1
MK-1M51-H0042	01	2	CLC	01	RB629		1
MK-1M51-H0043	01	2	CLC	01	RB629		1
MK-1M51-H0045	01	2	CLC	01	RB628		1
MK-1M51-H0046	01	2	CLC	01	RB628		1
MK-1P45-H0515	01	2	CLC	01	DG631		0

PERRY NUCLEAR POWER PLANT
 PIPE SUPPORT DATA BASE
 CLAMPS

SUPT. MK. NO.	DM	ASME CLSS	TYPE	QTY	BLDG/ ELEV	VOID	UNT CAT
MK-1B21-H0007	01	3	CLC	01	RB606		1
MK-1B21-H0010	02	3	CLC	01	RB621		1
MK-1B21-H0020	01	3	CLC	01	RB606		1
MK-1B21-H0025	02	3	CLC	01	RB626		1
MK-1B21-H0029	01	3	CLC	01	RB606		1
MK-1B21-H0042	01	3	CLC	01	RB606		1
MK-1B21-H0049	01	3	CLC	01	RB608		1
MK-1B21-H0054	01	3	CLC	01	RB605		1
MK-1B21-H0063	01	3	CLC	01	RB604		1
MK-1B21-H0065	02	3	CLC	01	RB619		1
MK-1B21-H0069	02	3	CLC	01	RB621		1
MK-1B21-H0074	01	3	CLC	01	RB605		1
MK-1B21-H0086	01	3	CLC	01	RB605		1
MK-1B21-H0092	02	3	CLC	01	RB621		1
MK-1B21-H0095	01	3	CLC	01	RB609		1
MK-1B21-H0098	01	3	CLC	01	RB626		1
MK-1B21-H0106	02	3	CLC	01	RB625		1
MK-1B21-H0107	01	3	CLC	01	RB606		1
MK-1B21-H0114	01	3	CLC	01	RB621		1
MK-1B21-H0117	01	3	CLC	01	RB621		1
MK-1B21-H0119	01	3	CLC	01	RB606		1
MK-1B21-H0122	01	3	CLC	01	RB615		1
MK-1B21-H0127	01	3	CLC	01	RB606		1
MK-1B21-H0135	01	3	CLC	01	RB606		1
MK-1B21-H0140	02	3	CLC	01	RB620		1
MK-1B21-H0141	01	3	CLC	01	RB606		1
MK-1B21-H0150	01	3	CLC	01	RB624		1
MK-1B21-H0151	02	3	CLC	01	RB624		1
MK-1B21-H0153	01	3	CLC	01	RB609		1
MK-1B21-H0154	01	3	CLC	01	RB624		1
MK-1B21-H0162	01	3	CLC	01	RB606		1
MK-1B21-H0170	02	3	CLC	01	RB621		1
MK-1B21-H0174	02	3	CLC	01	RB626		1
MK-1B21-H0181	01	3	CLC	01	RB607		1

PERRY NUCLEAR POWER PLANT
 PIPE SUPPORT DATA BASE
 CLAMPS

SUPT. MK. NO.	DM	ASME CLSS	TYPE	QTY	BLDG/ ELEV	VOID	UNT CAT
MK-1E22-H0134	01	3	CLC	01	DG638		0
MK-1E22-H0136	02	3	CLC	01	DG639		0
MK-1G41-H0228	01	3	CLC	01	AX609		1
MK-1G41-H0236	01	3	CLC	01	AX611		1
MK-1G41-H0238	01	3	CLC	01	AX607		1
MK-1G41-H0242	01	3	CLC	01	IB610		0
MK-1G41-H0244	01	3	CLC	01	AX607		1
MK-1M51-H0080	01	3	CLC	01	RB658		1
MK-1P42-H0101	01	3	CLC	01	AX594		1
MK-1P42-H0242	01	3	CLC	02	CC588		0
MK-1P42-H0296	01	3	CLC	01	IB632		0
MK-1P43-H0056	01	3	CLC	01	IB604		0
MK-1P45-H0068	01	3	CLC	01	AX593		1
MK-1P45-H0069	01	3	CLC	01	AX593		1
MK-1P45-H0073	01	3	CLC	01	AX615		1
MK-1P45-H0074	01	3	CLC	01	AX615		1
MK-1P45-H0076	01	3	CLC	01	AX612		1
MK-1P45-H0101	01	3	CLC	01	AX581		1
MK-1P45-H0129	01	3	CLC	01	AX580		1
MK-1P45-H0141	01	3	CLC	01	AX590		1
MK-1P45-H0163	01	3	CLC	01	AX596		1
MK-1P45-H0270	01	3	CLC	01	AX589		1
MK-1P45-H0273	01	3	CLC	01	AX614		1
MK-1P45-H0292	01	3	CLC	01	AX583		1
MK-1P45-H0422	01	3	CLC	01	CC589		0
MK-1P45-H0509	01	3	CLC	01	DG636		0
MK-1P45-H0510	01	3	CLC	01	DG635		0
MK-1P45-H0516	01	3	CLC	01	DG633		0
MK-1P45-H0521	01	3	CLC	01	DG633		0
MK-1P45-H0526	01	3	CLC	01	DG633		0

PERRY NUCLEAR POWER PLANT
 PIPE SUPPORT DATA BASE
 CLAMPS

SUPT. MK. NO.	DM	ASME CLASS	TYPE	QTY	BLDG/ ELEV	VOID	UNT CAT
MK-1E12-H0077	00	2	CLD	01	RB604		1
MK-1E12-H0084	01	2	CLD	01	RB598		1
MK-1E12-H0089	01	2	CLD	01	RB596		1
MK-1E12-H0699	01	2	CLD	01	RB647		1
MK-1E12-H0710	01	2	CLD	01	AX569		1
MK-1E21-H0085	01	2	CLD	01	AX624		1
MK-1B21-H0087	01	3	CLD	01	RB606		1
MK-1B21-H0410	01	3	CLD	01	RB626		1

PERRY NUCLEAR POWER PLANT
 PIPE SUPPORT DATA BASE
 CLAMPS

SUPT. MK. NO.	DM	ASME CLSS	TYPE	QTY	BLDG/ ELEV	VOID	UNT CAT
MK-2E12-H0151	01	2	CLC	01	AX590		2
MK-2E12-H0152	01	2	CLC	01	AX589		2
MK-2E12-H0197	01	2	CLC	01	AX590		2
MK-2F42-H0001	01	2	CLC	01	RB621		2
MK-2F42-H0002	01	2	CLC	01	RB621		2
MK-2F42-H0003	01	2	CLC	01	RB621		2
MK-2G41-H0060	01	3	CLC	01	AX609		2
MK-2G41-H0063	01	3	CLC	01	AX611		2
MK-2G41-H0071	01	3	CLC	01	AX611		2
MK-2G41-H0077	01	3	CLC	01	AX609		2
MK-2G41-H0078	01	3	CLC	01	AX609		2
MK-2G41-H0079	01	3	CLC	01	AX609		2
MK-2G41-H0080	01	3	CLC	01	AX609		2
MK-2G41-H0081	01	3	CLC	01	AX609		2
MK-2G41-H0082	01	3	CLC	01	AX609		2
MK-2G41-H0083	01	3	CLC	01	AX609		2
MK-2G41-H0084	01	3	CLC	01	AX609		2
MK-2G41-H0085	01	3	CLC	01	AX609		2
MK-2P45-H0049	01	3	CLC	01	DG633		0
MK-2P45-H0050	01	3	CLC	01	DG631		0
MK-2P45-H0057	01	3	CLC	01	DG635		0
MK-2P45-H0136	01	3	CLC	01	DG633		0
MK-2P45-H0172	01	3	CLC	01	CC615		0
MK-2P45-H0173	01	3	CLC	01	CC593		0
MK-2P45-H0175	01	3	CLC	01	DG634		0
MK-2E22-H0134	01	3	CLC	01	DG638		0
MK-2E22-H0136	01	3	CLC	01	DG639		0
MK-2G41-H0033	00	3	CLC	01	IB622		0
MK-2P42-H0066	01	3	CLC	01	CC594		0

PERRY NUCLEAR POWER PLANT
PIPE SUPPORT DATA BASE
CLAMPS

<u>SUPT. MK. NO.</u>	<u>DM</u>	<u>ASME CLSS</u>	<u>TYPE</u>	<u>QTY</u>	<u>BLDG/ ELEV</u>	<u>VOID</u>	<u>UNT CAT</u>
MK-2E12-H0022	01	2	CLD	01	RB591		2
MK-2E12-H0024	01	2	CLD	01	RB589		2
MK-2E12-H0032	01	2	CLD	01	RB590		2
MK-2E12-H0140	01	2	CLD	01	AX577		2
MK-2E12-H0288	01	2	CLD	01	AX572		2

PERRY NUCLEAR POWER PLANT
PIPE SUPPORTS
GE SCOPE OF SUPPLY

<u>UNIT</u>	<u>SUPPORT MARK NUMBER</u>	<u>SYSTEM</u>	<u>ASME CLASS</u>	<u>VENDOR</u>
1 & 2	S101A	B21	1	CLC
	S101B			
	S101C			
	S101D			
	S102A			
	S102B			
	S102C			
	S102D			
	S103A			
	S103B			
	S103C			
	S103D			
	S104A			
	S104B			
	S104C			
	S104D			
	S105B			
	S105C			
	S106A			
	S106B			
	S106C			
	S106D			

PERRY NUCLEAR POWER PLANT
 PIPE SUPPORTS
 GE SCOPE OF SUPPLY

<u>UNIT</u>	<u>SUPPORT MARK NUMBER</u>	<u>SYSTEM</u>	<u>ASME CLASS</u>	<u>VENDOR</u>
1 & 2	S107A	B21	1	CLC
	S107B			
	S107C			
	S107D			
	S108B			
	S108C			
	S301A	B33		
	S301B			
	S302A			
	S302B			
	S303A			
	S303B			
	S304A			
	S304B			
	S304A			
	S305B			
	S306A			
	S306B			
	S351A			
	S351B			
	S352A			
	S352B			
	S353A			
	S353B			

PERRY NUCLEAR POWER PLANT
PIPE SUPPORTS
GE SCOPE OF SUPPLY

<u>UNIT</u>	<u>SUPPORT MARK NUMBER</u>	<u>SYSTEM</u>	<u>ASME CLASS</u>	<u>VENDOR</u>
1 & 2	S354A	B33	1	CLC
	S354B			
	S356A			
	S356B			
	S357A			
	S357B			
	S358A			
	S358B			
	S359A			
	S359B			
	S360A			
	S360B			
	S361A			
	S361B			
	S362A			
	S362B			
	S363A			
	S363B			