Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

May 28, 1982

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: LaSalle County Station Units 1 and 2
Teledyne Open Item and Error/Deviation Reports for the LaSalle Independent Design Review, Supplemental Responses
NRC Docket Nos. 50-373 and 50-374

Reference (a): C. W. Schroeder letter to H. R. Denton dated March 16, 1982, "Independent Design Review Initial Status Report for the Period of February 11 through March 12, 1982."

(b): C. W. Schroeder letter to H. R. Denton dated May 7, 1982, "Teledyne Open Item and Error/Deviation Reports for the LaSalle Independent Design Review."

(c): C. W. Schroeder letter to H. R. Denton dated May 13, 1982, "Teledyne Open Item and Error/Deviation Report for the LaSalle Independent Design Review - Second Transmittal."

(d): C. W. Schroeder letter to H. R. Denton dated May 14, 1982, "Teledyne Open Item and Error/Deviation Reports for the LaSalle Independent Design Review - Final Transmittal; and 1st Transmittal of Responses."

(e): C. W. Schroeder letter to H. R. Denton dated May 20, 1982, "Teledyne Open Item and Error/Deviation Reports for the LaSalle Independent Design Review - Responses to Remaining Items."

(f): C. W. Schroeder letter to H. R. Denton dated May 26, 1982, "Teledyne Open Item and Error/Deviation Reports for the LaSalle Independent Design Review - Supplemental Responses."

(g): C. W. Schroeder letter to H. R. Denton dated May 27, 1982, "Teledyne Open Item and Error/Deviation Reports for the LaSalle Independent Design Review - Supplemental Responses."

B001 Add: H. Denton
1/1

Dear Mr. Denton:

Reference (a) provided you with an initial status report of the Independent Design Review being conducted at LaSalle County Station. References (b), (c), and (d) provided you with three sets of Teledyne Open Item and Error/Deviation Reports. References (d), (e), (f), and (g) also transmitted our responses and supplemental responses to the Open Item and Error/Deviation Reports. The purpose of this letter is to transmit to you additional supplemental responses.

Under separate cover, this material is being provided to Mr. James G. Keppler.

If there are any questions regarding this matter, please contact this office.

Very truly yours,

W Schroeder 5/28/82

C. W. Schroeder
Nuclear Licensing Administrator

lm

Attachment

cc: NRC Resident Inspector - LSCS - 1/0

4237N

Denton

May 28, 1982

Mr. L.O. DelGeorge:

Subject: Supplemental Response for the
LaSalle Independent Design Review

Enclosed is the final group of supplemental responses to the items identified by Teledyne. These supplemental responses provide additional clarifying information.

You should transmit this information to Mr. Denton and Mr. Keppler.

B. R. Shelton 5/28

B.R. Shelton

BRS/bmb/1604L

SARGENT & LUNDY
ENGINEERS
55 EAST MONROE STREET
CHICAGO, ILLINOIS 60603
TELEPHONE 312-269-2000

May 28, 1982
Project No. 4266-24

Commonwealth Edison Company
LaSalle County Station - Unit 1

Third Party Independent Review

Mr. B. R. Shelton
Project Engineering Manager
Commonwealth Edison Company
P. O. Box 767
Chicago, Illinois 60690

Dear Mr. Shelton:

Enclosed are 12 copies of Sargent & Lundy's supplemental responses to Open Item Reports 21, 23 and 24 and Error/Deviation Reports 11 and 17. These responses should complete our review of the Teledyne reports.

It is our understanding that Commonwealth Edison will distribute these simultaneously to Teledyne, the NRC and internally.

Yours very truly,

R. H. Pollock

R. H. Pollock
Mechanical Project Engineer

RHP:chm
In duplicate
Enclosures
Copies:
W. A. Chittenden (1/1)
E. V. Abraham (1/1)
G. C. Kuhlman (1/1)
R. J. Mazza (1/1)
E. B. Branch (1/1)
D. C. Haan (1/1)
W. G. Schwartz (1/0)
E. R. Weaver (1/1)
S. D. Killian (1/1)
A. E. Meligi (1/1)
File 85

OPEN ITEM #21

Supplemental Response

We have used the Limit Analysis approach in the analysis of Multi-Loaded Clamps;according to this procedure, the yield strength of the material is used as the maximum allowable stress. The design requirements of Appendix XVII-4000 (and also AISC) includes increasing the load by a factor when using the Limit Analysis method. This factor is 1.7 for Level A and Level B and 1.3 for Level C. We instead have used conservative method which would cause our calculated stress to be more than twice the actual stress due to the following reasons:

1. One rib only was used as an active rib while no credit was given to the other rib. This may double the value of the actual stress.
2. No credit was given to the strap which may absorb up to 25% of the applied load.
3. 32 ksi was always used as an allowable stress instead of 36 ksi.

These three factors combined if considered would reduce the calculated stress by more than half. This is equivalent to multiplying the load by a factor higher than 2.

OPEN ITEM #23

Supplemental Response

The removal of snubber RH58-1005S from node point F25A changes the piping span length from 6.61 feet to 9.61 feet of 24" standard schedule piping. When modeled as a simple-simple beam model, these spans result in first node frequencies of 230 Hz and 109 Hz respectively. The removal of snubber RHB9-1002S from node point G69 changes the piping span length from 5.27 feet to 6.94 feet of 14" standard schedule piping. When modeled as a simple-simple beam model, these spans result in first node frequencies of 253 Hz and 146 Hz respectively. By reviewing node shape displacements and participation factors of the eigenvalue solution, there is negligable response in these areas of the piping system for the first 30 modes. The first mode with a significant contribution in this area occurs at approximately 35 Hz. Removal of the above mentioned supports will not significantly shift the frequency below this value, because this area of the system is still very rigid without them based on the frequencies given above.

SARGENT & LUNDY
ENGINEERS
CHICAGO

OPEN ITEM #24

Supplemental Response

In order to substantiate the engineering judgement made concerning the impact on dynamic analysis of this interference, a dynamic analysis was made for one high frequency load (chugging) and one low frequency load (OBE) with a strut modeled at the location and in the direction of the interference. Attached is a load comparison between the restraint loads as analyzed and the restraint loads from this verification run. The results indicate that none of the restraints would experience a significant increase in design loads. One restraint, the Y restraint at NP 155, does have an increase of 19.7% in the OBE analysis, but the same restraint has a decrease of 20% in the chugging analysis, therefore the increase would be cancelled when the loads were combined. Also attached for your information is a comparison of frequencies, maximum deflections, and participation factors.

OPEN ITEM REPORT No. 24

SUPPLEMENTAL RESPONSE

Impact Loads and Additional Stress on Pipe

In order to substantiate by calculation the engineering judgement used to neglect the impact effects, a calculation was performed to determine the interaction force between the pipe and the slab and to evaluate the resulting stresses in the pipe. The calculated equivalent static load from impact is approximately 5,000 lbs. This load will create local stresses at the location of impact and global stresses throughout the span. The local stresses from a 5,000 lb. load are negligible; the stresses along the span will increase by no more than 30% of the dynamic stress in the pipe. The highest stress point in the span is at the top of the riser. Adding 30% of the combined stress (including pressure) at this point results in a new Service Level B and C stress of 15,350 and 16,200 psi respectively, still well below the Code allowable of 18,000 and 27,000 psi.

Form GO 3.08.1 Rev. 2

SARGENT & LUNDY ENGINEERS CHICAGO

Client C.E.C.O.

Project 146-1

Proj. No. 22636-00 Equip. No.

Safety-Related ☐ Non-Safety-Related ☐

Calcs. For RHR-11 MODE SHAPE COMPARISON

Prepared by [illegible] Date 5/24/22

Reviewed by Date

Approved by Date

Calc. No.

Rev. Date

Page 1 of 5

	RERUN W/ INTERFERENCE @ 184						"AS-ANALYZED"					
MODE NO.	PERIOD	MAX. MODE DEFLECTION LOCATION (NODE)	MAX. MODE DEFLECTION MAGNITUDE (INCH.)	PARTICIPATION FACTOR X	Y	Z	PERIOD	MAX. MODE DEFLECTION LOCATION (NODE)	MAX. MODE DEFLECTION MAGNITUDE (INCH.)	PARTICIPATION FAC. X	Y	Z
1	.195	180	-2.5-01	-.361	.190	-.698	.235	180	2.5-01	4.29	-.262	-.424
2	.164	170B	-7.2-02	1.711	.099	1.079	.192	180	2.5-01	1.44	-.275	.556
3	.131	170B	1.1-01	-.392	.037	5.874	.162	170B	-5.7-02	2.75	.014	1.234
4	.101	178	1.4-01	.534	1.136	-1.748	.129	180	-1.0-01	1.501	-.118	-6.04
5	.096	178	2.7-01	-1.52	-1.39	-1.11	.091	185	1.7-02	1.77	-1.65	.954
6	.089	220B	-3.8-02	1.187	-.166	-2.36	.088	220B	-3.8-02	1.35	-.149	-2.312
7	.082	195	-5.1-02	3.80	.983	2.07	.088	195	-4.2-02	4.041	.902	2.031
8	.185	195	-2.5-01	.151	-.527	-1.259	.086	195	-2.5-01	-.327	-.252	-.793
9	.078	165B	1.1-01	1.76	.369	2.23	.078	165B	1.1-01	1.503	.571	2.573
10	.071	220B	3.1-01	-2.06	3.69	-.853	.075	185	2.1-01	-.742	.640	.767
12	.060	212	-2.5-01	-.531	.857	-4.95	.065	178	-7.7-03	.188	.849	2.251
13	.054	200	-2.9-01	-1.52	-1.98	-2.46	.061	212	-2.5-01	-.511	.863	-4.119
17	.046	220A	-1.9-01	-3.59	-1.06	-1.11	.048	170B	1.5-01	1.55	-1.68	-1.324
26	.0308	180	-1.3-01	1.71	1.79	-2.03	.0314	212	-2.7-01	-.217	-1.88	-.27
29	.0284	190B	-2.8-01	-.252	.23	.326	.0296	180	4.4-02	1.13	.342	-2.71
37	.0229	214	2.0-01	.852	.658	-.539	.0232	180	-1.4-01	-.431	.809	1.45
39	.0215	180	-2.1-01	2.202	-.281	.342	.0220	210	-4.0-02	1.487	.987	1.528
43	.0189	215A	-1.6-01	-5.11	-.363	-.607	.0170	195	-2.1-01	-3.80	-.202	-.937
45	.0181	195	-3.0-01	.655	-.363	-.457	.0183	195	2.2-01	-1.86	.422	1.094
49	.0160	165B	-6.0-04	-.267	.902	.173	.0164	165B	-6.0-04	-.267	.902	.173
52	.0159	190B	2.8-01	.464	-.574	1.36	.0159	190B	-2.8-01	-.558	.527	-1.353
53	.0154	215B	-3.9-01	-.301	-2.04	-.264	.0155	215B	3.7-01	.884	1.97	.184

SARGENT LUNDY ENGINEERS CHICAGO

Calcs For RH-11 DYNAMIC, OBE

X Safety-Related | Non-Safety-Related

Calc. No.

Rev. | Date

Client C.E. CO

Project LAS-1

Proj. No. 4216-002 Equip. No.

Prepared by D.A. [illegible] Date 5/26/22

Reviewed by Date

Approved by Date

OBE LOADS

NODE	TYPE	DIREC.	NEW LOAD	OLD LOAD	% CHANGE
10A	R	X	26832	27685	-3%
18	S	Z	4355	4381	-.5%
20	R	Y	2766	3014	-8%
30	R	Y	3274	3342	-2%
33	S	Z	4227	4534	-7%
40B	S	Z	3909	4022	-3%
50A	S	Z	7603	7746	-2%
B71	S	Y	8265	8064	+2.5%
B72	S	X	7598	7296	+4.1%
B72	S	Z	5123	5057	+1.4%
86	S	X	9251	8981	+3.0%
86	S	Z	5252	5326	-1.4%
108	S	Y	8161	9479	-14.0%
109	S	Z	7170	7159	+.2%
115	S	X	7075	7854	-10.0%
125	R	Y	6748	8867	-24.0%
128	S	Z	3497	3421	+2.2%
135	R	Y	2271	2214	+2.5%
140A	S	X	3471	3945	-12.0%
147	R	Y	3100	3728	-17.0%
155	R	Y	7976	6666	+19.7%
165A	S	X	7238	6623	+9.2%
171	S	Z	12141	12971	-6.4%
* 184	R	X	7505		
185	S	Y	12802	18676	-31.5%
188	S	Z	3498	6234	-44.0%
192	S	X	5298	7539	-30.0%
192	R	Y	14010	21276	-34.0%

Form GQ 3.08.1 Rev. 2

SARGENT LUNDY ENGINEERS CHICAGO

Calcs. For RH-11 Dy[illegible], CBE

Calc. No.

Rev. | Date

Page 3 of 5

[X] Safety-Related [ ] Non-Safety-Related

Client C.E. CO

Project 1.16-1

Proj. No. 4266-00 Equip. No.

Prepared by [illegible] Date 5/26/

Reviewed by Date

Approved by Date

202	S	Z	4556	6991	-35.0%
205	R	Y	5193	5675	-8.5%
214	R	Y	9668	9909	-2.4%
217	S	Z	3497	3951	-11.4%
220E	S	X	12320	12894	-4.5%
228	S	Y	15705	16063	-2.2%
229	S	X	10330	10493	-1.6%
229	S	Z	5389	5474	-1.6%

Form GQ-3.08.1 Rev. 2

SARGENT & LUNDY ENGINEERS CHICAGO

Calcs. For RH-11 DYNAMIC, CHUG.

Calc. No.

Rev. | Date

[X] Safety-Related [ ] Non-Safety-Related

Page 4 of 5

Client C.E. Co

Project LAS-1

Proj. No. 12666-00 Equip. No.

Prepared by [illegible] Date 5/24/82

Reviewed by Date

Approved by Date

CHUGTWOPERCENT LOADS

NODE	TYPE	DIREC	NEW LOAD	OLD LOAD	% CHANGE
10A	R	X	12924	13041	-.9%
18	S	Z	2271	2326	-2.4%
20	R	Y	3504	3522	-.5%
30	R	Y	4343	4391	-1.1%
33	S	Z	3014	3069	-1.8%
40B	S	Z	1434	1445	-.8%
50A	S	Z	1739	1758	-1.1%
B71	S	Y	2449	2465	-.6%
B72	S	X	2554	2567	-.5%
B72	S	Z	3020	3000	+.7%
86	S	X	3488	3477	+.3%
86	S	Z	3962	3926	+.9%
108	S	Y	2260	2109	+7.1%
109	S	Z	6835	6734	+1.5%
115	S	X	3095	3074	+.7%
125	R	Y	1916	1788	+7.2%
128	S	Z	2881	2853	+1.0%
135	R	Y	1591	1658	-4.0%
140A	S	X	2671	2712	-1.5%
147	R	Y	1975	2062	-4.2%
155	R	Y	2545	3163	-20.0%
165A	S	X	3821	3536	+8.1%
171	S	Z	4633	4976	-6.9%
184	R	X	2017		
185	S	Y	4760	6022	-21%
188	S	Z	2303	3161	-27%
192	S	X	5590	5424	+3.0%
192	R	Y	6523	6975	-6.5%

SARGENT LUNDY ENGINEERS CHICAGO

Calcs. For RH-11 DYNAMIC, CHILD

Calc. No.

Rev. | Date

Page 5 of 5

X Safety-Related | Non-Safety-Related

Client C.E. Co

Project LAS-1

Proj. No. 4266-00 Equip. No.

Prepared by [illegible] Date 5/26/82

Reviewed by Date

Approved by Date

202	S	Z	4603	4873	-5.5%
205	R	Y	4280	4375	-2.2%
214	R	Y	2362	2385	-1.0%
217	S	Z	3740	3800	-1.6%
220E	S	X	6014	6160	-2.4%
228	S	Y	4514	4563	-1.1%
229	S	X	2081	2092	-.5%
229	S	Z	6163	6211	-.8%

Form GQ 3.08.1 Rev. 2

ERROR/DEVIATION REPORT No. 11

Supplemental Response

The 1-1/2" sockolet added at N.P. 120 has not met the requirements for examination of NB-2500, but meets the reduction in design stress of NB-3673.1. This sockolet is the same one that was added in ECN M-110-LS and is a B. F. Shaw Standard 72.1 which is attached to the piping using a full penetration weld. The 3/4" sockolet that was plugged per ECN M-110-LS is also a B. F. Shaw Standard 72.1 and meets the requirements of NB-2500.

ERROR/DEVIATION REPORT NO. 17

Supplemental Response

Each load resulting from a thermal flexibility analysis is included in all the load combinations applicable to the system, regardless of the Service Level associated with the combination. This means that all thermal modes used in the Structural analyses are combined at every applicable Service Level. The program then selects the highest positive and highest negative combined load from all the combinations for each Service Level. These design loads are then transmitted to the restraint designer. He then selects hardware comparing the design load to the hardware allowable load for each applicable Service Level.