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Standardized Nuclear Unit
Power Plant System

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Nicholas A. Petrick
Executive Director

July 24, 1980

SLNRC 80-32 FILE: 0491.10.2/M-218C
SUBJ: Corner & Lada Furnished Pipe Support Sway Struts

Mr. Boyce Grier
Director, Region I
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, Pennsylvania 19406

Ref: STN 50-482
STN 50-483
STN 50-486

Dear Mr. Grier:

On May 13, 1980, NRC Region I (McGaughey) was informed by telecon by the SNUPPS QA Manager (Seiken) of generic deficiencies in the pipe support sway struts furnished by Corner & Lada, Inc., to Callaway and Wolf Creek sites. The specific deficiencies identified involve the clamp end of the sway strut becoming loose from and possibly being disengaged from the bushing. Under seismic conditions disengagement of the paddle from the bushing could overstress the piping systems resulting in potential safety concerns covered by 10CFR50.55(e) regulations. Subsequent investigation since the May 13th telecon notification has reaffirmed this initial conclusion.

Enclosed with this letter is a generic report covering the defective pipe support sway struts furnished by Corner & Lada. This report provides a chronology of events associated with discovery of the defective sway strut assemblies; summarizes safety implications associated therewith and outlines a program of follow-up corrective actions initiated or contemplated to resolve this problem. The plan provides for on site inspections and/or tests sufficient to assure strut assemblies are tight and acceptable for use. Struts found with loose bushings will be replaced.

It should be noted that the enclosed report is being treated as a final submittal under 10CFR50.55(e) definitions The corrective action plan outlined in the enclosure will be monitored by Callaway and Wolf Creek site QA personnel. In the event additional actions are required or should complications result in the implementation phases, a supplemental report will be prepared and forwarded to NRC. In the interim, further questions may be addressed to Mr. S. J. Seiken SNUPPS QA Manager at (301) 869-8010.

Very truly yours,

Nicholas A. Petrick

SJS/bds/lb9
Enclosure: Report on Corner & Lada Sway Struts

cc Mr. J. A. Keppler, Director, Region III USNRC
Mr. Karl Seyfrit, Director, Region IV, USNRC
Mr. Victor Stello, Jr., Director, Office of Inspection and Enforcement, USNRC, Washington, D.C.
Document Management Branch, USNRC, Washington, D.C.

bcc:

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F. D. Field	UE
D. F.Schnell	UE
W. H. Weber	UE/CAL

10CFR50.55(e) REPORT

On

Loose Bushings In Pipe Support Sway Struts

Supplied By Corner & Lada Co., Inc.

For

Callaway Unit No. 1 (Union Electric)

And

Wolf Creek (Kansas Gas and Electric Co.)

Bechtel Power Corporation

Gaithersburg, Maryland

July 24, 1980

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1.0 INTRODUCTION

In accordance with the requirements of 10CFR50.55(e), this report is prepared to provide a summary of the deficiency related to loose bushings in pipe support sway struts supplied by Corner & Lada Co., Inc. (C&L), Cranston, Rhode Island to Union Electric's Callaway Unit No. 1 and Kansas Gas and Electric's Wolf Creek Generating Station.

In November, 1979, Bechtel was informed by a Nonconformance Report generated at the Wolf Creek Jobsite, of the existence of loose bushings in six size 1, 2, and 3 pipe support sway strut assemblies (C&L Fig. No. 631 - see attached C&L Engineering Standard Page No. 5-42). This deficiency was reported, as a potential significant deficiency per 10CFR50.55(e) to the NRC I&E Region IV by Kansas Gas and Electric Co. (KGE) on 11/8/79.

In a meeting between C&L and Bechtel representatives in Gaithersburg, Maryland on 11/20/79, it was agreed that C&L would conduct a tensile test to demonstrate the ability of size 1, 2, and 3 sway struts to carry the specified design loads using sway struts with loose bushings and, further, that C&L would arrange for inspection of bushings in all size 1, 2, and 3 sway struts available at Callaway and Wolf Creek Jobsites at that time. Since the problem appeared to be confined to size 1, 2, and 3 sway strut bushings only, C&L was requested to inspect only 10% of sway struts of other sizes (4 through 10) delivered to the jobsites. Further, C&L was asked to inspect all future shipments of sway strut bushings (regardless of size) for tightness, prior to final assembly.

On 12/5/79, three samples of size 1 and 3 each (six samples total) of sway struts were tested by C&L to determine if the sway struts with loose bushings would perform their intended design function and withstand the allowable fa' lted load. The tests were performed with loose rear bracket bushings. Since size 2 and 3 sway strut bushings, rear bracket, and paddle ends are identical, the size 3 test was performed

for both sizes. Testing by C&L was witnessed by a Bechtel representative. The tests indicated that the struts will perform their design function even with loose bushings and withstand the allowable faulted loads. Based on the test results, it was concluded that this deficiency was not a significant reportable deficiency per 10CFR50.55(e) or 10CFR Part 21 and the NRC I&E Region IV was advised accordingly by KGE on 1/25/80. No indepth study or test was performed at this time to determine whether or not the paddle could become disengaged from the bushing since existing spacing configurations provided by C&L appeared too small for this possibility to occur.

All size 1, 2, and 3 sway struts (749 total), delivered prior to 11/28/79, were inspected and all bushings found loose were reworked ("staked" - displacement of metal in close proximity to the bushing by using a center punch and hammer) by C&L personnel at the Wolf Creek Jobsite between 11/30/79 and 2/20/80. Similarily, all size 1, 2, and 3 sway struts (732 total), delivered prior to 11/28/79, were inspected and all loose bushings found were "staked" at the Callaway Jobsite between 1/21/80 and 2/15/80.

Subsequently, KGE QA surveillances identified size 2 and 3 sway strut clamps with sufficiently large spacing to permit possibility of the paddle becoming completely disengaged from the bushing. Bechtel requested C&L to perform a test to determine if the paddle, under these conditions, could become completely disengaged from the bushing at the clamp end. C&L informed Bechtel on 5/8/80, that, for size 2 and 3 struts, it is possible for the bushing to become completely disengaged from the paddle at the clamp end. On 5/12/80, Bechtel concluded that this new condition; i.e., bushing disengagement, was a significant problem reportable to the NRC per 10CFR50.55(e) and the NRC I&E Region I was advised accordingly by SNUPPS and Bechtel on 5/13/80. The same deficiency was also reported, pursuant to 10CFR Part 21, to the NRC I&E Region I by Bechtel on 5/14/80.

2.0 DESCRIPTION OF REPORTABLE DEFICIENCY

Loose bushings in size 2 and 3 sway struts at the clamp end can result in the sway strut paddle becoming completely disengaged from the bushing, causing a 3/8" gap between the innersurface of the paddle and the pin. Existence of the gap, during a seismic event, may result in piping and/or piping welds being overstressed causing a possible safety hazard.

3.0 ANALYSIS OF SAFETY IMPLICATIONS

Pipe support sway struts are used throughout the plant, including safety related piping systems, to support piping. Bechtel's piping stress analysis is based on the assumption that the sway struts are rigid components. The existence of a 3/8" gap has not been considered in the piping stress analysis. The existence of a 3/8" gap between the paddle and the pin during a seismic event, has since been evaluated and may result in piping and/or piping welds being overstressed due to movement of the piping system. This overstressed condition could result in a significant safety hazard, due to possible failure of the pressure boundry.

4.0 CORRECTIVE ACTION

C&L has strengthened their QC inspections of all sizes of sway strut bushings. All hole diameters are now checked and the bushings are staked and inspected for tightness using a special tool developed by C&L. All struts are also checked 100% for tightness by the Bechtel Supplier Quality Representative at C&L prior to final release for shipment. The results of those inspections are documented. Receipt inspections since January, 1980, at the jobsites have not identified any loose bushings in C&L sway struts received at the jobsites since that time. As indicated under "Introduction," all size 1, 2, and 3

sway struts shipped to SNUPPS jobsites prior to 11/28/79, were inspected and staked by C&L personnel at Callaway and Wolf Creek Jobsites. A few bushings inspected and "staked" at the jobsites have since become loose. To provide additional assurance of the quality of these items, all C&L sway struts, regardless of size, will be visually inspected and examined or tested for tightness prior to use. These inspections will be in accordance with designer specified criteria and will be documented at each site. Any struts found with loose bushings will be replaced.

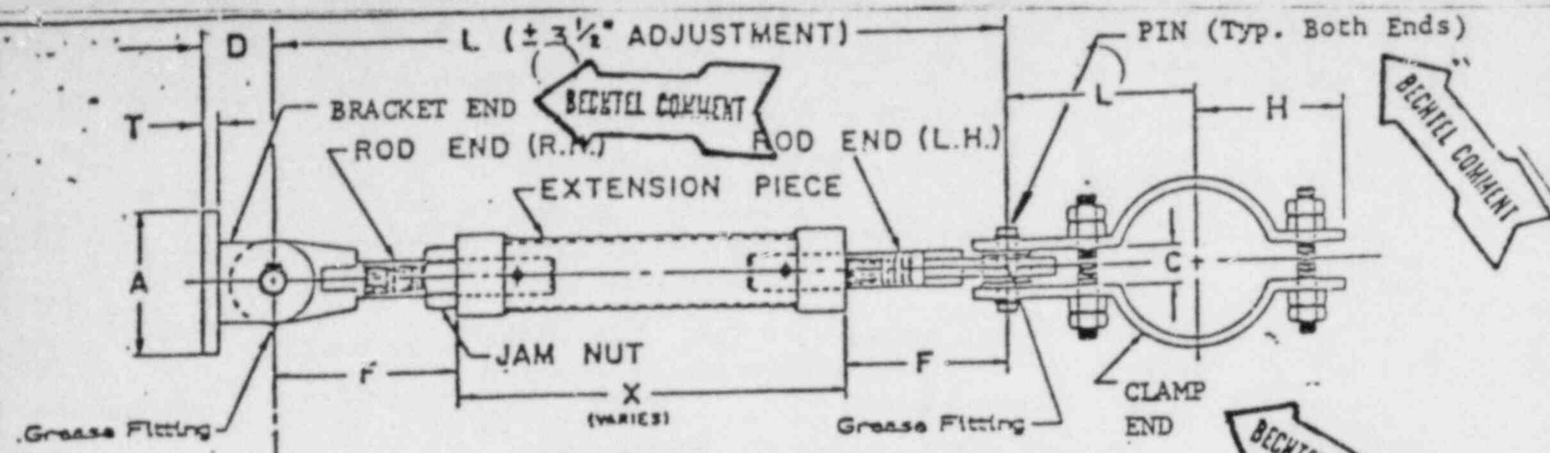
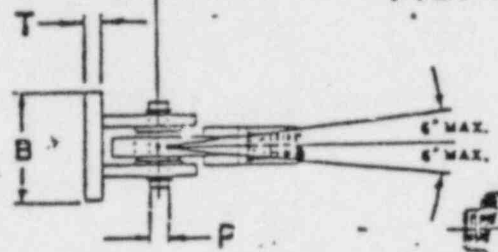


FIG. N631 with CARBON STEEL CLAMP
FIG. N632 with ALLOY CLAMP



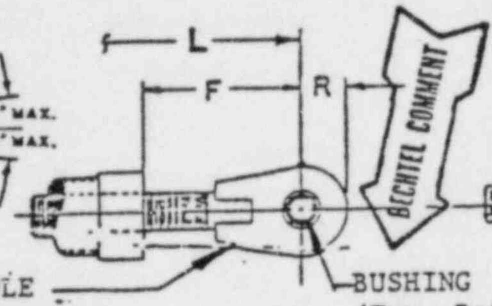


FIG. N633
less CLAMP

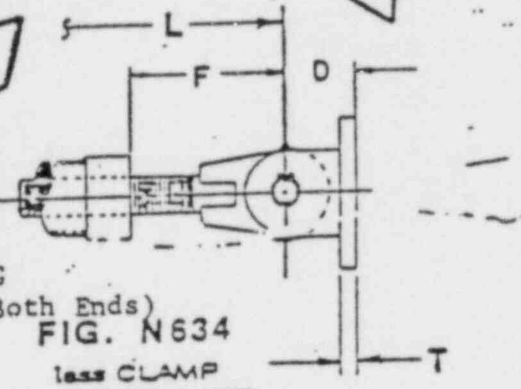


FIG. N634
less CLAMP
with BRACKET

POOR ORIGINAL

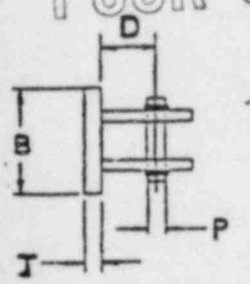


FIG. N637
REAR BRACKET

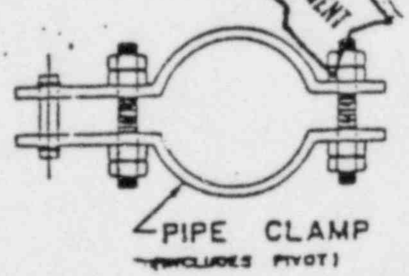


FIG. N635 CARBON STEEL
FIG. N636 ALLOY CLAMP

PIPE SIZE O.D.	E DIMENSION — STRUT SIZE 1	2,3	4,5	6,7	8	9,10	11
1.05	3.25						
1.32	3.38						
1.66	3.50						
1.90	4.88	7.00					
2.38	5.13	7.00	7.00	8.12			
2.88	5.38	7.00	7.00	8.12			
3.00- 4.06	5.98	7.00	7.00	8.12			
4.13- 4.56	6.50	7.25	7.25	8.38			
4.63- 5.63		7.75	7.75	9.12			
5.69- 6.69		8.38	8.38	10.00	10.00	11.88	12.00
6.75- 8.69		9.38	9.38	11.25	11.25	12.63	12.13
8.75-10.81		10.50	10.50	12.75	12.75	14.25	14.38
10.88-12.81		11.88	11.88	13.88	13.88	15.38	15.63
12.88-14.06		12.63	12.63	14.50	14.50	16.00	16.25
14.13-16.06		13.63	13.63	15.25	15.25	17.13	17.75
16.13-18.06		14.63	14.63	16.38	16.38	18.25	18.88
18.13-20.06		15.75	15.63	17.75	17.75	19.25	20.00
20.13-24.06		18.13	18.13	19.88	19.88	21.75	22.25
24.13-30.06		21.25	21.25	23.00	23.00	25.00	26.25
30.13-36.06		24.00	24.00	26.50	26.50	28.13	29.50

TO ORDER:

Specify FIG. No., Strut Size, Pipe Size, and 'L' Dimension.

STRUT SIZE	MAX. RATED LOAD	ROD END DIA.	A	B	C	D	F	C-C MIN.	C-C MAX.	P	R	T	EXTENSION PIECE PIPE SIZE	SCH.
1	650	0.75	2.00	2.00	0.63	1.88	4.63	18.25	60.00	0.372-0.374	1.25	0.38	1"	40
2	1500	1.00	3.25	2.00	1.38	2.00	5.63	20.25	106.00	0.747-0.749	1.25	0.50	1½"	40
3	4500	1.00	3.25	2.00	1.38	2.00	5.88	20.25	120.00	0.747-0.749	1.25	0.50	2"	40
4	8000	1.25	4.50	3.00	1.38	2.50	6.63	22.25	120.00	0.997-0.999	1.50	0.75	2½"	40
5	12000	1.50	4.50	3.00	1.38	2.50	7.00	23.25	120.00	0.997-0.999	1.50	0.75	3"	40
6	16000	1.75	5.38	3.69	1.69	3.25	8.00	26.75	120.00	1.247-1.249	2.00	1.00	3"	40
7	21000	2.00	5.38	3.69	1.69	3.25	8.25	27.75	120.00	1.247-1.249	2.00	1.00	3"	40
8	27500	2.25	6.12	4.63	2.00	4.00	9.63	31.75	120.00	1.497-1.499	2.50	1.25	4"	40
9	34000	2.50	7.88	5.75	2.38	5.00	10.13	34.25	120.00	1.747-1.749	3.00	1.75	4"	40
10	60000	3.00	10.12	6.50	2.75	5.75	12.63	41.00	120.00	1.997-1.999	3.63	2.00	6"	40
11	110000	4.00	14.00	8.75	3.38	7.25	14.75	47.75	120.00	2.497-2.499	5.00	2.25	8"	80

ENGINEERING STANDARD

2				
1	JAG	JWF	[illegible]	6/10/??
0	[illegible]	[illegible]	[illegible]	5/21/79

FIG. No. N631 thru N637
RIGID SWAY STRUT ASSEMBLY
Size 1 to 11

Corner & Lada Co., inc.

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