

DMB

UNION ELECTRIC COMPANY

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DONALD F. SCHNELL
VICE PRESIDENT

March 16, 1984

MAILING ADDRESS:
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Mr. James G. Keppler
Regional Administrator
U.S. Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

ULNRC-770

Dear Mr. Keppler:

FINAL 10 CFR 50.55(e) REPORT NO. U-34
CALLAWAY PLANT

On August 13, 1981 Union Electric informed Mr. J. E. Konklin of the NRC Region III of a potentially reportable significant deficiency concerning an interference between the ears of a Corner & Lada pipe clamp and its mating size 5 sway strut paddle. This interference potentially reduced the available cone of movement to less than 10 degrees as required by design specifications. Inadequate cone of movement could potentially prevent accommodating required thermal and seismic loads and result in overstressing safety-related piping or adjacent supports.

Accordingly, a rework plan was established and implemented to inspect and repair Corner & Lada sway struts at Callaway. The rework plan called for a sample inspection of all sizes of Corner & Lada sway struts for cone of rotation movement and established guidelines for the repair or replacement of any defective struts. The physical rework was essentially completed by February, 1982.

The attached report reflects Union Electric's final report on this deficiency. Subsequent to the original rework activities it was judged necessary to perform additional data searches and inspections consistent with the original rework plan criteria in order to reconcile the original rework plan data. We acknowledge the protracted time period between identification and this submittal; however, until recently the data was not in a completed form suitable for final analysis. In addition, this deficiency has been the subject of review and discussion with an NRC inspector who was updated as to our ongoing corrective

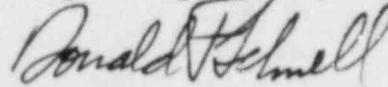
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action. Construction and testing activities also served to protract some inspection activities.

Very truly yours,

A handwritten signature in dark ink, appearing to read "Donald F. Schnell". The signature is fluid and cursive, with the first name "Donald" being more prominent.

Donald F. Schnell

JJS/glp

Attachment

cc: J. E. Konklin, NRC Region III
Richard DeYoung, Director I&E
NRC Resident Inspectors, Callaway Plant (2)
Missouri Public Service Commission

FINAL REPORT

10 CFR 50.55(e)

on

Pipe Clamp Interference

With

The Rod End of the Rigid Sway Strut Assemblies

by

Corner & Lada

UNION ELECTRIC CO.

March 16, 1984

SUMMARY OF CONTENTS

- 1.0 Introduction
- 2.0 Description of Reportable Deficiency
- 3.0 Analysis of Safety Implications
- 4.0 Corrective Action

10 CFR 50.55(e) - Final Report

1.0 INTRODUCTION

This final report is submitted in accordance with the requirements of 10 CFR 50.55(e) to describe the corrective action taken to resolve a generic deficiency related to an interference between the pipe clamp and rod end of Corner & Lada rigid sway strut assemblies.

On August 13, 1981, the Union Electric Site Quality Assurance Group filed a preliminary report regarding this deficiency to Mr. J. E. Konklin of the NRC Region III Office. Nonconformance Report 2SN-4371M documented an interference in a size 5 sway strut assembly, I.D. Number 2-EG09-C008/232. It was observed that the 12 degree cone of movement certified in the supplier's Load Capacity Data Sheet to accommodate thermal and seismic loads was not achievable at the clamp end of the assembly. An investigation disclosed that the problem was due to improper fabrication of either the clamp or paddle, or due to excessive weldment in a non-structural weld on the sway strut paddle.

A total of 65 sway struts (of 224 inspected) required rework or replacement by Corner & Lada to eliminate the

interferences. Suitable corrective action was taken by Corner & Lada to preclude future interference problems.

2.0 DESCRIPTION OF REPORTABLE DEFICIENCY

The size 5 Corner & Lada rigid sway strut in question was intended to be employed in a safety-related piping system. The manufacturing features which contributed to the interference between the pipe clamp and rod end of the sway strut was common to all sizes of sway struts supplied by Corner & Lada. The interference noted would potentially not permit the required thermal and seismic movement for safety-related pipe sections.

3.0 ANALYSIS OF SAFETY IMPLICATIONS

Rigid sway struts employed in piping systems must support the pipe under various loadings such as weight, thermal, and seismic, etc. The sway strut must also permit motion of the piping transversely perpendicular to either the end bracket or the pipe clamp. This is achieved by allowing a 12 degree cone of travel at both ends of the sway strut utilizing ball bushings.

The sway struts in question permitted less than the full 12 degree cone of movement specified in Corner & Lada's load capacity data sheets. The restriction of pipe movement could overstress the pipe. The action of the clamp locking up with the rod end of the sway strut also could have

overstressed any of the components in the sway strut assembly during piping movement.

4.0 CORRECTIVE ACTION

A Rework Plan (PV-14) was established so that the sway strut assemblies in question could be repaired onsite. The Rework Plan provided direction for eliminating any interference at the pipe clamp. All reworked clamp or rod ends were documented by recording the support number and the type of rework performed. All dimensional changes were also recorded.

The Lead A/E design specification requires a minimum of a 10 degree cone of movement and this was the acceptance criteria employed in the rework plan. If the available cone of movement was less than 10 degrees, one of the following steps was taken:

- 1) Replace flat washers with conical washers to meet the 10 degree cone of movement.
- 2) Remove excess material from either the rod end or the clamp ears as required to meet the 10 degree cone of movement.
- 3) Replace the clamp.

- 4) Use-As-Is based upon a Lead A/E determination that the cone of movement for the strut in question was adequate to meet design movement.

The following plan was used to sample other size C&L assemblies employed at Callaway for the available cone of movement.

- 1) All size 5 struts were inspected.
- 2) At least 10 samples were examined from each of the following size ranges: 1, 2-3, 4, 6-7.
- 3) If any of the samples inspected did not meet acceptance criteria, an additional 10 samples were inspected from this size range.
- 4) If additional nonconformances were detected, a 100% inspection of this size range was performed.

The following is a summary of struts inspected, reworked onsite, or returned to Corner & Lada for repair or replacement:

<u>Strut Size</u>	<u>Number Inspected</u>	<u>Number Reworked On Site</u>	<u>Number Sent to Corner & Lada for Repair</u>	<u>Number Used by Design</u>
1	10	0	0	181
2	11	0	0	305
3	10	0	0	431
4	134	43	6	122
5	37	18	2	30
6	12	2	1	12
7	8	2	0	6
8	2	0	0	9

Corner & Lada introduced additional controls into the manufacturing process to preclude the release of sway strut assemblies with interferences. In addition, inspections by an independent contractor, Nuclear Energy Services, were used to assure the remaining supports to be delivered were in compliance with design requirements.

Based upon the actions taken in Rework Plan PV-14 and the additional controls employed by Corner & Lada to preclude interferences of this type, this problem is considered adequately resolved.