U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
REGION IV

Report No. 99900349/80-01 Program No. 51300

Company: Corner & Lada Co., Inc.
1341 Elmwood Avenue
Cranston, Rhode Island 02910

Inspection Conducted: September 22-26, 1980

Inspector: L. E. Ellershaw 1-28-81
L. E. Ellershaw, Contractor Inspector Date
Components Section II
Vendor Inspection Branch

Approved by: I. Barnes 1-28-81
I. Barnes, Chief Date
Components Section II
Vendor Inspection Branch

Summary

Inspection conducted September 22-26, 1980 (99900349/80-01)

Areas Inspected: Implementation of 10 CFR 50 Appendix B criteria, and applicable codes and standards including: previous inspection findings; follow-up on an allegation, and a follow-up on a 10 CFR 21 report. The inspection involved 29 inspector hours on site.

Results: In the three areas inspected, one violation and two deviations from commitment were identified.

Deviations: Previous Inspection Findings - Corner & Lada Co., Inc. (C&L) is still not conforming to the requirements of procedure ST-150 in that certain drawings and associated documents do not reflect the required reviews and approvals (Notice of Deviation, Item A.); follow-up on 10 CFR 21 Report - dimensional inspection of reamed holes in a sample of 15 sway strut paddles, accepted by C&L QC, revealed that none of them met the drawing requirements (Notice of Deviation, Item B.).

Violation: Compliance with 10 CFR 21 - Failure to comply with 10 CFR 21, relative to evaluation of possible deviations, and notification to purchasers of parts with possible deviations. (Notice of Violation).

DETAILS SECTION

(Prepared by L. E. Ellershaw)

A. Persons Contacted

W. T. Allen, III - Manager, Quality Assurance
P. Easdon - Quality Control Inspector
J. W. Fenny - Manager, Engineering
C. P. Hou - Manager, Technical Services
L. J. Pires - Assistant Manager, Quality Assurance
J. Poli - Manager, Customer Relations

B. Action on Previous Inspection Findings

1. (Closed) Deviation A (Report No. 79-02): This item dealt with internal audits not being performed.

   Corner & Lada Co., Inc. (C&L) implemented their committed corrective action by completing all internal audits and establishing and adhering to the internal audit schedule for 1980.

2. (Closed) Deviation B. (Report No. 79-02): This item dealt with non-conforming material reports (NMRs) with Use-As-Is or Repair dispositions not being concurred with by the Authorized Nuclear Inspector (ANI).

   C&L implemented their committed corrective action by reviewing all NMRs and having the ANI sign, where necessary, and a review of NMRs by the inspector, generated since the last inspection, showed that the NMRs requiring ANI concurrence were signed by the ANI.

3. (Closed) Deviation C. (Report No. 79-02): This two part deviation dealt with activities operators and inspectors not signing off their respective operations, after completion, on the travelers, and parts had their material identity stamped in a location which was contrary to drawing requirements.

   C&L implemented their committed corrective actions by correcting the specific travelers, issuing corrective action requests, and restamping the mismarked parts.

   A review of travelers and parts, by the inspector during this inspection, did not reveal any deviations of a similar nature.

4. (Closed) Deviation D. (Report No. 79-02): This two part deviation dealt with certain drawings not designating the location of material

identification, and certain drawings designated material identification location without taking into consideration the size of the parts which precluded the possibility of marking in the required location.

C&L implemented their committed corrective action by reviewing and correcting manufacturing drawings which exhibited these problems.

5. (Closed) Deviation E. (Report No. 79-02): This item dealt with drawings having the incorrect material code symbol listed, for t[illegible] specified material type.

C&L implemented their committed corrective action by reviewing all drawings in order to ascertain whether or not the above condition existed on drawings, other than those identified by the inspector. Those that were found to exhibit this condition were corrected and documented by use of the Drawing Change Request. This was verified by the inspector.

6. (Closed) Deviation F. (Report No. 79-02): This item dealt with numerous drawings and their subsequent revisions showing no evidence of review by a Checker, Engineering Manager or Quality Assurance Manager. In addition, Product Design Check Lists (PDCL) were not used or were not signed by the Quality Assurance Manager when they were used.

C&L implemented their committed corrective action by performing an extensive review of all manufacturing drawings and their revisions, to correct and assure that all drawings were reviewed by the necessary personnel. This was completed by February 6, 1980. This was verified by the inspector during this inspection, by review of the cited drawings and those compiled by C&L as evidencing this problem.

However, the preventive measures were not adequate, in that a review of 10 drawings, either issued or revised after February 6, 1980, revealed that 8 either did not have approvals, did not have Document/ Drawing Change Requests (DDCR), did not have a Product Design Check List (PDCL), or did not have a Document Change Notice (DCN). See Notice of Deviation, Item A.

The following illustrates the specifics of Deviation A.:

(a) Drawing A 3208, Revision 0, dated 4-25-80: There was no Checker or Engineering approval.

(b) Drawing A 3209, Revision 0, dated 4-24-80: Same as (a) above.

(c) Drawing A 3210, Revision 0, dated 4-25-80: Same as (a) above; Revision 2 dated 5-19-80 had a DDCR, but it was not signed off by the Engineering Manager.

(d) Drawing A 3211, Revision 0, dated 4-25-80: Same as (a) above.

(e) Drawing B 3519: The DDCR used to change this drawing from Revision 1 to 2, was not signed off by Engineering or Quality Assurance.

(f) Drawing 1011: There was no DDCR used when changing this drawing from revision 2 to 3, which was dated 4-1-80.

(g) Drawing 1013, Revision 7 dated 5-22-80: The DDCR was not signed off by Engineering, and there was no DCN.

(h) Drawing 1038, Revision 3, dated 7-18-80: There was no DDCR, but there was a DCN which stated "Design Revision", which requires the use of a PDCL and one could not be located.

7. (Closed) Deviation G (Report No. 79-02): This item dealt with two NDE examiners being certified as qualified in accordance with CNT-TC-1A, when in fact they had not been given the required near distance acuity vision test.

C&L implemented their committed corrective action in that the two examiners were given near distance acuity vision tests which showed they were capable of reading Jaeger No. 1 letters. A review of the qualification records during this inspection showed that all four personnel certified as being qualified, were current relative to eye examinations.

C. Follow-up On An Action Item: Allegation

1. Introduction

NRC Region I office received an anonymous phone call on June 11, 1980, in which an allegation was made, that Corner & Lada Co., Inc. has provided pipe supports and clamps to nuclear sites, without performing the required heat treatment.

2. Inspection Objectives

The objectives of this area of the inspection were to review the nature and scope of the allegation and to determine whether or not it could be substantiated.

3. Method of Accomplishment

The preceding objectives were accomplished by:

a. Review QA Manual Section QN 8.0, "Heat Treating."

b. Review of ASME, Section II, "Materials Specifications" and Section III, subsection NF, "Component Supports."

c. Review listing of 21 jobs requiring nuclear qualified material, awarded to C&L, and a review of technical specifications for the following jobs:

(1) SNUPPS - (Wolf Creek and Callaway); Specification 10466-M-218B, "Specification For Materials and Shop Fabrication of Pipe Supports to ASME Section III, Subsection NF".

(2) Seabrook; Specification 9763-MPS-1, "Material Processing Requirements For Nuclear Power Plant Components".

(3) Hope Creek; Specification 10855-P-401(Q), "Technical Specification For Pipe Hangers, Supports And Restraints".

d. Review of a synopsis prepared by C&L personnel, relative to the remaining jobs, based upon a review of technical specifications relative to heat treatment requirements.

e. Review of selected component support drawings to ascertain material type and material thicknesses.

f. Discussions with cognizant personnel.

g. Review of selected Certified Material Test Reports to assure that the heat treatment required by material specifications was performed by the material manufacturers.

4. Findings

a. Allegation

It was determined that there have not been any ASME Code material orders requiring heat treatment, placed with C&L. There have been special, non ASME Code orders, requiring heat treatment. A review of documentation for some of these items showed heat treatment had been performed (subcontracted) as required.

The validity of the allegation was not substantiated.

b. Deviation From Commitment

None.

c. Unresolved Item

None.

D. 10 CFR Part 21 Report

1. Introduction

Bechtel Power Corporation (BPC), Gaithersburg, Maryland, reported a 10 CFR 21 deficiency by telephone on May 14, 1980 with a confirming written report dated May 19, 1980, to NRC, Region I office. The report concerns pipe support sway struts with loose bushings furnished to the Callaway Unit 1 and Wolf Creek jobsites (SNUPPS Project) by Corner & Lada Co., Inc. (C&L).

2. Background

On November 8, 1979, Kansas Gas & Electric Co. (KGE) reported a potential significant deficiency to NRC Region IV, regarding the existence of loose bushings in pipe support sway struts, at the Wolf Creek jobsite. This condition was also identified at the Union Electric Co. (UEC), Callaway jobsite. Both of these sites are part of the Standardized Nuclear Unit Power Plant System (SNUPPS), for which BPC is the architect engineer.

BPC met with C&L on November 20, 1979, and it was agreed that C&L would conduct tensile tests on the size 1, 2, and 3 sway struts to demonstrate the ability of these struts to carry the specified design loads using struts with loose bushings. Further, C&L would inspect all size 1, 2, and 3 struts already delivered to the jobsites. C&L was also to inspect all sway strut bushing fit for tightness, prior to final assembly at C&L.

The NRC inspector reviewed inspection reports at C&L and it was shown that the bushing hole dimensions were inspected on a 10% sample plan, prior to identification of the deficiency. It was further ascertained, that C&L sends the plate material to a vendor, who in turn, flame-cuts the materials into the specified paddle size. The paddles are then sent to another vendor, who in turn, drills and reams the bushing hole in the paddle.

On December 5, 1979, three samples each of size 1 and 3 sway struts were tested by C&L, with loose bushings in a maximum side displacement, to determine if the struts would perform their intended design function and stand the allowable faulted load. Size 2 was not tested because the bushings and paddle ends are identical to size 3. The testing showed that the struts would perform their design function. The failure load was nearly 10 times the faulted load and 18 times the rated load for the size 1 strut. For the size 3 strut, the failure load was between 2.1 and 2.9 times the faulted load and between 4 and 5.5 times the rated load. These tests were witnessed by a BPC representative. Based on these results, it was concluded that this deficiency was not

a significant reportable deficiency. NRC Region IV was advised accordingly by KGE on January 25, 1980.

Prior to the above testing being performed, C&L agreed to inspect all struts and rework all struts found with loose bushings at the sites. The rework consisted of "staking", which is the physical displacement of metal on the paddle, in close proximity to the bushing by using a center punch and hammer. This work occurred between November 30, 1979 and February 20, 1980 at Wolf Creek, and between January 21, and February 15, 1980 at Callaway.

To assure the adequacy of "staking", a "strike" test was developed, which consisted of striking the bushing with a mallet. Not withstanding the fact that the strike test could not be considered a controlled test, all staked bushings were tested in this fashion. The results of the "staking" and subsequent strike tests, performed at the site, were as follows: Wolf Creek - 449 nuclear class struts with 898 bushings (2 bushings/strut) were tested with 7 struts being rejected; Callaway - 456 nuclear class struts with 902 bushings were tested with 3 struts being rejected. The struts that were rejected, had new paddles and bushings installed.

A more controlled test was developed and implemented to assure adequacy of the "staking". An agreement was reached between BPC and C&L, to test the bushing fit after assembly into the paddles, in a manner that would assure the bushings would not be displaced with an applied force of up to 250 pounds. This procedure was observed by the NRC inspector during this inspection. In addition all sizes of sway struts would be staked at C&L prior to shipment. BPC, being the architect engineer, notified another licensee (Public Service Electric & Gas Co.) who had purchased sway struts from C&L for Hope Creek Generating Station, Units 1 and 2. PSE&G sent a TWX dated January 4, 1980, to C&L requesting information about sway struts that had been shipped to the site. C&L responded by letter dated January 8, 1980, listing a total of 51 struts, by Mark and Serial No., advising actions to be taken by PSE&G. If, after inspection by PSE&G, repairs were to be required, C&L would send personnel to the job site to correct any problems.

All of the above, is related to the rear bracket end of the sway strut.

3. Inspection Objectives

The objectives of this area of the inspection were to ascertain that the responsible organization had implemented the reporting requirements in accordance with 10 CFR 21 and had:

a. Met the requirements for reporting the deficiency.

b. Performed an evaluation of the condition, including making an assessment of generic implications.

c. Assigned responsibility for effecting corrective action and preventing recurrence.

4. Method of Accomplishment

The preceding objectives were accomplished by:

a. Verifying that the requirements for reporting "reportable deficiencies" have been posted, and that procedures have been initiated to provide for the reporting process.

b. Review 10 CFR 21 report and associated documents.

c. Review actions to correct the reported deficiency and to prevent recurrence.

d. Review of drawing dimensions for bushing holes and perform dimensional inspection of those dimensions.

e. Discussions with cognizant personnel.

f. Review of inspection records relative to the bushing holes.

5. Findings

a. Notice of Violation

In February, 1980, KG&E expressed an additional concern relative to the clamp end of the sway strut for sizes 2 and 3. A review of dimensions relative to the paddle thickness and the spacing of the clamp where the paddle is attached, showed that if a bushing were loose, it could become completely disengaged from the paddle. This particular situation had not been observed on any sway struts, however, it was a logical assumption because the paddles and bushings are identical at each end of the sway strut. Discussions with C&L personnel revealed that bushings have been found loose, but never completely disengaged.

A letter from C&L to BPC dated March 11, 1980, stated that an impact analysis was going to be performed by C&L, to evaluate whether or not damage would occur to the strut assembly due to a bushing disengagement at the clamp end. Discussion with C&L personnel revealed that as of this inspection, the analysis had not been performed. It was C&L's position, that while it was theoreticaly possible for a bushing to become completely disengaged, one had not been observed in this condition. Therefore, to evaluate a condition which did not exist, did not seem appropriate.

C&L, in a letter to BPC dated May 7, 1980, submitted an inspection/rework procedure for all size 1, 2, and 3 sway struts. This includes staking and subsequent testing of all installed bushings.

BPC advised C&L by telephone, followed by written confirmation, both on May 12, 1980, that they considered this deficiency to be reportable to the NRC per 10 CFR Part 21, since sway struts with loose bushings had been shipped to the jobsites and accepted. BPC requested C&L to notify them as to whether or not C&L intended to report this deficiency to NRC. BPC further stated that if C&L did not report to NRC, they would, and they would also indicate that notification is being made by BPC since C&L declined to do so.

C&L responded by TWX dated May 14, 1980, by stating, "It is Corner & Lada's position that since we have no prior knowledge of any struts manufactured by C&L with loose bearings and, have found no deficiencies in both our design criteria and manufacturing processes that would create this loose bearing condition, we are not required to file a report under 10 CFR 21."

As a result, BPC submitted a 10 CFR 21 Report to NRC Region I, dated May 19, 1980.

As previously indicated, BPC is the architect engineer (AE) for the aforementioned jobs. They are also the AE for Arizona Public Service Company, (Palo Verde Units 1, 2, and 3). As such, they issued Deficiency Evaluation Report No. 80-23 dated August 14, 1980, in order to obtain an accounting of all sway struts supplied to the sites by C&L. C&L submitted a listing to BPC dated September 3, 1980, showing a total of 212 struts that have been shipped. C&L also agreed to go to the sites to inspect and correct, if required, all struts found with loose bushings.

It was further ascertained by the NRC inspector, that C&L has shipped these components to other nuclear jobsites. The Long Island Lighting Company (LILCo), Shoreham site has received sway strut components (material only), including paddles with installed bushings. Because the components are material only, they are not ordered to ASME Code requirements. However, purchase order 34472 dated September 22, 1978, invokes 10 CFR 21 requirements.

Two Commonwealth Edison Company (CECo) sites (Byron and Braidwood) have also received sway struts from C&L. Purchase Order 216480 dated January 18, 1978, ordered the struts in accordance with MSS SP-58 and ANSI B31.1 Codes and not the ASME Code. Further, the purchase order designated the struts as non-safety related.

Consumers Power Company, Midland 1 and 2 sites have received sway struts from C&L. The following BPC purchase orders, all dated during the last half of 1978 invoked 10 CFR 21 requirements: 29255Q; 29898Q; 321660, and 31903Q. There were approximately 53 size 1 struts and 59 size 2-3 struts ordered.

LILCo, CECo and Consumers Power Company had not been notified about the possible loose bushings as of this inspection.

Subsequent to this inspection, C&L performed tests on the clamp end of the rigid sway struts to examine the load capacity and functional operability, when the spherical bushing was totally disengaged from the paddle. The results show that the actual test loads are well in excess of the faulted and rated loads.

While it appears that the sway strut itself is capable of meeting and/or exceeding design load requirements, the fact that the spherical bushing could become completely disengaged would create a condition which was not considered in the stress analysis of the piping system in which these struts are used.

b. Deviation From Commitment

Drawing A3217, Revision 1, dated April 3, 1979, "Figure 631 Rigid Sway Strut Paddle End. Sizes 1-11", shows the following dimensions of the reamed hole for the size 1 and size 2-3 sway struts:

Size 1, .811 - .812
Size 2-3, 1.248 - 1.249

The NRC inspector, in conjunction with C&L quality personnel, took three actual measurements on each of five - size 1 paddles and ten - size 2-3 paddles, at approximately 120^{o} apart from each other with the following results:

Size 1	Sample Number	Results
	1	.812, .813, .820
	2	.816, .825, .816
	3	.817, .820, .830
	4	.814, .818, .825
	5	.815, .816, .820

Size 2-3	Sample Number	Results
	1	1.250, 1.265, 1.266
	2	1.258, 1.260, 1.265
	3	1.255, 1.260, 1.261
	4	1.255, 1.263, 1.264
	5	1.250, 1.257, 1.258
	6	1.250, 1.255, 1.259
	7	1.266, 1.268, 1.273
	8	1.271, 1.275, 1.275
	9	1.264, 1.268, 1.270
	10	1.266, 1.269, 1.273

It was clearly evident that none of the measurements taken met the drawing requirements. These parts had been accepted by C&L inspection. In addition, certain dimensions on this drawing for other size paddles, had tolerances such that they could not be measured using the equipment available at C&L, e.g., sizes 6 and 7 require a 1.9885 - 1.9887 reamed hole, and size 9 requires a 2.8110 - 2.8112 reamed hole.

The equipment used to measure these holes consisted of vernier calibers, which are not accurate enough to measure holes to the ten thousandths. C&L did state that they have investigated the purchase of equipment which will measure these types of tolerances.

b. Unresolved Items

None.

E. Exit Meeting

A meeting was held at the conclusion of this inspection on September 26, 1980, with the following management representatives:

W. T. Allen, III - Manager, Quality Assurance
J. W. Fenny - Manager, Engineering
W. Lada - Vice President
R. W. Muuray - Manager of Operations
L. J. Pires - Assistant QC Manager
A. W. Rogers - Manager, Manufacturing

The scope and findings of this inspection were summarized. Management acknowledged the statements made by the inspector. Management was informed that additional review would be conducted by the inspector upon return to the Region IV office, which would probably include further discussion with C&L, by telephone.

The inspector requested C&L to notify all purchasers of the potential loose bushing problem and further suggested an evaluation; through actual testing, be performed on the clamp end of the size 2-3 sway struts.

A telephone call was made to C&L on October 7, 1980, and the inspector was informed that C&L has a representative at the Palo Verde site, conducting a visual inspection in conjunction with site QA personnel.

A telephone call was made to C&L on November 6, 1980, and the inspector was informed that testing had been completed, and that all customers had been notified.