ORGANIZATION: ALFAB, INCORPORATED
ENTERPRISE, ALABAMA

REPORT NO.: 99900787/82-01	INSPECTION DATE(S) 8/9-12/82	INSPECTION ON-SITE HOURS: 27

CORRESPONDENCE ADDRESS: ALFAB, Incorporated
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President
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PRINCIPAL PRODUCT: Structural Steel Fabrication

NUCLEAR INDUSTRY ACTIVITY: The ALFAB, Incorporated (AI), contribution to the nuclear industry represents approximately 30 percent of its total workload.

ASSIGNED INSPECTOR: Wm D. Kelley 9/30/82
W. D. Kelley, Reactive & Component Program Section (R&CPS) Date

OTHER INSPECTOR(S):

APPROVED BY: I. Barnes 10/4/82
I. Barnes, Chief, R&CPS Date

INSPECTION BASES AND SCOPE:

A. BASES: 10 CFR Part 21 and 10 CFR Part 50, Appendix B.

B. SCOPE: This inspection was made as a result of three construction deficiency reports by Carolina Power and Light Company concerning the welding of concrete embedded plates, crane rail embedded plates, and conduit seismic support members supplied to the Shearon Harris Nuclear Power Plant, Units 1 and 2. Additionally, the following areas were inspected: quality assurance program; and control of special processes-welding.

PLANT SITE APPLICABILITY:

50-400 and 50-401

DESIGNATED ORIGINAL

Certified By Shaune Clark

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ENTERPRISE, ALABAMA

REPORT NO.: 99900787/82-01	INSPECTION RESULTS:	PAGE 2 of 8

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Carolina Power and Light Company Purchase Order No. H-36933, and paragraph 6.8.2.8 of AWS D1.3, two welders, who were listed on the AI Inspection Report (Form 12) as having performed welding on galvanize coated conduit seismic support members, had not been qualified as required by paragraph 6.8.2.8 of AWS D1.3.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50, and paragraphs 9.1.6 and 12.1.9.3 of the AI Quality Assurance Policy Manual, weld gages on a Lincoln welding machine (Model R3S-600) had not been calibrated.

3. Contrary to Criterion V of Appendix B to 10 CFR Part 50, paragraph 5.1 of the AI welding procedure specification W-001 and paragraph 4.2.6.2 of the AWS D1.1 Code, required numbers of stud bend tests were not performed, as evidenced by: (a) only 21 bend tests were performed on the January 15, 1982, shipment of embedded strip plates which contained 4476 studs; (b) only 20 bend tests were performed on the January 19, 1982, shipment of embedded strip plates, which contained 3836 studs; and (c) only 19 bend tests were performed on the January 28, 1982, shipment of embedded strip plates, which contained 2376 studs.

4. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Carolina Power and Light Company Purchase Order No. H-36933 and paragraph 5.3.1 of the AWS D1.1 Code, an AI employee, who had not been qualified by test, was observed tack welding on a fabrication for Job No. 321357.

C. UNRESOLVED ITEMS:

An AI memorandum dated March 15, 1982, was presented to the NRC inspector at the conclusion of the inspection, which gave instructions that the galvanize coating was to be removed from strut weld areas by grinding. Compliance with these instructions will be ascertained during a subsequent inspection.

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ENTERPRISE, ALABAMA

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D. OTHER FINDINGS OR COMMENTS:

1. Carolina Power and Light Company (CP&L): Shearon Harris Nuclear Power Plant, Units 1 and 2.

a. Problem reported was stud separation in 59 of 1001 plates tested.

(1) Background:

CP&L notified the NRC on February 16, 1982, that stud separation occurred in 59 of 1001 concrete embedded strip plates. On March 19, 1982, CP&L submitted their final report of the deficiencies in welded studs, in accordance with the requirements of 10 CFR Part 50.55(e).

(2) Findings:

CP&L placed their Purchase Order No. 22AA8, dated December 23, 1981, with AI for 1950 concrete embedded strip plates, which varied in length from 1 to 4 feet. The plates were to be fabricated in accordance with CP&L Drawing No. MPS-B-838, which required 3/4-inch diameter by 7-inch long Nelson Studs, Type S3L, or approved equal to be welded to the plates.

The fabrication of the 1950 plates had been completed and shipped by AI and the 59 plates returned by CP&L had been repaired by AI and shipped back to the Shearon Harris Nuclear Power Plant prior to the NRC inspection; therefore, the NRC inspector could not visually verify the exact nature of the stud failures, but did verify that CP&L had waived source inspection.

The NRC inspector reviewed CP&L Deficiency and Disposition Reports DDR No. 806 and No. 812, the CP&L final 10 CFR Part 50.55(e) report, and AI Inspection Reports for the 59 deficient plates.

The NRC inspector verified that CP&L: (1) DDR No. 806 stated, that during receipt inspection of 400 studs for 360° flash, one stud was bent 30° and failed; and (2) DDR No. 812 identified that the majority of the 59 embedded plates were rejected because of undercut of the stud welds, with some of the plates also being rejected because of lack of fusion of the stud

welds. The CP&L 10 CFR Part 50.55(e) final report states that the embedded strip plates contained studs that could not pass the AWS D1.1 specified acceptance test.

The NRC inspector verified that the AI welding procedure specification W-001, Revision 1, for stud welding had been qualified in accordance with the requirements of AWS D1.1 and was listed on the AI Inspection Reports as the applicable welding procedure specification used for the stud welding.

AI evaluated that high humidity was the cause of defective stud welds and issued a corrective action report to CP&L on March 1, 1982, which stated their corrective action to prevent recurrence of stud weld failure was: (1) on days when the humidity was above 90% the stud welding equipment would be serviced by AI maintenance personnel prior to start of production, and when the humidity had been above 90% during the day when studs were welded, the equipment would be serviced the following morning regardless of the humidity level; and (2) each stud would be hit after welding, hard enough to give it a slight bend, in order to assure complete fusion.

During review of the AI Inspection Reports by the NRC Inspector, one nonconformance was identified (see paragraph B.3). Sixty 15° stud bend tests had been performed on the 10,688 welded studs. Paragraph 4.26.2 of D1.1 and paragraph 5.1 of the AI welding procedure specification W-001 require one bend test for every 100 welded studs, which would necessitate a minimum of 107 bend tests.

The AI quality assurance program did assure that the stud welding procedure specification W-001 had been qualified in accordance with AWS D1.1, but did not preclude the shipment of embedded strip plates with identified defective stud welds and performance of an insufficient number of 15° stud bend tests.

b. Problem reported was 36 of 79 crane rail embedded plates had undercut weld defects.

(1) Background:

CP&L notified NRC on April 29, 1982, that during receipt inspection, 36 of 79 crane rail embedded plates were found

to have undercut weld defects and CP&L was evaluating the item to determine its reportability.

(2) Findings:

CP&L placed their Purchase Order No. H-37507, dated February 19, 1982, for 312 crane rail embedded plates in accordance with their drawing MPS-B-852, Revision 2. The plates were 1½ inches thick by 45 inches long by 22 inches wide, with five 7/8 inch diameter by 8 inches long Type S3L Nelson studs and 5 cadweld splice sleeves (supplied by CP&L) welded to each plate.

AI personnel informed the NRC inspector that CP&L issued their DDR-880 on April 19, 1982, notifying them that 36 of the first shipment of crane rail embedded plates contained weld undercut defects. AI stated that: (1) when their personnel arrived on the Shearon Harris Nuclear Power Plant site, the second week of May 1982, CP&L had received the second shipment of 45 embedded plates and the third shipment of 81 embedded plates was waiting to be unloaded; (2) the 154 embedded plates of the first and second shipments were laid out and the cadweld splice sleeve welds were inspected for undercut using a straight edge and wire feeler gages; (3) 16 embedded plates were rejected because the weld undercut was greater than 0.030 of an inch and returned to the AI, Enterprise, Alabama, plant for repairs; and (4) none of the 77 embedded plates of the fourth and final shipment were rejected by CP&L. Since all embedded plates were onsite, the NRC inspector could not visually verify the depth and magnitude of the weld undercut.

The NRC inspector verified by review of documents that CP&L had waived source inspection.

The NRC inspector reviewed AI welding procedure specification 321BB-1 and verified that it had been accepted by CP&L; however, the AI Inspection Reports stated that the welding was performed in accordance with ALFAB welding procedure specification W-004.

AI personnel informed the NRC inspector that the welding of the cadweld splice sleeve had been performed in accordance with their welding procedure specification 32BB-1 and agreed that their documentation did not confirm their statement.

The AI quality assurance program did not preclude the shipment of crane rail embedded plates with identified defective welds of cadweld sleeves and the AI Inspection Reports recording that welding procedure specification W-004 had been used, rather than the customer accepted welding procedure specification 32BB-1.

c. Problem reported was 87 of 309 conduit support assemblies had undercut weld deficiencies.

(1) Background:

CP&L notified NRC on May 5, 1982, of a potential construction deficiency, 87 of 309 conduit support assemblies received from AI had undercut weld deficiencies.

(2) Findings:

CP&L placed their Purchase Order No. H-36933, dated January 19, 1982, for 600 conduit seismic support members in accordance with their Drawing No. MPS-B-845, Revision 2, and Site Specification No. 025. The conduit seismic support members were fabricated from 3 inch square ASTM A-500, Grade B, tubing with a B-Line System, Inc., galvanized strut, Size B-52, welded to it with 1/8 inch skip fillet welds. The CP&L purchase order requires the welding to be in accordance with AWS D1.1 and AWS D1.3.

The NRC inspector verified that CP&L had waived final source inspection of the conduit seismic support member and that all support members had been shipped to the Shearon Harris Nuclear Power Plant.

AI personnel informed the NRC inspector that the first shipment of conduit seismic support members had been returned from the site and scrapped. Additionally, all support members had been shipped, which precluded direct verification by the NRC inspector of the magnitude of the weld deficiencies.

Paragraph 6.8.2.8 of AWS D1.3 requires welders welding on galvanized sheet steel to be qualified using galvanized material. One nonconformance was identified by the NRC

inspector (see paragraph B.1) as a result of the identification that two welders were listed on the AI Inspection Report for the first shipment of support members (which did not have the galvanized coating removed in the weld areas), who had not been qualified for welding on galvanized coated steel.

AI personnel informed the NRC inspector that the galvanized coating had been removed in the weld area of the replacement support members for the first shipment and all subsequent shipments; however, no documentation was made available during the inspection, which would substantiate that the galvanize coating had been removed. After the exit interview, the AI personnel presented to the NRC Inspector an internal memorandum, dated March 15, 1982, which gave instructions that the galvanize coating was to be removed from the struts by grinding.

Compliance with this internal memorandum will be ascertained during a subsequent inspection by review of applicable process and inspection documentation. This item is considered unresolved (see paragraph C.).

CP&L accepted AI welding procedure specification 22CC-1; however, AI Inspection Reports stated that the support members were welded in accordance with AI welding procedure specification W-004, Revision 7.

The AI quality assurance program did not preclude the shipment of conduit seismic support members with identified defective welds, unqualified welders welding on galvanize coated steel, and the AI Inspection Report recording that welding procedure specification W-004 had been used, rather than the customer accepted welding procedure specification 22CC-1.

2. Control of Special Processes-Welding:

Reviewed Sections 9 and 12 of the AI Quality Assurance Policy Manual, five welding procedures, three welder qualifications, and observed fabrication and welding in progress.

Two nonconformances were identified as a result of the observations by the NRC inspector of: (a) An AI employee, who had not been qualified in accordance with the requirements of AWS D1.1, was

observed tack welding on a fabrication for Job No. 321357 (see paragraph B.4); and (b) the weld gages on a Lincoln welding machine, Model R3S-600, which was located in the bay where nuclear work was in progress, had not been calibrated (see paragraph B.2).

The NRC inspector additionally noted, that the use of an unqualified tack welder had not been identified by the AI Quality Assurance Inspector, although present in the immediate area where the activity was being performed.

3. Review of QA Program:

Reviewed: (a) the AI Quality Assurance Policy Manual; (b) implementing procedures for receiving inspection, shop inspection, and welding and nondestructive testing procedures; and (c) the documentation of inspection, welding, and calibration. The NRC inspector identified that the quality assurance program was not being fully implemented, as evidenced by the nonconformances identified in Section B of this report.

PERSONS CONTACTED

Company ALFAB Inc. Dates Aug 9 - , 1982

Docket/Report No. 99900787 Inspector Wm D. Kelley

NAME(Please Print)	TITLE(Please Print)	ORGANIZATION(Please Print)
B.R. Dicus	Exec. Vice President & Secretary	A.I
M. Hall	Plant Manager	A.I
R. Hilburn	Engineering Manager	A.I.
B. Grantham	Quality Assurane Manager	A.I
M.R. Salsman	Contract Administrator	A.I
M N. Brown	Sales Manager	A.I.

Inspector Wm O Kelley

Scope Deficiencies of the welds of the studs to embedded strip plates

DOCUMENTS EXAMINED

Docket No. 99900787

Report No. 82-001

Item No.	Doc. Type	TITLE/SUBJECT	Doc Date	Doc Rev
01	4	ALFAB Quality Assurance Policy Manual	5/13/82	12
02	5	CP&L Purchase Order 22AA8	12/23/81	
03	2	CP&L Specification No 025 Nuclear Safety Related & Seismic Class I Embedded Steel & Related Items		5
04	1	CP&L Dwg No MPS-B-838 Type II Embedded Plates	11/17/81	0
05	8	TRW Nelson Division Certification Nelson Shear Connector Stud Weldability Qualification-Nelson 3/4" and 7/8" Solid Flux Studs		3/23/72
06	7	TRW Nelson Division letter to ALFAB Certification "no changes in any critical stud, ferrule or flux parameters	9/2/81	
07	3	ALFAB Procedure W-001 Procedure for Welding Steel Studs to Steel		1
08	3	ALFAB Procedure W-007 Procedure for Manual Shielded Arc Welding of Carbon Steel		4
09	8	ALFAB Inspection Report per Procedure No W-001		
10	8	ALFAB Inspection Report Job No. 22AA8	1/15/82	
11	8	ERICO Products Inc. Certification of Conformance A758A	1/7/80	
12	8	WEC Electrode Test Report W Order No. CA 98381-MW	9/28/80	

Document Types:

1. Drawing
2. Specification
3. Procedure
4. QA Manual
5. Purchas Order
6. Internal Memo
7. Letter
8. Other (Specify-if necessary)

Inspector Wm D. Kelley

Scope/Module Deficiencies of the welds of the studs to embedded strip plates.

DOCUMENTS EXAMINED

1	2	TITLE/SUBJECT	3	4
13	8	Conners Steel Co - Certified Mill Test Report HT 2LA26 & 14774	1/4/82	
14	8	ALFAB Certificate of Conformance	1/15/82	
15	8	ALFAB Shop Release for Shipment	1/15/82	
16	6	ALFAB Memo Dicus to Hall RE: 59 Rejected Embed Plates	2/11/82	
17	7	CP&L letter Subject: CP&L P.O. H-36504 - Embed Plates	2/10/82	
18	8	CP&L Deficiency and Disposition Report DDR No 816	2/2/82	
19	8	CP&L " " " " DDR No 812	2/2/82	
20	7	ALFAB letter to CP&L Corrective Action Report	3/1/82	

Document Types:
1. Drawing
2. Specification
3. Procedure
4. QA Manual
5. Purchas Order
6. Internal Memo
7. Letter
8. Other (Specify-if necessary)

Columns:
1. Sequential Item Number
2. Type of Document
3. Date of Document
4. Revision (If applicable)

Inspector Wm D. Kelley
Scope Deficiencies in the welds of cadweld sleeves to crane rail embedded plates

DOCUMENTS EXAMINED

Docket No. 99900787
Report No. 82-01

Item No.	Doc. Type	TITLE/SUBJECT	Doc Date	Doc Rev
01	4	ALFAB Quality Assurance Policy Manual	5/13/82	12
02	5	CP&L Purchase Order H-37507 for 312 each 1" x 1'-10" x 3'-9" Embedded Plates	2/19/82	
03	8	CP&L AS-7 Documentation Submittal Checklist		11
04	2	EBASCO Project Specification CAR-SH-AS-7 Structural Steel - Seismic Class 1 & Non-Seismic Class 1		11
05	8	CP&L P.O Change Order 2 Change thickness to 1½"	3/17/82	
06	8	Daniel Construction Co. - Cadweld Test Report	3/24/82	
07	2	~~AEA~~ ALFAB Qualified Joint Welding Procedure 32BB-1 Cadweld sleeves		1
08	7	CP&L letter to ALFAB Approval of ALFAB Procedure 32B3-1	4/2/82	
09	8	ALFAB Inspection Report Form #12	3/26 thru 4/6/82	
10	8	ALFAB Magnetic Particle Examination Report	3/26 thru 4/5/82 ~~10/6/81~~	
11	8	ALFAB Inspection Report Form #14 (Seven)	4/2/82	
12	8	WEC Electrode Test Report HT 46744	4/15/81	
13	8	UCC - Linde Div. Certified Material Test Report HT 686076	10/20/80	
14	8	AMICO Report of Chemical and Physical Tests HT 15603	7/28/81	

Document Types:
1. Drawing
2. Specification
3. Procedure
4. QA Manual
5. Purchas Order
6. Internal Memo
7. Letter
8. Other (Specify-if necessary)

spector Wm D. Kelley

Scope Deficiencies in the welds of the cadweld sleeves to crane rail embedded plates

DOCUMENTS EXAMINED

Docket No. 99900787

Report No. 82-01

tem No.	Doc. Type	TITLE/SUBJECT	Doc Date	Doc Rev
15	8	CP&L Deficiency and Disposition Report DDR 880	4/19/82	
16	1	C.P&L. Drwg. MPS-B-852 FHB-Embedded Plates @ Crane Runway		2
17	3	ALFAB Procedure for Welding Steel Studs to Steel		1
18	3	ALFAB Procedure for Gas Metal Arc Welding of Carbon Steel		7

Document Types:

1. Drawing
2. Specification
3. Procedure
4. QA Manual
5. Purchas Order
6. Internal Memo
7. Letter
8. Other (Specify-if necessary)

Inspector Wm D. Kelley
Scope Deficiencies of the welds of the conduit supports.

DOCUMENTS EXAMINED

Docket No. 99900787
Report No. 82-01

Item No.	Doc. Type	TITLE/SUBJECT	Doc Date	Doc Rev
01	4	ALFAB Quality Assurance Policy Manual		12.
02	5	CP&L Purchase Order H-36933	1/19/82	
03	2	CP&L Site Specification No 025 Nuclear Safety Related and Seismic Class 1 Embedded Steel & Related Items.		6.
04	1	CP&L Conduit Seismic Support Member Type FA1-3		2
05	3	ALFAB Sheet Steel Welding Procedure Specification 22CC1		1
06	7	CP&L letter to ALFAB Subject: Acceptance of ALFAB Specification 22CC1, Rev.1	3/8/82	
07	8	ALFAB Inspection Report Form #12	3/18/82 Thru 4/5/82	
08	8	Imperial Coatings Corp - Supplier Record of Test Results	2/1/82	
09	8	B-Line Systems, Inc - Statement of Conformance	2/4/82	
10	8	Union Carbide Corp - Linde Div - Material Certification	10/26/82	
11	8	Independence Tube Corp - Material Certification	1/19/82	
12	8	ALFAB Certificate of Conformance	3/18/82	
13	8	CP&L Record of Telephone Conversation - Subject Final Source Examination waived	3/22/82	
14	8	CP&L Deficiency and Disposition Report DDR No 891	4/21/82	

Document Types:
1. Drawing
2. Specification
3. Procedure
4. QA Manual
5. Purchas Order
6. Internal Memo
7. Letter
8. Other (Specify-if necessary)

Inspector Wm D. Kelley

Scope Deficiencies of the welds of the conduit supports

DOCUMENTS EXAMINED

Docket No. 99900787

Report No. 82-01

Item No.	Doc. Type	TITLE/SUBJECT	Doc Date	Doc Rev
15	8	ALFAB Credit Memo to CP&L	7/29/82	

Document Types:

1. Drawing
2. Specification
3. Procedure
4. QA Manual
5. Purchas Order
6. Internal Memo
7. Letter
8. Other (Specify-if necessary)