ORGANIZATION: CHICAGO BRIDGE & IRON COMPANY
SALT LAKE CITY, UTAH

REPORT NO: 99900784/82-01	INSPECTION DATE(S): 7/26-30/82	INSPECTION ON-SITE HOURS: 56

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PRINCIPAL PRODUCT: Nuclear Component Supports

NUCLEAR INDUSTRY ACTIVITY: 40% of production devoted to nuclear products.

ASSIGNED INSPECTOR: H. W. Roberds — 8/18/82
H. W. Roberds, Reactive and Component Program Section (R&CPS) — Date

OTHER INSPECTOR(S): I. Barnes, Chief, R&CPS

APPROVED BY: I. Barnes — 8/18/82
I. Barnes, Chief, R&CPS — Date

INSPECTION BASES AND SCOPE:

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

B. SCOPE: This inspection was made as a result of the identification of weld deficiencies in restraint assemblies that have been furnished to the Comanche Peak Steam Electric Station, Units 1 and 2. Areas selected for inspection included: NDE personnel qualification; nondestructive examination (magnetic particle and visual); nonconformance and corrective examination; manufacturing process control; welding procedure specifications; welding material
(cont. on next page)

PLANT SITE APPLICABILITY:

50-445; 50-446

B. SCOPE: cont.
control; joint fitup and production welding; weld heat treatment; visual examination of welds; and welder performance qualification.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 14.0 of the Nuclear Quality Assurance Manual, repairs were not controlled and documented on a Repair Checklist for weld buildups on Contract No. 82105 (Comanche Peak), Assemblies 609-11-1-2, 609-18-2, and 609-4-2.

2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 14.0 of the Nuclear Quality Assurance Manual, completion of disposition had not been signed off by the Nuclear QA Coordinator on the Nonconformance Control List for Contract No. 82105B, NCCL8.6.2, Items 6, 7, 8, 9, 10, and 13, although all the actions necessary to resolve the nonconformity had been completed.

3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 8.0 of the Nuclear Quality Assurance Manual, a weld (Area K) was observed being performed on Contract No. 82105, Pipe Restraint Assembly 1007-A, which had not been either originally identified on, or added to, the Daily Weld Material Distribution Log by a Welding QA Supervisor or storage attendant.

4. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Section 8.0 of the Nuclear Quality Assurance Manual and General Welding Procedure Specification GWPS-SMAW (WPS800), Revision 10:

   a. The Preheat-Interpass Monitoring Log for Contract No. 82105, Pipe Restraint Assembly 801-A, was not maintained with respect to checking of required preheat for performance of a weld repair made after final assembly postweld heat treatment.

   b. Welding was commenced after torch preheating of Area K of Contract No. 82105, Pipe Restraint Assembly 1007-A, without checking to ascertain that the required minimum 250^{o} F preheat temperature had been reached.

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5. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 8.0 of the Nuclear Quality Assurance Manual, surveillance over welders was not maintained throughout welding operations on Contract No. 82105, Pipe Restraint Assembly 1007-A, to assure that the proper welding procedure was being followed, as evidenced by the observation of the use of flux core arc welding for Area B, in addition to the shielded metal arc welding process permitted by the applicable Shop Checklist.

6. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 10.0 of the Nuclear Quality Assurance Manual, postweld heat treatment (PWHT) was performed for dimensional purposes on Contract No. 82105, Pipe Restraint Assemblies 806-A, 807-A and 860-A, without either designating PWHT or incorporating heat treating requirements on the process control documents (Shop Checklists).

7. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 8.0 of the Nuclear Quality Assurance Manual, the following examples were identified during review of welder performance qualification records, of both failure to record and incorrect recording of qualification information on the welder qualification master sheet:

   a. A January 3, 1978, 2G (horizontal) position shielded metal arc welder performance qualification had been entered on the master sheet as a 3G (vertical) position performance qualification.

   b. An October 21, 1981, stud welder performance qualification had not been entered on the master sheet; and for the same individual a May 6, 1982, stud welder performance qualification had been entered on the master sheet as being performed on May 6, 1981.

   c. An October 14, 1981, gas metal arc welder performance qualification had not been entered on the master sheet.

8. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Procedure GR-100N, Revision 0, no records were available which would indicate a dimensional inspection (including measurement of repair depth) had been performed on a surface that was repaired after final PWHT on Contract No. 82105, Pipe Restraint Assembly 801-A.

9. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraphs QW-201.1 and QW-201.2 in Section IX of the ASME Code, Welding Procedure Specification WPS DS88-F3/82105 permitted a change in an essential variable (QW-403.9) for the gas metal arc welding process from that qualified by the supporting Procedure Qualification Record (PQR), and for which requalification had not been performed.

C. UNRESOLVED ITEMS:

The NRC inspectors were unable to establish from review of QA program requirements, and inspection of process control documentation, that the Nuclear Quality Assurance Manual, Issue 8, makes adequate provision for assuring performance of required inspection activities associated with repair welding of materials and/or assemblies.

The QA program permits, if there is an existing approved repair procedure, to collectively group repairs and required examinations under a single line entry on a Shop Checklist. This results in a single signoff for inspection and nondestructive examination of all repairs. It could not be ascertained, however, from review of the QA program, what provisions existed that would assure either performance of inspections/examinations required to be carried out in concert with repairs, or would allow inspection/NDE personnel to physically identify all repaired areas after completion.

During the inspection a review was made of the process control documentation for Contract No. 82105, Pipe Restraint Assembly 1006-A, with respect to repair history. The process control documentation indicated that a weld repair had been made, but that a required magnetic particle examination of the repair had currently not been performed. Visual examination of the assembly failed to indicate the location of the repair.

D. OTHER FINDINGS OR COMMENTS:

1. NDE Personnel Qualification - The NRC inspector reviewed Section 9.0 of the Nuclear Quality Assurance Manual, "Nondestructive Examination." To verify that nondestructive examination personnel were trained, qualified and certified in accordance with SNT-TC-1A, as required by Section III of the ASME Code, a review was made of procedures governing these activities and current records for six Level II technicians for magnetic particle, radiography, liquid penetrant, and visual examination methods. The specific records examined consisted of: NDE education and experience; written SNT-TC-1A examinations; and certification history including current eye examinations.

   Within this area of inspection, no nonconformances or unresolved items with respect to NRC, contractual, or QA program requirements were identified.

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2. Nondestructive Examination (Magnetic Particle and Visual) - To verify that magnetic particle and visual examinations are performed by qualified personnel using approved procedures which comply with contractual and NRC requirements, a review was made of the qualifications of personnel and procedures that had been used for magnetic particle and visual examination of a pipe restraint assembly that had been fabricated and shipped to the Comanche Peak Steam Electric Station. The procedures were examined for compliance to the requirements of Section V of the ASME Code and to assure that the acceptance standards were as delineated in Subsection NF of Section III of the ASME Code. Personnel qualifications were reviewed to ascertain that they were currently certified in accordance with SNT-TC-1A requirements.

   Within this area of inspection, no nonconformances or unresolved items with respect to NRC, contractual or QA program requirements were identified.

3. Nonconformances and Corrective Action - The NRC inspector reviewed Section 14.0 of the Nuclear Quality Assurance Manual, "Nonconformities and Corrective Action," to verify that a system has been initiated for the control of nonconformances, including reporting, disposition, documentation and establishment of corrective actions for identified discrepant conditions. To verify that the system was implemented, a review was made of the Nonconformance Control List for Contract Nos. 82105 and 03271.

   Within this area of inspection, two nonconformances were identified (see paragraphs B.1 and B.2).

4. Manufacturing Process Control - The NRC inspector reviewed Section 7.0, "Process Control," and Section 8.0, "Welding," of the Nuclear Quality Assurance Manual, to verify that a system had been established for the control of fabrication, which was consistent with NRC, code and contractual requirements. Two repair procedures were reviewed and an evaluation of six Shop Checklists and in-process manufacturing operations performed, with specific attention given to: (a) definition of and control of sequencing of manufacturing operations; (b) compliance with any designated hold points; (c) performance of designated inspections and nondestructive examinations; (d) evidence of definition of required fabrication inspection and performance consistent with QA program commitments; (e) completeness of operation signoff; (f) performance of operations by appropriately qualified personnel; and (g) definition of identity of applicable procedures and instructions.

Within this area of inspection, three nonconformances (see paragraphs B.3, B.6, and B.8) and one unresolved item (see paragraph C.) were identified.

In addition to paragraph C above, the following pertinent information on the same subject was obtained during the inspection of Non-conformances and Corrective Action. From a review of Shop Checklists, it could not be ascertained that a required magnetic particle examination of plate edge weld buildups on Assembly Nos. 609-11-1-2, 609-18-2 and 609-4-2 had been accomplished. Examination of the process control documentation showed that magnetic particle examination was signed off after all assembly welding had been completed. Performance of weld buildup examinations could not be fully accomplished after completion of welding, in that buildup surfaces would then be inaccessible for examination.

5. Control of Welding - The NRC inspector reviewed Section 8.0, "Welding," of the Nuclear Quality Assurance Manual, to verify that systems had beer established which would provide for qualification and performance of welding operations in accordance with NRC, code, and contractual requirements. Specific welding subject areas reviewed and findings were as follows:

   a. Welding Procedure Specifications

      A review was performed of the shielded metal arc (SMAW) and gas metal arc (GMAW) welding procedure specifications (WPS) and supporting PQR's, which had been approved for application on Contract No. 82105. General WPS's for these two welding processes were also reviewed and an evaluation performed of the above documents with respect to ASME Code Section IX essential and non-essential variables.

      Within this area of inspection, one nonconformance was identified (see paragraph B.9).

   b. Welding Material Control

      A review was performed of procurement specification requirements for SMAW and GMAW materials utilized in restraint assembly fabrication, and an examination made of vendor certification for materials currently listed as approved for use. Electrode ovens were inspected with respect to material traceability and conditioning practices, and an inspection performed of issue practices for two welding stations.

Within this area of inspection, no nonconformances or unresolved items were identified.

c. Joint Fitup and Production Welding

An inspection was performed at two welding stations of welder compliance with WPS requirements and a review made of Weld Material Distribution and Preheat-Interpass Monitoring Logs with respect to fabrication of six assemblies.

Within this area of inspection, two nonconformances were identified (see paragraphs B.4 and B.5).

d. Visual Examination of Welds

This area of inspection could not be accomplished, as a result of the shipment of all presently completed assemblies prior to the inspection.

e. Weld Heat Treatment

A review was performed of Section 10.0, "Heat Treating," of the Nuclear Quality Assurance Manual, the procedure used for heat treatment of pipe restraint assemblies, calibration records for furnace temperature recorders, and heat treatment records (charts, thermocouple location sketches) for two furnace runs containing pipe restraint assemblies.

Within this area of inspection, no nonconformances or unresolved items were identified.

f. Welder Performance Qualification

A review was performed of performance qualification files for six welders and a comparison made against the welder qualification master sheet. Additionally, qualifications of personnel were verified for welding operations observed being performed on production assemblies.

Within this area of inspection, one nonconformance was identified (see paragraph B.7).

PERSONS CONTACTED

Company Chicago Bridge & Iron

Dates 7/26-30/82

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Inspector A. R. Herdt

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NAME(Please Print)	TITLE(Please Print)	ORGANIZATION(Please Print)
Ronald A Bonina	Supt - Welding & QA	Chicago Br. & I
Ronald D Bacher	Purch Mgr	"
Jim Hearley	General Foreman QA	"
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Ralph E Kelly	Director Corporate QA - Houston	"
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Inspector H. Heberton

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DOCUMENTS EXAMINED

1	2	TITLE/SUBJECT	3	4
			3-22-78	9
1	4	SECTION 9.0 NONDESTRUCTIVE EXAMINATION	10-13-78	10
2	2	GIBSON MILL SPECIFICATION 2323-55-168		
3	8	SWP-CHECK LIST 1010-B-2		
4	8	" " " 1010-B-3		
5	8	" " " 1010-B-4		
6	8	WORK RECORD SLIPS FOR WEEK OF JULY 5-8		
7	3	MAGNETIC PARTICLE EXAMINATION PROCEDURE MT3		3
8	8	PROCEDURE QUALIFICATION RECORD MT 3		
9	3	NDE Personnel Training & Certification Program	10/1/77	12
10	3	Radiographic Examination	10/1/77	12
11	3	Ultrasonic Examination	10/1/77	2
12	3	Visual Examination	10/1/77	12
13	8	Six Personnel Qualification Record Packages		
14	4	SECTION 14.0 NONCONFORMITIES AND CORRECTIVE ACTION		
15	8	Nonconformance Control List		

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 BARNES

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DOCUMENTS EXAMINED

1	2	TITLE/SUBJECT	3	4
				Issue
1	4	Division 3; Sections 7.0 "Process Control", 8.0 "Welding," 10.0 "Heat Treating."	3-22-78	8
2	2	Gibbs & Hill Specification 2323-SS-16B "Structural Steel (Category I)"	5-7-75	—
3	8	Brown & Root Letter on fabrication requirements	3-21-79	—
4	4	Nuclear Quality Assurance Manual For Pipe Whip Restraints	1-18-79	—
5	3	General Repair Procedure For Materials And Welds — GR 22	6-18-79	2
6	3	GR-10FN General Repair Procedure For Materials And Or Weld Metal After Final PWHT	2-8-80	0
7	2	WPS-GB100/82105	1-17-80	0
8	2	GWPS-SMAW (WPS-800) General Welding Procedure Specification For The Shielded Metal Arc Process	1-31-78	10
9	2	WPS-E7018/82105	6-23-79	0
10	2	WPS-E-7018-#2/82105	11-25-81	1
11	2	GWPS-GMAW (WPS-340) General Welding Procedure Specification For The Gas Metal Arc Process	1-4-78	11
12	2	WPS-DS 88-F3/82105	6-6-79	0
13	3	HT 11X — Post Weld-Post Form Heat Treatment Procedure	3-14-80	2
14	2	QAS-311 Quality Assurance Specification For Welding Materials Certified To SFA Specification	2-9-79	12
15	2	QAS-312 Quality Assurance Specification For Welding Materials Not Certified To SFA Specification	3-12-79	9
16	2	QAS-313 Quality Assurance Specification For Testing Of Welding Materials	2-23-79	6
17	3	CAL — Calibration Of Temperature Recorders	10-17-78	1

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1. Drawing
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DOCUMENTS EXAMINED

1	2	TITLE/SUBJECT	3	4
18	3	Procedure VT5, "Visual Examination Procedure"	12-28-77	1
19	8	Shop Check Lists	—	—
20	8	SMAW and FCAW Certified Material Test Reports	—	—
21	8	Welder Performance Qualification Records	—	—
22	8	CBI Standard 8500-6 "Reporting Of Defects And Noncompliance - NRC Reg. 10CFR Part 21	—	—
23	8	Procedure Qualification Records - SMAW and GMAW	—	—

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1. Drawing
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4. QA Manual
5. Purchas Order
6. Internal Memo
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