EVALUATION RESEARCH CORPORATION

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CONTROL NO. QF-001

COMANCHE PEAK RESPONSE TEAM

QUALITY INSTRUCTION FOR ISSUE-SPECIFIC ACTION PLAN VII.c

INSTRUCTION NO: QI-052

REVISION: 1

ISSUE DATE: 02/20/86

DOCUMENTATION REVIEW OF PIPE WHIP RESTRAINTS

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1.0 PURPOSE

This instruction describes the methods and accept/reject criteria to be used for the document review of Pipe Whip Restraints by the QA/QC Review Team.

2.0 APPLICABILITY

This instruction applies the requirements of Action Plan VII.c to safety related Pipe Whip Restraints which have been QC inspected and accepted.

3.0 REFERENCES

3.1 Memorandum QA/QC-RT-1114 delineating documentation used in development of this instruction including specific sources for attributes.

3.2 QI-051, "Reinspection of Pipe Whip Restraints."

3.3 CPP-009, "Performance of Reinspection and Documentation Reviews."

4.0 GENERAL

4.1 Responsibilities

4.1.1 QA/QC Discipline Engineers

The QA/QC Discipline Engineers prepare the quality instruction delineating documentation review requirements and attributes.

4.1.2 QA/QC Inspectors

The QA/QC inspectors perform the reviews in accordance with this inspection instruction and established project procedures. Reference 3.3 addresses the method to perform documentation reviews, and to document and process the results.

4.2 Policy

Activities performed under this instruction shall conform to the policies contained in the latest Comanche Peak Response Team Program Plan and Issue-Specific Action Plan VII.c.

5.0 INSTRUCTIONS

Using the information in Reference 3.3 and below, perform the documentation reviews of the sample items in this population and document the results on the checklist (Attachment 6.1). Should additional space be required for remarks on the checklist, use Attachment 6.6. (See Note 6)

Attachment 6.3 lists the various quality control reports and documents required to perform the documentation review. Using these documents and any other information available, perform the following review:

5.1 Construction Operation Traveler Package (Notes 1, 3)

5.1.1 Inspection Package (1A)

For the traveler reference number indicated on the Checklist, obtain all the traveler packages from PPRV (Permanent Plant Records Vault), IRV (Interim Records Vault), PFG (Paper Flow Group) for Unit 1, PFG for Unit 2, or TUGCO Vault.

From the traveler package(s) identify those that are applicable to the Equipment Mark/Tag number on the Checklist.

If no applicable traveler exists, reject this attribute and enter 'N/A' on all the remaining attributes on the Checklist.

5.1.2 Drawings (1B)

Record the drawing(s) listed on the Document Package Inventory Card or QA/QC Construction Operational Traveler(s) on Attachment 6.8. The Discipline Engineer shall compare these drawings against the drawings used for the reinspection program and initiate Deviation Reports, if appropriate.

5.1.3 Inspector Certification (1C)

Verify, by review, that the below listed documents, when included, are signed or initialed as required by a certified inspector. The accept/reject criteria for inspection certification is:

1. The inspector must be certified in the area, discipline or procedure for the type of inspection performed, and:

2. The inspector's certification must be current at the time of inspection.

5.0 INSTRUCTIONS (Cont'd)

5.1 Construction Operation Traveler Package (1) (Cont'd)

5.1.3 Inspector Certification (1C) (Cont'd)

If this attribute is rejected, determine if the person that signed as QC inspector was ever certified to the procedure used. If the inspector was ever certified to the procedure, record the time period of certification, otherwise state in the remarks column that the person was never certified.

NOTE: Inspector's name shall be recorded on the checklist when a deviation occurs.

Attachment 6.2 gives guidelines for the various inspector types and levels along with type of work each type and level can perform.

Inspector certification files - files retrieved from the Permanent Plant Records Vault or B&R training office shall be used for this verification. CB&I Inspector Certifications are filed in Section 8.12 of P.O. 91939.

a. Inspection Report

b. Weld Inspection Documentation Card

c. Multiple weld data card

d. Structural Assembly Verification Card

e. Receiving Inspection Reports

f. Other documents reviewed to meet requirements of this instruction. List the titles of these documents on the document review checklist.

5.2 Welding (2)

From the Construction Operation Traveler(s) identified in 5.1.1, determine those entries which are related to the population item being reviewed. If the Traveler(s) indicates that some welding was performed by CBI (referred to as Subcontractor on the Traveler), obtain the CBI checklist from PPRV (filed in Section 8.5 of P.O. 91939). Some of the attributes described below may be listed as individual entries or they may be included with an entry for the entire inspection area. Should an attribute described below not be applicable to the item being reviewed, enter N/A on the document review checklist.

5.0 INSTRUCTIONS (Cont'd)

5.2 Welding (2) (Cont'd)

5.2.1 Welds (2A)

Document reviews required by this Section shall be performed for each weld called out on the drawings with a field weld symbol. Verify that welding of all field welds is documented.

5.2.2 Weld Procedure Qualification (2B)

Identify the procedure(s) used for welding from WFML (Weld Filler Metal Log), Multiple Weld Data Card or CBI Checklist, as applicable.

Verify, by review, that there is a letter of approval from Gibbs & Hill or TUSI for the weld procedure used. It may be filed with the welding procedure in the Brown & Root Welding Procedure Manual or referenced on the CB&I welding procedure under P.O. 91939.

5.2.3 Weld Procedure Application (2C)

1. Code

Verify, by review, that the weld procedure used is qualified to the appropriate code as indicated below:

- Welds for Moment Restraints are required to be made by procedures qualified as per ASME III, Subsection NF.

- Welds for all other Restraints and Support Structures are required to be made by procedures qualified per AWS D1.1, ASME IX or ASME III, Subsection NF.

2. Base Material (Notes 4, 5)

Verify, by review, that the weld procedure supports the materials (or the corresponding P-numbers and Group numbers) being joined. Materials are specified on the SAVC or design/vendor drawings. ASTM A-588 may be welded by a procedure qualified for P3 Group 1 materials.

3. Filler Metal

- For Brown & Root Welds

5.0 INSTRUCTIONS (Cont'd)

5.2 Welding (2) (Cont'd)

Verify, by review, that the weld filler metal (specified on the Weld Filler Metal Log) used to make the joint is as specified in the weld procedure used for the weld as to material type and classification. Additionally, for Moment Restraint welds, verify, by review, that the weld filler metal was impact property tested by examining the CMTR.

NOTE: WFML may specify multiple material issuance without identifying the specific joint. Therefore, the inspector shall check all material listed on the WFML.

° For CBI Welds

Verify that the "complete" column of the Record Drawing (if included) is initialed and dated. If the Record Drawing is not included, verify that an inspector has initialed and dated the statement, 'requirements of WPS were met' on the CBI detail checklist.

This will indicate that use of proper filler metal was verified by a CBI inspector.

4. Material Thickness

Verify, by review, that the thickness of the material being joined (specified on the Construction Operation Traveler or the design/vendor drawings) is within the material thickness range of the welding procedure.

5.2.4 Welder Qualifications (2D)

1. Brown & Root Welds

° Obtain the welder symbol from Welder ID Record (Attachment 6.19 of QI-051 - included in the reinspection package) or use the welder symbol(s) listed on the WFML.

° Obtain from the "Welder Performance Qualification Record Listing Standard Tests" effective at the time of welding (use date specified on the WFML for each welder) the tests for which the welder is qualified to.

5.0 INSTRUCTIONS (Cont'd)

5.2 Welding (Cont'd)

Verify, by review of the "Welder Qualification Matrix" and the data obtained above, the welder is qualified to the welding procedure(s) identified in 5.2.2.

2. CB&I Welds

Welder Symbol for CBI welds may be obtained from Welder ID Record (included in reinspection package) or from Record Drawing.

Verify, by review of CBI documentation (Section 8.10 of P.O. 91939), that the welder is qualified to the welding procedure(s) identified in 5.2.2.

If welder ID is not available, verify by examining the CBI Detail Checklsit that an inspector has initialed and dated the statement 'welders were qualified'.

5.2.5 Hold Points (2E)

Verify, by review, that the QC hold points for fit-up (when checked), preheat (when checked) and required NDE (as indicated below) were signed and dated. For CBI Welds, the NDE report number is indicated on the Record Drawing or Detail Checklist. The reports are filed in PPRV under P.O. 91939 (Section 7.10 for VT, Section 7.3 for PT, Section 7.4 for MT and Section 7.5 for UT).

- All welds are required to be visually inspected.
- All welds are required to be examined by either Magnetic Particle or Liquid Penetrant method.
- All complete penetration welds in 1" plate or thicker and fillet welds greater than 3/4" (as measured through throat of the weld) are required to be ultrasonically tested. In addition, drawing may call out ultrasonic examination requirement by referring to detail 'C' of drawing S1-0581-01, S2-0581-01 or S1-0680.

5.0 INSTRUCTIONS (Cont'd)

5.2 Welding (Cont'd)

5.2.6 Stress Relief (2F)

The weld procedure used may require certain welds to be post weld heat treated. In addition, all complete penetration welds in plates greater than 1-1/2" and fillet welds greater than 1" (leg size) are required to be post weld heat treated. For all such welds made using procedures qualified to ASME III, Subsection NF, perf rm the verification listed below. If any weld requiring post weld heat treatment has been welded using procedures qualified to AWS D1.1 or ASME IX, it shall be brought to the attention of the discipline engineer for verification instructions.

PWHT Charts for welding performed by CBI are filed under Section 7.7.2 of P.O. 91939 in PPRV.

1. Time

   Verify, by review of the temperature charts that the time at temperature was at least that which was called for on the welding procedure.

2. Range

   Verify, by review, the PWHT temperature was within the range specified on the welding procedure.

3. Rate

   Verify, by review, the heating and cooling rate was correct. The code requires that above 800°F the rate of heating and cooling shall not exceed 400°F/hour divided by the maximum thickness (in inches) of the material being heat treated, but in no case more than 400°F/hour.

4. Total Time

   If the member being heat treated has been subjected to multiple PWHT cycles, verify by review the weld procedure was qualified to at least 80% of the total time at temperature of the production weld. Refer to the "Post Weld Heat Treatment Log" to verify number of cycles weld was subjected to.

5.0 INSTRUCTIONS (Cont'd)

5.3 Richmond Inserts/Embedded Bolts (3)

Verify, by review, that for Richmond Inserts and embedded bolts QC has signed off or indicated that bolts/nuts have been installed snug.

5.4 Concrete Expansion Anchors (Hilti's) (4)

Using information in the Construction Operation Traveler/ Inspection Report or Hilti Inspection Report perform the following:

5.4.1 Torque (4A)

Verify, by review, that:

1. Calibration

   The calibration due date of the torque wrench used is subsequent to the date the installation is being performed.

   Note: It is only necessary to have the MT&E number on reinspection report in order to trace calibration on equipment.

2. Torque Value

   The recorded torque setting value meets or exceeds the minimum torque requirements of Attachment 6.4.

5.4.2 Spacing (4B)

Verify, by review, that if abandoned holes were drilled and subsequently covered by a baseplate, the inspector noted that the appropriate spacing was maintained between the installed Hilti and the abandoned holes, and that if located at a distance of four (4) bolt diameters and closer, holes were filled and patched in accordance with procedure 35-1195-CLP-12 (grouted).

5.4.3 Rework (4C)

Verify, by review, that if rework of bolts occurred, that the inspector noted:

1. Thread fit

   Correctness of thread fit requirements.

5.0 INSTRUCTIONS (Cont'd)

5.4.3 Rework (Cont'd)

2. Restamping

Restamping of bolt to new length designation was observed.

5.5 Structural Bolting (5)

From Attachment 6.6 to QI-051, included in the reinspection package, identify all the structural bolted connections.

Using the Construction Operation Traveler/Inspection Report(s), perform the following reviews for each bolted connection:

5.5.1 Bearing Joints (5A)

Verify, by review, that the bolts are installed snug tight.

5.5.2 Friction Joints (5B)

1. Torque

Verify, by review, that the bolts are tightened either by turn of the nut method or by using calibrated wrenches to a torque value that equals or exceeds the minimum installation torque given in Attachment 6.5.

2. Calibration

When calibrated wrenches are used, verify that the calibration due date is subsequent to the date of installation. If turn of the nut method is used, enter "N/A" for this attribute.

Note: It is only necessary to have the MT&E number on the inspection report in order to trace calibration on the equipment.

5.6 Material Traceability (6)

5.6.1 Material Certification (6A)

1. RIR

Using the assembly ID's on the vendor drawings, obtain the Receiving Inspection Report (RIR) from PPRV.

5.0 INSTRUCTIONS (Cont'd)

5.6 Material Traceability (6) (Cont'd)

Verify, by review, that the receipt inspection documented on the RIR was satisfactory or that any unsatisfactory conditions were corrected and accepted.

2. QAR

Verify, by review, that an inspector representing TUGCO has indicated on the QAR (Quality Assurance Release) that all the required documentation is acceptable. QAR is referenced on the RIR and is usually included with it.

5.6.2 Heat Number/Unique ID Conformity (6B)

Attachment 6.2 to QI-051, included in the reinspection package lists unique ID's and heat numbers recorded during hardware reinspection.

Verify, by review of vendor drawings, that each ID is valid.

For those items identified by heat number only, verify that the heat number is traceable. Heat number documentation may be included with the RIR or may be filed in PPRV under the P.O. number indicated on the vendor drawings.

5.6.3 Material Conformity (6C)

Verify that any field supplied material for the Pipe Whip Restraints is as specified on the design/vendor drawings.

All items are vendor supplied, unless there is documentation in the traveler package that indicates field supplied material.

5.7 Hot Gap

Hot gaps on U-Bar Restraints were checked by TUGCO on HFT Cards. Verify, by review, that the measurements on the HFT Card were reviewed on a DCA.

For all other Restraints/Support Structures, this attribute shall be marked "N/A".

NOTES:

1. Numbers in parenthesis refer to the attributes on the Checklist.

2. Multiple Weld Data Cards (MWDC) for non-pressure boundary welds will be filed with the support package. Weld Data Cards (WDC) for pressure boundary attachment welds are filed with pipe spool package.

3. Drawing, as referenced here, includes all the associated change documents (i.e., DCA's and CMC's).

4. Material for U-Bar Restraint brackets is ASTM A533 Class 2 unless specified otherwise on drawing.

5. CBI drawings refer to spec. numbers for materials. Attachment 6.7 lists Corresponding Materials.

6. In order to perform the required documentation reviews, the inspector must review the hardware reinspection package. This package contains the drawings, various Attachments to QI-051 required for the review, and, when necessary, supplemental instructions defining the boundaries of the sample item. This package will be obtained by the Discipline Engineer who will make it available to inspectors. Responsibility of the package shall remain with the engineer at all times.

6.0 ATTACHMENTS

6.1 Inspection Checklist

6.2 Inspector Certification Guidelines

6.3 Document List

6.4 Torque Requirements for Concrete Expansion Anchors

6.5 Torque Requirements for Friction Connections

6.6 Supplemental Remarks

6.7 Material Designations for CBI furnished materials.

6.8 Drawing List from Construction Traveler Package(s)

CHECKLIST

COMANCHE PEAK RESPONSE TEAM CHECKLIST				Attachment 6.1 QI-052 Rev. 1
POPULATION DESC Pipe Whip Restraints	VERIFICATION PKG NO. R-S-PWRE			PAGE 1 OF 3
QUALITY INSTRUCTION QI-052	☐ REINSPECTION			☐ UNIT 1
EQUIPMENT MARK/TAG NO.	☒ DOCUMENTATION REVIEW			☐ UNIT 2
Traveler Reference No.				☐ COMMON
ATTRIBUTE	VERIFICATION ACCEPT	REJECT	DATE	REMARKS
1. Construction Operation Traveler A. Traveler Package				
B. Drawings	N/A	N/A		Record on Attachment 6.8
C. Inspector Certification				
2. Welding A. Welds				
B. Weld Procedure Qualification				
C. Weld Procedure Application 1. Code				
2. Base Material				
3. Filler Metal				
3. Mat'l.Thickness				
D. Welder Qualifications 1. B&R Welds				
2. CB&I Welds				

PREPARED BY: DISCIPLINE ENGR. DATE	APPROVED BY: LEAD DISCIPLINE ENGR. DATE
INSPECTED BY: INSPECTOR DATE	APPROVED BY: LEAD INSPECTOR DATE

CHECKLIST (Cont'd)

COMANCHE PEAK RESPONSE TEAM CHECKLIST				Attachment 6.1 QI-052 Rev. 1
POPULATION DESC Pipe Whip Restraints	VERIFICATION PKG NO. R-S-PWRE			PAGE 2 OF 3
ATTRIBUTE	VERIFICATION			REMARKS
	ACCEPT	REJECT	DATE	
2. Welding (Cont'd) E. Hold Points				
F. Stress Relief 1. Time				
2. Range				
3. Rate				
4. Total Time				
3. Richmond Inserts/ Embedded Bolts				
4. Concrete Expansion Anchors (Hilti's) A. Torque 1. Calibration				
2. Torque Value				
B. Spacing				
C. Rework 1. Thread fit				
2. Restamping				
5. Structural Bolting A. Bearing Joints				
B. Friction Joints 1. Torque				
2. Calibration				

CPE-QP-1.18, Revision 0

CHECKLIST (Cont'd)

COMANCHE PEAK RESPONSE TEAM CHECKLIST				Attachment 6.1 QI-052 Rev. 1
POPULATION DESC Pipe Whip Restraints	VERIFICATION PKG NO. R-S-PWRE			PAGE 3 OF 3
ATTRIBUTE	VERIFICATION			REMARKS
	ACCEPT	REJECT	DATE	
6. Material Traceability A. Mat'l. Certs. 1. RIR				
2. QAR				
B. Heat No./Unique I.D.				
C. Material Conformity				
7. Hot Gap				

CPP-007.1B, Revision 0

INSPECTOR CERTIFICATION GUIDELINES

MECHANICAL INSPECTION PERSONNEL TYPICAL JOB DESCRIPTIONS - LEVEL I AND LEVEL II INSPECTOR

LEVEL I MECHANICAL EQUIPMENT INSPECTORS ARE AUTHORIZED TO PERFORM THE FOLLOWING INSPECTION FUNCTIONS:

1. Verify torque for mechanical joint make-up.
2. Verify torque for mechanical equipment installation, assembly or disassembly and equipment placement.
3. Witness valve, pump or component disassembly and reassembly.
4. Verify torque testing.
5. Witness Plant Tag changes and identification marking transfers.
6. Report nonconforming conditions.
7. Verify material identification and traceability.

LEVEL II MECHANICAL EQUIPMENT INSPECTORS

The certified Level II Mechanical Equipment Inspectors shall be capable and authorized to perform all Level I Mechanical Equipment Inspection functions in addition to performing:

1. Evaluation of Level I inspection and test results.
2. Evaluation and reporting of nonconformancing conditions.
3. Verify final alignment/installation of equipment.

LEVEL II VISUAL WELD INSPECTOR shall perform:

1. Fit-up and tack weld inspection of welded joints.
2. Final visual acceptance of welded joints in accordance with approved QA Procedures or Instructions.

DOCUMENT LIST

DOCUMENT	SOURCE
Inspection Report (IR)	Construction Operation Traveler
Weld Inspection Documentation Card (WIDC)	Construction Operation Traveler
Multiple Weld Data Card (MWDC)	Construction Operation Traveler
Weld Filler Metal Log (WFML)	Construction Operation Traveler
Structural Assembly Verification Card (SAVC)	Construction Operation Traveler
Nonconformance Report (NCR)	Permanent Plant Records Vault
Receiving Inspection Report (RIR)	Permanent Plant Records Vault
CB&I Checklist	CB&I Documentation Package for P. O. 91939

TORQUE REQUIREMENTS

CONCRETE EXPANSION ANCHORS (Hilti's)

Bolt Diameter (In.)	Minimum Torque (Ft./lbs.)
1/4	8
3/8	17
1/2	70
5/8	120
3/4	150
1	230
1 1/4	400

TORQUE REQUIREMENTS FOR FRICTION CONNECTIONS

NOTE: Requirements for A-325 bolts do not apply to Moment Restraints.

Bolt Type	Bolt Size(inches)	Torque(ft-lbs)
A-325	1/2	93
	5/8	228
	3/4	387
	7/8	518
	1	725
A-490	3/4	500
	7/8	650
	1	1320
	1 1/4	2620
	1 1/2	4565

SUPPLEMENTAL REMARKS

Preparer _____ Date _____

Material Designation for CBI Furnished Materials

A) For Contract No. 82105

SPEC NO.	MATERIAL	SPEC NO.	MATERIAL
1,6,9,10,11, 14,15,16,17,18,20	A588-77a Grade A	12	A36-77a; A606-75 or A588-77a GrA
		13	A36-77a,A606-75 or A588-77a GrA for thickness 1/4"
2,5	A-325-76C		A572-77a Gr50 for thickness 1/4" and 1/2"
3	A490-77 for 1/2" Ø thru 1-1/2" Ø A354-77 GrBD for 1-1/2" Ø and 4" Ø (A490-77 may be substituted for A354-77 Gr BD)		A588-77a GrA for thickness 1/2" thru 3/4"
		19	A-106B
4	A194-77a Gr2H		
		21	A193-77a GrB7
7	B22-863 (Lubron or Lubrite Plate)	22	A320-77a GrL43, L7 or L7C
8	A325-76C Hardened Washers		

Material Designation for CBI Furnished Materials

A) For Contract No. 91918

SPEC NO.	MATERIAL
1,2,3,4, 12,13	A588-77a Grade A
5	A-490-76a
6,8	SA325
7	SA194 Gr2H
9	SA325 Hardened Washers
10	SA36,A606-75 or A588-77 GrA or B
11	SA36,A606-75 or A588 GrA or B for t 1/4" A572-77a Gr50 for 1/4" t 1/2" A588-77a GrA for 1/2" t 3/4"
14	A588-77a GrA or B

Drawing List from Construction Traveler Package(s)

Prepared by _____ _____
Inspector Date

Reviewed for
Acceptance by _____ _____
QA/QC Discipline Engineer Date