

ERASSO SERVICES INCORPORATED

WATERFORD STREAM ELECTRIC STATION - UNIT NO 3

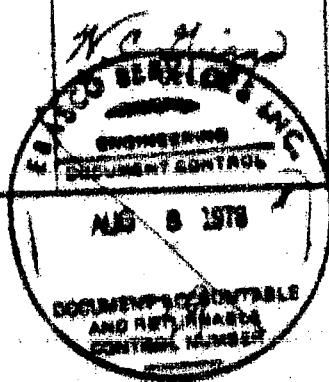
PROCEDURE FOR: INSPECTION OF CONCRETE REINFORCING  
STEEL MECHANICAL SPLICES (LAPWELDS)

PROC. NO. QCIP-9

ISSUE SUMMARY

NOTATIONS IN THIS COLUMN INDICATE WHICH CHANGES HAVE BEEN MADE

ISSUE/DATE	PREPARED	APPROVED	REMARKS
"A" 10/30/75	M G Vinson	<i>M.G. Vinson</i>	
"B" 1-18-76	M G Vinson	<i>M.G. Vinson</i>	Complete Revision
"C" DRAFT 8/19/75	E. L. Boyd <i>E.L. Boyd</i>	<i>J.O. Booth</i>	Edited and updated QCIP-9-1
C 9/5/75	E. L. Boyd <i>E.L. Boyd</i>	J. O. Booth	
"D" DRAFT 1/29/76	R. A. Koffe <i>R.A. Koffe</i>	<i>J.O. Booth</i>	
"D" 2-19-76	R. A. Koffe <i>R.A. Koffe</i>	J. O. Booth	
"E" DRAFT 2-18-76	R. A. Koffe <i>R.A. Koffe</i>	<i>J.O. Booth</i>	Revised forms QCIP-9-1 and QCIP-9-2.
"E" 3-26-76	R. A. Koffe <i>R.A. Koffe</i>	J. O. Booth	
"F" DRAFT 8-11-76	S. Kalat <i>S. Kalat</i>		Revised Form No. QCIP-9-3. Revised Paragraph 6.5.3.
"F" 9/3/76	S. Kalat <i>S. Kalat</i>	<i>W.C. Griggs</i> W. C. Griggs	
"G" DRAFT 11-6-76	R. Koffe <i>R. Koffe</i>		
"G" 12-8-76	R. Koffe <i>R. Koffe</i>	<i>W.C. Griggs</i>	Revised Paragraphs 6.2.1, 6.6.1 6.5.1, 6.5.3 Added Paragraph 8.4 Revised Form QCIP-9-2.



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PDR FOIA  
GARDE84-455 PDR

FORM NO. E-1 (3-3-72)

FREEDOM OF INFORMATION  
ACT REQUEST

14-455

6/425

**1.0 PURPOSE**

To define the procedure to be followed to monitor the quality of mechanical splices in reinforcing steel, generally called Cadwelds.

**2.0 SCOPE**

2.1 This procedure covers receiving inspection of materials, qualification of splicers, general inspection of splices, User's Testing of Splices, recording of splice locations, and documentation of the Cadweld program.

2.2 Inspection of the qualification of splicers: general inspection of splices, User's testing of splices, recording of splice locations, and documentation of the Cadweld program by Ebasco shall be performed in accordance with inspection procedure ASP-III-11.

**3.0 REFERENCES**

- 3.1 Ebasco Specification LOU-1564.479, for Mechanical Splicing of Concrete Reinforcing Steel
- 3.2 Ebasco Specification LOU-1564.473, for Concrete Reinforcing Steel Furnishing, Fabrication and Delivery
- 3.3 ASP-III-14, Receiving, Handling and Storage
- 3.4 ASP-III-11, Inspection
- 3.5 ASP-I-6, Quality Assurance Records

**4.0 DEFINITIONS**

- 4.1 Cadweld - used interchangeably with "mechanical splice", and denoting a splice formed with a sleeve which is placed over the end of a reinforcing bar and filled with molten metal to form a mechanical (shear) means of transmitting longitudinal force from the bar to the member to which the sleeve is attached.
- 4.2 Installation equipment - non-expendable tools.
- 4.3 Materials - splice sleeves, chemicals and other components of splice kits, the condition of which may be critical for the quality of the splice.

**5.0 RESPONSIBILITY**

- 5.1 The Senior Quality Control Supervisor shall be responsible for ensuring that this procedure is implemented.
- 5.2 The Material Control Supervisor shall be responsible for verifying that the materials and kits delivered to the site are acceptable as to quality and condition. He shall also be responsible for verifying that handling, storage, and documentation conform to the requirements of this and other applicable procedures.
- 5.3 The Lead Quality Control Engineer (Welding and Mechanical) shall review all documentation and file in accordance to ASP-I-6.

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- G 5.4 The Quality Control Welding Supervisor shall be responsible for supervising the inspection and testing of splices and for reviewing the documentation.
- 5.5 The Inspector, who reports to the Quality Control Welding Supervisor, shall be responsible for performing visual inspections of the splices and documenting the inspection results.
- 5.6 The Construction Superintendent shall be responsible for coordinating all activities that require participation of field personnel in departments other than Quality Control.
- 5.7 The Contractor shall be responsible for qualifying his splicing crews and informing Ebasco QC prior to qualification and production activities in the field.
- 6.0 PROCEDURE
- 6.1 Receiving Inspection
  - G 6.1.1 Receiving Inspection shall be in accordance with ASP-III-14.
- 6.2 Qualification of Splicers
  - G 6.2.1 The Quality Control Welding Supervisor or his designee shall ensure that the Contractor's qualification or requalification of splicers is performed according to Specification LOU-1564.479 and is recorded on "Cadveld Operator's Qualification Test Record," Form No. QCIP-9-1 (sample attached). These records shall be retained in the Quality Control files.
  - 6.2.2 The Quality Control Welding Supervisor shall ensure that a file of qualified operators and their qualification test records is maintained at the site.
- G 6.3 Monitoring of Workmanship
  - 6.3.1 The Q.C. Welding Supervisor shall ensure that the Contractor prepares and submits a written procedure for Cadvelding, that the procedure is reviewed and approved prior to start of Cadvelding, and that work follows the procedure.
  - 6.3.2 The Q.C. Welding Supervisor shall assign to an Inspector the duty of maintaining a "Cadveld Daily Inspection - Visual" log, Form No. QCIP-9-2 (attached).
  - 6.3.3 Cadveld Inspectors shall observe the following points carefully:
    - 6.3.3.1 That bar ends are thoroughly cleaned by wire brush to remove all loose mill scale, dirt and other foreign matter and are heated to remove all moisture.
    - G 6.3.3.2 That, in order to confirm correct centering of bar ends in the splice sleeve, permanent reference marks are made equal distance from the bar ends - the distance shall be recorded on Form No. QCIP-9-2.

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- 6.3.3.3 That splice sleeves are free of foreign material or serious rust on the inside surfaces.
- 6.3.3.4 All graphite parts except crucible covers shall be cleaned as required, using a material or tool that will not damage the graphite.
- 6.3.3.5 That special attention is given to maintaining the alignment between sleeve and guide tube thus ensuring a proper fill.
- 6.3.3.6 That shortly before ignition all possibility of moisture in the uncompleted splice is avoided by reheating - this would apply particularly in cold, damp weather or sub-freezing temperatures.
- 6.3.3.7 That no Cadwelding takes place during periods of precipitation unless performed under adequate protection.

6.3.4 The Inspector shall record on Form QCIP-9-2 whether workmanship as discussed in this Section 6.3 was satisfactory.

#### 6.4 Splice Identification

6.4.1 The Q.C. Welding Supervisor shall obtain from the Contractor, a copy of the Cadweld Map on which shall be shown to an adequately large scale for the purpose described in this section the locations and identification of the Cadwelds produced in a portion of the work to be defined by the Contractor.

6.4.2 Cadweld Maps shall have the following information:

6.4.2.1 Placement number

6.4.2.2 Bar size

6.4.2.3 Layer of steel

6.4.2.4 Location dimensions

6.4.2.5 Cadweld operator identification and sequential number

6.4.3 Daily cadweld visual inspection report shall have the following information:

6.4.3.1 Cadweld operator identification and sequential number

6.4.3.2 Splice position and bar size

6.4.3.3 Sleeve lot number

6.4.3.4 Powder lot number

6.4.3.5 "Comments" (cut out for test, visual reject, replaced by, etc.)

6.4.3.6 Map number

NOTATIONS IN THIS COLUMN INDICATE WHICH CHANGES HAVE BEEN MADE

- 6.4.4 The following information shall be permanently marked on the Cadweld splice sleeve using a low-stress die stamp:
  - 6.4.4.1 Cadweld Operator Identification
  - 6.4.4.2 Sequential number
- 6.4.5 The Inspector shall verify by the use of a copy of the Contractor's daily visual inspection report and Cadweld map the following:
  - 6.4.5.1 The location of each splice
  - 6.4.5.2 The sizes of the bars spliced
  - 6.4.5.3 The symbol indicating the assigned identification letter(s) of the operator or crew, the sequential number of the splice (starting from the first splice made by the operator or crew and continuing without interruption), a suffix "s" if the splice is a sister splice of the splice with the same number, the size(s) of the bars spliced, and the horizontal or vertical position of the bars spliced.
  - 6.4.5.4 Inspection Status (Sign-off)
    - 6.4.5.4.1 Pre-Equipment Set-up acceptance
    - 6.4.5.4.2 Final visual acceptance
- 6.4.6 At the time of visual inspection of the splice, the Inspector shall copy the ID symbol of the splice on Form No. QCIP-9-2, record his approval or otherwise on the form.
- 6.4.7 All Cadwelds within a pour must be approved, and therefore painted white, before concrete may be placed.
- 6.5 Visual Inspection and Testing of Production Splices
  - 6.5.1 The Inspector shall carry out visual inspection in accordance with Specification LOU-1564.479. He shall record the results, on Form No. QCIP-9-2 in accordance with this procedure.
  - 6.5.2 The Inspector shall ensure that the frequency of production splice testing defined in Specifications is satisfied.
  - 6.5.3 The Quality Control Welding Supervisor shall ensure that the splice test samples are placed at the disposal of the site testing laboratory. The site testing laboratory shall collect the samples, test them for ultimate tensile strength, and record the results on Form No. QCIP-9-3, Report of Tensile Tests (sample attached) which shall be filed per ASP-I-6. Identification of the samples shall be by the identification symbol described above (6.4.2.3).

Criteria for acceptance shall be those stated in Specification LOU-1564.479. Discrepancies shall be reported and resolved in accordance with ASP-III-11.

7.0 ATTACHMENTS

- 7.1 Cadweld Daily Inspection - Visual (Form No. QCIP-9-2)
- 7.2 Cadweld Operator's Qualification Test Record (Form No. QCIP-9-1)
- 7.3 Report of Tensile Tests - Cadwelds Splices (Form No. QCIP-9-3)

G 8.0 INSPECTION AND TESTING DESIGNATION

- 8.1 The Ebasco Material Control Supervisor is responsible for receiving inspection of all cadweld material received at the site.
- 8.2 The Ebasco Quality Control Welding Supervisor shall verify 100% of the documentation required for qualification of the contractor's splicers.
- 8.3 The Ebasco Quality Control staff shall maintain a "Cadweld Daily Visual Inspection Log" for 100% of Cadweld splices installed in the field and shall inspect the installation of 20% of splices made each day by each operator or crew (minimum of one splice per day for each operator or crew).
- G 8.4 Qualification records, inspection records, and test records will be retained and filed according to the requirements of ASP-I-6.

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CADWELD OPERATOR'S QUALIFICATION TEST RECORD

OPERATOR'S NAME \_\_\_\_\_ BADGE NO. \_\_\_\_\_ ID SYMBOL \_\_\_\_\_

DATE QUALIFIED \_\_\_\_\_

MATERIAL INFORMATION:

REINFORCING STEEL: ASTM A-615 GRADE 60

TYPE OF SPLICE: "T" SERIES CADWELDS

BAR SIZE \_\_\_\_\_ SLEEVE TYPE \_\_\_\_\_ FILLER METAL LOT NO. \_\_\_\_\_

BAR SIZE \_\_\_\_\_ SLEEVE TYPE \_\_\_\_\_ FILLER METAL LOT NO. \_\_\_\_\_

TEST RESULTS - BAR SIZE \_\_\_\_\_

<u>POSITION</u>	<u>VISUAL INSPECTION</u>	<u>TENSILE (PSI)</u>	<u>FRACTURE POSITION</u>	<u>COMMENTS</u>
VERTICAL	_____	_____	_____	_____
	_____	_____	_____	_____
HORIZONTAL	_____	_____	_____	_____
	_____	_____	_____	_____

TESTING LAB REPORT NO. \_\_\_\_\_

TEST RESULTS - BAR SIZE \_\_\_\_\_

<u>POSITION</u>	<u>VISUAL INSPECTION</u>	<u>TENSILE (PSI)</u>	<u>FRACTURE POSITION</u>	<u>COMMENTS</u>
VERTICAL	_____	_____	_____	_____
	_____	_____	_____	_____
HORIZONTAL	_____	_____	_____	_____
	_____	_____	_____	_____

TESTING LAB REPORT NO. \_\_\_\_\_

WITNESSED BY ERASCO Q.C.: \_\_\_\_\_ CADWELD INSTRUCTOR: \_\_\_\_\_

REMARKS: Cadwelder Qualification  Accepted  Rejected

CONTRACTOR'S REPRESENTATIVE: \_\_\_\_\_



WATERFORD STEAM ELECTRIC STATION  
1980 - 1165 MW INSTALLATION - UNIT NO 3

CADWELD DAILY INSPECTION - VISUAL

(Separate form required each day for each operator or crew.)

Contractor \_\_\_\_\_

Date \_\_\_\_\_

Spliced by  
(Name and ID) \_\_\_\_\_

Bar Size \_\_\_\_\_

Splice Position \_\_\_\_\_

Powder Cartridge Size \_\_\_\_\_

Splice ID	In Process Inspections (Initials)			Final Visual (Initials)	Sleeve Lot No.	Powder Lot No.	Accept	Reject	Comments	If pulled for test	Cadweld Map No.
	Each Bar	Final Dist.	Equipment								



WATERFORD STEAM ELECTRIC STATION  
1980 - 1165 MW INSTALLATION - UNIT NO. 3

REPORT OF TENSILE TESTS - CADWELD SPLICES

Portion to be Completed by Inspector Requesting Test

Cadweld Operator and Sequential Number \_\_\_\_\_

Date Cadweld Splice Completed \_\_\_\_\_

Position of Splice - Vertical - Horizontal - Other \_\_\_\_\_

Size of Rebar Spliced \_\_\_\_\_

Filler Material Cartridge No. \_\_\_\_\_

Inspector Signature \_\_\_\_\_ Date \_\_\_\_\_

Portion to be Completed by Testing Laboratory

Lab Report Number \_\_\_\_\_

Total Load, Lbs.	Strength, PSI	Position of Failure
Tensile -		

Lab. Tech. Signature \_\_\_\_\_ Date \_\_\_\_\_

Remarks \_\_\_\_\_

Portion to be Completed by Ebasco Q.C.

Does Test Results Comply with Applicable Specifications? Yes \_\_\_ No \_\_\_

Remarks: \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

ERASCO SERVICES INCORPORATED

WATERFORD STEAM ELECTRIC STATION - UNIT NO 3

PROCEDURE FOR: INSPECTION OF CONCRETE REINFORCING  
STEEL MECHANICAL SPLICES (CADWELDS)

PROC. NO. QCIP-9

ISSUE SUMMARY

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"B" 1-18-74	M G Vinson	<i>M. G. Vinson</i>	Complete Revision
"C" DRAFT 8/19/75	E. L. Boyd <i>E. L. Boyd</i>	<i>J. O. Booth</i>	Edited and updated QC 4.2.1-1
C 9/5/75	E. L. Boyd <i>E. L. Boyd</i>	J. O. Booth	
"D" DRAFT 1/29/76	R. A. Koffe <i>R. A. Koffe</i>	<i>J. O. Booth</i>	
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"F" 9/3/76	S. Kalat <i>S. Kalat</i>	<i>W. C. Griggs</i>	
"G" DRAFT 11-4-76	R. Koffe <i>R. Koffe</i>		
"G" 12-8-76	R. Koffe <i>R. Koffe</i>	<i>W. C. Griggs</i>	Revised Paragraphs 6.2.1, 6.4.6, 6.5.1, 6.5.3 Added Paragraph 8.4 Revised Form QCIP-9-2.

INFORMATION ONLY