

Washington Public Power Supply System
A JOINT OPERATING AGENCY

P. O. BOX 1223

ELMA, WASHINGTON 98541

PHONE (206) 249-5001

May 29, 1981
G03-81-2056

Nuclear Regulatory Commission, Region V
Suite 202, Walnut Creek Plaza
1990 N. California Boulevard
Walnut Creek, California 94596

Attention: Mr. B. H. Faulkenberry
Chief, Reactor Construction Projects Branch

Gentlemen:

Subject: WPPSS NUCLEAR PROJECTS 3 AND 5
NRC INSPECTION OF WNP-3 AND WNP-5
DOCKET NUMBERS 50-508 AND 50-509
FINAL REPORT OF EMBED PLATE STUD WELDS

- References: 1) G03-81-861, Letter, R. S. Leddick to
B. H. Faulkenberry, dated March 25, 1981.
- 2) G03-81-979, Letter, R. S. Leddick to
B. H. Faulkenberry, dated April 28, 1981.

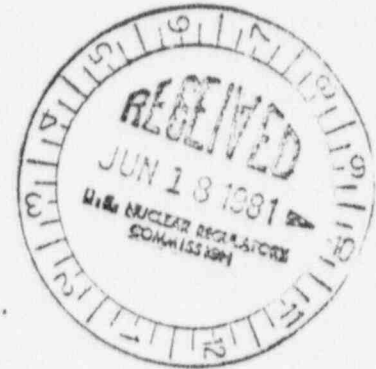
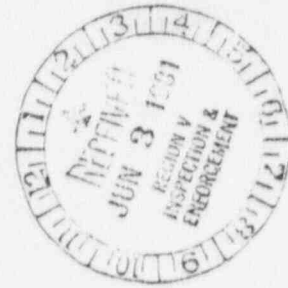
On February 26, 1981, your office was notified by telecon of a problem considered potentially reportable under the requirements of 10CFR50.55(e). The problem was identified as failure of the stud welds when studs were bent to 30° as required by AWS. The studs in question were welded to embeds manufactured by Chicago Bridge And Iron in Salt Lake City, Utah.

When the problem was discovered approximately 80% of the embeds had been received at the site and 42 had been embedded in concrete.

Site Corrective Action

For those embeds that were on site, NCRs were written identifying those embeds that had been installed and those that had been received and were in storage.

For those embeds not installed, the NCR was dispositioned to test 20% of each plate type, bending 50% of the studs 30° on plates selected at random. The acceptance criteria was established where those embeds with 5% or less



8106190292

S

THIS DOCUMENT CONTAINS
POOR QUALITY PAGES

E27
S.11

81-67

May 29, 1981
G03-81-2056

failures were acceptable, those with greater than 5% failures required all studs on that plate to be tested and all failures repaired.

After completion of this testing program, a review of the results revealed that the majority of the failures were on non-safety related embeds. All of the safety related embeds met the acceptance criteria established by the NCR disposition and were accepted. The plates failing to meet this criteria were dispositioned "Repair." The embeded plates were dispositioned "Use As Is" based on the design intent and the percentage failure rate established during the testing program.

Supplier Corrective Action

The embeds fabricated but not shipped were placed on hold by CB&I. CB&I established a test program where every third stud was tensile tested to the load specified by AWS. Any failure of welds on a plate required all studs on that plate to be tested and all failures to be repaired by fillet welding.

Cause Of Stud Failures

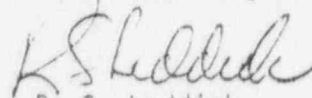
The cause of the welding problem was identified as a defective stud welding gun in the CB&I shop.

Conclusions

Based on the design intent of the type of embeds where studs failed to meet the testing criteria and the acceptance of all other embeds, this problem is deemed not reportable as required by 10CFR50.55(e).

Attached please find a copy of the Engineer's Report for your information. Should you have any questions, or desire further information please feel free to contact me.

Very truly yours,



R. S. Leddick
Program Director, WNP-3/5

cc: D. Smithpeter - BPA /wo/a
Ebasco - New York /wo/a
WNP-3/5 Files - Richland/w/a

MEMORANDUM

DATE: May 28, 1981

LETTER NO: WPPS-ESSE CAV-11-330

FILE NO: 3240-113

TO: A M Cutrona / L A Bast

FROM: R Shetty

SUBJECT: Washington Public Power Supply System
WPPSS Nuclear Projects No. 3 & No. 5
Significance of Nonconformance
Report No. 12825
For Reportability per 10CFR50.55(e)

The following report evaluates the non-conforming conditions in CB&I Contract 3240-113 Stud Welding and Resolution. Since non-conforming conditions are found, basically, in non-critical plates and the problem is rectified before the embedment of these plates (except 42 plates) we consider, for the purpose of reportability per 10CFR50.55(e). The problem is not significant designwise.

RS:mcf

Attachments:

1. Report
- 1a. Statistical Table
2. CB&I Letter No. 245
3. CB&I Letter No. 253
4. CB&I Letter No. 206
5. NCR 12825
6. CB&I Report on Studs (Preliminary)

cc: J J Mallanda
J P Sluka
D Quamme (w/o attach)
C B Tatum
E W Lindsay
T E Cottrell
E Bennett
A H Wern
R H Wang
N Yates (w/o attach)
H Werchel (w/o attach)
J Brodsky
J Porrovecchio
J Gushue
I Koski
D Cutting
J Puzaska

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

NUCLEAR POWER GENERATING STATION

UNIT #3

DEFECTIVE STUD WELDING REPORT

Contract 3240-113

By

R. Shetty

SUMMARY:

Project: Washington Public Power Supply System
WPPSS Nuclear Project No. 3 and No. 5
Owner: Washington Public Power Supply System (WPPSS)
A/E: Ebasco Services Inc. (Ebasco)
Subject: Stud Welding on Embedded Plates for Reactor Building
Supplier: Chicago Bridge and Iron (CB&I)
Problem: Defective Stud Welding

DESCRIPTION:

Chicago Bridge and Iron Company supplies embedded plates for Unit #3 and #5 under Contract 3240-113. CB&I ships these plates from its shop at Salt Lake City, Utah, after testing the studs for AWS D-1.1 Structural Welding Code acceptance criteria.

On 25 Feb 81, WPPSS-Ebasco Quality Surveillance, in a spot check, found out certain studs were failing at 30° bend test. The failure was identified as brittle failure in the weld zone. 30° bend test is AWS D1.1 Section 4.25 Quality Control requirement for production weld. NCR-12825 was generated to identify the problem.

CODE REQUIREMENTS:

Stud welding is done according to American Welding Society D1.1 Structural Welding Code Part I and project procedure 3240-448.

Code requires a 30° bend test on first two studs (AWS D1.1 - 4.25.1.1 & 4.25.2) for the production weld and a 15° bend test of one stud for every 100 studs as an inspection criterion (AWS D1.1 - 4.26.1 & 4.26.2).

COMPLIANCE:

CB&I was complying to these requirements. CB&I was also bend testing over 50 percent of the studs to 15° criterion. All these studs appeared to have passed

(Compliance cont'd.)

the normal requirements of the Code.

PROBLEM:

In a detailed CB&I investigation, it was found out that one of the stud welding guns were malfunctioning. According to CB&I, they had been using Nelson and KSM stud welding guns. KSM stud welding guns have voltage regulating circuits. It was discovered that one of the stud welding gun's circuits was not functioning correctly. It was concluded that stud welding done by this particular gun was defective.

CB&I had already delivered 80 % of the plates to the site for Unit #3. 42 plates were already embedded in the concrete. Some of the plates were up on the forms; the rest were in the storage yard.

TESTING:

Since it was not possible to separate those studs which were welded by the defective gun from the rest, it was necessary to test studs in each plate to establish a definitive trend of failure.

The following sampling program was set up to accomplish this goal:

- a. Test by group identified by mark numbers.
- b. Test minimum 20% of plates in each group.
- c. Test minimum of 50% of studs in each plate to be tested.
- d. Test the studs to 30° bend test per AWS D1.1.

ACCEPTANCE CRITERIA:

1. Accept up to 5% failure per plate.
2. If more than 5% failure in any plate, test all the studs.
3. Replace all broken studs.

JUSTIFICATION FOR 5% ACCEPTANCE: **

Confidence interval for Proportion P:

$$\hat{p} - z_{\alpha/2} \sqrt{\frac{\hat{p}\hat{q}}{n}} < P < \hat{p} + z_{\alpha/2} \sqrt{\frac{\hat{p}\hat{q}}{n}}$$

where

P = proportion of defects in the random sample of size n.

$$\hat{q} = 1 - \hat{p}$$

$z_{\alpha/2}$ = value of standard normal curve leaving an area of $\alpha/2$ to the right.

No. of samples $n = 100$

No. of defects $x = 5$

$$\hat{p} = \frac{x}{n} = \frac{5}{100} = 0.05$$

$$\hat{q} = 0.95$$

$$\left. \begin{array}{l} z_{\alpha/2} = 1.96 \text{ for 95\% confidence interval} \\ z_{\alpha/2} = 1.64 \text{ for 90\% confidence interval} \end{array} \right\} \begin{array}{l} \text{From the Chart} \\ \text{Attachment I} \end{array}$$

Substituting the values:

90% confidence interval:

$$0.05 - 1.64 \sqrt{\frac{0.05 \times 0.95}{100}} < P < 0.05 + 1.64 \sqrt{\frac{0.05 \times 0.95}{100}} = 0.014 < P < 0.086$$

95% confidence interval:

$$0.05 - 1.96 \sqrt{\frac{0.05 \times 0.95}{100}} < P < 0.05 + 1.96 \sqrt{\frac{0.05 \times 0.95}{100}} = 0.007 < P < 0.093$$

** Reference: Probability and Statistics for Engineers and Scientists
by Ronald F. Walpole and Raymond H. Myers

CORRECTIVE ACTION:

For corrective action the embed plates were catagorized as follows:

- I. Embed plate immediately needed for construction and those were already up on the forms.
- II. Embed plates in the storage yard at site.
- III Embed plates in CB&I shop.
- IV Embed plates already embedded in concrete.

For Catagory I & II a failure trend was established by the field bend test program. Bend test results showed that Type I, Type II and Type P1 plates are the plates which were failing bad.

All these plate groups which had failure less than 5% were accepted to "Use As Is". Broken studs in the sample were replaced. All the rest of the plate groups were rejected.

Every stud in rejected plates were tested and the failed studs were replaced.

All Catagory III plates were reinspected and studs were tension tested by CR&I and accepted on the basis of allowable tension values. Testing and approval has been documented in NCR 12885 and NCR 134NS.

Catagory IV plates were embedded before the problem was identified. The following plates were used as noted below:

See Attached Chart Following Page —

Date	Cont. Pour No.	Mark No.	Type Plate	Qty	Plate Size (inch)	No./Studs per Plate	Purpose — to Support	Fail Rate by Test
1/26/81	038	82A	Type I	1	4x1/2x0-4	2	Handrail Post	18% 75%
2/4/81	039	82A	Type I	13	4x1/2x0-4	2	Handrail Post	18% 75%
2/6/81	059	78F	Type P3	1	-	-	-	0%
2/6/81	059	82D	Type IV	1	10x1x0-10	4		5%
2/6/81	059	82G	Type VII	1	-	-	-	0%
2/13/81	038A	82A	Type I	2	4x1/2x0-4	2	Handrail Post	18% 75%
2/13/81	038A	74D	Type P3	4	-	-	-	0%
2/13/81	039A	82A	Type I	2	4x1/2x0-4	2	Handrail Post	18% 75%
2/13/81	039A	74D	Type P3	4	-	-	-	0%
2/18/81	041	82B	Type II	4	6x1/2x0-6	2	Ladder	54%
2/18/81	041	82G	Type VII	6	-	-	-	0%
2/18/81	041	82A	Type I	3	4x1/2x0-4	2	Handrail Post	18% 75%

ANALYSIS:

Only Type I and Type II Plates had more than 5% failure rate. Type IV had a 5% failure rate. All other types had 0% failure rate.

Type I plates are exclusively used to support handrail posts on the top of slabs. Type II plates are used to support ladder, also on the top of the slab. These plates basically serve as means for attachment. There is no load carrying criteria for these plates in this application. Attachment is not safety related and failure of these plates would not create any safety hazard. Moreover, the bond between concrete and plate is more than sufficient for the intended purpose.

Type IV plate is a part of pipe rupture restraint. This plate supports a knee brace for support RCH-16-R-8 shown on drawing G-3535S1. Plate is shown in Section AE & AF on Drawing G-3535 S3. The loading on this brace is 2^k tension.

The plate capacity is as given below:

Tension	14.3 ^k	(reduced capacity for 2" eccentricity)
Shear (Vert.)	27 ^k	
Shear (Horiz)	23.3 ^k	
Moment	90" ^k	

Factor of safety in tension = $\frac{14.3}{2} \approx 7$
or 700%

Failure rate for this plate is 5%. Since only one plate is used and loading is small, this plate could be used as is.

All other plates proved to be good 100%. Hence a separate analysis for these plates is not required.

CORRECTIONS BY CB&I

CB&I's Letter No. 81-243, 81-253, 81-206 (Attachments 2 thru 4) explain the CB&I corrective actions undertaken to rectify the problem. CB&I corrective steps are as follows:

1. Completely discontinue KSM stud welding gun and start using Nelson stud welding guns for all stud welding.
2. Inspect 100% of all welded studs to AWS' D1.1 criteria before shipment from the shop.
3. Tension test every third stud in every plate.
4. If one stud fails, test every stud.
5. Continue tension testing for future 5000 studs to assure the adequacy of welding gun and process.

CONCLUSION:

Field testing programme demonstrated specific pattern of failure. Three categories of plate types and three specific mark numbers were identified as the failing categories. They are as follows:

<u>Mark No.</u>	<u>Type</u>	<u>Failure</u>
82A	I	75%
82B	II	54%
70A	P1	13%

The following plates were already embedded:

Type I - 21 plates

Type II - 4 plates

All above plate types are used for supporting non-critical items such as handrail ladders, etc. There is no safety hazard even if the plates fail, because impact would not be significant.

880 West 17th South
P O Box 687
Salt Lake City, Utah 84110
801 973 2500

11355-61-245

EBASCO Services, Inc.
P.O. Box 1189
Elma, WA 98541

Attention: D. L. Quamme

RE: 3240-113
Washington Public Power Supply System
WPPSS Nuclear Projects 3 and 5
Satsop, Washington
CBI Contract Q3270/80, Q4020/30
EBASCO letter EB113-81-25

3/5 FI

TITLE	WMP-3 & B	A or V
ON MANAGER		
MGR MGR		
FEDERATION MGR		
MGR MGR	V	
MGR ENGINEERING		
MGR ENG MGR	V	
MGR MGR	V	
OPERATIONS		
BUSINESS MGR		
CONTROL MGR		
QUALITY MGR		
ADMIN MGR		
CONTROL CR		
- - - - -		
- - - - -	V	

Gentlemen:

We have reviewed our operating and quality assurance procedures relative to the stud welding being performed under Contract 3240-113. We find that stud welding and inspection performed to date is in conformance with the specifications, the applicable ASME and AWS code requirements, the procedures approved for this contract, and the CBI Quality Assurance Program.

While performing the above review it was found that one of the stud welding guns used on this work has performed in an anomalous manner. We believe that removal of this particular stud gun from service will resolve any concerns you may have.

In reply to your request to upgrade the present contractual inspection procedure, you may wish to consider the following program:

- 1) All plates which have Nelson studs attached, both at site and those presently ready for shipment shall be inspected by Tensile loading every third stud on every plate to the load specified in AWS Fig. 4.2.6.2 and ASME Section IX para. QW 192.3.
- 2) Should any one stud fail under such loading on any plate, all studs on that plate shall be subject to the tension test.
- 3) Notwithstanding the above, any stud which has been previously bent more than 15 shall not be tension loaded.

CEI Registration No.
223-01-CH-IC-43-157719

March 13, 1981
11333-81-246
Page Two

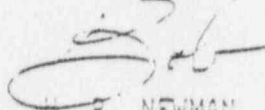
- 4) All failed studs shall be manual fillet welded to the plate and tension tested. This tension test shall be in addition to any test which may be required on failed studs by the AWS code.

We propose that the Nelson stud plates meeting the above criteria be considered as accepted and suitable for your needs.

Per your direction we are performing certain chemical and mechanical tests on failed test studs and plate materials from Salt Lake and the jobsite if necessary, and we will forward the results in a timely manner.

We await your direction as to the implementation of the above suggested reinspection procedure. Reply requested by March 17, 1981.

Sincerely,



H. R. NEWMAN
Project Manager
CBI Salt Lake

HRN/ik

113-81-246-11
113-81-246-11



550 West 17th South
P.O. Box 687
Salt Lake City, Utah 84110
801 472 2500

81 MAR 25 AM 1:00

March 20, 1981

113EB-81-253

EBASCO SERVICES, INC.
#19 Rector Street, Room 605
New York, New York 10006

ATTN: Mr. R. H. Wang
Supervising Engineer

WNP-355	
TYPE	A
ON MANAGER	
WNP PROJECTS	
DESIGN ON WNP	
WNP CONSTR	
WNP ENGINEERING	
WNP ENG MGR	
CONTRACT MGR	
OPERATIONS	
BUSINESS MGR	
CONTROL MGR	
QUALITY MGR	
ADMIN MGR	
CONTROLLER	
WNP-355	
A - ACTION 1/3, 1000	

RE: 3240-113 3/5 FILES RICHLAND ✓
Washington Public Power
Supply System
WPPSS Nuclear Projects #3 & #5
Contract 3240-113
CBI Contract 03270/80
Nonconformance Report Concerning
Testing of Studs

In the March 10, 1981 meeting between Ebasco and CB&I at CB&I Salt Lake facility, stud welding and testing of studs was discussed at length. As a result of this discussion, Ebasco requested CB&I initiate the suggested, stud testing procedure outlined in CB&I's letter 113 EB-81-246 dated March 13, 1981. This procedure is to be applied to sufficient number of studs to assure a quality stud weld is provided consistently. To initiate these new testing guide lines, it was suggested by Ebasco that CB&I submit a Nonconformance Report to void Nonconformance Report #4NS and the addition testing specified therein. Accordingly please find enclosed the CB&I prepared Nonconformance Report dated March 18, 1981, which outlines the revised testing procedure.

At Ebasco's request, CB&I is now testing studs to be shipped to the site per this Nonconformance Report. This program will be continuing so we request your response by March 26, 1981.

Sincerely,

R. Newman
Project Manager
CB&I, Salt Lake Plant

WNP/9
Enclosure

CB&I Registration No.
223-01-CH-IC-AS-1377N9

NAME OF PROJECT:

DRAWING NO./SPEC. NO.:

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

CONSTRUCTION OR CONTRACTOR:

P.O. NO.:

Chicago Bridge & Iron Company

3240-113

3240-448

IDENTIFICATION OF COMPONENT, PART OR SYSTEM:

Structural Steel Phase IV

DESCRIPTION OF NONCONFORMANCE (1) (Items Involved, Specification, Code or Standard to Which Items Do Not Conform. Submit Sketch if Applicable)

Disposition of Nonconformance Report 84-NS does not assure studs of sufficient quality.

NAME AND SIGNATURE OF PERSON REPORTING NONCONFORMANCE (1):

MACK JOHNSTON

Mack Johnston

TITLE/COMPANY:

Assist. Q.A. Supt. CBI

DATE (2):

03/18/84

RECOMMENDED DISPOSITION (1) (Submit Sketch if Applicable)

Discontinue testing studs by bending except as required by stud welding procedure. The following testing program will be performed on the studied plates currently in the shop and on studied plates fabricated in the future until 5000 studs have been welded.

- 1) All plates which have Neslon studs attached, shall be inspected by Tensile loading every third stud on every plate to the load specified in AWS Fig. 4.2.6.2 and ASME Section IX

NAME AND SIGNATURE OF PERSON RECOMMENDING DISPOSITION (1):

MACK JOHNSTON

Mack Johnston

TITLE/COMPANY:

Assist. Q.A. Supt. CBI

DATE (2):

03/18/84

EVALUATION OF DISPOSITION BY EBASCO, REASON FOR DISPOSITION (1):

CORRECTIVE ACTION (1) ☐ Required ☐ Not Required

ENGINEERING	QUALITY ASSURANCE	CONSTRUCTION	OTHER
SIGNATURE:	NAME SIGNATURE:	NAME SIGNATURE:	NAME SIGNATURE:
DATE:	DATE:	DATE:	DATE:
ACCEPTED <input type="checkbox"/> REJECTED <input type="checkbox"/>	ACCEPTED <input type="checkbox"/> REJECTED <input type="checkbox"/>	ACCEPTED <input type="checkbox"/> REJECTED <input type="checkbox"/>	ACCEPTED <input type="checkbox"/> REJECTED <input type="checkbox"/>
ACCEPTED WITH COMMENTS	ACCEPTED WITH COMMENTS	ACCEPTED WITH COMMENTS	ACCEPTED WITH COMMENTS

VERIFICATION OF DISPOSITION

☐ REQUIRED☐ NOT REQUIRED

DATE: PLACE OF WORK:

SIGNATURE:

TITLE:

DATE:

NONCONFORMANCE REPORT

Yellow - Organization recommends disposition

Pink - Initiator of NCR

See back of form

Page 2 of 3

1. NAME OF PROJECT

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

DRAWING NO./SPEC NO. (2)

2. NAME OF CONTRACTOR OR SUBCONTRACTOR

Chicago Bridge & Iron Company

S.D. NO. (3)

3240-113

3240-448

3. DESCRIPTION OF COMPONENT, PART OR SYSTEM

Structural Steel Phase IV

1. DESCRIPTION OF NONCONFORMANCE

(Items Involved, Specification, Code or Standard to Which Items Do Not Comply, Submit Sketch if Applicable)

NAME AND SIGNATURE OF PERSON REPORTING NONCONFORMANCE (1)

TITLE/COMPANY

DATE (1)

11. RECOMMENDED DISPOSITION (12) (Submit Sketch if Applicable)

Cont. 2) Should any one stud fail under such loading on any plate, all studs on that plate shall be subject to the tension test.

3) Notwithstanding the above, any stud which has been previously bent more than 15° shall not be tension loaded.

4) All failed studs shall be manual fillet welded to the plate and tension tested. This tension test shall be in addition to any test which may be required on failed studs by the AWS code.

NAME AND SIGNATURE OF PERSON RECOMMENDING DISPOSITION (13)

TITLE/COMPANY

DATE (13)

MACK JOHNSTON

Assist. O.A. Supt. CBI

03/18/81

111. EVALUATION OF DISPOSITION BY EBASCO, REASON FOR DISPOSITION (14)

IV. CORRECTIVE ACTION (14)

☐ Required

☐ Not Required

1. ENGINEERING

2. QUALITY ASSURANCE

CONSTRUCTION

OTHER

NAME & SIGNATURE

NAME & SIGNATURE

NAME & SIGNATURE

NAME & SIGNATURE

DATE

DATE

DATE

DATE

ACCEPTED ☐ REJECTED ☐

ACCEPTED ☐ REJECTED ☐

ACCEPTED ☐ REJECTED ☐

ACCEPTED ☐ REJECTED ☐

ACCEPTED WITH COMMENTS

ACCEPTED WITH COMMENTS

ACCEPTED WITH COMMENTS

ACCEPTED WITH COMMENTS

VI. VERIFICATION OF DISPOSITION

☐ REQUIRED

☐ NOT REQUIRED

7. SIGNATURE

TITLE

DATE

INSTRUCTIONS (See back of form) Page 3 of 3

CLIENT OR PROJECT NO. _____

DRAWING NO./SPEC NO. _____

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

CONSTRUCTION OR CONTRACTOR NO. _____

ITEM NO. _____

Chicago Bridge & Iron Company

3240-113

3240-448

DISCUSSION OF COMPONENT, PART OR SYSTEM NO. _____

Structural Steel Phase IV

I. DESCRIPTION OF NONCONFORMANCE (Items Involved, Specification, Code or Standard to Which Items Do Not Comply, Submit Sketch if Applicable)

NAME AND SIGNATURE OF PERSON REPORTING NONCONFORMANCE (1) _____ TITLE (COMPANY) _____ DATE (1) _____

II. RECOMMENDED DISPOSITION (1) (Submit Sketch if Applicable)

Cont. This program of stud testing was discussed and agreed to by Bill Freshour in a meeting at Salt Lake on March 17, 1981.

This Nonconformance Report voids the disposition on Report 84 NS.

NAME AND SIGNATURE OF PERSON RECOMMENDING DISPOSITION (1) _____ TITLE (COMPANY) _____ DATE (1) _____
 MACK JOHNSTON *MJ* Assist. O.A. Supt. CBI 03/18/81

III. EVALUATION OF DISPOSITION BY EBASCO, REASON FOR DISPOSITION (1)

IV. CORRECTIVE ACTION (1) ☒ Required ☐ Not Required

ENGINEERING	QUALITY ASSURANCE	CONSTRUCTION	OTHER
NAME SIGNATURE	NAME SIGNATURE	NAME SIGNATURE	NAME SIGNATURE
DATE	DATE	DATE	DATE
ACCEPTED <input type="checkbox"/> REJECTED <input type="checkbox"/>	ACCEPTED <input type="checkbox"/> REJECTED <input type="checkbox"/>	ACCEPTED <input type="checkbox"/> REJECTED <input type="checkbox"/>	ACCEPTED <input type="checkbox"/> REJECTED <input type="checkbox"/>
ACCEPTED WITH COMMENTS <input type="checkbox"/>	ACCEPTED WITH COMMENTS <input type="checkbox"/>	ACCEPTED WITH COMMENTS <input type="checkbox"/>	ACCEPTED WITH COMMENTS <input type="checkbox"/>

V. VERIFICATION OF DISPOSITION ☒ REQUIRED ☐ NOT REQUIRED

NAME AND SIGNATURE _____ TITLE _____ DATE _____

ATTACHMENT # 4



Chicago Bridge & Iron Company

31 APR 8 P 11:05

850 West 17th South
Salt Lake City, Utah 84110
801 475 2100
11322-01-206

March 20, 1981

EBASCO Services, Inc.
P. O. Box 1169
Elma, Washington 98541

Attention Mr. D. L. Quamme &
Mr. Ed Lindsay

NAME	WPPSS-345	A
DM MANAGER		
DM SUPERVISOR		
DM TO CBI UNIT		
DM UNIT		
NCR ENGINEERING		
DMO AND MDR		
UNITARY MDR		
OPERATIONS		
BUSINESS MDR		
CONTROL MDR		
ADMIN MDR		
CONTROL		
3/5 FILE		
113		

3240-113
Washington Public Power Supply System
WPPSS Nuclear Projects #3 & #5
Contract 3240-113
CBI Contract 03270/30
Stud, Inspection and Welding Procedure

Gentlemen:

This letter will confirm the discussions between CBI and EBASCO concerning the stud welding and inspection of embedded assemblies for the 3240-113 contract. The subject discussions occurred at the EBASCO-CBI meeting of March 17, 1981, at CBI's Salt Lake facility.

The following is a summary of the areas of concern and disposition of each

Item #1 - Embedded Assemblies Already Fabricated..

A. Assemblies at site. EBASCO site personnel have or will test and repair as required all embed assemblies except the P-1 embeds. These P-1 embeds will be loaded by EBASCO on a CBI-provided truck, returned to Salt Lake where all studs will be tested and defective studs replaced per the non-conformance report dated 3-18-81 prepared by CBI.

B. Assemblies in Salt Lake shop. An NCR dated 3-18-81 was prepared submitted and approved by EBASCO by teletype which outlined the inspection and repair procedure for these embed assemblies.

Item #2 - Balance of Unit #3 and Unit #5 Embedded Assemblies.

As directed by EBASCO in the March 17 meeting, CBI will initiate the inspection procedure outlined in CBI's letter 11322-01-248 dated March 13, 1981, for 5,000 studs. If the inspection results from these 5,000 studs verify that the problem with the stud welding gun has been eliminated, then all further inspection will be in accordance with the contract requirements.

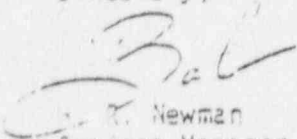
Chicago Bridge & Iron Company

Item #1 - Chemical and Mechanical Tests.

These tests requested by EBASCO are now in process. We expect test results from the studs shot with the KSM stud gun by Friday, March 27, 1981, and we will telecopy these to you the day they are received here at Salt Lake. Similar Tests for studs shot with the Nelson gun will be available at a later date.

We hope the above is in complete agreement with your understanding of how CBI is to proceed on stud welding and inspection of studs. If you have any questions, please call me. Our shop is proceeding now per the above; so we request your response to this by April 6, 1981.

Sincerely,



R. Newman
Project Manager
CBI, Salt Lake

HRN:aej

SITE NONCONFORMANCE REPORT

QUALITY CLASS (2) ☒ I ☐ II ☐ G

INSTRUCTIONS (SEE BACK OF FORM)

PROJECT NO. (3) ☒ 3 ☐ 5 ☐ 3&5

DESCRIPTION OF COMPONENT, PART, OR SYSTEM (4)

LOCATION (5)

DRAWING/SPEC./CODE/STANDARD NO. (6)

Embedded Plates

Reactor Building

RESPONSIBLE CONTRACT (7)

ACTION TAKEN TO CONTROL NONCONFORMANCE (8)

SUBSEQUENT ITEMS OR AREAS AFFECTED (9)

3240-113

Hold Tag Attached

RB Concrete Placement 056, 060, 043,

045, 106, 046, & 111

I. DESCRIPTION OF NONCONFORMANCE (10)

Identified apparent brittle failure of Nelson Studs on certain embeds supplied by CB&I under contract 113.

NAME, SIGNATURE, COMPANY & CONTRACT NO. (11)

LCDE Reactor Building

2/25/81

II. RECOMMENDED DISPOSITION (12)

DESIGN DOCUMENT CHANGE REQUIRED (13)

☐ YES☒ NO(14) ☒ USE AS-IS☐ REPAIR☐ REWORK ON PREPURCHASED ITEMS WITHOUT APPROVED PROCEDURE IDENTIFIED(15) ☐ REJECT☒ OTHER REWORK PLACEMENTS

(16) CORRECTIVE ACTION

Minimum of 20% of all embed types for each Material Receipt Report

(NBR) will have a minimum of 50% of Nelson Studs bent approx. 30° from an axis between the attachment point and the center of stud head (1) only studs which have not been previously bent shall be bend tested. (2) When adjacent studs are bent, studs shall not be bent towards each other (3) Embeds which have studs that fail the specified bend tests shall be segregated and failed studs retained with each embed plate. (4) Those plates with failed studs shall be repaired in accordance with an approved procedure.

ACTION TO PREVENT REOCCURRENCE (IF APPLICABLE) (17) ACTION IS NOT APPLICABLE FOR ABOVE REASONS

Contractor Quality Control and Ebasco VQA have increased frequency of inspections.

Additional sampling and testing to be performed for additional placements as required.

ADDITIONAL INVESTIGATION & CORRECTIVE MEASURE WILL BE TAKEN AS APPROPRIATE WHEN CAUSE IS IDENTIFIED.

RECOMMENDED VERIFICATION BY (18)

CONTRACTOR QS

☐ EBASCO QA☐ EBASCO ENGINEERING☒ CONTRACT NO. 245☐ OTHER☐ NOT REQUIRED

NAME AND SIGNATURE OF PERSON RECOMMENDING DISPOSITION (19)

TITLE

DATE

III. EVALUATION OF DISPOSITION (20)

NRB (20)

☒ REQUIRED☐ NOT REQUIRED

ANI CONCURRENCE

☐ REQUIRED☒ NOT REQUIRED

Disposition under disposition is acceptable.

See page 2

ANI

CONCURRENCE BY

NAME

TITLE

DATE

☐ RESIDENT ENGINEER☐ MASTER WORKMAN☐ ELSE☒ QUALITY ASSURANCE☒ OTHER AUTHORIZED PERSONNEL

NAME (SIGNATURE)

NAME (SIGNATURE)

NAME (SIGNATURE)

NAME (SIGNATURE)

DATE

DATE

DATE

DATE

☐ ACCEPTED☐ REJECTED☒ ACCEPTED☐ REJECTED☒ ACCEPTED☐ REJECTED☒ ACCEPTED☐ REJECTED☒ ACCEPTED WITH COMMENTS☐ ACCEPTED WITH COMMENTS☒ ACCEPTED WITH COMMENTS☐ ACCEPTED WITH COMMENTS

IV. CONFIRMATION OF COMPLETION OF APPROVED DISPOSITION (21)

NAME, SIGNATURE, COMPANY & CONTRACT NO.

TITLE

DATE

V. VERIFICATION OF COMPLETION OF APPROVED DISPOSITION (22)

NAME, SIGNATURE, COMPANY & CONTRACT NO.

TITLE

DATE

VI. FINAL REVIEW SATISFACTORY (24)

ANI ACCEPTANCE NAME

TITLE

DATE

BY

SIGNATURE

TITLE

DATE

OS - 40 - 4542 (12-80) R1 (8-29-80) R2 (11-19-80) R3 (12-11-80)

RELEASE SHEET

RELEASE FROM NOL
SAT. FOR USE

NO	MFR	TYPE	TOTAL STUDS TESTED	NUMBER FAILING	% FAILING	ACQ	FREE	REMARKS
79F	11454	P8	252	0	0			DTK 10/1
80B	11455	P8	60	0	0			2/10/1
78F	11457	P8	110	0	0			
78B	11457	P8	112	1	.9			DTK 4/3/2
82D	11687	IX	20	1	5			
83A	11687	IX	6	0	0			
82E	11693	II	13	7	54			
77B	11693	P8	3	0	0			
81B	11693	P8	4	0	0			
71E	11693	P2	11	0	0			
75B	11740	P5	27	0	0			
74D	11740	P3	24	0	0			
75F	11740	P5	54	1	1.9			
85B	11687	XI	6	0	0			
83D	11693	XVII	6	0	0			
82G	11693	VII	9545	0	0			

- RECOMMENDED DISPOSITIONS:
- TYPE II PLATES - MARK NO 82B - ALL STUDS ARE ALL PLATES AS PER APPROVED PROCEDURE.
 - TYPE II - MARK NO 79B - FAILURE RATE OF 0.9 IS NOT VERY SIGNIFICANT. REPLACE BROKEN STUDS AND USE THIS AS IS.
 - TYPE II - MARK NO 75F - FAILURE RATE OF 1.9 IS NOT CAUSE SIGNIFICANT CHANGE TO STRENGTH OF PLATE. REPLACE THE BROKEN STUDS AND USE AS IS.
 - TYPE III - MARK NO 82D - 5% OF FAILURE RATE IS SIGNIFICANT. HOWEVER PLATES ARE IN DESIGN POINT OF VIEW THIS IS ACCEPTABLE FOR THE INTENDED USE. REPLACE BROKEN STUDS AND USE AS IS.
 - ALL OTHER TYPES - SAMPLING SHOWS 100% GOOD RESULTS. USE THE PLATES AS IS.

12/1/12

Stud welding evaluation
KSM Gun
Nelson Gun

In accordance with our discussion
at the meeting of _____ I am enclosing the
results of our tests for the KSM & Nelson stud
welding equipment. 15 Studs with each gun &
each size were welded to the same base material.

1. Chemistry of base material
and studs.

2. Tensile loads for each gun & studs
KSM Gun
Nelson Gun

3. Bend test results for
KSM Gun
Nelson Gun

4. Hardness test results includes photomicrographs
KSM Gun
Nelson Gun

Tensile & Bend results of Nelson
stud welds

William Christensen

1/2 STOODS	3/4 STOODS	2 STOODS
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16
17	17	17
18	18	18
19	19	19
20	20	20
21	21	21
22	22	22
23	23	23
24	24	24
25	25	25
26	26	26
27	27	27
28	28	28
29	29	29
30	30	30
31	31	31
32	32	32
33	33	33
34	34	34
35	35	35
36	36	36
37	37	37
38	38	38
39	39	39
40	40	40
41	41	41
42	42	42
43	43	43
44	44	44
45	45	45
46	46	46
47	47	47
48	48	48
49	49	49
50	50	50
51	51	51
52	52	52
53	53	53
54	54	54
55	55	55
56	56	56
57	57	57
58	58	58
59	59	59
60	60	60
61	61	61
62	62	62
63	63	63
64	64	64
65	65	65
66	66	66
67	67	67
68	68	68
69	69	69
70	70	70
71	71	71
72	72	72
73	73	73
74	74	74
75	75	75
76	76	76
77	77	77
78	78	78
79	79	79
80	80	80
81	81	81
82	82	82
83	83	83
84	84	84
85	85	85
86	86	86
87	87	87
88	88	88
89	89	89
90	90	90
91	91	91
92	92	92
93	93	93
94	94	94
95	95	95
96	96	96
97	97	97
98	98	98
99	99	99
100	100	100

Tension: Load	Failure	Bends
3-9000 psi	Yield N.B.	1 Flat
6-9000 "	Yield NB	5 Flat
9-9000 "	Yield NB	7 Flat
12-9000 "	Yield NB	13 Flat
15-9400 "	Yield B	14 30° +ve
3-5600 "	Yield weld	2 - 300°
6-5500 "	weld	4 - 300°
9-5600 "	weld	5 - 300°
12-6000 "	weld	11 Flat
15-6000 "	weld	13
3-3600 "	Yield	2 - 300°
6-3500 "	Yield	4 - Flat
9-3300 "	Yield	9 - 300°
12-3300 "	Yield	10 - Flat
15-3200 "		

Sheet No of base material	Specification	thickness
---------------------------	---------------	-----------

Houston tests required

1. Chemical analysis of base material
2. Chemical analysis of one of each size stud.
3. Cross section one stud failed in shear and one failed in weld from each size stud.
 - a. make hardness survey of base material and stud material in field year.
 - b. examine for cracks

KSM Stud welding evaluation

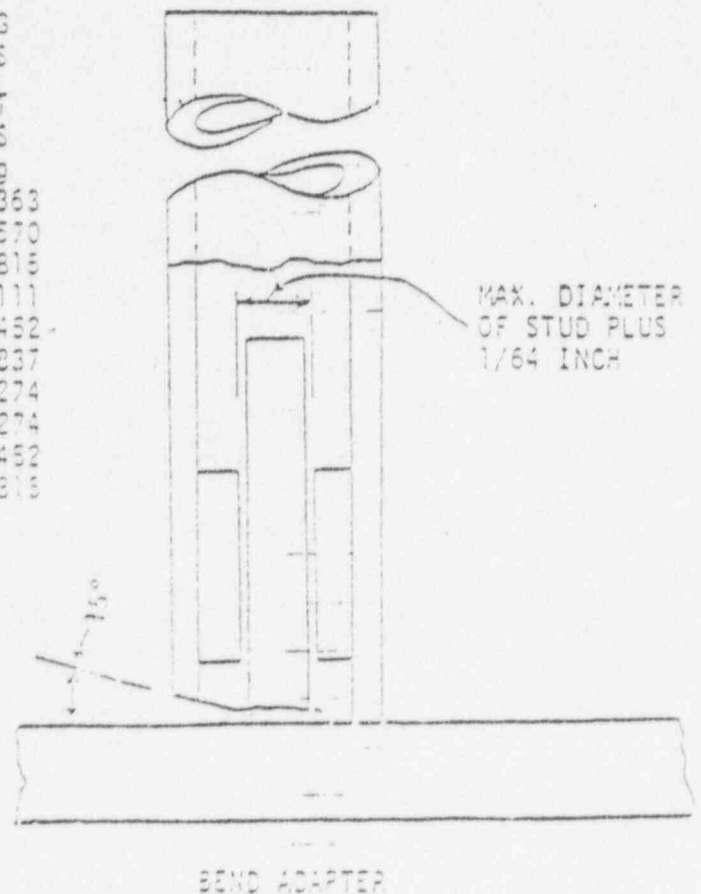
NO.									
BY									
DATE									
ENG'G ASSIGNED									PUBLICATION
									MADE BY Dec
									DATE 3/17/61
									CHECK'D BY
									DATE
									CONTRACT NO. 03271
									SHEET 1

INSTRUCTIONS FOR STUD WELDING PROCEDURE QUALIFICATION TEST

- 1 Ten studs are required to qualify each procedure for stud welding.
- 2 Every other stud shall be bent over to an angle 15° and returned to its original position using the bend adapter as shown in the sketch. The bend adapter is recessed to provide the proper radius of bend in each diameter of stud. A 15° slope is built into the bend adapter to be sure the proper amount of bend is accomplished. When testing studs with heads first burn off the head and grind off any dross to accommodate the bend adapter. *Can use a hammer etc.*
- 3 Visually inspect the bent studs after returning to original position and all shall be free to visible separation or fracture.
- 4 The remaining 5 studs shall be tested in tension to at least 35,000 psi. The load value required when using the CBI hydraulic tester is listed in the table below. This completes the test for P1 studs.
- 5 For studs other than P1 material 5 welds shall be subjected to a macro-examination at a magnification of 10X and shall be free of cracks.

TABLE OF REQUIRED TENSILE LOAD/PSIG
 FOR THREADED AND NON THREADED STUDS

NOMINAL STUD Ø	WITH THREADS		WITHOUT THREADS	
	lb./psig		lb./psig	
1/4	940	200	1715	363
5/16	1590	333	2695	570
3/8	2375	504	3850	815
7/16	3265	689	5250	1111
1/2	4220	896	6860	1452
9/16	5675	1200	8965	1937
5/8	7065	1496	10745	2274
3/4	10365	2237	15470	3274
7/8	14665	3104	21035	4452
1	19280	4081	27475	5815





CHICAGO BRIDGE & IRON
Houston Corporate Welding

Analysis for Stud Chemists

Contract 052

[illegible]

Comments

by -

date:

HARDNESS RESULTS (VHN)

STUDS WELDED

AC 307 6.1.11

1/2"Ø Stud

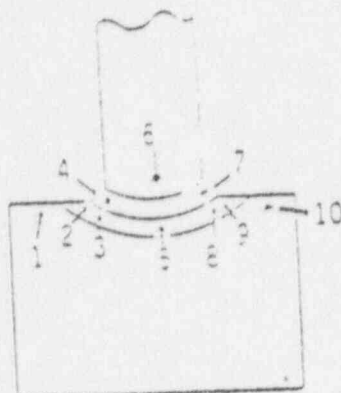
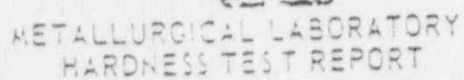
	<u>TENSILE</u>	<u>BEND</u>
STUD	188	190
WM	318	337
HAZ	263	299
BM	141	137

3/4"Ø Stud

	<u>TENSILE</u>	<u>BEND</u>
STUD	150	154
WM	220	241
HAZ	304	347
BM	136	137

7/8"Ø STUD

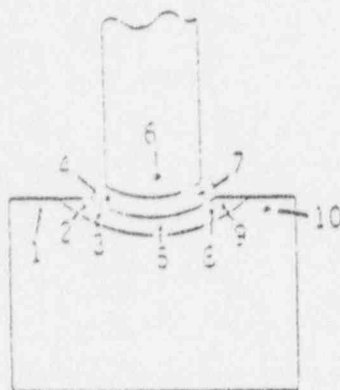
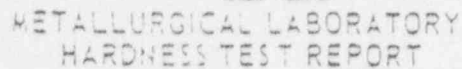
	<u>TENSILE</u>	<u>BEND</u>
STUD	160	167
WM	266	256
HAZ	249	260
BM	160	143



Material: _____
Thickness: _____
Electrode: _____
PWHT: _____
Position: _____
Test By: P.B. Shaw
Date: 4/1/81
Location: Houston

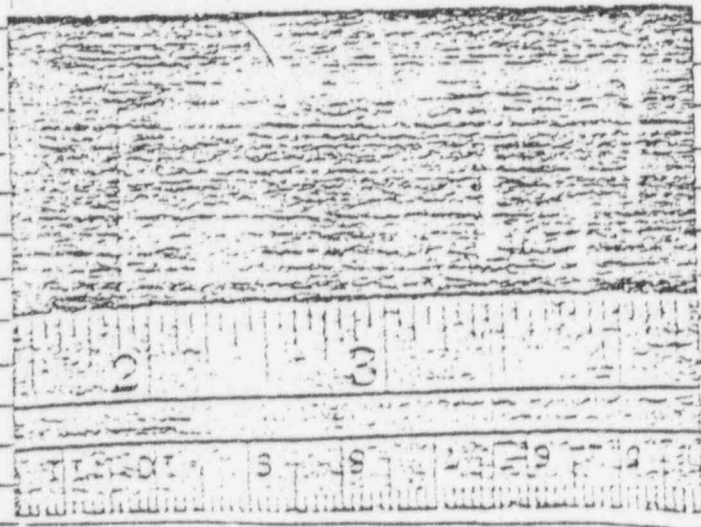
1/2"Ø Tensile Specimen

[illegible]

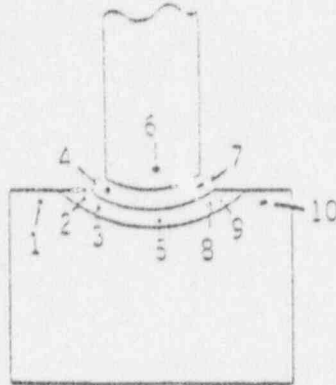


Material: _____
Thickness: _____
Electrode: _____
PWHT: _____
Position: _____
Test By: P.B. Shaw
Date: 4/1/81
Location: Houston

AREA	ROCKWELL	BHN	VHN	KHN
1-B11			137	
2-HAZ			264	
3-HAZ			296	
4-WM			385	
5-HAZ			270	
6-STUD			190	
7-WM			288	
8-HAZ			359	
9-HAZ			303	
10-B11			136	

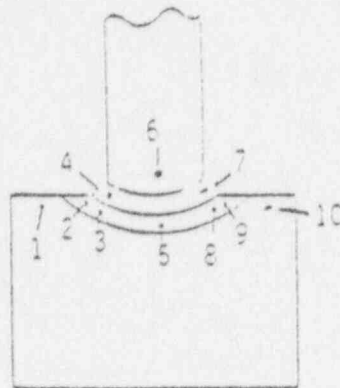


Direction: _____
Thickness: _____
Electrode: _____
PWHT: _____
Position: _____
Test By: P. E. Shaw
Date: 4/1/81
Location: Houston



AREA	ROCKWELL	BHN	VHN	KHN
1-BM			136	
2-HAZ			365	
3-HAZ			326	
4-WM			233	
5-HAZ			320	
6-STUD			150	
7-WM			206	
8-HAZ			285	
9-HAZ			224	
10-BM			137	

6210

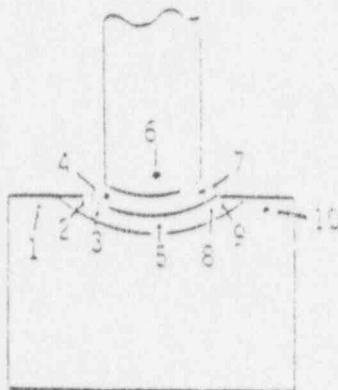


Material: _____
Thickness: _____
Electrode: _____
PWHT: _____
Position: _____
Test By: P. B. Shaw
Date: 4/1/81
Location: Houston

3/4"Ø Send Specimen

AREA	ROCKWELL	BHN	VHN	KHN
1-BM			137	
2-HAZ			339	
3-HAZ			364	
4-WM			245	
5-HAZ			350	
6-STUD			154	
7-WM			236	
8-WAT			336	
9-HAZ			348	
10-BM			137	
			244	

1911

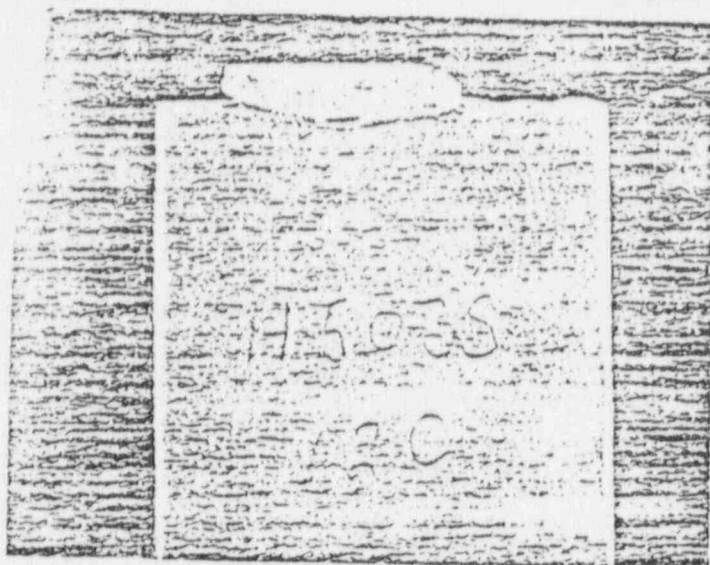


Waterlight: _____
Thickness: _____
Electrode: _____
PWT: _____
Position: _____
Test By: P.B. Shaw
Date: 4/1/81
Location: Houston

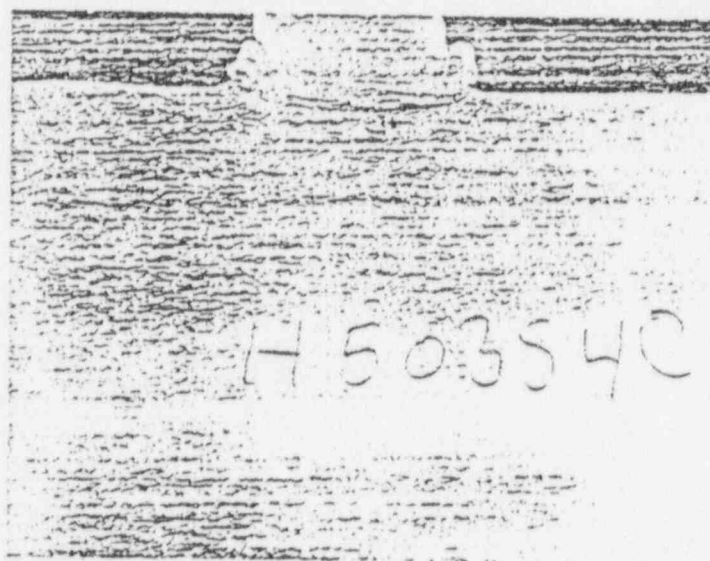
7/8" Bend Specimen

AREA	ROCKWELL	BHN	VHN	RHN
1-BM			143	
2-HAZ			300	
3-HAZ			215	
4-WM			264	
5-HAZ			204	
6-STUD			167	
7-WM			247	
8-HAZ			295	
9-HAZ			284	
10-BM			142	

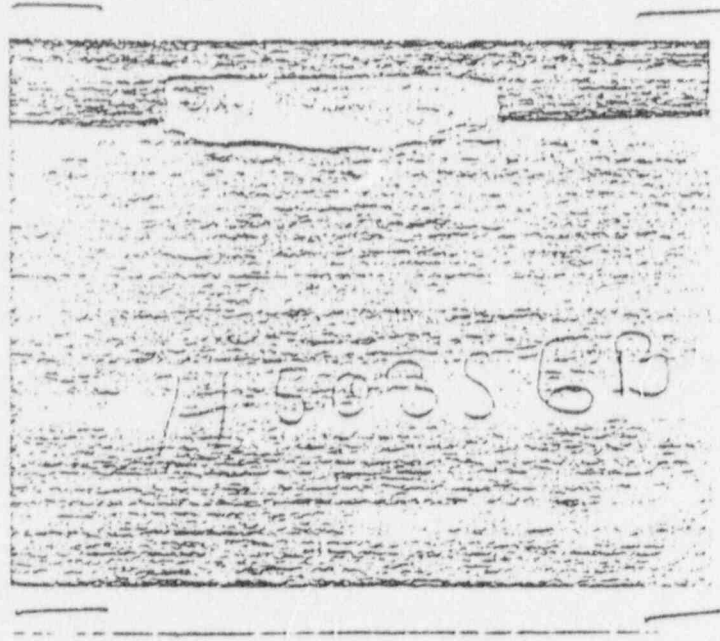
KSM



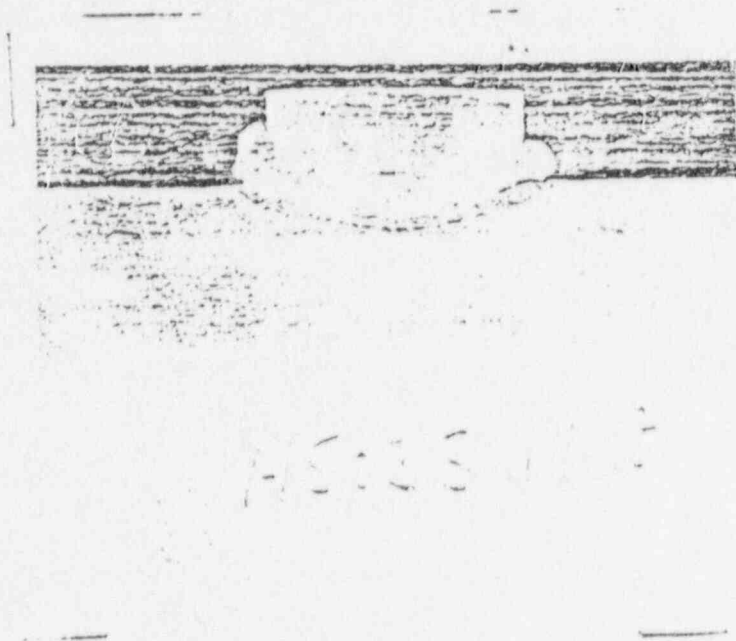
1/2"Ø Stud - Tensile Specimen



1/2"Ø Stud - Bend Specimen



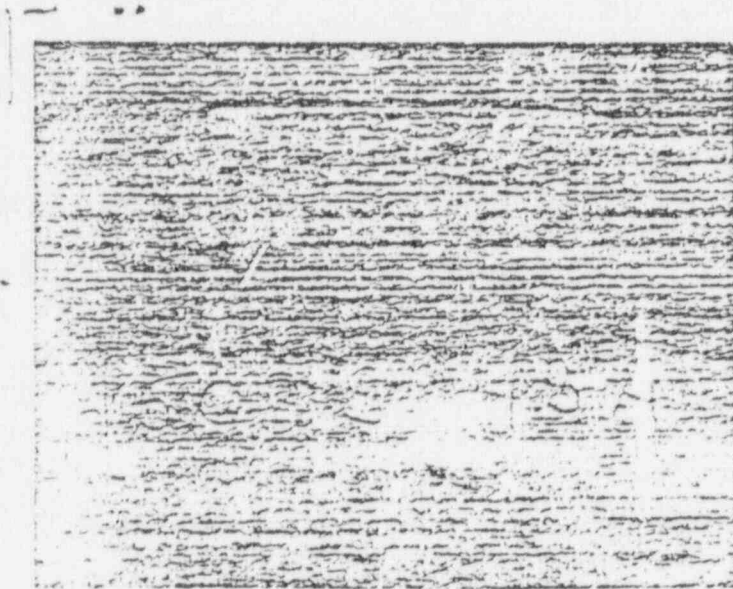
3/4"Ø Stud - Tensile Specimen



3/4"Ø Stud - Tensile Specimen



7/8"Ø Stud - Tensile Specimen



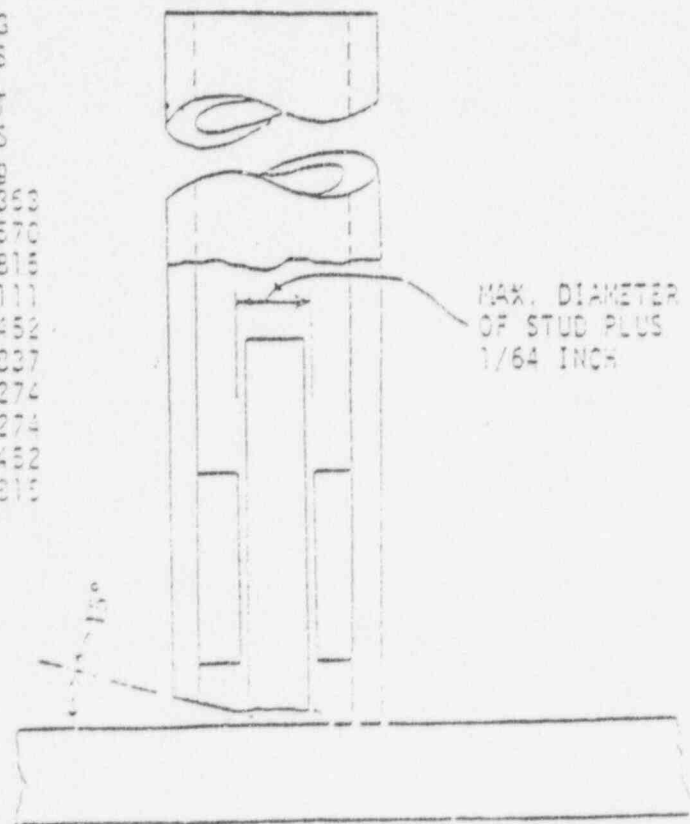
7/8"Ø Stud - Bend Specimen

INSTRUCTIONS FOR STUD WELDING PROCEDURE QUALIFICATION TEST

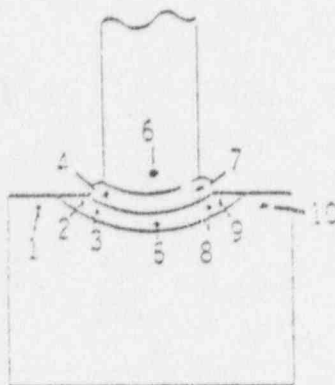
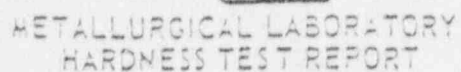
- 1 Ten studs are required to qualify each procedure for stud welding.
- 2 Every other stud shall be bent over to an angle 15° and returned to its original position using the bend adapter as shown in the sketch. The bend adapter is recessed to provide the proper radius of bend in each diameter of stud. A 15° slope is built into the bend adapter to be sure the proper amount of bend is accomplished. When testing studs with heads first burn off the head and grind off any dross to accommodate the bend adapter. *Can use a hammer etc.*
- 3 Visually inspect the bent studs after returning to original position and all shall be free of visible separation or fracture.
- 4 The remaining 5 studs shall be tested in tension to at least 35,000 psi. The load value required when using the CBI hydraulic tester is listed in the table below. This completes the test for P1 studs.
- 5 For studs other than P1 material 5 welds shall be subjected to a macro-examination at a magnification of 10X and shall be free of cracks.

TABLE OF REQUIRED TENSILE LOAD/PSIG
FOR THREADED AND NON THREADED STUDS

NOMINAL STUD Ø	WITH THREADS		WITHOUT THREADS	
	lb./psig		lb./psig	
1/4	940	200	1715	353
5/16	1590	333	2695	570
3/8	2375	504	3850	815
7/16	3265	689	5250	1111
1/2	4220	896	6860	1452
9/16	5675	1200	8965	1837
5/8	7065	1496	10745	2274
3/4	10865	2237	15470	3274
7/8	14665	3104	21035	4452
1	19280	4031	27475	5815



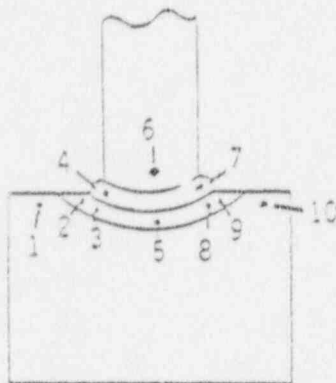
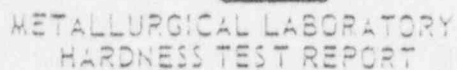
BEND ADAPTER



Work Order No.: 70500-00
Material: _____
Thickness: _____
Electrode: _____
PWT: _____
Position: _____
Test By: B. L. F.
Date: 4-11-81
Location: Houston

Nelson Stud
1/2"Ø Bend Specimen


[illegible]



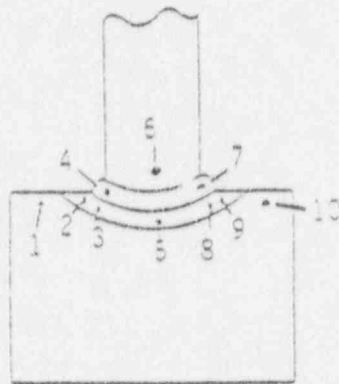
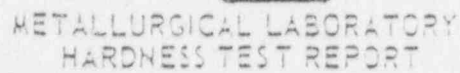
Work Order No. H556S-7C
Material: _____
Thickness: _____
Electrode: _____
PWHT: _____
Position: _____
Test By: B.L.F.
Date: 4-11-81
Location: Houston

1/2"Ø Tensile Specimen

AREA	ROCKWELL	BHN	VHN	KHN
1-BM			146	
2-HAZ			314	
3-HAZ			325	
4-WM			289	
5-HAZ			303	
6-STUD			270	
7-WM			297	
8-HAZ			349	
9-HAZ			371	
10-BM			140	



A micrograph showing a metal microstructure, likely a weld or heat-treated metal. The image displays a complex, granular texture with various shades of gray. A vertical scale bar is visible on the right side of the micrograph, with markings for 3 and 4. The scale bar is oriented vertically, with the number 3 at the bottom and 4 at the top. The micrograph is positioned in the lower right corner of the page, below the table.



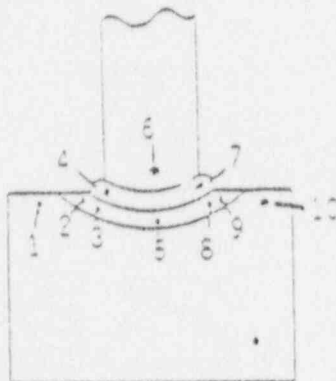
Work Order No.: MS003-65
Material: _____
Thickness: _____
Electrode: _____
PWHT: _____
Position: _____
Test By: B. L. F.
Date: 4-11-81
Location: Houston

Nelson Stud
3/4"Ø Bend Specimen

AREA	ROCKWELL	BHN	VHN	KHN
1-BM			154	
2-HAZ			308	
3-HAZ			300	
4-WM			225	
5-HAZ			205	
6-STUD			141	
7-WM			223	
8-HAZ			258	
9-HAZ			261	
10-BM			143	

Micrograph of a metal specimen showing a weld joint. A vertical crack is visible on the left side of the weld. A scale bar at the bottom right indicates a length of 3 units.

METALLURGICAL LABORATORY
HARDNESS TEST REPORT



Work Order No.: H366S-95
Material: _____
Thickness: _____
Electrode: _____
PWHT: _____
Position: _____
Test By: E. L. F.
Date: 4-11-81
Location: Houston

Nelson Stud
3/4"Ø Tensile Specimen

AREA	ROCKWELL	BHN	VHN	KHN
1-BM			143	
2-HAZ			284	
3-HAZ			164	
4-WM			235	
5-HAZ			270	
6-STUD			140	
7-WM			234	
8-HAZ			303	
9-HAZ			342	
10-BM			138	

42513



B. L. F.

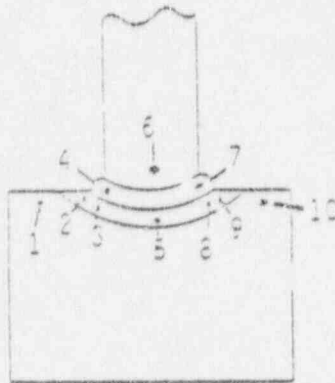
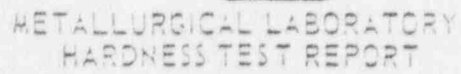
4-11-81

Houston

Nelson Stud

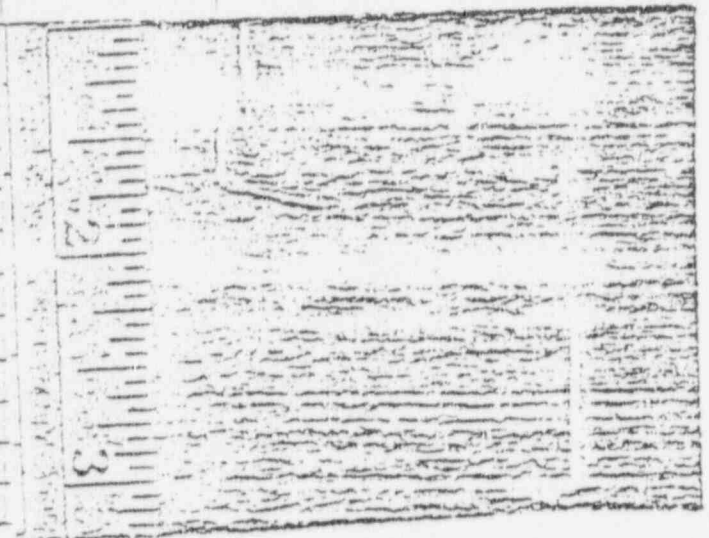
7/8"Ø Bend Specimen

A black and white photograph of a textured surface, possibly a book cover or endpaper, showing a vertical crease and a horizontal fold. A ruler is placed vertically along the right edge for scale, with markings from 1 to 6 visible. The texture is dense and fibrous.



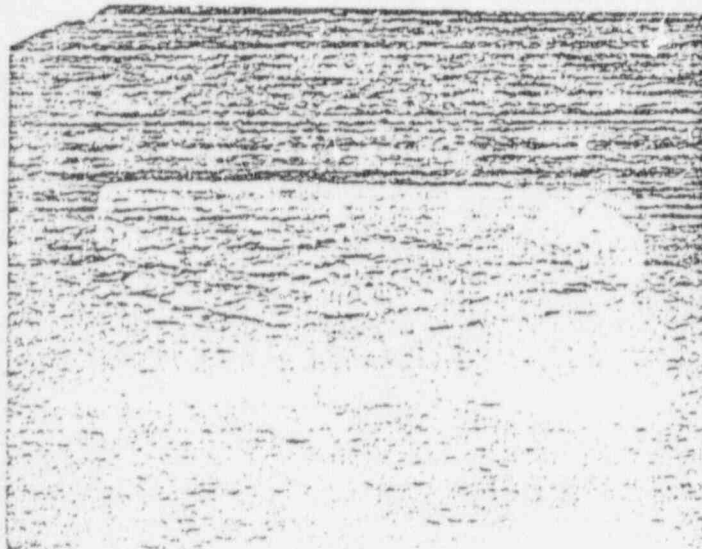
Work Order No. _____
Material: _____
Thickness: _____
Electrode: _____
Fillet: _____
Position: _____
Test By: S. U. F. _____
Date: 4-11-81 _____
Location: Houston _____

Nelson Stud
7/8"Ø Tensile Specimen

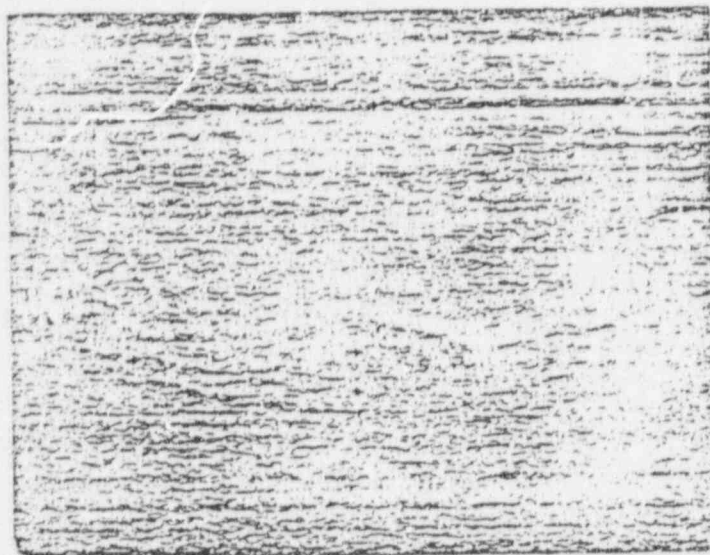
[illegible]



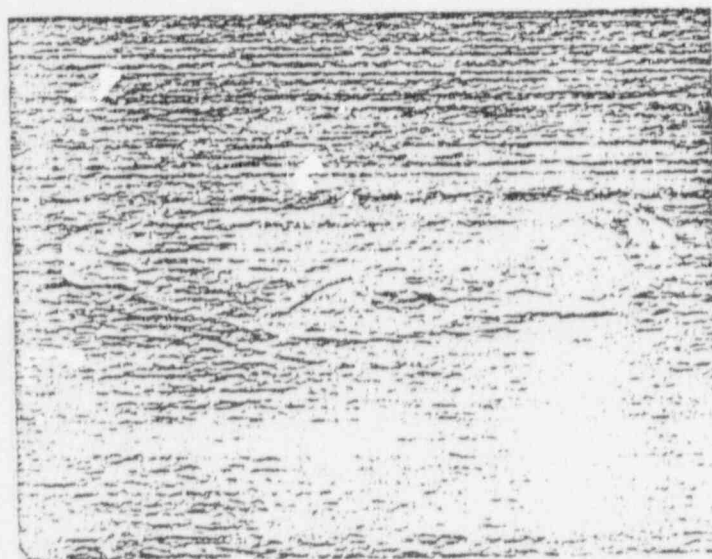
KSM Stud
1/2"Ø Bend Specimen



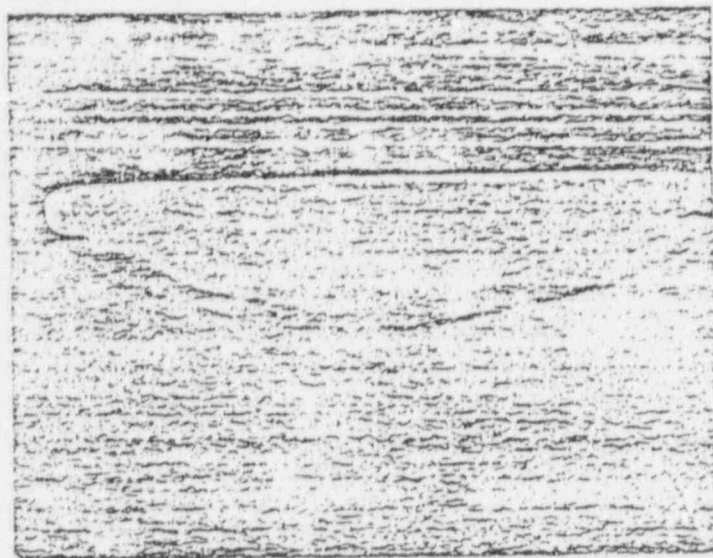
KSM Stud
1/2"Ø Tensile Specimen



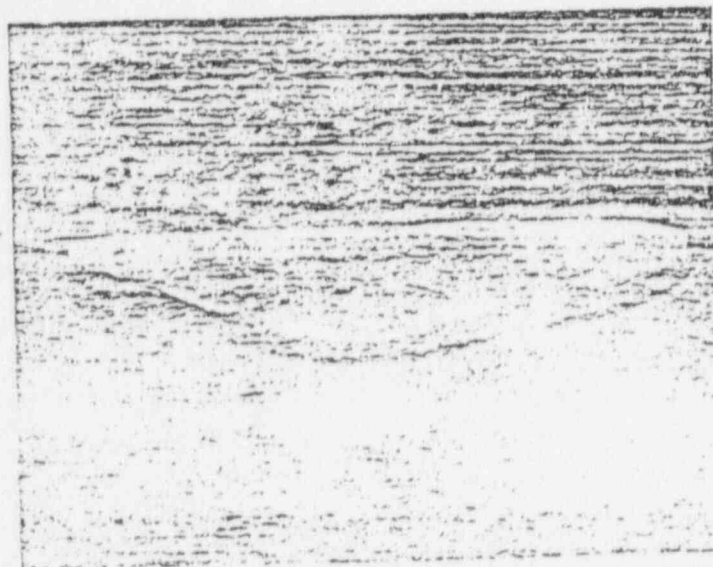
KSM Stud
3/4"Ø Bend Specimen



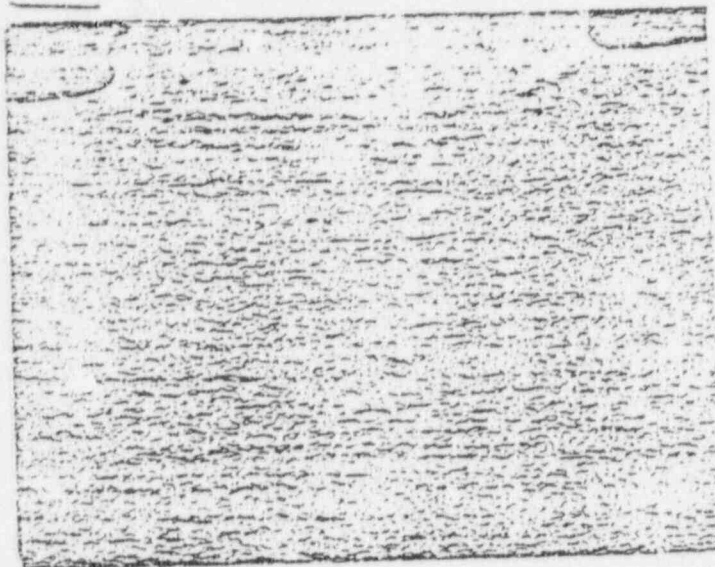
KSM Stud
3/4" Tensile Specimen



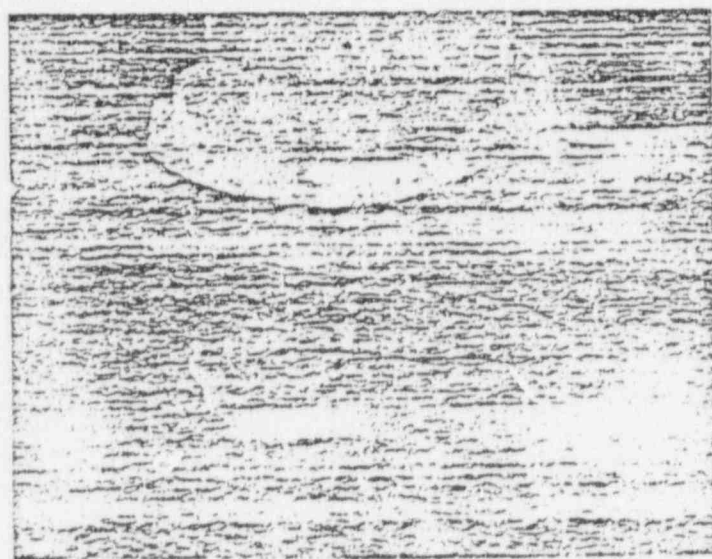
KSM Stud
7/8" Bend Specimen



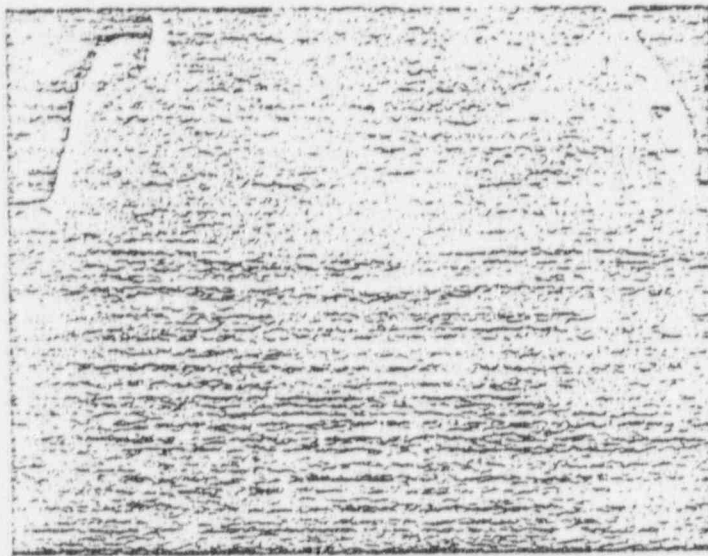
KSM Stud
7/8" Bend Specimen



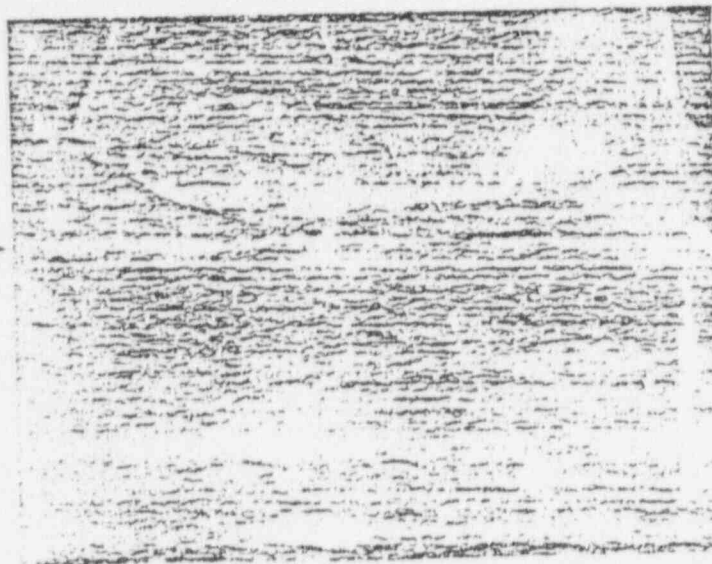
Nelson Stud
1/2"Ø Bend Specimen



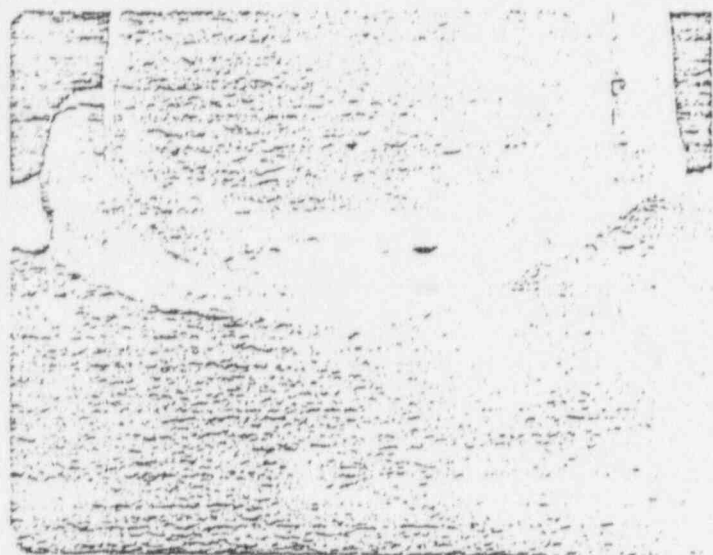
Nelson Stud
1/2"Ø Tensile Specimen



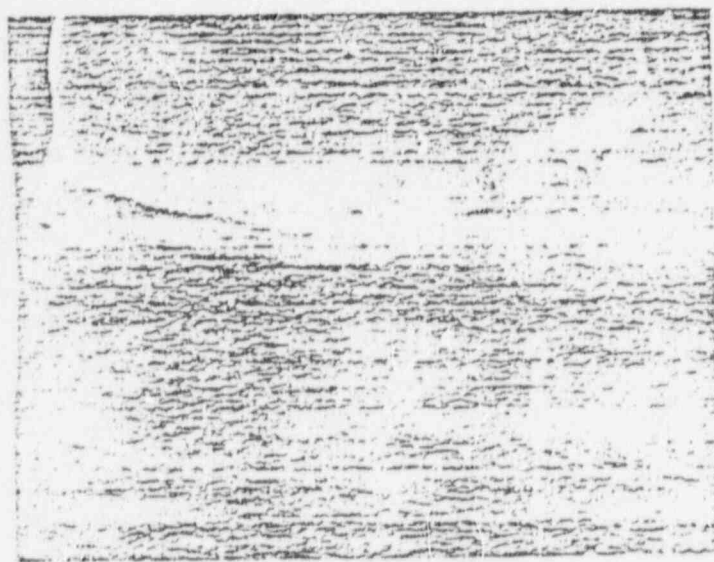
Nelson Stud
3/4"Ø Bend Specimen



Nelson Stud
3/4"Ø Tensile Specimen



Nelson Stud
7/8" Bend Specimen



Nelson Stud
7/8" Bend Specimen

12859

DESCRIPTION OF COMPONENT, PART, OR SYSTEM (4)

LOCATION (5)

DRAWING/SPEC./CODE/STANDARD NO. (6)

EMBED ID:

SACINEW

RESPONSIBLE CONTRACT (7)

ACTION TAKEN TO CORRECT NONCONFORMANCE (8)

SUBSEQUENT WORK OR AREAS AFFECTED (9)

5330-113

RIB CONCRETE

AK #	MRR	TYPE	NO. OF TESTS	% of STRENGTH PER P.	STRENGTH TOTAL TESTS	% FAILURE	% FAILURE
82A	11687	I	11	50%			
84.E		XTL	1				
75D		P5(5.0)	1				
76A	†	P5(5.6)	1				
80E	11688	P8(8.6)	15				
78A	11693	P8(3.3)	1				
79E	11740	P8(6.9)	1				
80D		P8(2.3)	1				
70F		P2(6.0)	2				
82F	†	PT	8				
79D	11455	P8(6.6)	14				
77E	11510	P8(2.6)	12				
77F	†	P8(3.0)	26				
77D	11511	P8(2.1)	10				
78D	11512	P8(4.6)	10				
79B	†	P8(6.0)	12				
78C	11513	P8(4.0)	24				
77D	†	P8(2.0)	12				
78D	11516	P8(4.6)	10				
79B	†	P8(6.0)	12				
80C	11660	P8(8.0)	8				
85A	†	XTL	2				
78E	11670	P8(5.0)	20				
75E	†	P5(3.0)	6				

REPORT NO. 12359

LEASCO SERVICES INCORPORATED
WNP 3/3

1-E 3/0/81 PAGE 1 OF

SITE NONCONFORMANCE REPORT

QUALITY CLASS (2) ☐ ☐ ☐

INSTRUCTIONS (SEE BACK OF FORM)

PROJECT NO. 13: ☐ 3 ☐ 5 ☐ 38DESCRIPTION OF COMPONENT, PART, OR SYSTEM (4)
Embedded platesLOCATION (5)
See below

DRAWING/SPCL/COOL/STANDARD NO. (6)

RESPONSIBLE CONTRACT (7)
3240-113ACTION TAKEN TO CONTROL NONCONFORMANCE (8)
Hold tag attachedSUBSEQUENT ITEMS OF WORK AFFECTED (9)
See attached P1, Markings and MPR's

I. DESCRIPTION OF NONCONFORMANCE (10)

Identified apparent brittle failure of Nelson Studs on certain embeds supplied by CB&I under contract 113.

NAME, SIGNATURE, COMPANY & CONTRACT NO. (11)

L S Boreen / L S Boreen / LEASCO / 113

TITLE

PPE

DATE

3-4-81

II. RECOMMENDED DISPOSITION (12)

DESIGN DOCUMENT CHANGE REQUIRED (13)

☐ YES☐ NO(14) ☒ USE-AS-IS☐ REPAIR☐ REWORK ON PREPURCHASED ITEMS WITHOUT APPROVED PROCEDURE IDENTIFIED(15) ☐ REJECT☒ OTHER REWORK

(16) CORRECTIVE ACTION: Minimum of 20% of all embed types for each Material Receipt Report

(MPR's) will have a minimum of 50% of Nelson Studs bent approx. 30° from an axis between the attachment point and the center of stud head. (1) only studs which have not been previously bent shall be bent tested. (2) When adjacent studs are bent, studs shall not be bent towards each other. (3) Embeds which have studs that fail the specified bend tests shall be segregated and failed studs retained with each embed plate. (4) Following above steps this NCR shall be returned to the Engineer for redistribution.

ACTION TO PREVENT REOCCURRENCE (IF APPLICABLE) (17) VENDOR QC AND LEASCO IS HAVE INCREASED INSPECTION FREQUENCY. ADDITIONAL INVESTIGATION IS CURRENTLY UNDERWAY BY CB&I TO IDENTIFY THE CAUSE OF THE DEFICIENCY.

RECOMMENDED VERIFICATION BY (18)

CONTRACTOR QC

☐ LEASCO QA☐ LEASCO ENGINEERING☒ CONTRACT NO. 265☐ OTHER☐ NOT REQUIRED

NAME AND SIGNATURE OF PERSON RECOMMENDING DISPOSITION (19)

TITLE

DATE

L S Boreen / L S BOREEN

PPE

3-4-81

III. EVALUATION OF DISPOSITION (21)

NRB (20)

☐ REQUIRED☐ NOT REQUIRED

ANI CONCURRENCE

☐ REQUIRED☐ NOT REQUIRED

BY

NAME

TITLE

DATE

ANI

CONCURRENCE BY

NAME

TITLE

DATE

☐ RESIDENT ENGINEER☐ MATERIALS MANAGEMENT☐ ES&E☐ QUALITY ASSURANCE☐ OTHER AUTHORIZED PERSONNEL☐ OTHER AUTHORIZED PERSONNEL

NAME (SIGNATURE)

NAME (SIGNATURE)

NAME (SIGNATURE)

NAME (SIGNATURE)

DATE

DATE

DATE

DATE

☐ ACCEPTED☐ REJECTED☐ ACCEPTED☐ REJECTED☐ ACCEPTED☐ REJECTED☐ ACCEPTED☐ REJECTED☐ ACCEPTED WITH COMMENTS☐ ACCEPTED WITH COMMENTS☐ ACCEPTED WITH COMMENTS☐ ACCEPTED WITH COMMENTS

IV. CONFIRMATION OF COMPLETION OF APPROVED DISPOSITION (22)

NAME SIGNATURE COMPANY & CONTRACT NO.

TITLE

DATE

V. VERIFICATION OF COMPLETION OF APPROVED DISPOSITION (23)

NAME SIGNATURE COMPANY & CONTRACT NO.

TITLE

DATE

VI. FINAL REVIEW SATISFACTORY (24)

BY SIGNATURE

TITLE

DATE

DS (AD) 4644 (12 79) R1 (15 29 80) R2 (11 19 80) R3 (12 11 80)

QUALITY CLASS (2) ☒ I ☐ II ☐ G

SITE NONCONFORMANCE REPORT

INSTRUCTIONS (SEE BACK OF FORM)

PROJECT NO. (3) ☒ 3 ☐ 5 ☐ 385

DESCRIPTION OF COMPONENT, PART OR SYSTEM (4) <u>EMBED ASSEMBLY</u>	LOCATION (5) <u>LAGUNA</u>	DRAWING/SPEC./CODE/STANDARD NO. (6) <u>AWSD11 4.26.1</u>
RESPONSIBLE CONTRACT (7) <u>3240-113</u>	ACTION TAKEN TO CONTROL NONCONFORMANCE (8) <u>1420 FAF</u>	SUBSEQUENT ITEMS OR AREAS AFFECTED (9) <u>N/A</u>

DESCRIPTION OF NONCONFORMANCE (10)
BENDING OF STUDS IN ACCORDANCE WITH AWS D11 4.26.1 AND THE FOLLOWING EMBED ASSEMBLYS RESULTED IN ONE OR MORE STUD FAILURES PER EMBED MRP 11511 - 11510 ARE 3/11/81 (SEE P 2647 FOR DETAIL)

NAME, SIGNATURE, COMPANY & CONTRACT NO. (11)
RICHARD CROSS EBASCO SERVICES
TITLE QA INSPECTOR DATE 3/25/81

RECOMMENDED DISPOSITION (12) DESIGN DOCUMENT CHANGE REQUIRED (13) ☐ YES ☒ NO
(14) ☐ USE-AS-IS ☐ REPAIR ☐ REWORK ON PREPURCHASED ITEMS WITHOUT APPROVED PROCEDURE IDENTIFIED
(15) ☐ REJECT ☒ OTHER REWORK

(16) CORRECTIVE ACTION:
REPLACE NONCONFORMING STUDS IN ACCORDANCE W/ AWS D11 & AN APPROVED PROCEDURE
(SEE NCR-12559 & 12900 FOR ADDITIONAL TESTING INFORMATION)
LSB 4-1-81

ACTION TO PREVENT REOCCURRENCE (IF APPLICABLE) (17) NA VENDOR QC & EBASCO VQA HAVE INCREASED INSPECTION FREQUENCY. ADDITIONAL INVESTIGATION IS CURRENTLY UNDERWAY BY CB&I TO IDENTIFY THE CAUSE OF THE DEFICIENCY.

RECOMMENDED VERIFICATION BY (18) CONTRACTOR QC LSB 2-19-81
☐ EBASCO QA ☐ EBASCO ENGINEERING ☒ CONTRACT NO. 265 ☐ OTHER ☐ NOT REQUIRED

NAME AND SIGNATURE OF PERSON RECOMMENDING DISPOSITION (19)
L. BORRAN / L.S. BROWN TITLE DPE DATE 3-19-81

EVALUATION OF DISPOSITION (21)
RECOMMENDED DISPOSITION IS
SUFFICIENT
NRB (20) ☐ REQUIRED ☒ NOT REQUIRED
ANI CONCURRENCE ☐ REQUIRED ☒ NOT REQUIRED
BY [Signature] NAME [Signature] TITLE [Signature] DATE 4-1-81
ANI CONCURRENCE BY NAME TITLE DATE

RESIDENT ENGINEER <input type="checkbox"/> MATERIALS MANAGEMENT <input type="checkbox"/> ESSE <input type="checkbox"/> QUALITY ASSURANCE <input checked="" type="checkbox"/> OTHER AUTHORIZED PERSONNEL <input type="checkbox"/>	NAME (SIGNATURE) <u>[Signature]</u> DATE <u>4-1-81</u>	NAME (SIGNATURE) <u>[Signature]</u> DATE <u>4/2/81</u>	NAME (SIGNATURE) <u>[Signature]</u> DATE
<input checked="" type="checkbox"/> ACCEPTED <input type="checkbox"/> REJECTED <input type="checkbox"/> ACCEPTED WITH COMMENTS	<input checked="" type="checkbox"/> ACCEPTED <input type="checkbox"/> REJECTED <input type="checkbox"/> ACCEPTED WITH COMMENTS	<input checked="" type="checkbox"/> ACCEPTED <input type="checkbox"/> REJECTED <input type="checkbox"/> ACCEPTED WITH COMMENTS	<input checked="" type="checkbox"/> ACCEPTED <input type="checkbox"/> REJECTED <input type="checkbox"/> ACCEPTED WITH COMMENTS

CONFIRMATION OF COMPLETION OF APPROVED DISPOSITION (22)

NAME SIGNATURE COMPANY & CONTRACT NO. TITLE DATE

VERIFICATION OF COMPLETION OF APPROVED DISPOSITION (23)

NAME SIGNATURE COMPANY & CONTRACT NO. TITLE DATE

FINAL REVIEW SATISFACTORY (24)
ANI ACCEPTANCE NAME TITLE DATE

BY SIGNATURE TITLE DATE

REPORT NO. (1) 12817

WPPSS/EBASCO

PAGE 2 OF 2QUALITY CLASS (2) 12817SITE NONCONFORMANCE REPORT
CONTINUATION SHEET

PROJECT NO. (3)

☒ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9

INSTRUCTIONS: (SEE BACK OF FORM)

☒ 3
☐ 5
☐ 385

DESCRIPTION OF COMPONENT, PART, OR SYSTEM (4)

LOCATION (5)

DRAWING/SPEC./CODE/STANDARD NO. (6)

EMBED ASSEMBLYSA-11NADAWSD 11-261

RESPONSIBLE CONTRACT (7)

ACTION TAKEN TO CORRECT NONCONFORMANCE (8)

SUBSEQUENT TEST OR AREAS AFFECTED (9)

3240-113HOLD TAP111AREFLECTED EMBED ASSEMBLYMAR 25/10/211. PIECE MARK77E-4311510277E-57377E-62477F-21577F-82677F-93777F-121877F-124978C-13211511

SITE NONCONFORMANCE REPORT

QUALITY CLASS (2) ☒ 1 ☐ 2 ☐ 3

INSTRUCTIONS (SEE BACK OF FORM)

PROJECT NO. (3) ☒ 3 ☐ 5 ☐ 3 & 5

DESCRIPTION OF COMPONENT, PART, OR SYSTEM (4)

LOCATION (5)

DRAWING, SPEC, CODE / STANDARD NO. (6)

RESPONSIBLE CONTRACT (11)

ACTION TAKEN TO CORRECT NONCONFORMANCE (8)

SUBSEQUENT ITEMS OR AREAS AFFECTED (9)

I. DESCRIPTION OF NONCONFORMANCE (10)

POSSIBLE DEFECTIVE STUD WELDS ON EMBED P's MK NO 72C
ON MRR-11511.

NAME, SIGNATURE, COMPANY & CONTRACT NO. (12)

TITLE

DATE

L. BOREN / S. BROWN / EBASCO / 112DPE3-25-81

II. RECOMMENDED / DISPOSITION (12)

DESIGN DOCUMENT CHANGE REQUIRED (13)

☐ YES☒ NO(14) ☐ USE-AS-IS☐ REPAIR☐ REWORK ON PREPURCHASED ITEMS WITHOUT APPROVED
PROCEDURE IDENTIFIED(15) ☐ REJECT☐ OTHER REWORK

(16) CORRECTIVE ACTION: BEND TEST 8 STUDS ON EACH OF 26 P's / MK 72C
ON MRR-11511 TO 30° ± FROM ORIGINAL AXIS. ONLY STUDS
WHICH HAVE NOT BEEN PREVIOUSLY BENT SHALL BE BEND TESTED.
WHEN ADJACENT STUDS ARE BENT, STUDS SHALL NOT BE BENT
TOWARDS EACH OTHER. EMBEDS WHICH HAVE STUDS THAT
FAIL THE SPECIFIED BEND TEST SHALL BE SEQUESTERED AND
FAILED STUDS RETAINED W/ EACH EMBED P. AFTER COM-
PLETION OF ABOVE TESTING, THE NOR SHALL BE RETURN-
ED FOR FURTHER DISPOSITION. (SR 4-1-81)

(SEE REDISPOSITION / SH 3)

ACTION TO PREVENT REOCCURRENCE (IF APPLICABLE) (17)

INVESTIGATION IS CURRENTLY
UNDERWAY BY CBEI TO ISOLATE THE CAUSE OF THE DEF-
ICIENCY.

RECOMMENDED VERIFICATION BY (18)

CONTRACTOR QC

☐ EBASCO QA ☐ EBASCO ENGINEERING ☐ CONTRACT NO. _____☐ OTHER☐ NOT REQUIRED

NAME AND SIGNATURE OF PERSON RECOMMENDING DISPOSITION (15)

TITLE

DATE

L. BOREN / S. BROWNDPE3-25-81

III. EVALUATION OF DISPOSITION (21)

NRB (20)

☒ REQUIRED☐ NOT REQUIRED 4/1/81

ANI CONCURRENCE

☐ REQUIRED☒ NOT REQUIREDBY ALBERT E. CIVIL ENGINEER 3/25/81

NAME

TITLE

DATE

ANI

CONCURRENCE BY

NAME

TITLE

DATE

☐ RESIDENT
ENGINEER☐ MATERIALS
MANAGEMENT☒ QUALITY ASSURANCE☐ OTHER AUTHORIZED PERSONNEL☐ OTHER AUTHORIZED PERSONNEL

NAME (SIGNATURE)

NAME (SIGNATURE)

NAME (SIGNATURE)

NAME (SIGNATURE)

DATE

DATE

DATE

DATE

☒ ACCEPTED☐ REJECTED☒ ACCEPTED☐ REJECTED☐ ACCEPTED☐ REJECTED☐ ACCEPTED☐ REJECTED☐ ACCEPTED WITH COMMENTS☐ ACCEPTED WITH COMMENTS☐ ACCEPTED WITH COMMENTS☐ ACCEPTED WITH COMMENTS

IV. CONFIRMATION OF COMPLETION OF APPROVED DISPOSITION (22)

NAME SIGNATURE COMPANY & CONTRACT NO.

TITLE

DATE

V. VERIFICATION OF COMPLETION OF APPROVED DISPOSITION (23)

NAME SIGNATURE COMPANY & CONTRACT NO.

TITLE

DATE

VI. FINAL REVIEW SATISFACTORY (24)

ANI ACCEPTANCE: NAME

TITLE

DATE

BY

SIGNATURE

TITLE

DATE

DS-AD-444 (12-79) R1 (6-29-80) R2 (11-19-80) R3 (12-11-80)

REMARKS (NCR #, SPECIAL DEFECTS, ETC.)
NCR- 11511

Pl's w/ FAILING STUDS ARE:
SUFFIX NOS. 9 & 16.

CSB 4-1-A1

NCR- 12900
SH. 2 OF

PLATE TYPE	TOTAL NO OF STUDS PER. PLATE	TOTAL PLATES INSP.	TOTAL PLATES REJ.	TOTAL STUDS REJ.	REMARKS (NCR #, SPECIAL DEFECTS, ETC.)
28C		24	2	2	
TESTED P. 30-81 3-30-81 HOLD TAGS ATTACHED NCR- 12900					

SITE NONCONFORMANCE REPORT
REDISPOSITION
INSTRUCTIONS: (SEE BACK OF FORM)

REPORT No. 12900

PAGE 3 OF
PROJECT No.

QUALITY CLASS

☒ 1 ☐ 2 ☐ 3

☒ 3 ☐ 5 ☐ 3 5 5

DESCRIPTION OF COMPONENT, PART OR SYSTEM: EMBED P's LOCATION: SEANAW DRAWING/SPEC./CODE/STANDARD:
RESPONSIBLE CONTACT: 3740-112 ACTION TAKEN TO CONTROL NONCONFORMANCE: HOLD TAGS SUBSEQUENT ITEMS OR AREAS AFFECTED: MX No. 78C (MRB-11511)
REASON FOR REDISPOSITION: PRELIMINARY DISPOSITION IDENTIFIED TESTING ONLY FURTHER DISPOSITION IS REQUIRED BASED ON TEST RESULTS

II. RECOMMENDED DISPOSITION:

DESIGN DOCUMENT CHANGE REQUIRED ☐ YES ☒ NO

☒ USE - AS - IS

☐ REPAIR

☐ REWORK ON PREPURCHASED ITEMS WITHOUT APPROVED PROCEDURE IDENTIFIED
Contractor Q. C. to verify & attach documentation

☐ REJECT

☒ OTHER REWORK

CORRECTIVE ACTION:

1) MK No 78C - 9 & 16 - REPLACE FAILED STUDS IN ACCORDANCE W/ AWS D1.1 & APPROVED PROCEDURE. (BY CONTRACT 265) (REWORK)

2) ALL REMAINING P's MK 78C (MRB-11511) SHALL BE USED - AS-IS. FAILURE RATE OF 2 IN 192 STUDS (1%) IS ACCEPTABLE FROM DESIGN STANDPOINT. THESE P's MAY BE RELEASED FOR CONSTRUCTION PRIOR TO COMPLETION OF REWORK PER ITEM 1) ABOVE (USE-AS-IS)

III. EVALUATION OF DISPOSITION:

NRB ☒ REQUIRED ☐ NOT REQUIRED
ANI CONCURRENCE ☐ REQUIRED ☒ NOT REQUIRED

RECOMMENDED DISPOSITION
IS ACCEPTABLE

BY Richard J. Fied TITLE SENIOR CIVIL ENGR DATE 4/9/81

ANI CONCURRENCE BY NAME TITLE DATE

<input type="checkbox"/> RESIDENT ENGINEERING	<input type="checkbox"/> MATERIALS MANAGEMENT	<input checked="" type="checkbox"/> QUALITY ASSURANCE	<input checked="" type="checkbox"/> OTHER AUTHORIZED PERSONNEL	<input type="checkbox"/> OTHER AUTHORIZED PERSONNEL
NAME (SIGNATURE): <u>Richard J. Fied</u>	NAME (SIGNATURE): <u>David L. Loken</u>	NAME (SIGNATURE): <u>Richard J. Fied</u>	NAME (SIGNATURE): <u>David L. Loken</u>	NAME (SIGNATURE): <u>Richard J. Fied</u>
DATE: <u>4/9/81</u>	DATE: <u>4/9/81</u>	DATE: <u>4/9/81</u>	DATE: <u>4/9/81</u>	DATE: <u>4/9/81</u>
<input checked="" type="checkbox"/> ACCEPTED <input type="checkbox"/> REJECTED	<input checked="" type="checkbox"/> ACCEPTED <input type="checkbox"/> REJECTED	<input checked="" type="checkbox"/> ACCEPTED <input type="checkbox"/> REJECTED	<input checked="" type="checkbox"/> ACCEPTED <input type="checkbox"/> REJECTED	<input checked="" type="checkbox"/> ACCEPTED <input type="checkbox"/> REJECTED
<input type="checkbox"/> ACCEPTED WITH COMMENTS	<input type="checkbox"/> ACCEPTED WITH COMMENTS	<input type="checkbox"/> ACCEPTED WITH COMMENTS	<input type="checkbox"/> ACCEPTED WITH COMMENTS	<input type="checkbox"/> ACCEPTED WITH COMMENTS

IV. CONFIRMATION OF COMPLETION OF APPROVED DISPOSITION

NAME, SIGNATURE, COMPANY AND CONTRACT No. TITLE DATE

V. VERIFICATION OF COMPLETION OF APPROVED DISPOSITION:

NAME, SIGNATURE, COMPANY AND CONTRACT No. TITLE DATE

VI. FINAL REVIEW SATISFACTORY:

ANI ACCEPTANCE: NAME TITLE DATE

BY SIGNATURE TITLE DATE