

From: <david.chrzanowski@exeloncorp.com>
To: <gfd@nrc.gov>
Date: 3/18/05 12:38PM
Subject: Byron #2

Action Required:
Recommendation:

<<Document #1 Part 1c.pdf>> <<Document #1 Part 2a.pdf>>

David Chrzanowski
Licensing Engineer
Exelon Nuclear - Cantera
phone (630) 657-2816
pager (630) 683-0535
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Mail Envelope Properties (423B1219.431 : 1 : 42033)

Subject: Byron #2
Creation Date: 3/18/05 12:38PM
From: <david.chrzanowski@exeloncorp.com>

Created By: david.chrzanowski@exeloncorp.com

Recipients

nrc.gov
owf4_po.OWFN_DO
GFD (George Dick)

Post Office

owf4_po.OWFN_DO

Route

nrc.gov

Files

MESSAGE

Document #1 Part 1c.pdf

Document #1 Part 2a.pdf

Mime.822

Size

1141

2083404

1333972

4679718

Date & Time

03/18/05 12:38PM

Options

Expiration Date: None

Priority: Standard

Reply Requested: No

Return Notification: None

Concealed Subject: No

Security: Standard

VISUAL EXAMINATION DATA FORM VT-2-1.1

(1) STATION: Byram (2) UNIT: 01 (3) EXAM DATE: 10/10/00
 (4) ASME XI CLASS: I (5) SYSTEM: RC (6) DRAWING: M-60-243
 (7) WORK REQUEST/MODIFICATION NO.: 970122922, 970122923, 990039158
 (8) COMPONENT EXAMINATION INSTRUCTION NO.: N/A (9) REV: N/A
 (10) SCOPE OF INSPECTION: PMT, MODE 3 WALKDOWN
 (11) TEST PRESSURE: 223.4 PSEC (12) PRESSURE GAUGE ID.: P0493
 (13) FLOW MEASURED (IF APPLICABLE): N/A (14) FLOW GAUGE ID.: N/A
 (15) TEST TEMPERATURE: 559°F
 (16) EQUIPMENT USED: MIRAC, FLASHLIGHT, GRAYCARD

COMPONENT/ITEM IDENTIFICATION or DESCRIPTION (17)	RESULTS			EXPLANATION/COMMENTS (21)
	NI (18)	RI (19)	IO (20)	
1 RC F002 B	✓			POOR QUALITY ORIGINAL
1 RC F002 C	✓			
1 RC 016C	✓			

(22) RECORDABLE CONDITIONS

- (A) Evidence of through-wall leakage
- (B) Evidence of torqued water leakage or boric acid residue
- (C) Degradation of pressure retaining boundary due to corrosion
- (D) Improper leakage collection system function
- (E) Evidence of pressure/flow loss, flow impairment
- (F) Leakage from pressure retaining bolted connections
- (G) Other [Explain in space (21)]

(23) EXAMINED BY (LEVEL III or LT): [Signature] DATE: 10/11/00
 (24) COMMENTS AND DISPOSITION BY STATION LEVEL III or VT-2 EXAMINER: _____

(25) REVIEWED BY (STATION LEVEL III): [Signature] DATE: 10/11/00
 (26) AUTHORIZED INSPECTOR (API): [Signature] DATE: 10/11/00
 (27) Report Page 1 of 1

6/12/98

VISUAL EXAMINATION DATA FORM VT-2-1.1

- (1) STATION: Byron (2) UNIT: 1 (3) EXAM DATE: 10/10/00
- (4) ASME XI CLASS: 1 (5) SYSTEM: _____ (6) DRAWING: *See Below
- (7) WORK REQUEST/MODIFICATION NO.: 990048815
- (8) COMPONENT EXAMINATION INSTRUCTION NO.: NA (9) REV: NA
- (10) SCOPE OF INSPECTION: B+C' Loops IMB 377'+390' Mode 3 Walkdown
- (11) TEST PRESSURE: 2235 psig (12) PRESSURE GAUGE ID.: P0493
- (13) FLOW MEASURED (IF APPLICABLE): NA (14) FLOW GAUGE ID.: NA
- (15) TEST TEMPERATURE: 553 OF
- (16) EQUIPMENT USED: Flashlight, Mirror, Grey Card

POOR QUALITY ORIGINAL

COMPONENT/ITEM IDENTIFICATION or DESCRIPTION (17)	RESULTS			POOR QUALITY ORIGINAL EXPLANATION/COMMENTS (21)
	NI (18)	RI (19)	IO (20)	
B Loop IMB 377' 390'	X	X		Leak noted on ICV83788 approx. 1 drop/7sec. Ref AR* 990112402 RMC 00-1-054
C Loop IMB 377' 390'	X X			

- (22) RECORDABLE CONDITIONS
 - (A) Evidence of through-wall leakage
 - (B) Evidence of borated water leakage or boric acid residue
 - (C) Degradation of pressure retaining boundary due to corrosion
 - (D) Improper leakage collection system function
 - (E) Evidence of pressure/flow loss, flow impairment
 - (F) Leakage from pressure retaining bolted connections
 - (G) Other (Explain in space (21))

* 17-60-2, 3, 17-61-2, 3, 4, 5, 6
17-62, 17-64-1, 2, 5

(23) EXAMINED BY (LEVEL II or III): [Signature] DATE: 10/10/00

(24) COMMENTS AND DISPOSITION BY STATION LEVEL III VT-2 EXAMINER: _____

(25) REVIEWED BY (STATION LEVEL III): [Signature] DATE: 10/10/00

(26) AUTHORIZED INSPECTOR (ANII): _____ DATE: 10-10-00

(27) Report Page 1 of 1

VISUAL EXAMINATION DATA FORM VT-2-1.1

(1) STATION: Secan (2) UNIT: 1 (3) EXAM DATE: 10/10/01
 (4) ASME XI CLASS: 1 (5) SYSTEM: RL (6) DRAWING: SEE ATTACH
 (7) WORK REQUEST/MODIFICATION NO.: 99004818
 (8) COMPONENT EXAMINATION INSTRUCTION NO.: N/A (9) REV: NA
 (10) SCOPE OF INSPECTION: A/O IMB 377-390
 (11) TEST PRESSURE: 2235 PSIG (12) PRESSURE GAUGE ID.: P0493
 (13) FLOW MEASURED (IF APPLICABLE): N/A (14) FLOW GAUGE ID.: N/A
 (15) TEST TEMPERATURE: 529°F / 704.9
 (16) EQUIPMENT USED: FLASH 615 / MIRROR / BEEYKALIS

POOR QUALITY ORIGINAL

COMPONENT/ITEM IDENTIFICATION or DESCRIPTION (17)	RESULTS			EXPLANATION/COMMENTS (21)
	NI (18)	RI (19)	IO (20)	
(R-1-1) A/D 377-390 IMB 1CV837ER	X	X _P		1 drop / 7 seconds AR 990112402 RDR 00-1-054 00-1-054

(22) RECORDABLE CONDITIONS

- (A) Evidence of through-wall leakage
- (B) Evidence of boric acid residue
- (C) Degradation of pressure retaining boundary due to corrosion
- (D) Improper leakage collection system function
- (E) Evidence of pressure/flow loss, flow impairment
- (F) Leakage from pressure retaining bolted connections
- (G) Other [Explain in space (21)]

(23) EXAMINED BY (LEVEL II or III): Wesley J. [Signature] DATE: 10/10/01

(24) COMMENTS AND DISPOSITION BY STATION LEVEL III VT2 EXAMINER: _____

(25) REVIEWED BY (STATION LEVEL III): [Signature] DATE: 10/10/01

(26) AUTHORIZED INSPECTOR (ANII): [Signature] DATE: 10/10/01

(27) Report Page 1 of 1

QUALITY RELEASE

WESTINGHOUSE ELECTRIC COMPANY

CR. 515289
BUSINESS UNIT NSBJ
DATE 08.31.00

CHARGE NUMBER

CUSTOMER ORDER 00014925	SALES ORDER NO 5569	PURCHASE ORDER 4500048101	PAR N/A	CN N/A	PROJECT CBE
SD NO 21551	VENDOR SD	ITEM NO 1	SPIN NO N/A	BASIC COMPONENT CHECK <input checked="" type="checkbox"/> YES or <input type="checkbox"/> NO	
EQUIP. SPEC NO & REV N/A	DRAWING NO 4D98951	REVISION 2	GROUP/ITEM H04		
ASME CODE SECTION & CLASS SECTION III, SUBSECT. NB	ASME CODE EDITION & ADDENDA 1971 EDITION, W73 ADD.	ASME CODE CASES NONE			
ITEM NAME GUIDE BLOCK, LSV RETENTION	QUANTITY RELEASED 10				

SERIAL OR IDENTIFICATION NUMBER(S):
S/N 01 THRU 10

HEAT NO. DB3059A

POOR QUALITY ORIGINAL

COM ED CATALOG ID 0001026789 1

The attributes listed below have been reviewed and approved by QC/QA as noted by an A in the status column. Non-applicable items are lined out. Records are available for review. Contingent items are identified by "C" on the status column and explained in the remarks section.

AUDIT CHECKLIST	STATUS	STATUS	STATUS
<u>A</u> Material Certifications	Operating Equipment Test Records	ASME Data Report Form(s) ATTACHED	
Heat Treat Records	Non-Operating Equip. Test Records	Verified Stress Report	
RT Film and Records	Pressure Test Records	Special Handling, Storage & Material Instructions	
<u>A</u> PT Records	Seal Tightness Test Records	Instruction Books	
MT Records	Performance Test Records	<u>A</u> <u>PCI Co/C</u>	
<u>A</u> UT Records	Welding Personnel Qual. Cert.	<u>A</u> <u>PCI DATA PAGE</u>	
<u>A</u> Visual Inspection Records	<u>A</u> NDE Personnel Qual. Cert.		
<u>A</u> Dimensional Inspection	Painting		
<u>A</u> Cleanliness	Hydroblasting		

CUSTOMER QA DATA PACKAGE REQUIRED BY PURCHASE ORDER YES NO DEVIATION NOTICE(S) NONE APPLICABLE DN(S) LISTED BY DN NUMBER BELOW (COPY ATTACHED TO SHIPPING PAPERS)

REMARKS
ITEMS WERE PROCURED IN ACCORDANCE WITH WESTINGHOUSE ASME CERTIFICATE OF AUTHORIZATION N-1149 WHICH EXPIRES 1/24/01.

53724

THE SUPPLIER CERTIFIES that for the equipment and material released, all contractual requirements have been met. Approved deviations, if any, are listed above.

SUPPLIER **PCI ENERGY SERVICES** PO NO _____
SUPPLIER SIGNATURE **REFER TO PCI Co/C** DATE **8/29/00**

The equipment shown hereon is released by Quality Assurance. Shipment may be made subject to authorization by Purchasing.

The equipment supplier has certified that the equipment above meets all requirements of the purchase order drawings and specifications. Westinghouse has reviewed evidence supporting this release and except as specified above has detected no deviations from such requirements. This release does not waive any rights Westinghouse may have under the purchase order including Westinghouse's right to reject the equipment upon discovery of any such deviations after arrival at destination.

Ray Taje
WESTINGHOUSE QUALITY ASSURANCE REPRESENTATIVE



POOR QUALITY ORIGINAL

CERTIFICATE OF CONFORMANCE NO.: 21551-001

PCI Project No.: 21551

PCI Energy Services certifies that the equipment / services and required documentation for the same, meet the requirements of the Purchase Order and / or applicable contracting documents and the specification.

Client: Westinghouse Electric Co. LLC

Purchase Order/Contract No.: 4500048101

Specification: ASME Section III, Class 1

Revision: 1971 Edition through Winter of 1973 Addenda

Description/Identification of Equipment/Services: Provide (10) Guide Blocks, LSIV Retention, Part No. 4D98951H04, SA 479 Type 304 with .2% maximum Cobalt, Ht # D83059A. Material per Section III NB-2000 and the blocks are numbered 01 through 10. The purchase, Manufacturing, and Inspection was performed per Westinghouse Drawing 4D98951, Revision 2 as Nuclear Safety Related under the PCI Quality Assurance Program. 10CFR50 Appendix B, 10CFR21, ANSI N45.2, NCA-3800, SNT-TC-1A 1984, ComEd Standards - SQAD-1, SQAD-4, SQAD-6 CMTR, CONF, CRBS, LIQU, PACK, SHLF, UTRT. applies. The finished machined surfaces of all (10) Guide Blocks were Liquid Penetrant Examined per PCI QOP 9.7, Revision 7 and NB-2546 with acceptance criteria for material less than 5/8" thick and was acceptable with no defects.

PCI Quality Assurance Program Revision 14 Dated 7-15-97

Approved Exceptions: NONE

Signature Mike Broughn

QA Engineer

Title

Date August 29, 2000

53724

HBB-AMM
8/29/00



Report of Non-Destructive Examination
Liquid Penetrant Examination

POOR QUALITY ORIGINAL

Report No.: 21551-01
Date: 8/29/00

Client: Westinghouse Electric Co. LLC
Project No: 21551
Line/Drawing No: 4D98951, Revision 2
Weld/Join No: 4D98951H04, 01 through 10
System: LSV
Material Type: SA479 Type 304
NDE Procedure No: GQP 9.7 Rev. 7
Acceptance Standard: Appendix B and C
Surface Finish: Machined
Stage of Fabrication: Final
Joint Design: N/A
Material Thickness: .44" X .38"

Method: Solvent Removable Technique: Visible Dye

Cleaner: SKC-S Penetrant: SKL-SP Developer: SKD-S2

Batch No: 99DO3K Batch No: 94D17K Batch No: 97MO3K

Post Removal Dry Time: 5 Min. Dwell Time: 15 Min. Developing Time: 15 Min.

Removal Technique: Dry Wipe Application Technique: Brush

Temperature: 73 °F Thermometer No: QTC-07 Cal. Due Date: 8/11/02

INDICATION NO.	LO	WIDTH	TYPE	SIZE	SKETCH
					N/A

ACCEPTABLE / REJECTABLE

Comments: All (10) Guide Blocks, (LSIV Retention) machined surfaces were Liquid Penetrant Examined and no defects were observed.

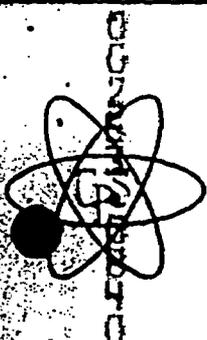
Examiner: *Mike Boy* Level: II Date: 8/29/00

Reviewer: _____ Level: _____ Date: _____

Client Reviewer: _____ Date: _____

AV/ANI/ANII: _____ Date: _____

5372
HOB-1004
8/29/00



CONSOLIDATED POWER SUPPLY

NUCLEAR CERTIFIED PRODUCTS

POOR QUALITY ORIGINAL

Copy to [unclear] 8/25/00

3556 Mary Taylor Road
Birmingham, Alabama 35235
Phone (205) 655-5515
Fax (205) 655-5511

CERTIFICATION

CUSTOMER:
PCI ENERGY SERVICES
ONE ENERGY DRIVE

DATE: 8/22/2000

LAKE BLUFF

IL 60044

CUSTOMER P.O. #: 200269 REV.1

SALES ORDER: 6503348 0 900 - 1

ITEM #	QUANTITY	UM	MATERIAL DESCRIPTION	HEAT CODE
1	1.0	EA	1/2" X 1/2" X 30" LONG SQUARE SST BAR ASME SA479 TP304	CROWNRISE STAINLESS STEEL LTD. HT# D83059A ✓ C/C- A3LF

ASME SECTION II AND III CLASS 1 1971 EDITION WINTER 1973 ADDENDA

NO REPAIR WELDING WAS PERFORMED ON THE MATERIAL SUPPLIED

LIQUID PENETRANT EXAMINATION NOT PERFORMED ✓

ASME B31.1 REQUIREMENTS/10CFR50 APPENDIX B AS APPLICABLE

ASME Q.A. PROGRAM 4TH EDITION REV. 2 DATED 10/21/98

THE ABOVE MATERIAL WAS SUPPLIED IN ACCORDANCE WITH THE ABOVE REFERENCED
QUALITY PROGRAM AND QUALITY SYSTEM CERTIFICATE #515, EXPIRATION DATE 12/12/01,
WHICH IS IN COMPLIANCE WITH THE CURRENT EDITION AND ADDENDA OF NCA-3800.

BASED UPON REVIEW OF THE ATTACHED DOCUMENTATION/TEST REPORTS, THIS
CERTIFICATION AFFIRMS THAT THE CONTENTS ARE CORRECT AND ACCURATE, AND THAT
ALL TEST RESULTS AND OPERATIONS PERFORMED BY CONSOLIDATED POWER SUPPLY OR ITS
SUBCONTRACTORS ARE IN COMPLIANCE WITH THE MATERIAL SPECIFICATION(S) AND THE
SPECIFIC APPLICABLE MATERIAL REQUIREMENTS OF SECTION III OF THE ASME B&PV
CODE, INCLUDING THE REQUIREMENTS OF YOUR REFERENCED PURCHASE ORDER, UNLESS
OTHERWISE NOTED.

ATTESTED BY:

DATE: 8/22/00

TITLE: QA REPRESENTATIVE

53724

PAGE: 1

Handwritten initials/signature

C.O. DOCUMENT

A DIVISION OF CONSOLIDATED PIPE & SUPPLY COMPANY, INC., BIRMINGHAM, AL



CROWN RIDGE STAINLESS STEEL LTD.

Reviewed to ASME II, Part A 1971 Ed, with Addenda 2047 Accepted John 9/12/99

Blackbridge Millard Haven Pembrokeshire SA73 1ES United Kingdom Tel: [44] (0)1646 690844 Fax: [44] (0)1646 690365

TEST CERTIFICATE

POOR QUALITY ORIGINAL

Your Order No./Purchase Order No. CR0161	Our Order No./Uncare Antrags-Nr. 58	Quantity (Kgt) 2,581	Test Certificate No / Prüf - Nr. 442 - 209
---	--	-------------------------	---

Applicable Specifications / Werkstoff-Normen:
 ASTM A270 - 98B; ASTM A479-97C; ASTM A193-98A; Q3575F Cond A; ASME SA182 - 98; ASME SA193-98; AMS 5639G; AMS 5647G; ASTM A302 - 93A Practices A & E; ASTM A302/320M CLASS 1 B9; ASME SA320-98; ASME SA179-98; ASTM A182-98; ASTM A184-98; ASTM A314-97; ASTM A379-97A; MIL-S 8828

Product Description / Erzeugnis: Stainless Steel Cold Drawn Square Bars	Grade of Material / Werkstoff-Bezeichnung: ASTM: 304/304L	Dimension / Abmessung (mm): 0.500" 1/2" 12.7 mm
Accepted:		Tolerance: HQ: ASTM A484

Inspection Certificate according to / Abnahmeschein nach: DIN 9043-3.1.B / DIN EN 10204-3.1.B

Chemical analysis transferred from certificate No: 11978
Cast Analysis

Element	C %	Si %	Mn %	P %	S %	Cr %	Mo %	Ni %	Ti %	Nb %	Al %
0.0088A	0.023 ✓	0.43 ✓	1.64 ✓	0.025 ✓	0.026 ✓	18.28 ✓	0.36	8.35 ✓	0.005	0.015	0.002
Element	Co %	Cu %	Se %	N %	V %	W %	Ce %	Ta %	Cb %	Fe %	Grain Size min max
0.0086	0.08 ✓	0.25	0.014	0.072	0.051	0.03	0.013	0.002	0.0012	70.4	4 - 6

Additional Chemical Certifications: Macroetch/ultrasonic test ok; Material free of nuclear contamination; Material free of welds; Solution treated at 1070C / WQ. Grain size according to ASTM E112-88.

Mechanical and Physical Properties / Mech. und phys. Eigenschaften

Gauge Length (mm): 50	Gauge Thickness / Diameter (mm): 10.03	EDDY CURRENT TEST: Satisfactory				
Condition Test Method	Proof Stress Minus (Kpa) Rp 0.2% Rp 1%	Tensile Strength Minus (Kpa) Rm	Elongation AS (%)	Reduction in Area Z (%)	Impact KCV (J) (FLB)	Hardness Minus Densit HB (HV)
C88454	611 (88.5) ✓ 503	714 (103.5) ✓	43 ✓	65 ✓		224

Additional NBN Certifications: Material Mercury Free; No Weld Repairs; Mill Practice and Solution Annealing Practice as set out under "Additional Chemical Certifications"

Test Certificate v2.1

53724

ALISTER W. SAINTER
Quality Assurance Manager
For Crownridge Stainless Steel Ltd
Dated / Datum: 28 November 1999



We hereby certify that the material described above has been tested and complies with the terms of the order contract. Es wird bestätigt, daß die Lieferung geprüft wurde und den Vereinbarungen bei der Bestellungsgenahme entspricht. Nous certifions que le livraison a été vérifié et est conforme aux stipulations de l'acceptation de la commande.

COMPANY No. 3450880. REGISTERED IN ENGLAND & WALES. REGISTERED OFFICE 25 NEW ST. SQUARE, LONDON EC4A 3LN



LABORATORY TESTING INC.

2331 Topaz Drive, Hatfield, PA 19440
TEL: 800-219-9095 • FAX: 800-219-9096

Certified Test Report
CPS001-00-08-17055



POOR QUALITY ORIGINAL

SOLD TO

Consolidated Power Supply
3556 Mary Taylor Road
Birmingham, AL 35235-3235

SHIP TO

Consolidated Power Supply
3556 Mary Taylor Road
Birmingham, AL 35235-3235
ATTN: BILL COX

CUSTOMER P.O.
Z85-08047

CERTIFICATION DATE
8/18/2000

SHIP VIA
FEDEX

DESCRIPTION

1 pc. 1/2" x 1/2" x 12' 0" long Square Bar, ASME Section II and ASME Section III, Subsection NB, Class 1, 1971 Edition, Winter 1973 Addenda, ASME SA-479, Type 304 Stainless Steel, Cut Code A3LF, Heat #D83059A

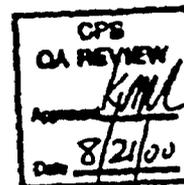
*Page 1 of 2
Revised to
ASME II, Part A
1971 Ed., WTS Add.
SA-479
Accepted 8/18/00*

The above material was 100% Ultrasonically Inspected in accordance with L.T.I. Procedure SA388-1, Rev. 8 dated 2/3/98 and (1) piece representing (11' 7") was found to be acceptable to those requirements.

Testing performed by Mark Tiemey, SNT-TC-1A, Level III. ✓

The referenced sample was submitted to chemical content evaluation and it was found to be in conformance to ASME SA-479, Type 304 Stainless Steel and Customer's Cobalt Requirement with the following results:

ELEMENT	CUT CODE A3LF
C	0.02% ✓
Mn	1.69% ✓
P	0.026% ✓
S	0.022% ✓
Si	0.43% ✓
Cr	18.45% ✓
Ni	8.47% ✓
Co	0.08% ✓



53724

HGB-ANI
[Signature]



LABORATORY TESTING INC.

2331 Toxiz Drive, Hatfield, PA 19440
TEL: 800-219-9095 • FAX: 800-219-9096

Certified Test Report
CPS001-00-08-17055



A Tensile test was performed on the submitted Test Specimen and it was found to be in conformance to ASME SA-479, Type 304 Stainless Steel with the following results:

<u>CUT CODE</u>	<u>TENSILE STRENGTH</u>	<u>YIELD (.2%) STRENGTH</u>	<u>ELONGATION (IN 4D)</u>	<u>REDUCTION OF AREA</u>
ASLF	105,180 PSI ✓	73,330 PSI ✓	40.6% ✓	71.6% ✓

FINAL SHIPPING QUANTITY: 1 pc. 30-1/2" long

POOR QUALITY ORIGINAL.

Packaging and shipping performed in accordance with ANSI N45.2.2, Level D.

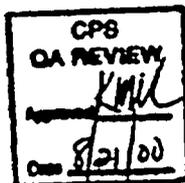
The above material was processed in accordance with Laboratory Testing, Inc. Procedure No. QC-III-MC, Rev. 0 dated 3/15/90.

The provisions of 10CFR21 and 10CFR50, Appendix B apply to this order.

All testing has been performed in accordance with L.T.I.'s Quality System Program Manual, Rev. 14 dated 10/8/99 as audited and approved by Consolidated Power Supply.

NOTE: The recording of false, fictitious or fraudulent statements or entries on this document may be punished as a felony under Federal Statutes including Federal Law, Title 18, Chapter 47.

The services performed above were done in accordance with LTI's Quality System Program Manual Revision 14 dated 10/8/99. These results relate only to the items tested and this report shall not be reproduced, except in full, without the written approval of Laboratory Testing, Inc. L.T.I. is accredited by A2LA in the Chemical, Mechanical and Nondestructive Fields of Testing. L.T.I. is accredited by NADCAP in the Material's Testing and NDT, MT, PT, RT and UT.



Sherri L. Lengyel
QA Coordinator

Sherri L. Lengyel

By: _____
Authorized Signature

HSS-ANI
[Signature]

53724

FORM NP-1 MANUFACTURERS' DATA REPORT FOR NUCLEAR PUMPS OR VALVES

70

92 970122923-91

Required by the Provisions of the ASME Code Rules

MFR #10338

1. Manufactured by Westinghouse Electro-Mechanical Division S/O L103
Cheswick Avenue, Cheswick, PA, 15024 Order No. EM-50005-AR6-AR1
(Name & Address of Manufacturer)
2. Manufactured for Commonwealth Edison Company Order No. 546-NCJ-211401-BN
(Name and Address)

3. Owner Commonwealth Edison Company

4. Location of Plant Commonwealth Edison Byron No. 1

5. Pump or Valve Identification 04-114E937G03 SPIN NO. CAE-RCPCLS-06

27 1/2" Motor Operated Gate Valve

(Brief description of service for which used)

POOR QUALITY ORIGINAL

(a) Drawing No. 114E937 Prepared by M. Bonfiglio

(b) National Board No. W-14511

6. Design Conditions 2500 psi 650 °F
(Pressure) (Temperature)

7. The material, design, construction, and workmanship complies with ASME Code Section III, Class I

Edition 1971, Addenda Date Winter 1973, Case No. 1552, 1553-1, 1649

Mark No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings			
Body SN F-281	SA351GRCF8M	Geo. Fisher	Ht. No. 53455-1
Bonnet SN F-272	SA351GRCF8M	Geo. Fisher	Ht. No. 14464-1
(b) Forgings			
Disc SNC-322	SA182 GR F316	Colt Industries	Ht. No. 536014
Disc SNC-331	SA182 GR F316	Colt Industries	Ht. No. 536014
Step SN 265	SA564 GR630	McInnes Steel	Ht. No. 11902

Supplemental sheets in form of lists, sketches or drawings may be used provided (1) size is 8 1/2" x 11", (2) information in items 1, 2, 4a and 5b on this data report is included on each sheet, and (3) each sheet is numbered and number of sheets is recorded at top of this form.

FORM NPV-1 (back)

Mark No.	Material Spec. No.	Manufacturer	Remarks
(2) Bolting			
Main Flange Studs	SA453 Cond. B	Rec. Corp.	Ht. No. L3269
24 Studs	Grade 660	-	-
Main Flange Nuts	SA453 Cond. B	Jarecki Ind.	Ht. No. L3229K-12
24 Nuts	Grade 660	-	-
DPS Studs	SA453 GR 660	Rec. Corp.	Ht. No. 28719
DPS Nuts	SA453 GR 660	Jarecki Ind.	Ht. No. L3109K11
(3) Other Parts			
Socket Weld Flange	SA182 TP 316	Ideal Forging	Ht. No. 623226
Blind Flanges	SA182 TP 316	Ideal Forging	Ht. No. 623226
DPS Piping	SA312 TP 304	Allegheny Ludlum	Ht. No. 07266
Socket Weld Tees	SA182 TP F-304	All Stainless	Ht. No. 09504
Seal Weld Ring	SA312 TP 304	A.B. Murray Co.	Ht. No. 87590
Socket Weld Elbows	SA182 TP F-304	All Stainless	Ht. No. F339
SST Globe Valves	(Ref: NPV-1)	Kerocast	SNS. KG 11-19
			KG 11-23

100% QUALITY ORIGINAL

5. Hydrostatic test 5410 psi.

CERTIFICATION OF DESIGN

Design information on file at Westinghouse Electro-Mechanical Division
 Stress analysis report on file at Westinghouse Electro-Mechanical Division
 Design specifications certified by James C. DiPerna (I) Prof. Eng. State PA Reg. No. 15372-E
 Stress analysis report certified by Oskar Hazen (I) Prof. Eng. State PA Reg. No. 009091-
 (I) Signature not required. List name only.

We certify that the statements made in this report are correct.

Date July 23 19 77 Signed Westinghouse Electro-Mechanical Division by Jack R. Allison, Jr.
 (Manufacturer)

Certificate of Authorization No. 1385 expires May 14, 1979

CERTIFICATE OF SHOP INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State of Province of Pennsylvania and employed by Lumbermens Mutual Casualty Co of Long Grove, Illinois 60049 have inspected the equipment described in this Data Report on JUL 18 19 77, and state that to the best of my knowledge and belief, the Manufacturer has constructed this equipment in accordance with the applicable Subsections of ASME Code, Section III.
 By signing this certificate, neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the equipment described in this Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date JUL 28 19 77

P. R. Miller (Inspector) Commission NA4249 P. 1984 (National Board, State, Province and No.)

TIMD282

DESCRIPTION

06/03/00 10:44

Catalog ID : 0001026789 QL: 1

Catalog Status: READY 05/15/00

Description: BLOCK, GUIDE, LSIV RETENTION, SA-479 OR SA-240 TYPE 304 OR TYPE 316 WITH .2% MAX CO

	Description and Notes	Date	By
P	ASME SECTION III, 1971 EDITION, W73	12/20/99	ZINNJ
B	ADDENDA, PER DRAWING 3D18417, 2.4 IN.	12/20/99	ZINNJ
B	LONG X 3/8 IN. THICK X .44 IN. HIGH FOR	12/20/99	ZINNJ
B	A LENGTH OF .31 IN. ON EACH END AND	12/20/99	ZINNJ
B	.15 IN. THICK IN THE MIDDLE PORTION.	12/20/99	ZINNJ
B	WITH A 30 DEGREE ANGLE THICKNESS	12/20/99	ZINNJ
B	TRANSITION	12/20/99	ZINNJ

More: +

- Fac P Facility Specific Description and Notes
- BYR C This item will be manufactured and paid
- BYR C for under a service contract.
- BYR C Therefore, the price is left at one

Date	By
12/20/99	ZINNJ
12/20/99	ZINNJ
12/20/99	ZINNJ

More: +

More Detail to view catalog data.

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GENERAL WELDING STANDARD - 1
FOR
ASME AND ANSI APPLICATIONS

GWS-1
Rev. 1
Page 1 of 9

1.0 PURPOSE

This Standard shall define the requirements and methods PCI Energy Services shall apply to all welding and associated operations used in the fabrication, installation and repair of plant components.

2.0 SCOPE

This Standard applies to all welding done under the American Society of Mechanical Engineers (ASME) or American National Standards Institute (ANSI) Code. This procedure shall not limit the prerogative of the Welding Manager to administer any special processes and/or techniques permitted by the applicable Codes and Specifications.

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3.1	Section 1;	Purpose
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3.12	Section 12;	Gas Shielding and Purging
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3.17	Section 17;	Appearance of Welding Layers
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REFERENCE DOCUMENTS

- 4.1 American Society of Mechanical Engineers (ASME) B&PV Code, Section II, "Material Specifications", Parts A, B, and C, (Latest Edition, Latest Addenda).
- 4.2 American Society of Mechanical Engineers (ASME) B&PV Code, Section III, "Nuclear Power Plant Components", (Latest Edition, Latest Addenda).
- 4.3 American Society of Mechanical Engineers (ASME) B&PV Code, Section VIII, Division 1, "Pressure Vessels" (Latest Edition, Latest Addenda).
- 4.4 American Society of Mechanical Engineers (ASME) B&PV Code, Section IX, "Welding and Brazing Qualifications", (Latest Edition and Addenda).
- 4.5 American Society of Mechanical Engineers (ASME) B&PV Code, Section XI, "Rules for In-service Inspection of Nuclear Power Plant Components", (Latest Edition and Addenda).
- 4.6 American National Standards Institute (ANSI), B31.1, "Power Piping", (Latest Edition, Latest Addenda).
- 4.7 Welding Control Procedure (WCP) 1 "Welding Procedure Preparation and Qualification".
- 4.8 Welding Control Procedure (WCP) 2 "Welder/Welding Operator Performance Qualification Testing".
- 4.9 Welding Control Procedure (WCP) 3 "Weld Material Control".
- 4.10 Welding Control Procedure (WCP) 4 "Inert Gas Purge".
- 4.11 Welding Control Procedure (WCP) 5 "Weld Repair".
- 4.12 Welding Control Procedure (WCP) 6 "Joint Design".
- 4.13 Welding Control Procedure (WCP) 8 "Preheating and Postweld Heat Treatment".



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5.0
GENERAL REQUIREMENTS

5.1 Prior to use, all Welding Procedure Specifications (WPS's) shall be qualified in accordance with WCP-1. The WPS numbering system is delineated by use of the ASME P-Number groupings. WPS-1 would delineate welding of ASME P-No. 1 materials. The WPS would then be followed by "Manual" for the GTAW and SMAW processes, Machine GTAW, Semi-automatic GMAW, Machine GMAW, Semi-automatic FCAW, Machine FCAW, etc. In the instance where one P-NO. is welded to a second P-No. as in WPS-48, this would indicate a P-No. 4 material welded to a P-No. 8 material. OV utilized in a WPS number would indicate an overlay or corrosion resistant procedure. HF would indicate hardfacing followed by the Stellite designation (i.e., HF-21 is hardfacing with Stellite 21). An A8 designation would be an example that indicates the weld metal analysis (stainless) per ASME Section IX. An F43 designation would be an example that indicated the filler metal F-No. per ASME Section IX. All welders/welding operators shall be qualified in accordance with WCP-2 prior to performing production welding operations.

6.0
WELDING PROCESSES

6.1 The welding shall be performed by one or a combination of the following processes, as specified on the applicable WPS:

- 6.1.1 SMAW - Shielded Metal Arc Welding (Manual)
- 6.1.2 GTAW - Gas Tungsten Arc Welding (Manual/Machine)
- 6.1.3 GMAW - Gas Metal Arc Welding (Manual/Machine)
- 6.1.4 FCAW - Flux-Core Arc Welding (Manual/Machine)
- 6.1.5 SAW - Submerged Arc Welding (Manual/Machine)



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8.4 The surface finish of the weld preparation shall be reasonably free of irregularities, as determined by the Welding Manager, prior to the start of the welding operation. Minor surface imperfections are acceptable, provided the fit-up requirements of the applicable WPS are met. Unacceptance discontinuities shall be repaired at the discretion of the Welding Manager in accordance with Section 20.0 of this Standard.

8.5 All grinding of stainless steel or nickel and nickel base alloys shall be performed using only rubber resin bonded, aluminum oxide or silicon carbide grinding wheels which have not been previously used on any other materials. All wire brushing of stainless steel or nickel base alloys shall be performed with stainless steel brushes which have not been previously used on other materials.

9.0 WELDING MATERIALS

9.1 Weld Filler Material

Filler materials used shall be as specified on the WPS. All welding materials shall be purchased and controlled as specified in WCP-3.

9.2 Metal Backing Rings/Strips

9.2.1 All backing rings/strips used in production shall conform to the requirements of the applicable welding procedure specification and WCP-6.

9.3 Tungsten Electrodes

Tungsten electrodes for GTAW process shall conform with AWS A5.12 and the following:

<u>Material P Number</u>	<u>Current Type, Polarity</u>	<u>Tungsten Electrode Type</u>
P1 through P11	DCSP	EWTh-1 or EWTh-2
P21 through P25	AC	EWP or EWZr
P41 through P44	DCSP	EWTh-1 or EWTh-2



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10.0 WELD JOINT DESIGNS

10.1 Weld end bevel and joint details for ASME/ANSI Code applications shall conform to the requirements as listed in the attachments of WCP-6.

11.0 FIT-UP ALIGNMENT

11.1 Alignment. Unless otherwise specified, alignment of sections shall be such that they meet the requirements of WCP-6.

12.0 GAS SHIELDING AND PURGING

12.1 The type, composition and flow rates of shielding, and purging gas(es) shall be as specified on the applicable WPS. Purging shall be accomplished in accordance with WCP-4.

13.0 PREHEAT AND INTERPASS TEMPERATURE CRITERIA

13.1 Shall be performed in accordance with the Welding Procedure Specification (WPS) or as required by WCP-8. If the WPS has a higher preheat than WCP-8, the WPS preheat shall govern.

14.0 JOINT WELDING PROCEDURE

14.1 The welding parameters such as filler metal type and sizes with amperage and voltage ranges for each size shall be in accordance with the applicable WPS.

14.2 Root openings for groove welding shall conform to the applicable welding procedure specification. Slip-on flanges shall have space from face of flange to end of pipe equal to thickness of pipe plus 1/8" but, in no case, less than 3/8".

14.3 Welding shall not be permitted on surfaces that are wet or damp.

14.4 Weld using a staggered sequence in a regular pattern. The pattern may be modified if needed to correct or control alignment. Block welding (welding all the way out in a segment) is not permitted unless authorized in writing by the Welding Manager. Block welding is not permitted on G.E. supplied components. If permitted, block welded segments shall have cascaded ends.

- 14.5 Arc strikes shall be confined to the weld groove or arc starting block. No arc strike outside the finished weld shall be made. Any such arc strikes shall be removed and repaired in accordance with WCP-5.
 - 14.6 Socket fit-up shall conform to Attachment No. 7 in WCP-6.
 - 14.7 For full penetration groove welds welded without backing by the SMAW process, the root side of the weld shall be back-gouged to sound metal by a mechanical or thermal process. A magnetic particle or liquid penetrant examination shall be performed to ensure that all defects have been removed from the root. Upon acceptance, the cavity shall be rewelded in accordance with the applicable WPS.
 - 14.8 All passes shall be deposited as stringer and/or weave beads with the maximum bead width not to exceed that as specified on the WPS.
 - 14.9 Stainless steel covered electrodes shall not be used on the root pass of backing ring or socket welded joints, or other such applications where entrapped slag may be in contact with water.
 - 14.10 The use of a "wash" pass (i.e., the remelting of weld metal without the addition of filler metal) to improve weld appearance shall not be permitted.
 - 14.11 When seal welding of threaded joints is performed, the exposed threads shall be entirely removed by grinding prior to performing the weld.
- 15.0 INTERPASS AND FINAL SURFACE CLEANING
- 15.1 Each weld bead or layer shall be thoroughly cleaned by filing, deburring, grinding or wire brushing.
 - 15.1.1 Wire brushes used on stainless steel or nickel based alloys shall be made of stainless steel. All tools used on stainless steel or nickel base alloys shall not have been previously used on other materials.

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16.0 PEENING

16.1 Peening of weld beads or layers shall not be performed, unless authorized by the Welding Manager.

17.0 APPEARANCE OF WELDING LAYERS

17.1 Welds shall be sound throughout with full penetration of pipe or plate thickness as required. If necessary, the weld shall be back ground and rewelded. There shall be no cracks or zone of incomplete penetration, or lack of fusion in any weld or weld pass. Welds should be uniform in width and height throughout their entire length. Each pass or layer of welding, as evidenced by visual inspection, should be smooth and free of slag, inclusions, cracks, porosity, lack of fusion, and overlap. Undercut shall not exceed 1/32 inch.

17.2 The final surface of all welds should be free of coarse ripples, sharp surface irregularities, non-uniform bead patterns and intermittent hollows and bumps. The surface condition shall not interfere with the interpretation of liquid penetrant, magnetic particles, radiographic or ultrasonic examinations where specified.

18.0 REINFORCEMENT AND SURFACE CONTOUR OF WELDS

18.1 The minimum weld reinforcement for butt welded joints in the "as welded" condition shall be at least one layer of weld metal more than the amount necessary to fill the groove completely.

18.2 The maximum weld reinforcement and surface (ID/OD) conditions shall be in accordance with WCP-6.

19.0 POSTWELD HEAT TREATMENT (STRESS RELIEVING)

19.1 Postweld Heat Treatment (PWHT), when required by the applicable Code shall be performed in accordance with WCP-8.



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20.0 REPAIR OF WELDS AND BASE MATERIAL

20.1 Unacceptable defects in weld material or base material detected by an NDE method shall be eliminated or reduced to an acceptance size and repaired when required by WCP-5.

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WELD PROCEDURE SUPPLEMENT

Procedure GWS-1 Rev. 1 Date 08/25/91

Customer CP&L Project No. 6510

Paul R. Evans 8/25/91 Trudy D. Kralik 8/25/91
Manager, Welding Engineering Date Approved Mgr., Q.A. Date

- 1) Change 4.2 to read: Utilize 1986 Edition of ASME Section III.
- 2) Change 4.5 to read: Utilize 1980 Edition, with Winter 1981 Addenda of ASME Section XI.
- 3) Change 4.6 to read: Utilize 1986 Edition of ANSI B31.1 "Power Piping".



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WELD PROCEDURE SUPPLEMENT

Procedure GWS-1 Rev. 1 Date 08/25/91

Customer CP&L - BRUNSWICK Project No. 6513

[Signature] 9/6/92 [Signature] 2/7/92
Manager, Weld Engineering Date Approved Manager, Q.A. Date

- 1) Change 4.2 to read: Utilize 1986 Edition of ASME Section III.
- 2) Change 4.5 to read: Utilize 1980 Edition, with Winter 1981 Addenda of ASME Section XI.
- 3) Change 4.6 to read: Utilize 1986 Edition of ANSI B31.1 "Power Piping".



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WELD PROCEDURE SUPPLEMENT

Procedure GWS-1 Rev. 1 Date 8/25/91

Customer Shearon Harris - CP&L Project No. 5377

William Jelle 10/29/92 M.A. Passer 29 Oct 1992
Manager, Weld Engineering Date Approved Manager, Q.A. Date

- 1) Change 4.6 to read: Utilize 1986 Edition of ANSI B31.1 "Power Piping".



WELD PROCEDURE SUPPLEMENT

Procedure GWS-1 Rev. 1 Date 08/25/91

Customer CP&L - BRUNSWICK Project No. 6515

Shirley D. Hask 02-1-93 Timothy D. Gullbs 2/15/93
Manager, Weld Engineering Date Approved Manager, Q.A. Date

- 1) Change 4.2 to read: Utilize 1986 Edition of ASME Section III.
- 2) Change 4.5 to read: Utilize 1980 Edition, with Winter 1981 Addenda of ASME Section XI.
- 3) Change 4.6 to read: Utilize 1986 Edition of ANSI B31.1 "Power Piping".



WELD PROCEDURE SUPPLEMENT

Procedure GWS-1 Rev. 1 Date 8/25/91

Customer FP&L Project No. 5278

Paul L. Evans 3/23/92 Timothy D. Gully 3/23/92
Manager, Weld Engineering Date Approved Manager, Q.A. Date

The following items shall be in force as requirements for the duration of the project.

1. Paragraph 6.1.3 and 6.1.4

Add: The use of these processes shall be approved by FP&L on a case by case basis per FP&L std. M2.3102-Com.

2. Add: Paragraph 8.5 of FP&L std. M2.8102-Com shall be followed.

3. Paragraph 8.2

Revise: Thermal cutting is permitted provided the base material is uniformly preheated in accordance with the requirements of the WPS to be used in joining the components. All slag shall be removed from the thermally cut surface. In addition, the as-cut surface shall require removal of a minimum of 1/32" by mechanical methods and 1/16" shall be removed for pressure boundary welds in stainless steel.

4. Paragraph 8.3.1

Revise: There shall be a visual separation of 1/2" minimum between the edge of the completed weld preparation and the unprepared base material such that surface oxides and other foreign material which may be detrimental to the welding operation(s) and/or subsequent weld quality do not come in contact with the welding arc or the molten weld pool or puddle.

5. Paragraph 13.1

Add: Per FP&L std. M-2,8102-Com, the recommended minimum preheat temperatures listed in ANSI B31.1 and ASME I are mandatory.

6. Paragraph 19.1

Add: As modified by FP&L std. M-2.8102-Com, 120.



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WELDING CONTROL

PROCEDURE

WCP-8

PCI ENERGY SERVICES
LAKE BLUFF, ILLINOIS

Rev.	Date	Weld Eng.	Date	Quality Assurance	Date	Synopsis
0	7/26/88	Paul R. Evans	7/26/88	Harold G. Gail	7/26/88	Original Issue
1	4/12/91	Paul R. Evans	4/12/91	Wm. H. Simmons	4/12/91	Complete Rewrite
2	8/25/91	Paul R. Evans	8/25/91	Kimberly D. Kullback	8/25/91	Complete Rewrite
3	9/30/91	Thom Flanagan	9/30/91	Kimberly D. Kullback	9/30/91	Editorial Corrections
4	6/23/93	Alfred E. Elie	6/23/93	Kimberly D. Kullback	6/23/93	Addition of attachment 12
5	01/04/94	Stephen L. [unclear]	01/04/94	Kimberly D. Kullback	01/04/94	Addressed changes to referenced codes

PCI ENERGY SERVICES
ONE ENERGY DRIVE
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CONSENT OF PCI ENERGY SERVICES.

WCP-8
PREHEATING AND POSTWELD HEAT TREATMENT

WCP-8
Rev. 5
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1.0 PURPOSE

This procedure establishes the methods, activities and responsibilities to perform the tasks of preheat, interpass temperature control and postweld heat treatment of steel weldments.

2.0 SCOPE

This procedure describes all specified requirements and preheating approved techniques which shall be employed in the tasks associated with postweld heat treatment (stress relieving). Methods for preheating when thermal gouging, cutting, and welding steel materials are also detailed within this procedure. This procedure shall not limit the prerogative of the Manager of Welding Engineering to administer any special technique as permitted by the applicable Codes and specifications.

3.0 REFERENCES

- 3.1 American Society of Mechanical Engineers (ASME), Section I, III, VIII Division 1, IX and XI, (Latest Edition and Addenda).
- 3.2 American Society of Mechanical Engineers (ASME), B31.1, "Power Piping", (Latest Edition and Addenda).
- 3.3 American Society of Mechanical Engineers (ASME), B31.3 "Chemical Plant And Petroleum Refinery Piping." (Latest Edition and Addenda).
- 3.4 General Welding Standard (GWS-1), "ASME and ANSI Applications".
- 3.5 PCI Energy Services Quality Control Systems Manual (ASME Section I, VIII, and B31.1).
- 3.6 PCI Energy Services Quality Assurance Program (10CFR50, Appendix B).
- 3.7 National Board Inspection Code ANSI/NB-23

4.0 RESPONSIBILITIES

- 4.1 Manager of Welding Engineering. The Manager of Welding Engineering is responsible for the entire welding program, including preparation of Welding Procedure Specifications, Procedure Qualification Records, Project Welding Manuals, and other related special process control procedures. He provides special technical direction on welding and special process matters and insures that special processes are controlled and conducted in accordance with the Quality Assurance Manual/Quality Control System Manual, the Construction Code(s) and/or Customer technical documents as applicable. On projects of sufficient scope he assigns, directs and provides technical assistance to the Welding Supervisor. When a Welding Supervisor is not assigned to a project, he ensures that their responsibilities are delegated to a properly qualified individual on the project. (e.g. Project Manager).
- 4.2 Manager, Quality Assurance. The Manager, Quality Assurance is responsible for implementation of the Quality requirements for special process control as required by the Quality Assurance Manual/Quality Control Systems Manual implemented on the project, the applicable Construction Code(s), and/or the Customer technical documents as applicable. This includes review and approval of Welding Procedure Specifications (WPS's), Welding Control Procedures (WCP's) and other similar process control documents.
- 4.3 Welding Supervisor. The Welding Supervisor is responsible for field welding activities, including training and qualification of welders, heat treatment (preheat, interpass, and postweld heat treatment), welding consumable control, maintenance of the required documentation and providing technical direction and guidance to the craft for proper application and control of special processes.

5.0 GENERAL DESCRIPTION

5.1 Definitions

5.1.1 Welding Manager - As defined in this section, denotes the Manager of Welding Engineering or his designee.

5.1.2 Preheating - The application of heat to the base metal before a welding or cutting operation.

5.1.3 Interpass Temperature - The highest temperature in the weld joint immediately prior to welding or for multiple pass welds, the temperature in the section of the previously deposited pass of deposited weld metal immediately before the next pass is started.

5.1.4 Weld Bead - A weld deposit resulting from a pass.

5.1.5 Postweld Heat Treatment (PWHT) - Any heat treatment subsequent to welding.

5.1.6 Subcritical Temperature - Below the temperature at which austenite begins to form during heating (as listed on a standard Iron-Iron Carbide Equilibrium Chart).

6.0 GENERAL REQUIREMENTS

6.1 Preheat requirements are as follows:

6.1.1 For ASME B31.1, Attachment 1.

6.1.2 For ASME B31.3, Attachment 2.

6.1.3 Non-mandatory Preheat (guidelines) for ASME Section 1 and ASME Section VIII (Division I), Attachment 3.

6.1.4 Non-mandatory Preheat (guidelines) for ASME Section III, Attachment 4.

6.2 Preheat and Interpass Temperature Criteria
The minimum preheat temperature for each application shall be in accordance with the

applicable WPS and the attachments of this WCP. The thickness of the thickest part at the point of welding shall be used to determine the minimum preheat temperature requirements. Temperatures above the minimum may be required for highly restrained weld joints.

6.3 Whenever materials of different P-Numbers are joined, the P-Number requiring the highest preheat temperature shall be used in determining the weld joint preheat requirements, except that whenever stainless steel (P-Number 8) or nickel and nickel base alloys (P-Numbers 4X) are joined to any other P-Number, the preheat requirements shall be applied separately to each material during joint welding.

6.4 Preheat for welding, thermal cutting or arc gouging may be applied by flame, induction, or resistance heating.

6.4.1 When oxy-fuel flame heating is used, care shall be exercised to ensure that only a neutral flame is used.

6.5 The method of heat application in all preheating shall be such that the temperature around the circumference of the joint in piping is fairly uniform with no local hot spots.

6.6 Preheat temperature shall be obtained prior to tacking or welding and maintained until all welding or cutting is completed, except that for low alloy steel production welds with a mandatory PWHT, the preheat temperature shall be maintained until the PWHT has been performed or verification of soundness.

NOTE: The tacking of a consumable insert to the pipe end preps and tacks which are not incorporated into the final weldment is exempt from the above requirements.

6.7 Welding shall not begin until the entire wall thickness has attained the specified minimum preheat temperature.

- 6.8 If the welding operation is interrupted, the following conditions shall apply.
- 6.8.1 The minimum preheat shall be maintained until welding is resumed, or resumption of welding shall be accomplished only after the joint has been reheated to the specified preheat temperature.
- 6.8.2 The weld joint shall be adequately supported to minimize the potential for cracking due to external strains.
- 6.8.3 On heavy wall piping (3/4" and over), a minimum weld deposit of 1/4T (T = Thickness of base materials) or 3/8", whichever is greater, shall be required to avoid potential cracking of the weld deposit due to internal strains.
- 6.9 The maximum interpass temperature for each application shall be in accordance with the applicable WPS.

NOTE: Maximum Interpass Temperature - Is the highest temperature in a multiple-pass weld, that the previously completed layer of deposited weld metal must be below before the next pass is started.

- 6.10 Welding shall not continue until the interpass temperature is at or below the maximum temperature specified on the applicable WPS.
- 6.10.1 For austenitic stainless steel (P-Number 8, 300 series) material, a demineralized water "quenching" may be performed to increase the interpass temperature cooling rate. The following requirements shall apply when quenching is performed:
- 6.10.1.1 Demineralized water from an approved source and stored in an approved clearly identifiable container until use, shall be the only quenching medium.
- 6.10.1.2 The quenching medium shall be applied by a wet (not dripping), clean white lint-free cloth or equal.

6.10.1.3 The wet cloth shall be applied uniformly around the entire weld circumference.

6.10.1.4 The quenching medium may only be applied after a complete weld pass has been deposited and no sooner than 10 seconds after the welding arc has been extinguished.

6.10.1.5 Prior to resumption of welding, there shall be no visible liquid on the surfaces to be welded

6.11 Preheat and Interpass Temperature Measurement

6.11.1 Preheat and interpass temperatures may be checked by either thermocouple, contact thermometers, pyrometers or temperature indication crayons as follows:

6.11.1.1 Where preheating is performed using an oxy-fuel gas torch, the preheat temperature check shall not be performed sooner than one minute after removal of the heat source.

6.11.1.2 The preheat temperature shall be measured on the surface of the base material within 2" of the side from which welding will be performed. The temperature check shall be performed both laterally and in advance of the weld starting point.

6.11.1.3 The interpass temperature shall be measured on the surface of the base material within 2" of the side from which welding will be performed, near the starting point for the next pass.

6.11.1.4 Crayon markings shall not be applied to the weld metal but may be applied to the surface on which weld metal will be deposited, provided any crayon marking present is removed using an approved cleaner.

6.11.1.5 Temperature checks shall be taken for each weld pass until the weld is completed.

6.12 General Postweld Heat Treatment (PWHT) Requirements

6.12.1 PWHT shall be accomplished by methods which will provide the desired heating and cooling

rates, the required metal temperature, metal temperature uniformity and temperature control.

- 6.12.2 PWHT shall be per the following sub-paragraphs and the applicable WPS.

NOTE: All postweld heat treatments for any particular weld shall be closely monitored to ensure that the maximum allowable time and temperature specified within the applicable welding procedure is not exceeded (e.g., after a weld is subjected to 1-hour of heat treatment as allowed by a procedure permitting a 2-hour heat treatment, any further heat treatment will not exceed an additional hour).

6.13 Postweld Heat Treatment Requirements

6.13.1 Recording Postweld Heat Treatment Cycle

A time-temperature recorder chart shall be provided for each PWHT operation. Below 600°F the cooling curves need not be recorded if thermal insulation is not disturbed.

6.13.2 Heat Treatment Temperature and Time Cycle

The PWHT temperature range and holding time for vessels, piping, tubing and nozzles shall be as specified in the attachments of this procedure.

6.13.3 Heated Area - Minimum Width Requirements

The heated band width requirements shall be in accordance with the applicable code requirements.

6.13.4 Heating and Cooling Rates

Heating and cooling rates shall be in accordance with the applicable code.

- 6.14 Prior to preparing the weldment for PWHT, the Welding Supervisor shall review process control checklists, and nondestructive examination results to ensure required inspections and examinations for the weldment have been completed and are satisfactory.

6.15 Welding Procedure Specifications used in conjunction with this standard shall be qualified in accordance with WCP-1 "Welding Procedure Preparation and Qualification". This qualification shall include PWHT as applicable for the material(s) and its application.

6.16 Required temperatures shall be verified by use of one or more of the following devices:

6.16.1 Temperature indicating Crayons

6.16.2 Contact Thermometers (calibrated)

6.16.3 Contact Pyrometers (calibrated)

6.16.4 Thermocouple - Thermocouple shall be properly coupled to calibrated time-temperature recording devices. Thermocouple shall be in direct contact with the component. Where ranges are specified, temperature measurement shall be at the anticipated hottest and coldest points of the Code band width as determined by the Welding Manager.

6.16.4.1 If thermocouple or thermocouple nuts are attached by welding; welders, welding procedures and filler materials shall meet the requirements of the applicable construction code and satisfy the requirements for temporary attachments therein. The same WPS used for the weld joint shall be used for temporary attachments or as determined by the Welding Manager.

6.17 The number of thermocouple required for each pipe size shall be in accordance with the following:

<u>Pipe Size (inches)</u>	<u>Minimum Qty. of Thermocouple</u>
Under 3"	2
3" - 14"	2
16" - 48"	4

6.17.1 For pipe sizes greater than 48", the number of thermocouples shall be determined by the Welding Manager.