



Pullman Power Products

PQR No. 047A

DOCUMENT NO.

PREPARED BY: G.L. Martin

APPROVED BY: K. J. Freed

KJF

ISSUE DATE: 2/13/81

PROCEDURE
QUALIFICATION RECORDTO BE USED
ONLY ON JOB #**7035**PAGE
NO. 1 of 4LATEST REV. DATE
4/13/81

PROCEDURE QUALIFICATION RECORD

047A-1-KI-A1

AS WELDED

Copyright 1981

PULLMAN POWER PRODUCTS

HEADQUARTERS AT

WILLIAMSPORT, PENNSYLVANIA

UE&C
CODE

01

REVISION	PREPARED BY	APPROVED BY	INITIALS	DESCRIPTION
00 2/13/81	G.L. Martin	K.J. Freed	<i>KJF</i>	Original Qualification
01 4/13/81	G.L. Martin	K.J. Freed	<i>KJF</i>	Corrected Preheat, Position, and Gas

RECEIVED
U.E. & C. INC.
MAY 01 1981
SEABROOK
STATION

PREPARED BY: G. L. Martin

APPROVED BY: K. J. Freed

DATE. 2/13/81

PROCEDURE
QUALIFICATION RECORD (PQR)

TO BE USED
ONLY ON JOB #

7035

PAGE NO. 2 of 4

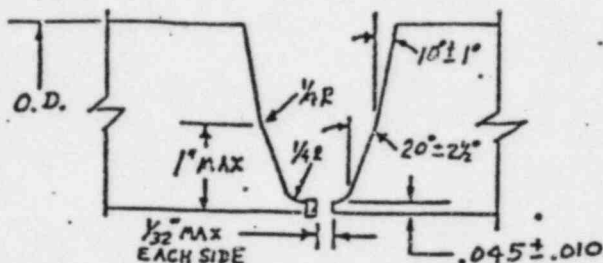
WPS NO. 150-I-1-KI-A1

WPS DATE 2/13/81

WELDING PROCESS (ES) GTAW

TYPES Automatic
(MANUAL, AUTOMATIC, SEMI-AUTO)

COMPOUND BEVEL
"U" GROOVE



GROOVE DESIGN USED

FILLER METALS (QW-404)

WELD METAL ANALYSIS A NO. 1 FILLER METAL F NO. 6
S.F.A. SPEC. 5.18 AWS CLASS E70S-3

POSTWELD HEAT TREATMENT (QW-407)	None
----------------------------------	------

TEMPERATURE

TIME

OTHER

BASE METAL (OW-403)

MATERIAL SPEC. SA 333

TYPE OR GRADE Gr 6

OF P NO. 1 Gr 1 TO P NO. 1 Gr 1

THICKNESS (IF PIPE DIAMETER AND WALL THICKNESS) 24" Dia. 1.565" Wall

POSITION (OW-405)

POSITION OF GROOVE 6G

WELD PROGRESSION Uphill & Downhill
(UPHILL - DOWNHILL)

PREHEAT (QW-406)

PREHEAT TEMP. 50°F Min.

INTERPASS TEMP. 200°F Max.

OTHER

GAS (QW-408)

TYPE OF GAS OR GASES 25-40 CFH Argon

COMPOSITION OF GAS MIXTURE 100% Argon

OTHER

TECHNIQUE PROCEDURES (OW-410)

STRING OR WEAWE BEAD Both

OSCILLATION See page 4

MULTIPASS OR SINGLE PASS Multiple

MULTIPASS OR SINGLE PASS _____ (PER SIDE)
Single

SINGLE OR MULTIPLE ELECTRODES Single

Type: EWTh-2

ELECTRICAL CHARACTERISTICS (QW-409) See page 4

WELDING PROCESS	ELECTRODE DIA.	BARE FILLER WIRE DIA.	CURRENT (AMPS)	VOLTS	AC/DC POLARITY	TRAVEL SPEED	COMMENTS
					DCSP		



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ONLY ON JOB #**7035**PAGE
NO. 4 of 4

SUPPLEMENTAL PROCEDURE QUALIFICATION RECORD FORM FOR AUTOMATIC GTAW WELDING

Filler Metal	E70S-3	E70S-3	E70S -3
Diameter Filler	1/8" x 1/16"	.035"	.045"
Pass Type	Root (K-Insert)	Hot & Fill	Fill & Cap
1st Level Weld Current	115 Amps	160-285 Amps	265-299 Amps
Low Pulse	P.A.	Sync-Pulse	Sync-Pulse
Low Pulse Frequency	1.1 P.P.S.	0	0
Low Pulse Width	50%	0	0
Background Current	60 Amps	65-184 Amps	190-195 Amps
Out Dwell	.1 Sec.	.3-.6 Sec.	.4-.6 Sec.
Excursion Time	.1 Sec.	.3-.4 Sec.	.3-.5 Sec.
In Dwell	.1 Sec.	.3-.6 Sec.	.2-.6 Sec.
Oscillator Amplitude	0	.16"-.27"	.18"-.20"
Primary Wire Speed	0	40-80 Ipm	40-65 Ipm
Background Wire Speed	0	30-70 Ipm	30-50 Ipm
1st Level Travel Speed	3.2 Ipm	3.2 Ipm	3.2-4.0 Ipm
Primary Arc Volts	9.3v	9.2-10.0v	10.2-10.6v
Background Arc Volts	7.8v	7.4-8.0v	8.6-8.8v
Gas Cup Size	#8	#8	#8, #10
Torch Lead	----	50°-100°	70°-100°
Torch Side Tilt	----	0°-70°	50°-100°
Wire Block	----	30°	30°
No. of Passes	1	11	28



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PAGE
NO. 3 of 4

TENSILE TEST (QW-150) 462.1(B)

SPECIMEN NO.	WIDTH	THICKNESS	AREA	ULTIMATE TOTAL LOAD LB.	ULTIMATE UNIT STRESS PSI	CHARACTER OF FAILURE & LOCATION
T1 - AW	.746	.581	.433	33,550	77,483	Base Metal
T2 - AW	.737	.578	.426	32,800	76,995	Base Metal
T3 - AW	.740	.576	.428	32,980	77,056	Base Metal
T4 - AW	.742	.575	.427	32,950	77,166	Base Metal

GUIDED BEND TESTS (QW-160) 462.2(A)

TYPE AND FIGURE NO.	RESULTS	TYPE AND FIGURE NO.	RESULTS
b5 - AW	Bent 180°, acceptable		
b6 - AW	Bent 180°, acceptable		
b7 - AW	Bent 180°, acceptable		
b8 - AW	Bent 180°, acceptable		

TOUGHNESS TESTS (QW -170) N/A

SPECIMEN NO.	NOTCH LOCATION	NOTCH TYPE	TEST TEMP.	IMPACT VALUES	AVE	LATERAL EXP		
						% SHEAR	MILS	

Welder's Name K. V. Fluck Clock No. N/A Badge No. 6568

Test Conducted by: MSI Testing, Inc. Laboratory Test No. 81-075

Per: B. Mockli

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Signed Pullman Power Products

Date 3/20/81

By G. L. Martin
G. L. Martin

GAP 980

THE GREAT
ATLANTIC AND PACIFIC
WELDING &
CONSTRUCTION COMPANY, INC.

405 Bannock Drive • P.O. Box 15857 • Salt Lake City, Utah 84115 • (801) 487-0731



Ref. W.P.S. No. 2/3 213

Pipe Diameter: 24" 2/8

Wall Thickness: 1 1/2"

Filler Material: 1-5

Dia. 3/8"

Sheet Of

WELDING TECHNIQUE SHEET

RECOMMENDED PROGRAM:

GOLD TRACK II

 ALARM Manual PERIOD MODE PA SYNC PULSE LOW PULSE LOW PULSE FREQ LOW PULSE WIDTH EMERGENCY STOP POWER ON	 1st LEVEL WELD PERIOD 0 1 5 0-100 SEC 2nd LEVEL WELD PERIOD 0 0 0 0-100 SEC 3rd LEVEL WELD PERIOD 0 0 0 0-100 SEC 4th LEVEL WELD PERIOD 0 0 0 0-100 SEC 1st LEVEL WELD CURRENT 1 6 0 0-300 AMPS 2nd LEVEL WELD CURRENT 0 0 0 0-300 AMPS 3rd LEVEL WELD CURRENT 0 0 0 0-300 AMPS 4th LEVEL WELD CURRENT 0 0 0 0-300 AMPS CURRENT UPSLOPE TIME 0 3 0-30 SEC BACKGROUND CURRENT 0 5 5 0-300 AMPS CURRENT DWELL TIME 0 1 0-30 SEC
 PREPURGE POSTPURGE 3 SEC 5 SEC Dwell 75 SEC Excursion Time 3-8 SEC Hill Dwell 3-8 SEC OSCILLATOR AMP 2 2 0-20 INCHES	 START DELAY 0 7 0-30 SEC PRIMARY WIRE SPEED 5 0 0-75 IPM BACKGROUND WIRE SPEED 3 0 0-75 IPM
 FIXTURE MODE TRAVEL START DELAY 0 2 0-30 SEC 1st LEVEL TRAVEL SPEED 0 3 2 0-75.0 IPM 2nd LEVEL TRAVEL SPEED 0 0 0 0-75.0 IPM 3rd LEVEL TRAVEL SPEED 0 0 0 0-75.0 IPM 4th LEVEL TRAVEL SPEED 0 0 0 0-75.0 IPM	 VARIABLE ARC VOLTAGE RESPONSE PRIMARY ARC VOLTS 0 3 5.0-25.0 VOLTS LOCK SAMPLED CONT BACKGROUND ARC VOLTS 7 8 5.0-25.0 VOLTS SYSTEM MODE

WELD JOINT DESIGN/FIT UP

Hot Pass
☐ ROOT ☒ FILL PASS NO. 1 ☐ CAP

RECOMMENDED WELD HEAD SET UP:
GAS CUP 3/8 WIRE BLOCK 4 30
TORCH LEAD 5° TORCH SIDE TILT 0°
ACTUAL TRAVEL SPEED IPM

NOTES: 1-2, 35 1/2 1/2 1/2
WELDED BY:

THE GREAT ATLANTIC AND PACIFIC WELDING & CONSTRUCTION COMPANY, INC.

4400 West 1st Drive • P.O. Box 10857 • Salt Lake City, Utah 84115 • (801) 467-0731



Ref. W.P.S. No. 7/2-23
Pipe Diameter: 24" 3/8
Wall Thickness: 1.5213"
Filler Material: 700-3 Dia. .035
Sheet Of

WELDING TECHNIQUE SHEET

RECOMMENDED PROGRAM:

GOLD TRACK II

ALARM	PERIOD MODE	1st LEVEL WELD PERIOD	2nd LEVEL WELD PERIOD	3rd LEVEL WELD PERIOD	4th LEVEL WELD PERIOD
OFF PA SYNC PULSE	EMERGENCY STOP	1st LEVEL WELD CURRENT	2nd LEVEL WELD CURRENT	3rd LEVEL WELD CURRENT	4th LEVEL WELD CURRENT
LOW PULSE FREQ	LOW PULSE WIDTH	CURRENT UPSLOPE TIME	BACKGROUND CURRENT	CURRENT DOWNSLOPE TIME	
PREPULSE POSTPULSE	OUT DWELL	EXCURSION TIME	OSCILLATOR AMP	START DELAY	PRIMARY WIRE SPEED
FIXTURE MODE	TRAVEL START DELAY	1st LEVEL TRAVEL SPEED	2nd LEVEL TRAVEL SPEED	3rd LEVEL TRAVEL SPEED	4th LEVEL TRAVEL SPEED
ARC VOLTAGE RESPONSE	PRIMARY ARC VOLTS	SAMPLED LOCK	BACKGROUND ARC VOLTS	OPERATE TEST	

WELD JOINT DESIGN/FIT UP

☐ ROOT ☒ FILL PASS NO. 2 ☐ CAP

RECOMMENDED WELD HEAD SET UP: Long
GAS CUP 18 WIRE BLOCK 4 30
TORCH LEAD 4 5 TORCH SIDE TILT 0
ACTUAL TRAVEL SPEED IPM

NOTES:

WELDED BY:

* INDICATE START, DIRECTION, AND LEVEL CHANGES.

**THE GREAT
ATLANTIC AND PACIFIC
PIPE WELDING &
CONSTRUCTION COMPANY, INC.**

408 Bearcat Drive • P.O. Box 15857 • Salt Lake City, Utah 84115 • (801) 467-0731



Ref. W.P.S. No. 1/3 803

Pipe Diameter: 36" O.D.

Wall Thickness: 1.5312"

Filler Material: E708-3

Dia. .075

Sheet Of

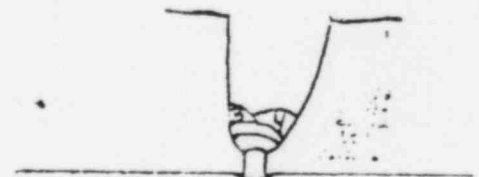
WELDING TECHNIQUE SHEET

RECOMMENDED PROGRAM:

SOLD TRACK 33

 ALARM		 Manual PERIOD MODE		1st LEVEL WELD PERIOD 0 1 5 0-999 SEC	2nd LEVEL WELD PERIOD 0 0 0 0-999 SEC	3rd LEVEL WELD PERIOD 0 0 0 0-999 SEC	4th LEVEL WELD PERIOD 0 0 0 0-999 SEC
 P.A. SYNC PULSE LOW PULSE LOW PULSE FREQ 0 2 0-45 P.P.S.		 EMERGENCY STOP POWER ON		1st LEVEL WELD CURRENT 2 4 0 0-300 AMPS	2nd LEVEL WELD CURRENT 0 0 0 0-300 AMPS	3rd LEVEL WELD CURRENT 0 0 0 0-300 AMPS	4th LEVEL WELD CURRENT 0 0 0 0-300 AMPS
 LOW PULSE WIDTH 0 0 0-99%		 CURRENT UPSLOPE TIME 0 3 0-30 SEC		 BACKGROUND CURRENT 1 5 5 0-300 AMPS		 CURRENT DOWNSLOPE TIME 1 5 0-30 SEC	
 PREPURGE POSTPURGE 0 5 0-30 SEC	 OUT DWELL 5 0-30 SEC	 EXCURSION TIME 4 0-30 SEC	 IN DWELL 5 0-30 SEC	 OSCILLATOR AMPS 1 6 0-30 INCHES			
 TRAVEL START DELAY 0 4 0-30 SEC				1st LEVEL TRAVEL SPEED 0 5 2 0-75.0 IPM	2nd LEVEL TRAVEL SPEED 0 0 0 0-75.0 IPM	3rd LEVEL TRAVEL SPEED 0 0 0 0-75.0 IPM	4th LEVEL TRAVEL SPEED 0 0 0 0-75.0 IPM
 FIXTURE MODE FWD REV		 VARIABLE ARC VOLTAGE RESPONSE		 PRIMARY ARC VOLTS 0 0 5 0-75.0 VOLTS	 LOCK SAMPLED COUNT	 BACKGROUND ARC VOLTS 0 7 7 0-75.0 VOLTS	 OPERATE TEST SYSTEM MODE

Due to joint configuration passes 3 & 4 were split for better weldment.



WELD JOINT DESIGN/FIT UP

☐ ROOT ☒ FILL PASS NO. 3 & 4 ☐ CAP

RECOMMENDED WELD HEAD SET UP: Long
GAS CUP $\frac{3}{8}$ WIRE BLOCK $\frac{1}{4}$
TORCH LEAD 4° TORCH SIDE TILT $7\frac{1}{2}^\circ$
ACTUAL TRAVEL SPEED _____ IPM

NOTES: _____

* INDICATE START, DIRECTION, AND LEVEL CHANGES. WELDED BY: _____

Ref. W.P.S. No.	11-13
Pipe Diameter:	2" 1/2
Wall Thickness:	1.312"
Filler Mat (ft)	11-13 Dia. 1000
Sheet	Of

RECOMMENDED PROGRAM:

GOLD TRACK II

WELD PERIODS:

- 1st LEVEL WELD PERIOD: 0 1 5, 0-999 SEC
- 2nd LEVEL WELD PERIOD: 0 0 0, 0-999 SEC
- 3rd LEVEL WELD PERIOD: 0 0 0, 0-999 SEC
- 4th LEVEL WELD PERIOD: 0 0 0, 0-999 SEC

WELD CURRENTS:

- 1st LEVEL WELD CURRENT: 2 7 0, 0-300 AMPS
- 2nd LEVEL WELD CURRENT: 0 0 0, 0-300 AMPS
- 3rd LEVEL WELD CURRENT: 0 0 0, 0-300 AMPS
- 4th LEVEL WELD CURRENT: 0 0 0, 0-300 AMPS

BACKGROUND CURRENT: 1 8 0, 0-300 AMPS

CURRENT UP/DOWN TIME: 0 3, 0-30 SEC

START DELAY: 0 7, 0-30 SEC

PRIMARY WIRE SPEED: 8 0, 0-99 IPW

BACKGROUND WIRE SPEED: 3 0, 0-75 IPW

TRAVEL START DELAY: 0 4, 0-30 SEC

TRAVEL SPEEDS:

- 1st LEVEL TRAVEL SPEED: 0 3 2, 0-75.0 IPW
- 2nd LEVEL TRAVEL SPEED: 0 0 0, 0-75.0 IPW
- 3rd LEVEL TRAVEL SPEED: 0 0 0, 0-75.0 IPW
- 4th LEVEL TRAVEL SPEED: 0 0 0, 0-75.0 IPW

ARC VOLTAGE RESPONSE: 0 0 5, 5.0-25.0 VOLTS

BACKGROUND ARC VOLTS: 0 7 7, 0.0-25.0 VOLTS

SYSTEM MODE: 0 7 7, 0.0-25.0 VOLTS

Other Controls:

- ALPINE (Analog Meter)
- Manual (Analog Meter)
- PERIOD MODE (Analog Meter)
- POWER ON (Analog Meter)
- IMPEDANCE STOP (Analog Meter)
- LOW PULSE FREQUENCY (Analog Meter)
- LOW PULSE WIDTH (Analog Meter)
- LOW PULSE FREQUENCY (Analog Meter)
- LOW PULSE WIDTH (Analog Meter)
- OSCILLATOR AMPL (Analog Meter)
- START DELAY (Analog Meter)
- PRIMARY WIRE SPEED (Analog Meter)
- BACKGROUND WIRE SPEED (Analog Meter)
- TRAVEL START DELAY (Analog Meter)
- TRAVEL SPEED (Analog Meter)
- ARC VOLTAGE RESPONSE (Analog Meter)
- BACKGROUND ARC VOLTS (Analog Meter)
- SYSTEM MODE (Analog Meter)

WELD JOINT DESIGN/FIT UP

☐ ROOT ☒ FILL PASS NO. 326 ☐ CAP

RECOMMENDED WELD HEAD SET UP:

GAS CUP	9	WIRE BLOCK	2	
TORCH HEAD	2		TORCH SIDE TILT	2
ACTUAL TRAVEL SPEED				IPM

NOTES: Maximum temperature 200° F

* INDICATE START, DIRECTION, AND LEVEL CHANGES. WELDED BY:

THE GREAT ATLANTIC AND PACIFIC PIPE WELDING & CONSTRUCTION COMPANY, INC.

60 Braemar Drive • P.O. Box 16857 • Salt Lake City, Utah 84115 • (801) 487-0731



Ref. W.P.S. No. 0/5 P/B

Pipe Diameter: 24" O/S

Wall Thickness: 1.312

Filler Material: E705-5

Dia. .035

Sheet 101029 Of

WELDING TECHNIQUE SHEET

RECOMMENDED PROGRAM:

GOLD TRACK II

ALARM	TIME Manual	1st LEVEL WELD PERIOD	2nd LEVEL WELD PERIOD	3rd LEVEL WELD PERIOD	4th LEVEL WELD PERIOD
		0 1 5 0-999 SEC	0 0 0 0-999 SEC	0 0 0 0-999 SEC	0 0 0 0-999 SEC
OFF P.A. SYNC PULSE	EMERGENCY STOP	1st LEVEL WELD CURRENT	2nd LEVEL WELD CURRENT	3rd LEVEL WELD CURRENT	4th LEVEL WELD CURRENT
		2 7 0 0-300 AMPS	0 0 0 0-300 AMPS	0 0 0 0-300 AMPS	0 0 0 0-300 AMPS
LOW PULSE FREQ	LOW PULSE WIDTH	CURRENT UPSLOPE TIME	BACKGROUND CURRENT	CURRENT DOWNSLOPE TIME	
0 0 0-4.5 P.P.S.	0 0 0-99%	0 3 0-30 SEC	1 9 0 0-300 AMPS	1 5 0-30 SEC	
MAN. PREPULSE 2.3	OUT DWELL	EXCURSION TIME	IN DWELL	OSCILLATOR AMP	
	5 0-3 SEC	4 0-3 SEC	6 0-3 SEC	1 2 0-30 INCHES	
FIGURE MODE	TRAVEL START DELAY	1st LEVEL TRAVEL SPEED	2nd LEVEL TRAVEL SPEED	3rd LEVEL TRAVEL SPEED	4th LEVEL TRAVEL SPEED
	0 1 0-30 SEC	0 3 2 0-75.8 IPM	0 0 0 0-75.8 IPM	0 0 0 0-75.8 IPM	0 0 0 0-75.8 IPM
	ARC VOLTAGE RESPONSE	PRIMARY ARC VOLTS	LOCK	SAMPLE	BACKGROUND ARC VOLTS
	0 9 8 0-25.0 VOLTS			0 7 9 0-75.8 VOLTS	0 0 0 0-75.8 VOLTS

Reheated after lunch break to <150° F



WELD JOINT DESIGN/FIT UP

☐ ROOT ☒ FILL PASS NO. 7 & 8 ☐ CAP

RECOMMENDED WELD HEAD SET UP:
 GAS CUP 8 WIRE BLOCK 4
 TORCH LEAD 4 TORCH SIDE TILT 72
 ACTUAL TRAVEL SPEED IPM

NOTES:

* INDICATE START, DIRECTION, AND LEVEL CHANGES. WELDED BY:

Sheet Of

CAF 9161

st. A	976	06U0	DD Boyle	06U9	WR Morrison	14U7
		06U0	HE Flora/AE Chiarlone	06U9	MP Hanson	Field
		06U0	GM Aggawal/JR Jennings	05U7	JF Vought	Field
		06U0	RA Mabry/LL Tipton	05U9	RR Thomas	Field
		06U4	DE Mc Caig	02U0	RJ Phelps	Field
		06U5	EH Case, II	02U1	JR Whitaker	Field
		06U5	JR Dmytryk	12U4	JF Wilson	Boston
		06U6	WC Stevenson/RE Keane	12U6	Serial File	06U1
		06U7	DE Mc Garrigan	14U7	DA Fertig	06U1

DC LAMBERT - Site

Mr. J. DeVincentis, Project Manager
Yankee Atomic Electric Company
1671 Worcester Road
P.O. Box 930
Framingham, Massachusetts 01701

March 26, 1981
SBU- 43465
File: 9.1.5
Category: REPT
Ref: SB-10898
SB-11031
SB-42515

No Response Required

Listed in Seabrook CDR computer
file as 81-00-02

Dear Mr. DeVincentis:

Public Service Company of New Hampshire
Seabrook Station - Units 1 and 2
Potentially Reportable 10CFR50.55(e) Deficiency
Final Report on Homer Shankland NDE Problem

The purpose of this letter is to provide a final report on the Homer Shankland NDE problem including the results of investigations conducted independently by Dravo and UE&C as referenced in the following:

1. Dravo letter Molvie to Case dated 1/26/81
2. UE&C memo Werner to McGarrigan dated 3/3/81
3. UE&C memo Werner to McGarrigan dated 3/23/81
4. Dravo letter Molvie to Case dated 3/3/81

This condition was initially detected by our Vendor Surveillance Representative Mr. E. Lucas on December 30, 1980 when Dravo inspector Mr. H. Shankland was observed performing magnetic particle inspection using an improper technique. VNR-06944 was consequently issued and Dravo responded by re-examining Mr. Shankland's work for the day in question and five additional spool pieces fabricated earlier. Results of this re-examination, as reported in Reference 1, revealed a base metal linear indication on an ASME III Class 3 piping subassembly which does not require magnetic particle testing of base metal adjacent to welds. Evaluation of the indication showed that it was not significant and, in fact, was representative of the type of surface indications typically found on A106 piping material. It was concluded that this was not a rejectable defect, however, it indicated that perhaps additional re-examination of this individual's work should be performed. You notified the NRC on Monday, January 26, 1981 of this potential significant deficiency and sent an Interim Report on February 23, 1981.

Mr. J. DeVincentis
Project Manager

-2-

March 26, 1981

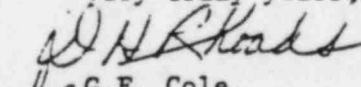
A program was then instituted to re-examine any work performed by this inspector which was available in Dravo's shop or in the shipping yard. As reported in Reference (1), seventy-six (76) fabricated piping subassemblies (54 of which were Seabrooks) were re-examined. This expanded investigation showed seven base metal indications similar to the first and seven lack of fusion indications in a weld used to join a backing ring. Based on the results of this initial re-examination program, Dravo concluded (Reference 1) that, (1) although some examinations performed by Mr. Shankland have not been performed in strict accordance with their procedures and (2) although some indications found were greater than the acceptance standards would permit, none of the indications were the result of serious defects in the welds or base material and it was their opinion that, if the defects had not been removed, they would not have affected the safety or reliability of the fabrication. This was reported by Dravo to NRC also on January 26, 1981 as a potential 10CFR Part 21 incident with the same conclusion.

Although UE&C followed this initial investigation very closely and generally agreed with Dravo's initial conclusion, it was UE&C's opinion that these findings warranted further investigation by UE&C at the Seabrook site to reinforce or refute Dravo's conclusion based on their own re-examination program.

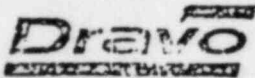
UE&C proceeded with our own re-examination program, which was performed by Pullman-Higgins certified NDE personnel during the period 2/9/81 through 2/23/81, under the auspices of UE&C NDE examiners D. Reinert and J. Werner. Results of this re-examination program, as delineated in Reference (2), revealed a total of sixteen (16) indications of which fifteen (15) were surface base metal linear indications and one (1) weld crater. These defects were identified on UE&C NCR-860. Re-examination and removal of reported indications was then performed during the period 3/12/81 to 3/17/81. Reference (3) reports the results and substantiates the fact that the indications, as witnessed during removal, were shallow in depth and considered to be non-relevant indications.

Concurrent with UE&C's own re-examination program at the site, Dravo expanded their own re-examination program to a much larger population (see Reference 4). The results of both UE&C's and Dravo's re-examinations, as reported in References (3) and (4) are mutually reinforcing in their respective conclusions. Considering the type, size and location of the indications detected to date, we can see no need to continue any additional re-examination of the work performed by Mr. Shankland. Further effort of this nature would only serve to further substantiate the conclusions expressed by Dravo and UE&C. Based on the results of this investigation, UE&C concluded that the improper NDE has caused no deficiency in the design or installation at Seabrook and that this condition is not a reportable 10CFR50.55(e) deficiency.

Very truly yours,


G.F. Cole
Project Manager

GFC/RCL/Ed
attachment



Reference (1)
Attachment to SBU- 43465

CC: DHC

JTF

GFC

WR Morrison (1407)

RCL Smith (1404)

DEMOLING

EHC (3 copies)

Paul Janket (1404)

January 26, 1981

United Engineers and Constructors
30 South 17th. Street
Philadelphia, PA 19101

FEB 3 '81 E.H. Case

FEB 3 '81 J.A. VILMER

Attention: Mr. E. H. Case

Subject: Inspection Problem Report (E2936 thru E2939, E2954 and E3098)

Gentlemen:

You will find attached a report of an inspector performing a magnetic particle examination not in accordance with the Dravo procedure. The report contains the re-examinations of this individual's work conducted by Dravo and the results of these re-examinations.

In addition, the report states certain conclusions and in-house corrective action which Dravo proposes.

This report is being sent to you for your information so that you can take what action you deem necessary. Note that in the re-examination program undertaken by Dravo, none of the rejectable indications were caused by major defects, which in our opinion, could cause a safety hazard.

We are also enclosing a copy of our letter informing the NRC of this incident.

Very truly yours,

DRAVO CORPORATION
Pipe Fabrication Division

W. A. Molvie

W. A. Molvie
Manager - Quality Assurance &
Technical Services

WAM/blw

Attachments

REPORT OF HOMER SHANKLAND
INSPECTION PROBLEM
JANUARY 23, 1981

1. PROBLEM

On December 30, 1980, Homer Shankland was found to be conducting a mag particle examination of a weld using a technique not in accordance with Dravo Procedure. The Dravo Procedure called for the area of interest to be covered in two directions 90 degrees apart where as he was examining in one direction only.

This inspector has been employed by Dravo as an inspector for approximately 24 years, has been an inspector through our Navy Nuclear Program and through all our commercial nuclear program. In the performance of his work he has been under observation by our customer inspectors, by our ANI and by our Level III Examiner in the normal course of performing their duties. (Our ANI witnessed hold points on October 13, 1980, and December 16, 1980, at which time Shankland was observed properly performing mag particle examinations). We have had no previous complaints as to his ability to perform as a qualified inspector and we therefore conclude that he is a knowledgeable individual with respect to the Code and with respect to our Nondestructive Testing Procedures. His failure to follow the procedure was not caused by his lack of understanding of the procedure.

2. INVESTIGATION

As soon as the problem described above was made known to Dravo, the Chief Inspector proceeded immediately to re-examine all of the work performed by this inspector on that day. Further work consisted of approximately 54 operations on 19 fabricated assemblies. Approximately half of these operations were magnetic particle examinations and half were dye penetrant examinations. These examinations were conducted by other members of Dravo's Inspection Department and some of these examinations were witnessed by the customer's inspector who had discovered this problem. There were no rejectable indications found in any of this work. There was no evidence that he was performing dye penetrant examinations in an improper manner. However, dye penetrant examinations were included in the re-examination to forestall questions concerning this inspector's actions in other NDE methods.

In addition, five (5) assemblies were brought in from the shipping yard so that re-examination could be performed on work done by this inspector several weeks or months prior to the incident. On one (1) of these five (5) assemblies, a linear indication was found in base material perpendicular to a weld. Class 3 assemblies do not require mag particle testing of base material adjacent to the welds and we do not consider this a rejectable defect. However, it indicated that perhaps additional examination of this individual's work should be done.

INVESTIGATION (CONT.)

A program was then instituted to re-examine any work performed by this inspector which was available in the shop or in the shipping yard to the extent that between 50 or 60 assemblies would be examined. Over the next two weeks, 76 fabricated assemblies on which this individual had performed examinations were brought into the shop and re-examinations were performed. In this group, there were three (3) Class 1 assemblies, 13 Class 2 assemblies, 38 Class 3 assemblies and 22 assemblies which were Class B31.1 Critical. All of these assemblies required mag particle or dye penetrant examination to some extent. On these 76, assemblies there were 197 operations performed as tabulated below:

<u>ITEMS RECHECKED</u>	<u>MT</u>	<u>DP</u>
Butt welds 2"	2	
Butt welds 3"	7	4
Butt welds 4"	13	
Butt welds 6"	15	
Butt welds 8"	14	1
Butt welds 10"	5	1
Butt welds 12"	1	2
Butt welds 16"	8	1
Butt welds 24"	10	
Total	75	9
 Bevels 6"	 3	
Bevels 8"	2	
Bevels 10"	2	2
Bevels 14"	2	
Bevels 16"	8	
Bevels 24"	9	
Total	26	2
 Bosses 3/4"	 3	 4
Bosses 1"	4	
Bosses 1 1/2"	17	
Bosses 2"	1	
Bosses 3"	1	
Bosses 4"	3	
Bosses 8"	1	
Bosses 10"	1	0
Total	31	4

INVESTIGATION (CONT.)

Code Plates	7	10
Rings 16"	5	
Rings 24"	7	
Total	12	
Buildups	10	
Ground Areas	1	2
Fillet Welds	8	

These examinations had been performed by the inspector over a period of several months but do not represent all of the work that he did in that period of time.

RESULTS OF INVESTIGATION

The results of the re-examinations described above are as follows:

A. INDICATIONS IN WELDS:

The only indications found in welds occurred in the split type backing rings that were welded across the ring to make a solid ring. Linear indications were found in seven (7) of the rings tested. Since it is not a Code requirement that these rings be welded and since the backing ring is not a pressure retaining part, we have concluded that the indication in these backing ring welds are not Code violations. Note that the construction was B31.1 Critical and not ASME III.

B. INDICATIONS IN BASE MATERIAL:

There were four (4) linear indications (2", 3/4", 3/4" and 1/4" long) in four (4) carbon steel Class 3 fabrications. The Code does not require examination of base material adjacent to welds. These are not considered rejectable indications. The 2" long indication has since been removed by grinding approximately .005" from the surface of the pipe. From the appearance of the other surface imperfections, they also are not material defects as defined in the applicable material specification.

- There were three (3) linear indications in three (3) stainless Class 1 and Class 2 fabrications, with length of 1/16" or less. The Code of record considers all linear indications as rejectable. However, since 1977, ASME III considers only indications with a major dimension greater than 1/16" to be relevant. Thus, in 1974 these indications were rejectable but today they would be accepted.

RESULTS OF INVESTIGATION (CONT.)

- C. We have been holding the shipment of an order of stainless fabrication since the first week in January 1981, until we were able to determine the magnitude of our inspection problem. Because of an urgent delivery requirement and in order to provide some assurance that the inspections made by Shankland in these assemblies were acceptable, we elected to re-examine one (1) assembly. This re-examination showed several unacceptable linear indications on the surface of full penetration welds attaching 1" thick plate supports to the pressure boundary. Additional penetrant examinations of these structural welds in other assemblies revealed some rejectable indications. We now propose to re-examine all of the welds previously examined by H. Shankland on this order prior to shipment and eliminate rejectable indications. There were no indications in the girth welds in these assemblies. This program is not complete as of this writing.
- D. Also on January 21, 1981, because of our urgent shipment requirement, we re-examined H. Shankland's work in three (3) Class 1 carbon steel assemblies. Some unacceptable indications were found in base material on two (2) of these assemblies where fitting lugs had been removed.

CONCLUSIONS:

1. Some examinations performed by H. Shankland have not been done in strict accordance with our procedures and/or the results of these examinations have not been properly evaluated over an unknown period of time.
2. Although some indications found were greater than the acceptance standards would permit, none of the indications were the result of serious defects in the welds or base material and it is our opinion that, if the defects had not been removed, they would not have affected the safety or reliability of the fabrication.
3. This problem did not occur as a result of lack of knowledge of the procedure or acceptance standards as this inspector has been observed by our customer inspectors, our ANI and our Chief Inspector performing both dye penetrant and magnetic particle in a proper manner.
4. There is no reason to suspect that the Dravo training program, qualification program or supervision was deficient or in any way contributed to this problem.

DRAVO ACTION

The following action shall be taken by Dravo:

1. Since Homer Shankland has quit, his personnel file should reflect this fact and his name removed from our Qualified Inspectors List.
2. Provisions should be included in our inspection procedures to require the Chief Inspector (SNT-TC-1A - Level III) to monitor the work of each Dravo inspector on a weekly basis. Records shall be maintained to attest to this surveillance.
3. Any dye penetrant or mag particle examinations on Class 1 fabrications performed by H. Shankland on accessible surfaces be re-done prior to shipment of these fabrication from our shop.
4. This report be sent to customers for whom we fabricated nuclear piping in the past six (6) months for their information.