2. To: (Receiving Organization) SST Retrieval Engineering		3. From: (Originating Organization) SST Retrieval Engineer		4. Related EDT No.: 610590	
5. Proj./Prog./Dept./Div.: W-320		6. Design Authority/ Design Agent/Cog. Engr.: J.W. Bailey/J.R. Bellomy		7. Purchase Order No.: N/A	
8. Originator Remarks: Supporting Document Approval and Initial Release				9. Equip./Component No.: C Farm Electrical Cathodic Protection	
				10. System/Bldg./Facility: 200 E Area, Tank 241-C-106	
11. Receiver Remarks: 11A. Design Baseline Document? [X] Yes [] No				12. Major Assm. Dwg. No.: H-2-818705, sht 1 H-2-818705, sht 2	
				13. Permit/Permit Application No.: N/A	
				14. Required Response Date: N/A	

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Designator	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	HNF-SD-W320-ATR-003	ALL	0	Cathodic Protection - Rectifier 47	SQ	1	N/A	N/A

16. KEY						
Approval Designator (F)		Reason for Transmittal (G)			Disposition (H) & (I)	
E, S, Q, D or N/A (see WHC-CM-3-5, Sec. 12.7)		1. Approval	4. Review	1. Approved	4. Reviewed no/comment	
		2. Release	5. Post-Review	2. Approved w/comment	5. Reviewed w/comment	
		3. Information	6. Dist. (Receipt Acknow. Required)	3. Disapproved w/comment	6. Receipt acknowledged	

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)											
(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
1	1	Design Authority	<i>J.W. Bailey</i>	2/20/97	52-48	3	1	G.A. Symons	<i>G.A. Symons</i>	2/20/97	52-48
1	1	Design Agent	<i>J.R. Bellomy</i>	2/20/97	52-47	3	1	K.B. Ferlan	<i>K.B. Ferlan</i>	2/20/97	52-48
1	1	Cog. Eng.	<i>J.R. Bellomy</i>	2/20/97	52-48	3	1	Project Files	<i>J.R. Bellomy</i>	2/20/97	52-48
1	1	Cog. Mgr	<i>J.R. Bellomy</i>	2/20/97	52-48	3		Central Files	<i>J.R. Bellomy</i>	2/20/97	52-48
1	1	QA	<i>J.R. Bellomy</i>	2/20/97	52-48						
1	1	Safety	<i>J.R. Bellomy</i>	2/20/97	52-48						
		Env.									

18. Signature of EDT Originator <i>G.A. Symons</i> 2/20/97		19. N/A Authorized Representative Date for Receiving Organization		20. J.W. Bailey Design Authority/Cognizant Manager 2/20/97		21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments	
---	--	--	--	---	--	--	--

Cathodic Protection- Rectifier 47

G.A. Symons
SGN Eurisys Services Corporation, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

EDT/ECN: 610590 UC: 510
Org Code: 08E00 Charge Code: D2MP6
B&R Code: EW3130010 Total Pages: 24

Key Words: Project W-320, Cathodic Protection, Rectifier

Abstract: Project W-320 Acceptance Test Report for Cathodic Protection
- Rectifier 47, C-Farm Electrical

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Jamie Bishop
Release Approval

2-21-97
Date

Release Stamp

Approved for Public Release

ACCEPTANCE TEST PROCEDURE WHC-SD-W320-ATP-003 (ref. memorandum)
 TEST TITLE Cathodic Protection - Rectifier 47
 LOCATION 200-E Area, Tank 241-C-106
 PROJECT NUMBER W-320 WORK ORDER ER4319
 PROJECT TITLE Tank 241-C-106 Sluicing

Prepared By
 ICF Kaiser Hanford Company
 Richland, Washington

For the U.S. Department of Energy
 Contract DE-AC06-93RL12359

PROCEDURE APPROVAL

ICF KAISER HANFORD COMPANY (ICF KH)

4/14/95
JE Breed
4/14/95
 Originator *Christopher M. [unclear] for C. Matzo* 9/26/94 Technical Documents 9-26-94
 Date Date Date Date
4/14/95
 Checker *C. Dublett* 9/26/94 Safety 11-6-94
 Date Date Date Date
RF M. [unclear] *RF M. 4/17/95*
 Environmental *RF M. [unclear]* 11/4/94 Quality Engineering 11-3-94
 Date Date Date Date
4/10/95
 Project Management *[unclear]* 11/11/94
 Date Date

Westinghouse Hanford Company (WHC)

4/18/95
 Projects Department *William M. Lane* 4/18/95 Quality Assurance 4-18-95
 Date Date Date Date
4/27/95
 Safety *[unclear]* 4/27/95 Operations 4-19-95
 Date Date Date Date

EXECUTION AND TEST APPROVAL

EXECUTED BY W. Whitman

W. Whitman / FDNW
Test Director/Organization

1/30/97
Date

William H. Cawley / FDNW 1-31-97
Test Operator/Organization Date

Harold Smiley / FDNW
Recorder/Organization

1/30/97
Date

WITNESSES

NA
Witness/Organization

1/30/97 Harold Smiley
Date Title III Inspector

1/30/97
Date

NA
Witness/Organization

NA
Date Witness/Organization

NA
Date

A-E APPROVAL

ICF Kaiser Hanford Company (ICF KH)

Without exceptions

With exceptions resolved X

With exceptions outstanding

Karl F. Ferguson
Acceptance Inspection

1/31/97
Date

Thomas
Design Engineer 1/30/97
Date

Kenny S. Allen
Project Manager

1/30/97
Date

TEST APPROVAL AND ACCEPTANCE

Westinghouse Hanford Company (WHC)

Without exceptions X

With exceptions resolved

With exceptions outstanding

JRB/WHC
Title or Department

2-3-97
Date

R.E. Bane
Title or Department 2/3/97
Date

Harold Smiley
Title or Department

2-3-97
Date

T.D. Penman
Cathodic Protection Engineer 2/3/97
Date

J.J. HUSTON
PROJECT QA. 2-A-97

GW 2/20/97

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NOTE: At completion of test, enter pages added during performance of test to this Table of Contents.

△ ECN W-320-575 2-17-97 K.I.A.

GMS 2/20/97

1 PURPOSE

This Acceptance Test Procedure (ATP) has been prepared to demonstrate that the cathodic protection system functions as required by project criteria.

2 REFERENCES

2.1 DRAWINGS

H-2-818705, Sh 1, Rev 0 Electrical Cathodic Protection Plan

H-2-818705, Sh 2, Rev 0 Electrical Cathodic Protection Details

2.2 SPECIFICATIONS

W-320-C5, Rev 0 Construction Specification (Section 16640)

2.3 ENGINEERING CHANGE NOTICES (ECN)

Prior to final test approval, enter ECNs written against this ATP.

3 RESPONSIBILITIES

3.1 GENERAL

Each company or organization participating in this ATP will designate personnel to assume the responsibilities and duties as defined herein for their respective roles. The designees shall become familiar with this ATP and the systems involved to the extent that they can perform their assigned duties.

3.2 WHC PROJECT ENGINEER

3.2.1 Designates a Test Director.

3.2.2 Coordinates testing with the Facility Manager.

3.2.3 Acts as liaison between the participants in acceptance testing.

3.2.4 Distributes the approved testing schedule before start of testing.

3.2.5 Schedules and conducts a pretest kickoff meeting with test participants when necessary.

3.2.6 Notifies the persons performing and witnessing the test 2 days before the start of testing.

3.2.7 Schedules a dry run when necessary.

3.2.8 Notifies concerned parties when a change is made in the testing schedule.

3.2.9 Signs Execution and Test Approval page when test is approved and accepted.

- 3.2.10 Takes necessary action to clear exceptions to the test.
- 3.2.11 Signs Exception Form when exception has been resolved.
- 3.2.12 Provides a distribution list for the approved and accepted ATP(ATR).

3.3 TEST DIRECTOR

- 3.3.1 Coordinates and directs acceptance testing.
- 3.3.2 Confirms that field testing and inspection of the system or portion of the system to be tested has been completed.
- 3.3.3 Stops any test which, in his or her judgment, may cause damage to the system until the problem has been resolved.
- 3.3.4 After verifying there is no adverse impact, may alter the sequence in which systems or subsystems are tested.
- 3.3.5 Ensures that required environmental conditions are maintained.
- 3.3.6 If a test is to be suspended for a period of time, ensures that the system is left in a safe mode.
- 3.3.7 Before restarting suspended test, re verifies the test prerequisites.
- 3.3.8 Initiates ECNs to document required changes to the ATP.
- 3.3.9 Reviews recorded data, discrepancies, and exceptions.
- 3.3.10 Obtains information or changes necessary to clear or resolve objections during the performance of the test.
- 3.3.11 Signs Execution and Test Approval page when test has been performed.
- 3.3.12 Signs Exception Form when exception has been resolved.
- 3.3.13 Obtains required signatures on the ATP Master prior to reproduction and distribution.

3.4 WITNESSES (Provided by Participating Organizations. One witness shall be a Title III acceptance inspector.)

- 3.4.1 Witness the tests.
- 3.4.2 Review results of testing.
- 3.4.3 Assist the Test Director when requested.
- 3.4.4 Sign Execution and Test Approval page when test has been performed.
- 3.4.5 Sign Exception Form when exception has been resolved.

3.5 RECORDER (Provided by ICF KH)

- 3.5.1 Prepares a Field copy from the ATP Master.
- 3.5.2 Records names of all designated personnel on Field copy of ATP prior to start of testing.
- 3.5.3 Records test instrument identification numbers and calibration expiration dates.
- 3.5.4 Initials and dates every test step on the Field copy as it is completed next to the step number or on a data sheet, when provided. Records test data. On data sheets where there is not room for both the initial and date, date may be entered at bottom of column.
- 3.5.5 Records objections and exceptions on an Exception form. Uses additional Exception forms as needed. Notifies the Test Director at time the objection is made.
- 3.5.6 Signs Execution and Test Approval page when test has been performed.
- 3.5.7 After test is finished, assigns alpha numeric page numbers to added data sheets and Exception forms. Records page numbers in the Table of Contents.
- 3.5.8 Transfers Field copy entries for each step to the Master in ink or type, signs, and dates. Transmits the completed Master to the Test Director for approval signature routing. Transmits the Field copy to Construction Document Control for inclusion in the official project file.
- 3.5.9 Signs Exception Form when exception has been resolved and transmits to Test Director.

3.6 TEST OPERATOR

- 3.6.1 Performs test under direction of the Test Director.
- 3.6.2 Provides labor, equipment, and test instruments required for performing tests which have not been designated as being provided by others.
- 3.6.3 Requests in writing from the Test Director those services, materials, or equipment that have been designated as being supplied by others.
- 3.6.4 Confirms that all equipment required for performing test will be available at the start of testing.
- 3.6.5 Signs the Execution and Test Approval page.

3.7 DESIGN ENGINEER ACCEPTANCE INSPECTION

- 3.7.1 Evaluate results.
- 3.7.2 Sign for A-E Approval on Execution and Test Approval page.

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4 CHANGE CONTROL

Required changes to this ATP must be processed on ECNs in accordance with company procedures. If a need for change is discovered in the course of running the test, the affected section of the test shall be stopped until the ECN is approved. However, other sections may be tested per direction from the test director.

5 EXECUTION

5.1 OCCUPATIONAL SAFETY AND HEALTH

Individuals shall carry out their assigned work in a safe manner to protect themselves and others from undue hazards and to prevent damage to property and environment. Facility line managers shall assure the safety of activities within their areas to prevent injury, property damage, or interruption of operation. Performance of test activities shall always include safety and health aspects.

5.2 PERFORMANCE

5.2.1 Conduct testing in accordance with ICF KH Procedure CON 3.5 (Performance and Recording of Acceptance Test Procedures).

5.2.2 Perform test following the steps and requirements of this procedure.

6 EXCEPTIONS

6.1 GENERAL

Exceptions to the required test results are sequentially numbered and recorded on individual Exception forms. This enables case-by-case resolution and approval of each exception.

Errors/exceptions in the ATP itself shall NOT be processed as test exceptions (see Section 4 CHANGE CONTROL).

6.2 RECORDING

6.2.1 Number each exception sequentially as it occurs and record it on an Exception Form (KEH-428), sample appended.

6.2.2 Enter name and organization of objecting party for each exception.

6.2.3 Enter planned action to resolve each exception when such determination is made.

6.3 RETEST/RESOLUTION

Record the action taken to resolve each exception. Action taken may not be the same as planned action.

6.3.1 When action taken results in an acceptable retest, sign and date Retest Execution and Acceptance section of the Exception Form.

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6.3.2 When action taken does not involve an acceptable retest, strike out the Retest Execution and Acceptance section of the Exception Form.

6.4 APPROVAL AND ACCEPTANCE

WHC provides final approval and acceptance of exceptions by checking one of the following on Exception Form:

6.4.1 Retest Approved and Accepted: Applicable when Retest Execution and Acceptance section is completed.

6.4.2 Exception Accepted-As-Is: Requires detailed explanation.

6.4.3 Other: Requires detailed explanation.

WHC signs and dates the Exception Form and obtains other WHC internal approvals, if required.

6.5 DISTRIBUTION

A copy of the approved Exception Form is distributed to each participant. The signed original is attached to the ATP Master.

7 PREREQUISITES, EQUIPMENT/INSTRUMENTS, AND ABBREVIATIONS

7.1 PREREQUISITES

The following conditions shall exist at start of testing for that portion of the system being tested.

7.1.1 Buried piping, associated with this project, in Tank Farm 241-C and the cathodic protection system have been inspected for compliance with construction documents.

7.1.2 Reference documents (including this ATP) have been verified for correct revision number and outstanding ECNs.

7.1.3 A Prejob Safety Analysis has been prepared and a Prejob Safety Meeting has been conducted.

7.1.4 Test instruments (except Waveform Analyzer) have a valid calibration stamp attached. Test instrument identification numbers and calibration expiration dates have been recorded in Para 7.2.

7.2 EQUIPMENT/INSTRUMENTS

Supplied by Test Operator unless otherwise noted. {Delete items not required. Add any additional necessary items.}

7.2.1 Voltohmmeter (VOM): Digital, portable, 0-150 V ac/dc.

Instrument No. 450-45-08-027 Expiration Date 4-30-97

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- 7.2.2 Waveform Analyzer: Hand held instrument with display of ON-OFF pipe-to-soil potential, DC potential or AC potential, MCMiller Co, Model WFA-1.
- 7.2.3 Test leads with insulated covers for wire clips.
- 7.2.4 Portable test reel, containing a minimum of 200 feet of test wire, 600 V, No. 18 AWG minimum.
- 7.2.5 Portable copper-copper sulphate reference electrode.
- 7.2.6 Pipe locator.

7.3 ABBREVIATIONS

ECN Engineering Change Notice

- 8.1 The following steps will verify (1) rectifier nameplate data, (2) rectifier input wiring is correctly terminated and color coded, and (3) anode feeder cable, anode loop cable, and negative return cables are properly labeled and connected.

CH 10-2-96 8.1.1 Record nameplate data for Rectifier 47.

Make	<u>Universal Rectifier</u>
Model	<u>OAB</u>
Serial Number	<u>960193</u>
AC Line Input Voltage	<u>115V</u>
AC Line Frequency	<u>60 Hz</u>
Number of Phases	<u>1</u>
DC Output Voltage	<u>24V.</u>
DC Output Current	<u>12 a.</u>

- 8.1.2 Verify the following on rectifier.

CH 10-2-96 8.1.2.1 Tank gasket is not damaged and is in place.

CH 10-2-96 8.1.2.2 There are no loose electrical connections or frayed wires.

10/3/96 8.1.2.3 There are no oil leaks.

CH 10-2-96 8.1.3 Open the disconnect switch that supplies ac input power to Rectifier 47.

CH 10-2-96 8.1.4 Verify that rectifier input circuit breaker is OPEN.

CH 10-2-96 8.1.5 Verify no dc voltage at rectifier output terminals.

10/1/96 8.1.6 Verify the rectifier case is filled with oil to the indicated level and that oil is CLEAR.

- 8.1.7 Verify the ac wiring from the disconnect switch is terminated on the ac input terminals of rectifier.

CH 10-2-96 8.1.7.1 Line 1 (Red or Black).

CH 10-2-96 8.1.7.2 Neutral (White or Gray)

CH 10-2-96 8.1.7.3 Ground (Green)

- 8.1.8 Verify the rectifier output cables are properly labeled.

CH 10-2-96 8.1.8.1 (+) FR47 (Anode Feeder Cable).

Replaced pages 11 - 23 with
these per ECN W320-136

- Ch 10-2-83 8.1.8.2 (+) LR47 (Anode Loop Cable).
Ch 10-2-96 8.1.8.3 (-) R47, (-) R47 (Negative Return Cables).

8.1.9 Verify the anode feeder and anode loop cables are terminated at the rectifier positive terminals.

Ch 10-2-96 8.1.9.1 (+) FR47 (Anode Feeder Cable).

Ch 10-2-96 8.1.9.2 (+) LR47 (Anode Loop Cable).

Ch 10-2-96 8.1.10 Verify the negative return cables (-) R47 and (-) R47 are connected to rectifier negative terminal.

Ch 10-2-96 8.1.11 Verify the rectifier case is connected to the ground rod.

NOTE: The steps shown in Paragraphs 8.2 and 8.3 may be done concurrently.

8.2 The following steps will verify pipe test conductors are (1) terminated on designated terminals in accordance with the Drawings and (2) labeled correctly with the pipe number or reference electrode. Record terminal number to which each conductor is connected.

Ch 10-2-96 8.2.1 Test Station T(47-1)

4-inch SN-200-M9 Terminals 3 and 4
w/6-inch ENC-M26a

4-inch SL-100-M9 Terminals 1 and 2
w/6-inch ENC-M26a

Reference Electrode Terminal 5

Ch 10-2-96 8.2.2 Test Station T(47-2)
Exception # 1

4-inch SN-200-M9 Terminals 3 and 4
w/6-inch ENC-M26a

4-inch SL-100-M9 Terminals 1 and 2
w/6-inch ENC-M26a

1-inch IA(100#)-701-M7 Terminals 7 and 8 1/2 1/4 1/4

1-inch RAW-601-M5 Terminals 5 and 6 1/2 1/4 1/4

Reference Electrode Terminal 5

Ch 10-2-96 8.2.3 Test Station T(47-3)

4-inch SL-100-M9 Terminals 1 and 2
w/6-inch ENC-M26a

Reference Electrode Terminal 5

8.2.4 Test Station T(47-4)

Ch
10-2-96
EXP #1

3-inch DR-301-M9
w/6-inch ENC-M26a

Terminals 1 and 2

3-inch DR-302-M9
w/6-inch ENC-M26a

Terminals 3 and 4

4-inch SN-200-M9
w/6-inch ENC-M26a

Terminals 6 and 7

~~2-inch M5-
w/4-inch ENC~~ <sup>DELETED
ECN 553
11/14/96</sup>

Terminals and

Reference Electrode

Terminal 548

8.3 Using a VOM, measure and record resistance between each set of pipe test conductors that are identified as being connected to the same pipe. Resistance measured shall be less than 1 ohm.

Ch
10-2-96

8.3.1 Record the following VOM data:

11/20/96

Manufacturer

FLUKE

Fluke

Model

23

8024B

Serial Number

954.45.08.005

953-65-08-012

Calibration Sticker Data

5/28/97

1-22-97

Ch
10-2-96

8.3.2 Test Station T(47-1)

4-inch SN-200-M9 w/6-inch ENC-M26a

.3 ohms

4-inch SL-100-M9 w/6-inch ENC-M26a

.3 ohms

Ch
10-2-96

8.3.3

Test Station T(47-2)

4-inch SN-200-M9 w/6-inch ENC-M26a

.2 ohms

4-inch SL-100-M9 w/6-inch ENC-M26a

.2 ohms

1-inch IA(100#)-701-M7

.5 ohms

1-inch RAW-601-M5

.6 ohms

Ch
10-2-96

8.3.4

Test Station T(47-3)

4-inch SL-100-M9 w/6-inch ENC-M26a

.2 ohms

Ch
10-2-96

8.3.5

Test Station T(47-4)

3-inch DR-301-M9 w/6-inch ENC-M26a

.2 ohms

3-inch DR-302-M9 w/6-inch ENC-M26a

.2 ohms

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ECN No.	W-320-136	Page 4 / 11
Ref. To	W320-W320-ATP-003, REV 0	Rev. 0
W320-W320-ATP-003	12/4/93	0
Prep. By	AR SNOWWHITE	Ch 11/20/96

-12-
GMB
12/20/96

4-inch SN-200-M9 w/6-inch ENC-M26a

.2 ohms

~~2-inch M5 w/4-inch ENC~~

~~2-inch M5 w/4-inch ENC~~

~~ohms~~

8.4 The following steps will provide the native potential of each new pipe using both the permanent reference electrode and a portable reference electrode for comparison.

NOTE: Connect the pipe test conductor to the positive terminal of the Wave Form Analyzer and the lead from the permanent or portable reference electrode to the common terminal of the Wave Form Analyzer. Turn the mode switch, on the Wave Form Analyzer, to the DC position. (Place the portable reference electrode directly above the pipe for those tests that require the use of the portable reference electrode).

8.4.1 Test Station T(47-1)

Volts

Permanent Reference Electrode and 4-inch
SL-100-M9 w/6" ENC-M26a

-0.35 ✓

Portable Reference Electrode and 4-inch
SL-100-M9 w/6" ENC-M26a

-0.359 ✓

Permanent Reference Electrode and 4-inch
SN-200-M9 w/6" ENC-M26a

-0.359 ✓

Portable Reference Electrode and 4-inch
SN-200-M9 w/6" ENC-M26a

-0.368 ✓

8.4.2 Test Station T(47-2)

Permanent Reference Electrode and 4-inch
SL-100-M9 w/6" ENC-M26a

-0.753 ✓

Portable Reference Electrode and 4-inch
SL-100-M9 w/6" ENC-M26a

-0.735 ✓

Permanent Reference Electrode and 4-inch
SN-200-M9 w/6" ENC-M26a

-0.753 ✓

Portable Reference Electrode and 4-inch
SN-200-M9 w/6" ENC-M26a

-0.810 ✓

Permanent Reference Electrode and 1-inch
IA(100#)-701-M7

-0.995

Portable Reference Electrode and 1-inch
IA(100#)-701-M7

-1.055

Permanent Reference Electrode and 1-inch
RAW-601-M5

-0.593

Portable Reference Electrode and 1-inch
RAW-601-M5

-0.69

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Prop. By	AR SNOWHITE	Chk. By	GA MCN

8.4.3

Ch 10-3-96

Test Station T(47-3)

Permanent Reference Electrode and 4-inch
SL-100-M9 w/6" ENC-M26a

- 0.735 V

Portable Reference Electrode and 4-inch
SL-100-M9 w/6" ENC-M26a

- 0.845 V

8.4.4

Test Station T(47-4)

Permanent Reference Electrode and 3-inch
DR-301-M9 w/6" ENC-M26a

- 0.547 V

Portable Reference Electrode and 3-inch
DR-301-M9 w/6" ENC-M26a

- 0.345 V

Permanent Reference Electrode and 3-inch
DR-302-M9 w/6" ENC-M26a

0.545 V

- 0.335 V

Portable Reference Electrode and 3-inch
DR-302-M9 w/6" ENC-M26a

- 0.545 V 103.8

Permanent Reference Electrode and 4-inch
SN-200-M9 w/6" ENC-M26a

- 0.350 V

- 0.490 V

Portable Reference Electrode and 4-inch
SN-200-M9 w/6" ENC-M26a

- 0.335 V 10-3-96

8.5 The following steps will verify proper operation of Rectifier 47.

8.5.1

Verify Rectifier 47 input circuit breaker is OPEN.

8.5.2

Verify COARSE and FINE transformer taps on rectifier are set at the lowest levels (Coarse - A and Fine - 1).

8.5.3

Close the disconnect switch that supplies ac input power to Rectifier 47.

8.5.4

Verify proper rectifier polarity by use of the VOM. Connect voltmeter positive lead to rectifier positive terminal and voltmeter negative lead to rectifier negative terminal. Close rectifier input circuit breaker and verify a POSITIVE voltage on VOM.

8.5.5

Using the meter on the rectifier, record volts and amperes, and then open input the circuit breaker. Set fine tap to next higher setting and leave coarse tap as previously set. Close input circuit breaker again and record volts and amperes, then open the input circuit breaker. Continue adjusting the output of the rectifier in steps until either the dc volts or dc amperes (whichever is first) approaches, but does not exceed, the nameplate rating of rectifier.

Transformer Taps
Coarse Fine

A

1

dc Output

Volts

Amp

.4

.2

W320003.ECN.354

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Prep. By	AR SNOWHITE	Chk'd.	2/11/12

A	2		<u>2.1</u>	<u>.5</u>
A	3		<u>3.8</u>	<u>.8</u>
A	4		<u>5.6</u>	<u>1.1</u>
A	5		<u>7.3</u>	<u>1.4</u>
B	1		<u>10.8</u>	<u>2.0</u>
B	2		<u>12.5</u>	<u>2.3</u>
B	3		<u>14.2</u>	<u>2.6</u>
B	4		<u>15.9</u>	<u>2.9</u>
B	5		<u>17.7</u>	<u>3.3</u>
C	1		<u>21.2</u>	<u>3.9</u>
C	2		<u>22.9</u>	<u>4.2</u>
C	3		<u>24.7</u>	<u>4.5</u>
C	4		<u>NA</u>	<u>NA</u>
C	5			
D	1			
D	2			
D	3			
D	4			
D	5		<u>NA</u>	<u>NA</u>

SET
IN ACCORDANCE
TO 8.5.5 INSTRUCTIONS

110-3-46 8.5.6 Open the rectifier input circuit breaker.

8.6 The following steps will verify proper operation of the ground bed system.

110-3-46 8.6.1 Verify the Mode switch, on the Wave Form Analyzer, is in the OFF position.

110-3-46 8.6.2 Connect the positive terminal of the Wave Form Analyzer to a protected pipeline test conductor through a portable test reel at various convenient test stations for the following procedure.

110-3-46 8.6.3 Connect common terminal of the Wave Form Analyzer to a portable copper-copper sulfate reference electrode.

110-3-46 8.6.4 Turn the Mode switch, on the Wave Form Analyzer, from the OFF position to the DC position.

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Prep. By	AR SNOWWHITE	Chk. By	WME

1/19/66 8.6.5

Record the following portable reference electrode data:

Manufacturer

mcm Electrode

Model and type

RE-5 Copper / Copper Sulfate

CH 10-296 8.6.6

Close the rectifier input circuit breaker, place the portable reference electrode over each anode location and measure the pipe-to-soil potential using the Wave Form Analyzer. Record the pipe-to-soil potential at each anode location. Values should be more negative than (-) 0.85 V dc (ie, (-)0.86 V dc).

NOTE:

A pipe locator may be used to locate anodes if necessary.

CH 10-346 8.6.7

<u>Anode</u>	<u>Volts</u>	<u>Anode</u>	<u>Volts</u>
A(47-1)	<u>-10.45V</u>	A(47-11)	<u>-2.80V</u>
A(47-2)	<u>-9.73V</u>	A(47-12)	<u>-2.40V</u>
A(47-3)	<u>-10.50V</u>	A(47-13)	<u>-2.35V</u>
A(47-4)	<u>-9.64V</u>	A(47-14)	<u>-2.90V</u>
A(47-5)	<u>-9.16V</u>	A(47-15)	<u>-4.50V</u>
A(47-6)	<u>-8.93V</u>	A(47-16)	<u>-4.28V</u>
A(47-7)	<u>-10.07V</u>	A(47-17)	<u>-3.92V</u>
A(47-8)	<u>-7.57V</u>	A(47-18)	<u>-6.77V</u>
A(47-9)	<u>-10.88V</u>	A(47-19)	<u>-2.53V</u>
A(47-10)	<u>-3.85V</u>		

CH 10-346 8.6.8

Turn the Mode switch, on the Wave Form Analyzer, to the OFF position and disconnect the leads.

CH 10-346 8.6.9

Open the disconnect switch at the rectifier.

8.7 The following steps will verify proper operation of the cathodic protection system:

CH 10-346 8.7.1

Position the 10-position DIP switch on the Pulse Generator (located in the rectifier control panel) as follows: SW1, 2, and 3 in the OFF position and SW4, 5, 6, 7, 8, 9, and 10 in the ON position.

2:30P CH 10-346 8.7.2

Close Rectifier 47 input circuit breaker and the supply disconnect switch and verify the rectifier has been energized for 24 hours prior to the following test.

CH 10-346 8.7.3

Measure and record the ON and OFF pipe-to-soil potential of each protected pipe by use of the Waveform Analyzer. For protected pipe, the OFF values should be equal to or more negative than (-)0.85 V dc

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16-1

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Ref. B. HNF-SD-W320-ATK-003 REV 0	Rev. C
WHC SD W320 ATP 003	P. 19
Prop. By AR SNOWHITE	Chk. By [Signature]

off values should be 100 mV more negative than the OFF values. If these values are not attainable by use of the existing permanent reference electrode a portable reference electrode may be used. For unprotected pipe, there is no criteria and the values will be recorded for record purposes. The unprotected pipes are designated below.

NOTE: Connect positive terminal of the Waveform Analyzer to the reference electrode terminal and the common terminal on the Waveform Analyzer to the pipe test conductor terminal. Turn the Mode switch from the OFF position to the WFA position, record values, then turn to the OFF position.

1 10/1/86 8.7.3.1 Test Station T(47-1)
 ECP #2
 Reference Electrode and 4-inch SN-200-M9 w/6-inch ENC-M26a On + 4.34 Off +1.32

Reference Electrode and 4-inch SL-100-M9 w/6-inch ENC-M26a On + 4.34 Off +1.32

1 12/23/86 8.7.3.2 Test Station T(47-2)
 ECP #2
 ECP #1
 Reference Electrode and 4-inch SN-200-M9 w/6-inch ENC-M26a On + 1.49 Off +1.40

Reference Electrode and 4-inch SL-100-M9 w/6-inch ENC-M26a On +1.33 Off +.42

Reference Electrode and 1-inch IA(100#)-701-M7 (Unprotected Pipe) On + 2.770 Off +1.223

Reference Electrode and 1-inch RAW-601-M5 (Unprotected Pipe) On + 2.766 Off +1.219

1 10/1/86 8.7.3.3 Test Station T(47-3)
 ECP #2
 Reference Electrode and 4-inch SL-100-M9 w/6-inch ENC-M26a On + 3.81 Off +1.42

1 12/1/86 8.7.3.4 Test Station T(47-4)
 ECP #2
 ECP #1
 Reference Electrode and 3-inch DR-301-M9 w/6-inch ENC-M26a On + 4.32 Off +1.53

Reference Electrode and 3-inch DR-302-M9 w/6-inch ENC-M26a On + 4.32 Off +1.53

Reference Electrode and 4-inch SN-200-M9 w/6-inch ENC-M26a On + 3.08 Off +.95

Reference Electrode and 2-inch M5 w/4-inch ENC (Unprotected Pipe) On _____ Off _____

W320003.ECN.354

(17) -
 GWP 12/20/97

ECN No.	W-320-136	Page	9/11
Ref. Date	JAN 50-W320-ATL-003-000	Rev.	0
Prop. By	AR SNOWHITE	Ckd. By	ESL/11/11

- 1⁹/4/66 8.7.3.5 Turn the mode switch on the Waveform Analyzer to the OFF position and disconnect leads.
- 1¹⁹/4/66 8.7.4 Open input circuit breaker on Rectifier 47.
- 1¹⁰/4/66 8.7.5 Testing complete, secure from test.

END OF SECTION 8

W320003.ECN.354

ECN No.	W-320-136	Paga	10/
Ref. SD	W320-ATK-003/004		
	WHCTSD W320-ATK-003	P22	
Prep. By	AR SNOWWHITE	Clid. By	<i>[Signature]</i>

18 -
GMS
2/20/77

EXCEPTION NO.		Project No.		ATP No.		Rev.		
Recorded by			Organization		Date Recorded		ATP Page No.	
Step No.		Requirement						
Description of Problem								
Objector 1 (Name/Organization)				Objector 2 (Name/Organization)				
Planned Action								
Action Taken								
RETEST EXECUTION AND ACCEPTANCE								
Retest Installation Contractor		Date		Recorder		Date		
Witness 1 (Name/Organization)		Date		Witness 2 (Name/Organization)		Date		
Field Engineering		Date		Test Director (Name/Organization)		Date		
Design Engineering (Author of ATP)		Date		A-E Project Engineer		Date		
APPROVAL AND ACCEPTANCE - OPERATING CONTRACTOR								
☐ Retest Approved and Accepted ☐ Exception Accepted - <i>WHC</i> ☐ Other*								
* Explanation								
Approver 1		Date		Approver 2		Date		
Approver 3		Date		Approver 4		Date		

REM-478 (6-05)

W320003.ECN.354

WHF-SD-W320-ATP-003, REV. D

ECN No. W-320-136		Page 11/11	
Ref. WHF-W320-1		Rev. 0	
WHF-SD-W320-ATP-003		P. 23	
Prep. By AR SNOWWHITE		Ckd. By <i>[Signature]</i>	

C-19
2/20/11

EXCEPTION NO. <u>1</u>		Project No. <u>W-32C</u>		ATP No. <u>WHE-SD-W320-ATR-003</u>		Rev. <u>0</u>	
Recorded by <u>E.L. Snyder</u>		Organization <u>FDNW</u>		Date Recorded <u>12/13/96</u>		ATP Page No. <u>11, 12, 13, 17</u>	
Step No. <u>* SEE BELOW</u>		Requirement <u>RECORD INFORMATION AND TEST DATA FOR POINTS AT TEST STATIONS T(47-2) T(47-4)</u>					
Description of Problem <u>T(47-2) IS MISSING 1" IA (100#) - 701-M7 + 1" RAW - 601-M5</u>							
<u>T(47-4) IS MISSING 2" MS W/4" ENC</u>							
<u>T(47-2) IS MISSING 11/13/96</u>							
<u>* 8.2.2, 8.2.4, 8.3.3, 8.3.5, 8.4.2, 8.7.3.2, 8.7.3.4</u>							
Objector 1 (Name/Organization) <u>MIKE RAMOS FDNW</u>				Objector 2 (Name/Organization) <u>E.L. SNYDER FDNW</u>			
Planned Action <u>ECN TO DELETE 2" MS W/4" ENC.</u>							
<u>COMPLETE INSTALLATION AT 1" IA AND 1" RAW AND TEST RE REQ'D</u>							
Action Taken <u>ECN 553 DELETED 2" MS W/4" ENC</u>							
<u>1" IA AND 1" RAW INSTALLED TEST PERFORMED 12/23/96</u>							
RETEST EXECUTION AND ACCEPTANCE							
Retest Installation Contractor <u>William H. Canley</u>		Date <u>1-31-97</u>		Recorder <u>Sheryl Smith FDNW</u>		Date <u>12/23/96</u>	
Witness 1 (Name/Organization) <u>NA</u>		Date <u>NA</u>		Witness 2 (Name/Organization) <u>Sheryl Smith FDNW</u>		Date <u>12/23/96</u>	
Field Engineering <u>[Signature]</u>		Date <u>1/30/97</u> <u>1/9/97</u>		Test Director (Name/Organization) <u>[Signature] FDNW</u>		Date <u>1/30/97</u> <u>1/9/97</u>	
Design Engineering (Author of ATP) <u>[Signature]</u>		Date <u>1/30/97</u> <u>12/31/96</u>		Project Engineer <u>[Signature]</u>		Date <u>1/30/97</u> <u>1/30/97</u>	
APPROVAL AND ACCEPTANCE - OPERATING CONTRACTOR							
☐ Retest Approved and Accepted ☒ Exception Accepted-as-is* ☒ Other*							
* Explanation <u>NON-EXISTING 2" MS LINE REMOVED FROM ATP. MISSING TEST STATION LEAD AT T(47-2) WAS INSTALLED AND APPLICABLE ATP STEPS WERE PERFORMED.</u>							
Approver 1 <u>[Signature]</u>		Date <u>1/30/97</u> <u>12/31/96</u>		Approver 2 <u>[Signature]</u>		Date <u>REV. 0</u>	
Approver 3 <u>[Signature]</u>		Date <u>[Signature]</u>		Approver 4 <u>[Signature]</u>		Date <u>[Signature]</u>	

EXCEPTION NO. 2		Project No. W-320		ATP No. WHC-SD-W320-ATP-003		Rev. 0		
Recorded by F SNYDER			Organization FDNW		Date Recorded 12/23/96		ATP Page No. 17	
Step No.		Requirement						
8.7.3.1 HRA 8.7.3.4 RECORD PIPE TO SOIL POTENTIAL WITH WAVE FORM ANALYZER. (WFA) Description of Problem WHEN CONNECTING THE WFA POS TERMINAL TO THE REF ELECTRODES AND THE CANNON TO THE PIPE THE RESULTANT VALUES ARE POSITIVE. THE 4" SN 200 M9 AND 4" SL 100 M9 RECORDED OFF +.410 & +.92 RESPECTIVELY (THE +.410 AND +.92 WILL NOT MEET ACCEPTANCE OF MORE NEG THAN (-).85 IF REVERSED.)								
Objector 1 (Name/Organization) F SNYDER FDNW				Objector 2 (Name/Organization) JEFF WHITMAN FDNW				
Planned Action Retest - perform the following steps within a 48 hour period of time: (1) Repeat step 8.4.2 for both reference electrodes (permanent & portable) for SL-100-m9 w/6" GNC-M269 and SN-200-m9 w/6" GNC-M269, (2) the repeat step 8.7.3.2 for the same two pipes. JPL for G.P. McDonald 1/8/97								
Action Taken Retested continuity, native potentials, and ON-OFF values as recorded in the attached data sheet. Final results met ATP acceptance criteria								
RETEST EXECUTION AND ACCEPTANCE								
Retest Installation Contractor William H. Canby		Date 1-31-97		Recorder David Snyder / FDNW		Date 1/30/97		
Witness 1 (Name/Organization) NA		Date NA		Witness 2 (Name/Organization) David Snyder / FDNW		Date 1/30/97		
Field Engineering Jeff Whitman / FDNW		Date 1/30/97		Test Director (Name/Organization) Jeff Whitman / FDNW		Date 1/30/97		
Design Engineering (Author of ATP) J. K. Smith		Date 1/30/97		A/E Project Engineer Kevin S. Miller		Date 1/30/97		
APPROVAL AND ACCEPTANCE - OPERATING CONTRACTOR								
☒ Retest Approved and Accepted ☐ Exception Accepted-as-is* ☐ Other*								
* Explanation								
GKS 2/20/97								
						HNF-SD-W320-ATP-003		
						REV. 0		
Approver 1 J. K. Smith		Date 1/30/97		Approver 2		Date		
Approver 3		Date		Approver 4		Date		

or the ON values should be 100 mV more negative than the OFF values. If these values are not attainable by use of the existing permanent reference electrode a portable reference electrode may be used. For unprotected pipe, there is no criteria and the values will be recorded for record purposes. The unprotected pipes are designated below.

NOTE:

Connect positive terminal of the Waveform Analyzer to the reference electrode terminal and the common terminal on the Waveform Analyzer to the pipe test conductor terminal. Turn the Mode switch from the OFF position to the WFA position, record values, then turn to the OFF position.

1 10/4/6 8.7.3.1
Exp. #2

Test Station T(47-1)

Volts

Reference Electrode and
4-inch SN-200-M9 w/6-inch ENC-M26a

On + 4.34 Off +1.32

Reference Electrode and
4-inch SL-100-M9 w/6-inch ENC-M26a

On + 4.34 Off + 1.32

1 12/23/6 8.7.3.2
Exp. #2

Test Station T(47-2)

Reference Electrode and
4-inch SN-200-M9 w/6-inch ENC-M26a

On + 1.49 Off + 1.10

Reference Electrode and
4-inch SL-100-M9 w/6-inch ENC-M26a

On + 1.33 Off + .42

Reference Electrode and
1-inch IA(100#)-701-M7 (Unprotected Pipe)

On + 2.770 Off + 1.223

Reference Electrode and
1-inch RAW-601-M5 (Unprotected Pipe)

On + 2.766 Off + 1.219

1 10/4/6 8.7.3.3
Exp. #2

Test Station T(47-3)

Reference Electrode and
4-inch SL-100-M9 w/6-inch ENC-M26a

On + 3.81 Off + 1.42

1 12/13/6 8.7.3.4
Exp. #2

Test Station T(47-4)

Reference Electrode and
3-inch DR-301-M9 w/6-inch ENC-M26a

On + 4.32 Off + 1.53

Reference Electrode and
3-inch DR-302-M9 w/6-inch ENC-M26a

On + 4.32 Off + 1.53

Reference Electrode and
4-inch SN-200-M9 w/6-inch ENC-M26a

On + 3.08 Off + .95

Reference Electrode and
2-inch M5 w/4-inch ENC (Unprotected Pipe)

On _____ Off _____

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Prep. By	AR SNOWWHITE	Chk. By	ES/61

----- Message Contents -----

Gentlemen:

On 1/23/96 ATP #3 Test Station T(47-2) the following data was collected for step 8.3.3 using VOM 950-45-08-028 EXP 5/23/97.

4" SN-200-M9	.1 ohms
4" SL-100-M9	.1 Ohms
1" IA (100#)-701-M7	.2 ohms
1" RAW-601-M5	.2 ohms

The following was obtained for step 8.4.2 using the Wave form Analyzer:

	Ref Electrode	
	Permanent	Portable
4" SN-200-M9	-.710	-.932
4" SL-100-M9	-.710	-.932
1" IA (100#)-701-M7	-.710	-.931
1" RAW-601-M5	-.710	-.931

On 1/24/97 the following data was collected using the wave form analyzer connected in accordance to the instruction, for step 8.7.3.2.

	On	Off
4" SN-200-M9	+3.03	+1.23
4" SL-100-M9	+3.03	+1.20
1" IA (100#)-701-M7	+3.03	+1.23
1" RAW-601-M5	+3.03	+1.23

On Exception #2 the column for Planned Action needs to be completed and then the Action Taken column. It is my suggestion that the following be used.

Planned Action:

1. The results that are Positive in lieu of Negative is accept as is. The instructions for connection of the leads will provide Positive results.
2. Make necessary repairs to the installed components and retest steps 8.3.3, 8.4.2 and 8.7.3.2.

Action Taken:

1. No action taken
2. Retest of steps 8.3.3, 8.4.2, and 8.7.3.2 provided the results per attachment.

For questions call
Floyd Snyder
372-3094

HNF-SD-W320-ATR-003
REV. 0

GMS
2/29/97