JUN 14 1995

Ltr. 31 #67

ENGINEERING DATA TRANSMITTAL

1. EDT 606399

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
SST Retrieval Projects	Retrieval Engineering	N/A
5. Proj./Prog./Dept./Div.:	**6. Cog. Engr.:**	**7. Purchase Order No.:**
W-320/77360	W. M. Lane	N/A
8. Originator Remarks:		**9. Equip./Component No.:**
The attached specification is for approval.		N/A
		10. System/Bldg./Facility:
		241-C-106
11. Receiver Remarks:		**12. Major Assm. Dwg. No.:**
		N/A
		13. Permit/Permit Application No.:
		N/A
		14. Required Response Date:
		June 8, 1995

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-W320-ATP-001	All	0	Cathodic Protection - Rectifier 46	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 2. Release 5. Post-Review 3. Information 6. Dist. (Receipt Acknow. Required)	1. Approved 4. Reviewed no/comment 2. Approved w/comment 5. Reviewed w/comment 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	(J) Name (K) Signature (L) Date (M) MSIN	(G) Reason	(H) Disp.
1,3	1	Cog.Eng.: W. M. Lane W.M. Lane 6/1/95 S6-12	D. E. Bowers S6-01	3	
1	1	Cog. Mgr.: J. P. Harris 6-1-95 S2-48	F. W. Bradshaw S3-10	3	
1,3	1	QA: J. J. Huston 6-1-95 S6-12	T. H. May S6-12	3	
1,3	1	Safety: M. N. Islam M. Bowman Jalan 6/1/95 for Stacy Baker R3-08	Project W-320 Files S2-48	3	
1	1	Cathodic Cog. Eng.: J. M. Haberman 6/5/95 R1-30	Central Files (orig. +2) L8-04	3	
3	X	Env.: D. J. Carrell S7-30	OSTI (2) A3-36		
3		E. G. Allen S6-12			
3		J. W. Bailey S6-12			

18.	19.	20.	21. DOE APPROVAL (if required) Ctrl. No.
W. M. Lane W.M. Lane 6/1/95 Signature of EDT Originator Date	Authorized Representative for Receiving Organization Date	J. P. Harris 6-1-95 Cognizant Manager Date	[] Approved [] Approved w/comments [] Disapproved w/comments

BD-7400-172-2 (04/94) GEF097

DISCLAIMER

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RELEASE AUTHORIZATION

Document Number:	WHC-SD-W320-ATP-001, Rev. 0
Document Title:	Cathodic Protection - Rectifier 46
Release Date:	June 8, 1995

This document was reviewed following the procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

V.L. Birkland — June 8, 1995

V.L. Birkland

SUPPORTING DOCUMENT

1. Total Pages 29

2. Title	3. Number	4. Rev No.
Cathodic Protection - Rectifier 46	WHC-SD-W320-ATP-001	0

5. Key Words

Project W-320, cathodic protection, rectifier

6. Author

Name: W. M. Lane

W. M. Lane
Signature

Organization/Charge Code 77360/D2M58

7. Abstract

Acceptance test procedure for Cathodic Protection - Rectifier 46 for Project W-320.

8. RELEASE STAMP

OFFICIAL RELEASE
BY WHC
DATE JUN 14 1995
Sta. 31 #67

ACCEPTANCE TEST PROCEDURE WHC-SD-W320-ATP-001

TEST TITLE Cathodic Protection - Rectifier 46

LOCATION 200-E Area (Near corner of 7th Avenue and Buffalo Avenue)

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)

A R. Sumikita ARS	4-14-95 10-10-94	Originator	J E Breed SPD for J E Breed	4/14/95	Technical Documents
	Date			Date	
C Dublett MLO for C Dublett	4-14-95 10-19-94	Checker	J Schofield CDE 4/17/95	10-6-94	Safety
	Date			Date	
RF Mercinger RFM 4/17/95	11-4-94	Environmental	C E Norton 4/13-14-95	11-3-94	Quality Engineering
	Date			Date	
J W Badden JWB 4/18/95	11/11/94	Project Management			
	Date				

Westinghouse Hanford Company (WHC)

William M. Lane	4/18/95	Projects Department	J C Winters	4-18-95	Quality Assurance
	Date			Date	
S B	4/27/95	Safety	T N Shaw	4-19-95	Operations
	Date			Date	

EXECUTION AND TEST APPROVAL

EXECUTED BY

Test Director/Organization	Date	Test Operator/Organization	Date
Recorder/Organization	Date		

WITNESSES

Witness/Organization	Date	Title III Inspector	Date
Witness/Organization	Date	Witness/Organization	Date

A-E APPROVAL

ICF Kaiser Hanford Company (ICF KH)

Without exceptions ____ With exceptions resolved ____ With exceptions outstanding ____

Acceptance Inspection	Date	Design Engineer	Date
Project Manager	Date		

TEST APPROVAL AND ACCEPTANCE

Westinghouse Hanford Company (WHC)

Without exceptions ____ With exceptions resolved ____ With exceptions outstanding ____

<Title or Department>	Date	<Title or Department>	Date
<Title or Department>	Date	Cathodic Protection Engineer	Date

TABLE OF CONTENTS

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

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-2-818706, Sh 1, Rev 0	Electrical - Cathodic Protection Plan #1
H-2-818707, Sh 1, Rev 0	Electrical - Cathodic Protection Plan #2
H-2-818709, Sh 1, Rev 0	Electrical - Cathodic Protection Details

2.2 SPECIFICATIONS

W-320-C1, 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, reverifies 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.

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 test shall be stopped until the ECN is approved. However, this does not prevent the running of another portion of the test unaffected by the change.

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.

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 interfarm piping 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. _____ Expiration Date _____

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 RECTIFIER, CABLES, PIPE TEST CONDUCTORS, NATIVE POTENTIALS, ANODES, AND SYSTEM OPERATION

8.1 The following steps will verify (1) rectifier nameplate data, (2) rectifier input wiring is correctly terminated and color coded, and (3) anode header cable, anode loop cable, and negative return cables are labeled and connected in accordance with the design.

_____ 8.1.1 Record nameplate data for Rectifier 46.

Make _____

Model _____

Serial Number _____

AC Line Input Voltage _____

AC Line Frequency _____

Number of Phases _____

DC Output Voltage _____

DC Output Current _____

_____ 8.1.2 Verify the following on rectifier:

_____ 8.1.2.1 Tank gasket is not damaged and is in place.

_____ 8.1.2.2 There are no loose electrical connections or frayed wires.

_____ 8.1.2.3 There are no oil leaks.

_____ 8.1.3 Verify disconnect switch at rectifier is OPEN.

_____ 8.1.4 Using a VOM, verify no dc voltage at rectifier output terminals.

_____ 8.1.5 Verify rectifier case is filled with oil to the indicated level and that oil is CLEAR.

8.1.6 Verify ac supply wiring from disconnect switch is terminated on ac input terminals of rectifier.

_____ 8.1.6.1 Line 1 (Red or Black).

_____ 8.1.6.2 Neutral (White or Gray).

_____ 8.1.6.3 Ground (Green)

8.1.7 Verify rectifier output cables are properly labeled.

_____ 8.1.7.1 (+) HR46 (Anode Header Cable)

_____ 8.1.7.2 (+) LR46 (Anode Loop Cable)

_____ 8.1.7.3 (-) R46 (Negative return cable)

8.1.8 Verify Anode Header Cable and Anode Loop Cable are terminated at rectifier positive terminals.

_____ 8.1.8.1 (+) HR46 (Anode Header Cable)

_____ 8.1.8.2 (+) LR46 (Anode Loop Cable)

8.1.9 Verify Negative Return Cable is terminated at rectifier negative terminal.

_____ 8.1.9.1 (-) R46

_____ 8.1.10 Verify rectifier frame is connected to ground rod.

_____ 8.1.11 Verify Anode Header Cable (+) HR46 and Anode Loop Cable (+) LR46 are connected together at Anode Junction Box AJB (46-1) and AJB (46-2).

8.2 The following steps will verify continuity of the Anode Header Cable and the Anode Loop Cable.

_____ 8.2.1 Record the following VOM data:

Manufacturer _____

Model _____

Serial Number _____

Calibration Sticker Data _____

_____ 8.2.2 Disconnect Anode Header Cable (+) HR46 and Anode Loop Cable (+) LR46 in Anode Junction Box AJB (46-1) and AJB (46-2).

_____ 8.2.3 Using VOM, verify continuity (less than one ohm) across Anode Header Cable (+) HR46 and Anode Loop Cable (+) LR46 in Anode Junction Box AJB (46-1) and AJB (46-2).

_____ 8.2.4 Reconnect Anode Header Cable (+) HR46 and Anode Loop Cable (+) LR46 that were disconnected in Step 8.2.2.

NOTE: The steps shown in Paragraphs 8.3 and 8.4 may be done concurrently.

8.3 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.

_____ 8.3.1 Test Station T(46-1)

4-inch SL-100-M9 w/6" ENC-M26a Terminals _____ and _____

		4-inch SN-200-M9 w/6" ENC-M26a	Terminals _____	and _____
		Reference Electrode	Terminal _____	
_____	8.3.2	Test Station T(46-2)		
		4-inch SL-100-M9 w/6" ENC-M26a	Terminals _____	and _____
		4-inch SN-200-M9 w/6" ENC-M26a	Terminals _____	and _____
		U.G. Line	Terminals _____	and _____
		Reference Electrode	Terminal _____	
_____	8.3.3	Test Station T(46-3)		
		4-inch SL-100-M9 w/6" ENC-M26a	Terminals _____	and _____
		4-inch SN-200-M9 w/6" ENC-M26a	Terminals _____	and _____
		30-inch CMP	Terminals _____	and _____
		Reference Electrode	Terminal _____	
_____	8.3.4	Test Station T(46-4)		
		4-inch SL-100-M9 w/6" ENC-M26a	Terminals _____	and _____
		4-inch SN-200-M9 w/6" ENC-M26a	Terminals _____	and _____
		8-inch RW	Terminals _____	and _____
		Reference Electrode	Terminal _____	
_____	8.3.5	Test Station T(46-5)		
		4-inch SL-100-M9 w/6" ENC-M26a	Terminals _____	and _____
		4-inch SN-200-M9 w/6" ENC-M26a	Terminals _____	and _____
		U.G. Line	Terminals _____	and _____
		Reference Electrode	Terminal _____	

_____	8.3.6	Test Station T(46-6)		
		4-inch SL-100-M9 w/6" ENC-M26a	Terminals _____	and _____
		4-inch SN-200-M9 w/6" ENC-M26a	Terminals _____	and _____
		12-inch RW	Terminals _____	and _____
		Reference Electrode	Terminal _____	
_____	8.3.7	Test Station T(46-7)		
		4-inch SL-100-M9 w/6" ENC-M26a	Terminals _____	and _____
		4-inch SN-200-M9 w/6" ENC-M26a	Terminals _____	and _____
		12-inch RW	Terminals _____	and _____
		Reference Electrode	Terminal _____	
_____	8.3.8	Test Station T(46-8)		
		4-inch SL-100-M9 w/6" ENC-M26a	Terminals _____	and _____
		4-inch SN-200-M9 w/6" ENC-M26a	Terminals _____	and _____
		4-inch COND DR	Terminals _____	and _____
		Reference Electrode	Terminal _____	
_____	8.3.9	Test Station T(46-9)		
		4-inch SL-100-M9 w/6" ENC-M26a	Terminals _____	and _____
		4-inch SN-200-M9 w/6" ENC-M26a	Terminals _____	and _____
		3-inch V113	Terminals _____	and _____
		Reference Electrode	Terminal _____	
_____	8.3.10	Test Station T(46-10)		
		4-inch SL-100-M9 w/6" ENC-M26a	Terminals _____	and _____
		4-inch SN-200-M9 w/6" ENC-M26a	Terminals _____	and _____

		4-inch COND DR	Terminals _____	and _____
		Reference Electrode	Terminal _____	
_____	8.3.11	Test Station T(46-11)		
		4-inch SL-100-M9 w/6" ENC-M26a	Terminals _____	and _____
		4-inch SN-200-M9 w/6" ENC-M26a	Terminals _____	and _____
		U.G. Line	Terminals _____	and _____
		Reference Electrode	Terminal _____	
_____	8.3.12	Test Station T(46-12)		
		4-inch SL-100-M9 w/6" ENC-M26a	Terminals _____	and _____
		4-inch SN-200-M9 w/6" ENC-M26a	Terminals _____	and _____
		12-inch RW	Terminals _____	and _____
		Reference Electrode	Terminal _____	
_____	8.3.13	Test Station T(46-13)		
		4-inch SL-100-M9 w/6" ENC-M26a	Terminals _____	and _____
		4-inch SN-200-M9 w/6" ENC-M26a	Terminals _____	and _____
		U.G. Line	Terminals _____	and _____
		U.G. Line	Terminals _____	and _____
		Reference Electrode	Terminal _____	
_____	8.3.14	Test Station T(46-14)		
		4-inch SL-100-M9 w/6" ENC-M26a	Terminals _____	and _____
		4-inch SN-200-M9 w/6" ENC-M26a	Terminals _____	and _____
		3-inch V-714 w/6" ENC	Terminals _____	and _____
		U.G. Line	Terminals _____	and _____
		Reference Electrode	Terminal _____	

_____ 8.3.15 Test Station T(46-15)

U.G. Line Terminals _____ and _____

U.G. Line Terminals _____ and _____

U.G. Line Terminals _____ and _____

Reference Electrode Terminal _____

8.4 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.

_____ 8.4.1 Record the following VOM data:

Manufacturer _____

Model _____

Serial Number _____

Calibration Sticker Data _____

_____ 8.4.2 Test Station T(46-1)

4-inch SL-100-M9 w/6" ENC-M26a _____ ohms

4-inch SN-200-M9 w/6" ENC-M26a _____ ohms

_____ 8.4.3 Test Station T(46-2)

4-inch SL-100-M9 w/6" ENC-M26a _____ ohms

4-inch SN-200-M9 w/6" ENC-M26a _____ ohms

U.G. Line _____ ohms

_____ 8.4.4 Test Station T(46-3)

4-inch SL-100-M9 w/6" ENC-M26a _____ ohms

4-inch SN-200-M9 w/6" ENC-M26a _____ ohms

30-inch CMP _____ ohms

_____ 8.4.5 Test Station T(46-4)

4-inch SL-100-M9 w/6" ENC-M26a _____ ohms

4-inch SN-200-M9 w/6" ENC-M26a _____ ohms

8-inch RW _____ ohms

_____ 8.4.6 Test Station T(46-5)

4-inch SL-100-M9 w/6" ENC-M26a _____ ohms

		4-inch SN-200-M9 w/6" ENC-M26a	_____ ohms
		U.G. Line	_____ ohms
_____	8.4.7	Test Station T(46-6)	
		4-inch SL-100-M9 w/6" ENC-M26a	_____ ohms
		4-inch SN-200-M9 w/6" ENC-M26a	_____ ohms
		12-inch RW	_____ ohms
_____	8.4.8	Test Station T(46-7)	
		4-inch SL-100-M9 w/6" ENC-M26a	_____ ohms
		4-inch SN-200-M9 w/6" ENC-M26a	_____ ohms
		12-inch RW	_____ ohms
_____	8.4.9	Test Station T(46-8)	
		4-inch SL-100-M9 w/6" ENC-M26a	_____ ohms
		4-inch SN-200-M9 w/6" ENC-M26a	_____ ohms
		4-inch COND DR	_____ ohms
_____	8.4.10	Test Station T(46-9)	
		4-inch SL-100-M9 w/6" ENC-M26a	_____ ohms
		4-inch SN-200-M9 w/6" ENC-M26a	_____ ohms
		3-inch V113	_____ ohms
_____	8.4.11	Test Station T(46-10)	
		4-inch SL-100-M9 w/6" ENC-M26a	_____ ohms
		4-inch SN-200-M9 w/6" ENC-M26a	_____ ohms
		4-inch COND DR	_____ ohms
_____	8.4.12	Test Station T(46-11)	
		4-inch SL-100-M9 w/6" ENC-M26a	_____ ohms
		4-inch SN-200-M9 w/6" ENC-M26a	_____ ohms
		U.G. Line	_____ ohms
_____	8.4.13	Test Station T(46-12)	
		4-inch SL-100-M9 w/6" ENC-M26a	_____ ohms

		4-inch SN-200-M9 w/6" ENC-M26a	_____ ohms
		12-inch RW	_____ ohms
_____	8.4.14	Test Station T(46-13)	
		4-inch SL-100-M9 w/6" ENC-M26a	_____ ohms
		4-inch SN-200-M9 w/6" ENC-M26a	_____ ohms
		U.G. Line	_____ ohms
		U.G. Line	_____ ohms
_____	8.4.15	Test Station T(46-14)	
		4-inch SL-100-M9 w/6" ENC-M26a	_____ ohms
		4-inch SN-200-M9 w/6" ENC-M26a	_____ ohms
		3-inch V-714 w/6" ENC	_____ ohms
		U.G. Line	_____ ohms
_____	8.4.16	Test Station T(46-15)	
		U.G. Line	_____ ohms
		U.G. Line	_____ ohms
		U.G. Line	_____ ohms

8.5 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).

_____	8.5.1	Test Station T(46-1)	Volts
		Permanent Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Permanent Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____

		Portable Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
_____	8.5.2	Test Station T(46-2)	
		Permanent Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Permanent Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
_____	8.5.3	Test Station T(46-3)	
		Permanent Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Permanent Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
_____	8.5.4	Test Station T(46-4)	
		Permanent Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Permanent Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
_____	8.5.5	Test Station T(46-5)	
		Permanent Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Permanent Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____

		Portable Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
_____	8.5.6	Test Station T(46-6)	
		Permanent Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Permanent Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
_____	8.5.7	Test Station T(46-7)	
		Permanent Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Permanent Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
_____	8.5.8	Test Station T(46-8)	
		Permanent Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Permanent Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
_____	8.5.9	Test Station T(46-9)	
		Permanent Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Permanent Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____

		Portable Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
_____	8.5.10	Test Station T(46-10)	
		Permanent Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Permanent Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
_____	8.5.11	Test Station T(46-11)	
		Permanent Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Permanent Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
_____	8.5.12	Test Station T(46-12)	
		Permanent Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Permanent Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____
_____	8.5.13	Test Station T(46-13)	
		Permanent Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Portable Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	_____
		Permanent Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	_____

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

_____ 8.5.14 Test Station T(46-14)

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

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

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

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

8.6 The following steps will verify proper operation of Rectifier 46.

_____ 8.6.1 Verify Rectifier 46 input circuit breaker is OPEN.

_____ 8.6.2 Verify all COARSE and FINE output transformer taps on rectifier are set at the lowest levels (Coarse - A and Fine - 1).

_____ 8.6.3 Close circuit breaker in Distribution Panelboard, Control/Lunch Trailer.

_____ 8.6.4 Close rectifier input circuit breaker and disconnect switch at rectifier. Using meter on rectifier, record volts and amperes, and then open input 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		dc Output	
Coarse	Fine	Volts	Amp
A	1	_____	_____
A	2	_____	_____
A	3	_____	_____
A	4	_____	_____
A	5	_____	_____
B	1	_____	_____
B	2	_____	_____
B	3	_____	_____

B	4	_____	_____
B	5	_____	_____
C	1	_____	_____
C	2	_____	_____
C	3	_____	_____
C	4	_____	_____
C	5	_____	_____
D	1	_____	_____
D	2	_____	_____
D	3	_____	_____
D	4	_____	_____
D	5	_____	_____

_____ 8.6.5 Open rectifier input circuit breaker.

8.7 The following steps will verify that if either the Anode Header Cable or the Anode Loop Cable is severed, the cathodic protection system will continue to function properly.

_____ 8.7.1 Close rectifier input circuit breaker and record the current shown on the rectifier ammeter. _____ amperes.

_____ 8.7.2 Open rectifier input circuit breaker.

_____ 8.7.3 Disconnect Anode Header Cable (+) HR46 from positive terminal of rectifier, leaving Anode Loop Cable (+) LR46 connected.

_____ 8.7.4 Close rectifier input circuit breaker and record the current shown on the rectifier ammeter. _____ amperes.

_____ 8.7.5 Open rectifier input circuit breaker and disconnect Anode Loop Cable (+) LR46 and reconnect Anode Header Cable (+) HR46.

_____ 8.7.6 Close rectifier input circuit breaker and record the current shown on the rectifier ammeter. _____ amperes.

_____ 8.7.7 Open rectifier input circuit breaker and reconnect Anode Loop Cable (+) LR46.

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

_____ 8.8.1 Verify the Mode switch, on the Wave Form Analyzer, is in the OFF position.

_____ 8.8.2 Connect 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.

_____ 8.8.3 Connect common terminal of the Wave Form Analyzer to a portable copper-copper sulfate reference electrode.

_____ 8.8.4 Turn the Mode switch, on the Wave Form Analyzer, from the OFF position to the DC position.

_____ 8.8.5 Record the following portable reference electrode data:

Manufacturer _____

Model and type _____

_____ 8.8.6 Close rectifier input circuit breaker, place the portable reference electrode over each anode location and measure pipe to soil potential using the Wave Form Analyzer. Record 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.

_____ 8.8.7

Anode	Volts	Anode	Volts
A(46-1)	_____	A(46-24)	_____
A(46-2)	_____	A(46-25)	_____
A(46-3)	_____	A(46-26)	_____
A(46-4)	_____	A(46-27)	_____
A(46-5)	_____	A(46-28)	_____
A(46-6)	_____	A(46-29)	_____
A(46-7)	_____	A(46-30)	_____
A(46-8)	_____	A(46-31)	_____
A(46-9)	_____	A(46-32)	_____
A(46-10)	_____	A(46-33)	_____
A(46-11)	_____	A(46-34)	_____
A(46-12)	_____	A(46-35)	_____
A(46-13)	_____	A(46-36)	_____
A(46-14)	_____	A(46-37)	_____
A(46-15)	_____	A(46-38)	_____
A(46-16)	_____	A(46-39)	_____

Anode	Volts	Anode	Volts
A(46-17)	_____	A(46-40)	_____
A(46-18)	_____	A(46-41)	_____
A(46-19)	_____	A(46-42)	_____
A(46-20)	_____	A(46-43)	_____
A(46-21)	_____	A(46-44)	_____
A(46-22)	_____	A(46-45)	_____
A(46-23)	_____	A(46-46)	_____

_____ 8.8.8 Turn the Mode switch, on the Wave Form Analyzer, to the OFF position and disconnect leads.

_____ 8.8.9 Open the disconnect switch at the rectifier.

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

_____ 8.9.1 Position the ten 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.

_____ 8.9.2 Open the input circuit breaker on existing Rectifier 11, located approximately 50 feet south of Building 241-AN-271 and in Rectifier 14, located outside the "A" Tank Farm fence near the northwest corner.

_____ 8.9.3 Close Rectifier 46 input circuit breaker and the disconnect switch at the rectifier and verify the rectifier has been energized for 24 hours prior to the following test.

_____ 8.9.4 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 (-)0.85V dc 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 by an asterisk.

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.

_____	8.9.4.1	Test Station T(46-1)		
				Volts
		Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	ON _____	OFF_____
_____	8.9.4.2	Test Station T(46-2)		
				Volts
		Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and U.G. Line *	ON _____	OFF_____
_____	8.9.4.3	Test Station T(46-3)		
				Volts
		Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and 30-inch CMP *	ON _____	OFF_____
_____	8.9.4.4	Test Station T(46-4)		
				Volts
		Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and 8-inch RW *	ON _____	OFF_____
_____	8.9.4.5	Test Station T(46-5)		
				Volts
		Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and U.G. Line *	ON _____	OFF_____
_____	8.9.4.6	Test Station T(46-6)		
				Volts
		Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and 12-inch RW *	ON _____	OFF_____

_____	8.9.4.7	Test Station T(46-7)		
				Volts
		Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and 12-inch RW *	ON _____	OFF_____
_____	8.9.4.8	Test Station T(46-8)		
				Volts
		Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and 4-inch COND DR *	ON _____	OFF_____
_____	8.9.4.9	Test Station T(46-9)		
				Volts
		Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and 3-inch V113 *	ON _____	OFF_____
_____	8.9.4.10	Test Station T(46-10)		
				Volts
		Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and 4-inch COND DR *	ON _____	OFF_____
_____	8.9.4.11	Test Station T(46-11)		
				Volts
		Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	ON _____	OFF_____
		Reference Electrode and U.G. Line *	ON _____	OFF_____
_____	8.9.4.12	Test Station T(46-12)		
				Volts
		Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	ON _____	OFF_____

		Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	ON _____ OFF_____
		Reference Electrode and 12-inch RW *	ON _____ OFF_____
_____	8.9.4.13	Test Station T(46-13)	
			Volts
		Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	ON _____ OFF_____
		Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	ON _____ OFF_____
		Reference Electrode and U.G. Line *	ON _____ OFF_____
		Reference Electrode and U.G. Line *	ON _____ OFF_____
_____	8.9.4.14	Test Station T(46-14)	
			Volts
		Reference Electrode and 4-inch SL-100-M9 w/6" ENC-M26a	ON _____ OFF_____
		Reference Electrode and 4-inch SN-200-M9 w/6" ENC-M26a	ON _____ OFF_____
		Reference Electrode and 3-inch V-714 w/6" ENC *	ON _____ OFF_____
		Reference Electrode and U.G. Line *	ON _____ OFF_____
_____	8.9.4.15	Test Station T(46-15)	
			Volts
		Reference Electrode and U.G. Line *	ON _____ OFF_____
		Reference Electrode and U.G. Line *	ON _____ OFF_____
		Reference Electrode and U.G. Line *	ON _____ OFF_____
_____	8.9.4.16	Turn the Mode switch, on the Wave Form Analyzer, to the OFF position and disconnect leads.	
_____	8.9.4.17	Open disconnect switch at the rectifier.	
_____	8.9.4.18	Close the input circuit breaker on existing Rectifiers 11 and 14 that were opened in previous Step.	
_____	8.9.5	Testing complete, secure from test.	

END OF TEST

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-as-is* ☐ Other*

* Explanation

Approver 1	Date	Approver 2	Date
Approver 3	Date	Approver 4	Date

KEH-428 (6-85)