ST. 37-73

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				12. Major Assm. Dwg. No.: N/A	
				13. Permit/Permit Application No.: N/A	
11. Receiver Remarks: 11A. Design Baseline Document? ☐ Yes ☒ No				14. Required Response Date:	

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(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Designator	Reason for Trans- mittal	Originator Dispo- sition	Receiver Dispo- sition
1	TWR-2273	-	0	Project W-314 Specific Test And Evaluation Plan for Transfer Line SN-632	Q	1	1	

16. KEY					
Approval Designator (F)		Reason for Transmittal (G)		Disposition (H) & (I)	
E, S, O, D or N/A (see WHC-CM-3-5, Sec.12.7)		1. Approval 2. Release 3. Information	4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment	4. Reviewed no/comment 5. Reviewed 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 Auth., D.E. Bowers	<i>D.E. Bowers</i>	3-16-98	SS-130	1	1	Design Agent, J.T. Koberg	<i>J.T. Koberg</i>	3-17-98	RP-50
1	1	Eng. Mgr., J.L. Hoffman	<i>J.L. Hoffman</i>	3-14-98	14-07						
1	1	Cog. Eng., W.H. Hanks	<i>W.H. Hanks</i>	3-15-98	15-29						
1	1	QA, H.M. Chafin	<i>H.M. Chafin</i>	3-13-98	13-98						
1	1	ETF Ops, T.K. Ravencraft	<i>T.K. Ravencraft</i>	3-16-98	16-98						
1	1	ETF Ops, R.A. Dodd	<i>R.A. Dodd</i>	3-16-98	16-98						
1	1	Ops Integration, R.W. Jacobson	<i>R.W. Jacobson</i>	3-17-98	17-98						
1	1	SE Mgmt., D.L. McGrew	<i>D.L. McGrew</i>	3-17-98	17-98						
1	1	Chief Test Director, R.L. Legg	<i>R.L. Legg</i>	3-17-98	17-98						

18. EDT Originator S.K. Kujak		19. Authorized Representative for Receiving Organization		20. Design Agent Manager Date <i>J.L. Hoffman</i> 3-17-98		21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments	
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PROJECT W-314

SPECIFIC TEST AND EVALUATION PLAN

FOR SN-632 TRANSFER LINE 241-AX-B TO 241-AZ-02A

William H Hays

Numatec Hanford Company, Richland, WA 99352

U.S. Department of Energy Contract DE-AC06-96RL13200

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Key Words: Specific Test and Evaluation Plan, Project W-314, Transfer Line SN-632

Abstract: This Specific Test and Evaluation Plan (STEP) defines the test & evaluation activities encompassing the installation of transfer line SN-632 for the W-314 Project.

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Date

W. L. Burkland 3/20/98

Release Stamp

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PROJECT W-314
SPECIFIC TEST AND EVALUATION PLAN
FOR
SN-632 TRANSFER LINE (241-AX-B TO 241-AZ-02A)

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1.0 PURPOSE

The purpose of this Specific Test and Evaluation Plan (STEP) is to provide a detailed written plan for the systematic testing of modifications made by the addition of the SN-632 transfer line by the W-314 Project. The STEP develops the outline for test procedures that verify the system's performance to the established Project design criteria. The STEP is a "lower tier" document based on the W-314 Test & Evaluation Plan (TEP).

2.0 SCOPE

This STEP encompasses all testing activities required to demonstrate compliance to the project design criteria as it relates to the addition of transfer line SN-632. The Project Design Specifications (PDS) identify the specific testing activities required for the Project. Testing includes Validations and Verifications (e.g., Commercial Grade Item Dedication activities...etc), Factory Acceptance Tests (FATs), installation tests and inspections, Construction Acceptance Tests (CATs), Acceptance Test Procedures (ATPs), Pre-Operational Test Procedures (POTPs), and Operational Test Procedures (OTPs). It should be noted that POTPs are not required for testing of the transfer line addition. The STEP will be utilized in conjunction with the TEP for verification and validation.

3.0 ADMINISTRATIVE

3.1 Safety Information/Communications

Testing and inspection activities will be performed to the safety and communication procedures of the testing facility (e.g., shop, mockup, tank farm, vendor facility...etc.)

During the performance of SN-632 transfer line ATPs and OTPs, the Operations Test Director will be the direct line of communication with the Shift Office. During abnormal and casualty situations, the Double-Shell Tank Farms Shift Manager will be the building emergency director/event commander.

4.0 GENERAL INFORMATION AND PREREQUISITES

4.1 Initial Conditions

Prerequisite tests and all required construction, specific to the test, shall be completed prior to beginning any test. Test boundaries shall be verified as being appropriate and secure. Required locks and tags shall be correctly placed to allow performance of the test without disturbing the lock and tag. Required personnel shall be available and briefed on the steps of the test (a pre-job briefing is a prerequisite that must be satisfied before performing a Construction Work Package (CWP), ATP, and/or OTP). Required test apparatus shall be functional and set up in a safe configuration for the test. Installed and existing equipment, required for the test, shall be verified to be ready to operate in the test conditions.

4.2 Measurement & Test Equipment

Instruments used will be specified per the test document and controlled per the performing agency's Measurement & Test Equipment program.

4.3 Functional Tests

Functional tests, when required for calibration of equipment, will be performed prior to the associated ATP or OTP. Functional tests will be performed to approved documents.

4.4 Temporary Modifications

Temporary modifications may be required in 241-AN Tank Farm. Temporary modifications will be made per HNF-IP-0842, Vol. IV, section 4.5.

4.5 Equipment and Materials

Equipment installed by the project that fails during testing, or existing equipment that is damaged by testing, will be the responsibility of the construction contractor. Existing facility SSCs, not damaged but found defective, will be the responsibility of Double-Shell Tanks organization. Initiation of repairs will be accomplished by the creation of either a work package, using JCS, or a Construction Work Package (CWP).

5.0 ASSIGNMENTS OF RESPONSIBILITY

The design agent (FDNW) will provide test directors for the Acceptance Test Procedures. Tank Farm Operations will provide a qualified Tank Farm Shift Manager or Operations Engineer who will be the Test Directors for all OTPs. This representative will accept the results of the ATPs for Tank Farm Operations. Roles and responsibilities for construction, TWRs Operations, TFRSO Startup Group, W-314 Project Management, Acceptance Inspection, and Quality Assurance are defined in the W-314 TEP, Chapter three.

5.1 Joint Test Review Group

The JTRG will consist of the Chief Test Director (from the TWRS Testing and Systems Readiness organization), Engineering manager (of the facility that will operate the equipment), W-314 Startup Manager, the Design Authority, applicable Test Director for each ATP & OTP, and W-314 Project Manager. The JTRG provides Tank Farm Operations with a high level of confidence that the test can be performed safely and efficiently. The review by the JTRG provides a basis for test procedure approval and release. The JTRG conducts thorough reviews of ATPs and OTPs to ensure compliance with applicable procedural requirements, to ensure they can be performed safely, and to ensure the scope of testing and inspections provide a product that satisfies operational and safety requirements. The JTRG reviews test procedure data, and provides their recommendation concerning the final acceptance that test results satisfy the design specifications as stated in the ATPs, OTPs, or test plans.

5.2 Test Configuration Control

Testing shall be conducted using detailed test procedures and the latest versions of all ECNs and Drawings for the Project. Configuration control shall conform to HNF-PRO-440 and HNF-PRO-226. Drawings shall be retained in project status by the W-314 Project until such time as all work on the SN-632 transfer line is complete and accepted.

6.0 SYSTEM BOUNDARIES

6.1 Objective

Specific system boundaries are identified for use in planning and implementing the various tests listed in this STEP. These system boundaries will provide safe work boundaries which allow testing to proceed in a safe environment, isolated from facility hazards.

6.2 Administrative Controls

Where actual physical isolations are not possible (e.g., pit nozzles...etc), Lock and Tag system (HNF-IP-0842, Vol. II, Sections 4.9.1 and 4.10.1), as a minimum, will be utilized to establish the required administrative controls.

6.3 Description

The table below lists the work and test boundaries for transfer line SN-632 work. These boundaries are estimates and may be modified at the time of execution to match current conditions in the farm and the job. This table will not be modified to reflect those changes.

TABLE 5-1 SN-632 TRANSFER LINE WORK AND TEST BOUNDARIES

WORK ACTIVITY	PROJECT DRAWING	ESSENTIAL DRAWING	LOCK & TAG LOCATION	COMMENTS
The following work boundaries are based on the AX-B Valve P&ID work boundaries being established prior to or at the same time as this work is started.				
Excavation for Transfer line installation	H-14-100695 H-14-101113, sh 1-8 H-14-101047, sh 1	H-2-39393, sh 2		Lock and Tag test time for SL-108, SH-111, SH-208 and SH-211 at VPAX-A. Remaining Lock and Tags for excavation to be determined based on exact areas to be excavated and results of surface scan.
Cell 8 Crp SH-400 at AX-B Valve P&ID	H-14-101113 H-14-101047			Verify Process blank on L3 at AX-501 condensate pt. Header R12 in AX-B Valve P&ID should have an isolation or a process blank
Tr is to existing sub at AX-B valve P&ID, inside R12	H-14-101047 H-14-101113, sh 6 H-14-101114	H-2-37248		
Cathodic Protection Modifications	H-14-101021, sh 1-8	H-2-39393, sh 2		Lock and Tag Rectifiers 9 and 10 at MCC-AX1, Breaker 8
Pressure Test of installed line and Encasement Line Pressure Test Encasement Pressure Test	H-14-101047 H-14-101113, sh 6 H-14-101114			After completion of the seal pressure test, drain test vessel to AZ-101 or AZ-102 as dictated by operation.

6.4 System Turnover

Following completion and acceptance of all the required testing and testing data within a given boundary, the systems and equipment in that area will be ready for release to operations for their control and use. The SSC(s) will be released to TWRs Operations by using the Acceptance for Beneficial Use process described in the W-314 TEP (HNF-SD-W314-001).

7.0 TEST AND ACCEPTANCE

The Project W-314 SN-632 transfer line STEP includes design verifications performed by various methods including engineering analysis, Vendor data review, FATs and CATs performed in accordance with Procurement/Construction Specifications, drawings, and system functional tests performed in accordance with ATPs and OTPs. These verifications and tests will be documented in the W-314 Project 200 East Upgrades Requirements Verification Report (RVR), HNF-2257, Rev.0, and in specific test documentation (e.g., ATRs, OTRs, CWP...etc.). In addition, approved calibration and functional test procedures will be performed in preparation for the above listed tests.

7.1 Validation and Verification

All design requirements listed in the Project Development Specifications are formally reviewed by analysis and examination for project compliance. Commercial grade equipment utilized in Safety Class applications, will be qualified per appropriate procedures and programs. Equipment used in non-safety class applications will be verified using vendor data to ensure the design requirements of the application are met. These reviews are documented in the 200 East Upgrades RVR. This report is listed in the reference section of this document.

7.2 Commercial Grade Item Dedication

The following table lists the testing that will be performed to satisfy the Commercial Grade Item Dedication requirements for the addition of transfer line SN-632. Note that acceptance criteria are included in the individual drawings, specifications, procedures, and CWPs.

TABLE 7-2

COMMERCIAL GRADE ITEM DEDICATION ACTIVITIES					
TEST NUMBER	TEST NAME	REFERENCE DOCUMENT	LOCATION	TEST DOCUMENT	INTERDEPENDENCIES
1.4.E.F.CG.1	Steel Plate, bar and shape Tensile test and physical inspection	W-314-C2, section 05500, 1.3.2.1	Shop		Test reports must be in place prior to installing any items for which testing was required.
1.4.E.F.CG.2	Commercial Grade Dedication for Piping Materials, verify pipe size	W-314-C2, section 15493, 1.2.3.1 and 2.4; RVR App.A 3.2.2.6	Shop		Test Reports must be accepted prior to fabrication of piping spools.

7.3 Factory Acceptance Testing

It has been determined that factory acceptance testing will not be required for transfer line SN-632.

7.4 Construction Acceptance Testing

The table below lists the construction tests performed during fabrication, modification and installation to verify functionality of structures, systems and components following installation. AI inspection activities performed during construction are referenced in "ACCEPTANCE INSPECTION PLAN", W-314-C2-1, REV. 0. Note that acceptance criteria are included in the individual test drawings, specifications, procedures, and CWP's.

TABLE 7-4

CONSTRUCTION ACCEPTANCE TESTS					
TEST NUMBER	TEST	REFERENCE DOCUMENT	LOCATION	TEST DOCUMENT	INTERDEPENDENCIES
1.4.E.F.C.1	In-Place Density Test	W-314-C2, section 02220, 3.1.7.2	Field	CWP	Required prior to excavation for all excavations
1.4.E.F.C.2	Backfill Density Test	W-314-C2, section 02220, 3.3, 3.4, 3.5, 3.7.1; RVR App. A 3.3.1.6, 3.3.1.7	Field	CWP	During & after backfill
1.4.E.F.C.3	Structural Weld Examinations	W-314-C2, section 05500, 3.4.1, 3.4.2	Shop, Field	CWP	Prior to coating any structural pieces.
1.4.E.F.C.4	Voltage Verification	W-314-C2, section 16640, 3.3.1.2	Field	CWP	Prior to energizing equipment.
1.4.E.F.C.5	Holiday Testing of Piping Protective Coatings	W-314-C2, section 15493, 3.1.6.2	Field	CWP	Prior to Backfill.
1.4.E.F.C.6	Welding Non-Destructive Examination	W-314-C2, section 15493, 3.2.1 & Appendix A, 3.3 & 4.1; RVR App. A 3.3.1.5, 3.3.4, App. B 3.3.4.1	Shop, Field	CWP	Prior to any form of pressure testing.
1.4.E.F.C.7	Piping Fabrication Cleanliness Inspection	W-314-C2, section 15493, 3.2.3.5; RVR App. A 3.3.4	Shop	CWP	Prior to any form of pressure testing
1.4.E.F.C.8	Piping Fabrication Pressure Tests	W-314-C2, section 15493, 3.2.4; RVR App. A 3.3.1.2	Shop	CWP	
1.4.E.F.C.9	Piping Installation Cleanliness Inspection	W-314-C2, section 15493, 3.2.3.5; RVR App. A 3.3.4	Field	CWP	Prior to any form of pressure testing
1.4.E.F.C.10	Piping Installation Pressure Tests	W-314-C2, section 15493, 3.2.4; RVR App. A 3.3.1.2	Field	CWP	
1.4.E.F.C.11	Piping Configuration Verification	RVR App. A 3.2.2.1, 3.2.2.7, 3.2.2.8, 3.2.2.9, 3.2.2.10, 3.3.1.8	Shop, Field	CWP	Prior to installation of the piping
1.4.E.F.C.12	Cathodic Protection	W-314-C2, section 16640, 3.3.1, 3.3.2	Field	CWP	After piping installation and prior to application of protective coating on pipe

7.5 Acceptance Testing

Acceptance testing will be conducted by utilizing ATPs. ATPs are separate "stand alone" documents which obtain their requirements from the applicable PDS, drawings, and vendor data. ATPs will ensure that the SSCs are fabricated and/or installed properly per the design. Detailed ATPs will be required after the CAT functional checks and/or inspections are completed and, will validate overall SSC installation as a whole. The acceptance criteria shall be specified in the test procedures and/or on approved drawings and specifications. These tests will be performed on components in their installed condition but may not exercise the entire system as an operational unit. The table below describes the ATP that will be performed to acceptance test the installation of the SN-632 transfer line. Acceptance testing of SN-632 consists of testing the modifications to the Cathodic Protection system and; therefore, will be accomplished using a modified version of the existing cathodic protection survey procedure. An Acceptance Test Report (ATR) will be generated when all test exceptions have been cleared and the test has been successfully completed. Note that acceptance criteria are included in the individual test document.

TABLE 7-5

ACCEPTANCE TEST PROCEDURES				
TEST DOCUMENT	TEST DESCRIPTION	REFERENCE DOCUMENT	LOCATION	INTERDEPENDENCIES
TBD	Cathodic Protection	RVR App A 3.2.3.2, 3.7.1.1.1.1	Field	Prior to field jumper installation

7.6 Operational Testing

Transfer line hydro tests constitute the operational tests for SN-632 but will be performed as CATs. Cathodic protection will be tested in-service as part of Acceptance testing. Therefore, operational testing will not be conducted for SN-632.

7.7 SN-632 Transfer Line Test Completion

Transfer line SN-632 testing will be considered successfully completed when the **TEST COMPLETION CHECKLIST** (attached to the end of this STEP) is completely signed off. This checklist is a "stand alone" document that will be listed on the SN-632 ABU (HNF-SD-W314-ABU-006) and included in the turnover of documents. This checklist will be completed by the W-314 Startup Manager or his designee.

REFERENCES

- HNF-PRO-229, *Technical Procedure Standard*, Fluor Daniel Hanford Company, Richland, Washington.
- HNF-PRO-242, Rev. 1, *Engineering Drawing Requirements*, Fluor Daniel Hanford Company, Richland, Washington.
- HNF-PRO-440, *Engineering Document Change Control Requirements*, Fluor Daniel Hanford Company, Richland, Washington.
- HNF-PRO-446, *Testing Practices Requirements*, Fluor Daniel Hanford Company, Richland, Washington.
- HNF-PRO-572, *Project Acceptance and Closeout*, Fluor Daniel Hanford Company, Richland, Washington.
- W-314-C2, *Construction Specification for Tank Farm Restoration and Safe Operations 200 East Upgrades*, Fluor Daniel Northwest, Inc., Richland, Washington.
- HNF-SD-W314-PDS-001, Rev. 0, *Project Development Specification - Transfer Piping*, Fluor Daniel Northwest, Inc., Richland, Washington.
- HNF-SD-W314-PDS-002, Rev. 0, *Project Development Specification for Valve Pit Manifold*, Fluor Daniel Northwest, Inc., Richland, Washington.
- HNF-SD-W314-PDS-003, Rev. 0, *Project Development Specification for Pit Leak Detection*, Fluor Daniel Northwest, Inc., Richland, Washington.
- HNF-SD-W314-PDS-005, Rev. 0, *Project Development Specification for Special Protective Coating*, Fluor Daniel Northwest, Inc., Richland, Washington.
- HNF-2257, Rev. 0, *Requirements Verification Report for 200 East Upgrades (WBS 1.4.E)*, Fluor Daniel Northwest, Inc., Richland, Washington.
- HNF-SD-W314-ABU-006, Rev. 0, *SN-632 Transfer Line (AX-B to AZ-02A) Acceptance For Beneficial Use*, Rev. 0, Numatec Hanford Corporation, Richland, Washington.
- HNF-SD-W314-TEP-001, Rev. 0, *Test and Evaluation Plan for W-314 Tank Farm Restoration and Safe Operations*, Numatec Hanford Corporation, Richland, Washington.
- HNF-CM-3-5, *Document Control and Records Management*, Fluor Daniel Hanford Company, Richland, Washington.
- HNF-IP-0842, *TWRS Administration*, Fluor Daniel Hanford Company, Richland, Washington.
- HNF-IP-1266, *Tank Farm Operations Administrative Controls*, Fluor Daniel Hanford Company, Richland, Washington.
- HNF-SD-WM-BIO-001, Rev. F, *TWRS Basis for Interim Operation*, Fluor Daniel Hanford Corporation, Richland, Washington.
- W-314-C2-1, Rev. 0, *Acceptance Inspection Plan for 200 East/West Upgrades*, Fluor Daniel Hanford Corporation, Richland, Washington.

SN-632 TRANSFER LINE TEST COMPLETION CHECKLIST

PAGE ____ OF ____

TEST NUMBER	TEST NAME	TEST PROCEDURE/DOCUMENT NUMBER	DATE TEST COMPLETED	TEST COMPLETED AND RESULTS ACCEPTED (i.e., ALL EXCEPTIONS RESOLVED)	
				PRINT NAME	SIGNATURE
COMMERCIAL GRADE ITEM DEDICATION ACTIVITIES					
1.4.E.F.CG.1	Steel Plate, bar and shape Tensile test and physical Inspection				
1.4.E.F.CG.2	Commercial Grade Dedication for Piping Materials				
CONSTRUCTION ACCEPTANCE TESTS					
1.4.E.F.C.1	In-Place Density Test				
1.4.E.F.C.2	Backfill Density Test				
1.4.E.F.C.3	Structural Weld Examinations				
1.4.E.F.C.4	Voltage Verification				
1.4.E.F.C.5	Holiday Testing of Piping Protective Coatings				
1.4.E.F.C.6	Welding Non-Destructive Examination				
1.4.E.F.C.7	Piping Fabrication Cleanliness Inspection				
1.4.E.F.C.8	Piping Fabrication Pressure Tests				
1.4.E.F.C.9	Piping Installation Cleanliness Inspection				
1.4.E.F.C.10	Piping Installation Pressure Tests				
1.4.E.F.C.11	Piping Configuration Verification				
1.4.E.F.C.12	Cathodic Protection				

SN-632 TRANSFER LINE TEST COMPLETION CHECKLIST

PAGE ____ OF ____

TEST NUMBER	TEST NAME	TEST PROCEDURE/DOCUMENT NUMBER	DATE TEST COMPLETED	TEST COMPLETED AND RESULTS ACCEPTED (i.e., ALL EXCEPTIONS RESOLVED)	
				PRINT NAME	SIGNATURE
ACCEPTANCE TEST PROCEDURE					
	Cathodic Protection				

SN-632 TRANSFER LINE LOGIC DIAGRAM
(SEE TEP FIGURE B-3 FOR HIGHER LEVEL LOGIC)

DISTRIBUTION SHEET

To	From	Page 1 of 1
DISTRIBUTION	Tank Farm Restoration and Safe Operation Project/8C610	Date 3/16/98
Project Title/Work Order		EDT No. 618471
Tank Farm Restoration and Safe Operation Project/8C610		ECN No. N/A

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C. A. Rieck	S2-48	x			
B. L. Syverson	G3-12	x			
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S. U. Zaman	R3-01	x			
Project Files	R1-29 G3-11	x			
TWR Proj. File CPF #28	H6-08	x			
Central Files	B1-07	x			