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PROJECT W-314

SPECIFIC TEST AND EVALUATION PLAN

FOR 241-AY-02A PUMP PIT UPGRADE

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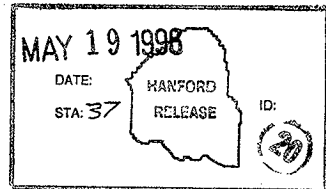
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Abstract: This Specific Test and Evaluation Plan (STEP) defines the test & evaluation activities encompassing the upgrade of the 241-AY-02A Pump Pit for the W-314 Project.

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PROJECT W-314
SPECIFIC TEST AND EVALUATION PLAN
FOR
241-AY-02A PUMP PIT UPGRADE

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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 to the 241-AY-02A Pump Pit 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 modification of the 241-AY-02A Pump Pit. 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 Tests and Inspections (FTIs), installation tests and inspections, Construction Tests and Inspections (CTIs), 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 pump pit modification. 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 241-AY-02A Pump Pit 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-AY 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-224. Drawings shall be retained in project status by the W-314 Project until such time as all work on the 241-AY-02A Pump Pit 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 the 241-AY-02A Pump Pit upgrades. 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 5-1 241-AY-02A PUMP PIT UPGRADES WORK AND TEST BOUNDARIES

WORK ACTIVITY	PROJECT DRAWING	ESSENTIAL DRAWING	LOCK & TAG LOCATION	COMMENTS
Remove Cover Blocks and jumpers in pit	H-14-102644	H-2-74600, sh 3 H-2-93590, sh 3 H-2-816559, sh 3&4 H-2-916650, sh 2 H-2-916650, sh 3 H-2-816860 H-2-84400	Lock and Tag AY-01D and AY-02D pumps at MCC-AY-1. Lock and tag slurry pump P-1361 and booster pump P-1362 at MCC-2N. Lock and tag slurry pump P-0621 and booster pump P-0622 at electrical equipment skid AY-051.	
Excavation for Transfer line and nozzle installation	H-14-102644 H-14-102645 H-14-102650 H-14-102648 H-14-102652 H-24-102660	H-2-64400 H-2-74600, sh 3 H-2-93590, sh 3 H-2-816559, sh 3&4 H-2-916650, sh 2 H-2-916650, sh 3 H-2-816860 H-2-816863	Lock and Tag AY-01D and AY-02D pumps at MCC-AY-1. The remainder of the circuits to be deenergized to be determined based on exact areas to be excavated and results of surface scan. Lock and tag slurry pump P-1361 and booster pump P-1362 at MCC-2N. Lock and tag slurry pump P-0621 and booster pump P-0622 at electrical equipment skid AY-051.	
Install new nozzles U12, U5, and USA.	H-14-102644 H-14-102645 H-14-102648 H-14-102650	H-2-64400 H-2-74600, sh 3 H-2-93590, sh 3 H-2-816559, sh 3&4 H-2-916650, sh 2 H-2-916650, sh 3 H-2-816860 H-2-816863		
Install conduit and make connections at panelboard PP-10	H-14-102621 H-14-102623, sh 2	H-2-131363 H-2-131363, sh 3	Lock and tag breaker #6 multi pack starter assembly 102AY tank recirc 241-AY-402	
Remove old pit leak detectors and install LDE-501 and LDE-502	H-14-102621	H-2-74600, sh 3 H-2-93590, sh 8	Remove the AY-02A pit leak detector from service by locking and tagging. Serial 11 is panel EDS-0P-807.	
Pressure Test of new nozzles	H-14-102644	H-2-64400 H-2-74600, sh 3 H-2-93590, sh 3 H-2-816559, sh 3&4 H-2-916650, sh 2 H-2-916650 H-2-816860 H-2-816863	Lock and Tag AY-01D and AY-02D pumps at MCC-AY-1. The remainder of the circuits to be deenergized to be determined based on exact areas to be excavated and results of surface scan. Lock and tag slurry pump P-1361 and booster pump P-1362 at MCC-2N. Lock and tag slurry pump P-0621 and booster pump P-0622 at electrical equipment skid AY-051.	After completion of the final pressure test, drain test water to AY-101 or AY-102 as directed by operations.
Jumper Leak test	H-14-102644	H-2-64400 H-2-74600, sh 3 H-2-93590, sh 3 H-2-816559, sh 3&4 H-2-916650, sh 2 H-2-916650 H-2-816860 H-2-816863 H-2-84400 H-2-93590, sh 3	Lock and Tag AY-01D and AY-02D pumps at MCC-AY-1. The remainder of the circuits to be deenergized to be determined based on exact areas to be excavated and results of surface scan. Lock and tag slurry pump P-1361 and booster pump P-1362 at MCC-2N. Lock and tag slurry pump P-0621 and booster pump P-0622 at electrical equipment skid AY-051.	Introduce test fluid at SN-633 stub out at AY-02A. Drain to AT-101.
Jumper Hydro Test US-U12	H-14-102654		SHOP TEST	
Jumper Hydro Test USA	H-14-102655		SHOP TEST	

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 24I-AY-02A Pump Pit Upgrade STEP includes design verifications performed by various methods including engineering analysis, Vendor data review, FTIs and CTIs 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 24I-AY Tank Farm Upgrades Requirements Verification Report (RVR), HNF-2700, 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 AY Tank Farm 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 upgrades to the 241-AY-02A Pump Pit. Note that acceptance criteria are included in the individual drawings, specifications, procedures, and CWP's.

TABLE 7-2

COMMERCIAL GRADE ITEM DEDICATION ACTIVITIES					
TEST NUMBER	TEST NAME	REFERENCE DOCUMENT	LOCATION	TEST DOCUMENT	INTERDEPENDENCIES
1.4.G.L.CG.1	Grating Bearing bars Tensile Test and Physical Inspection	W-314-C3, section 5500 1.3.2.2	Shop	Test Report	Test reports must be in place prior to installing any Grating.
1.4.G.L.CG.2	Steel Plate, bar and shape Tensile test and physical inspection	W-314-C3, section 05500, 1.3.2.1	Shop	Test Report	Test reports must be in place prior to installing any items for which testing was required.
1.4.G.L.CG.3	Commercial Grade Dedication for Instrumentation	W-314-C3, section 13440, 2.3.2; RVR App.C 3.3.5.1	Shop	CWP	Tests must be documented as acceptable prior to installing any components in field locations
1.4.G.L.CG.4	Commercial Grade Dedication for Piping Materials, verify pipe size	W-314-C3, section 15493, 1.2.3.1 and 2.4; RVR App.A 3.2.2.6	Shop	Test Report	Test Reports must be accepted prior to fabrication of piping spools.
1.4.G.L.CG.5	Commercial Grade Dedication for Electrical	W-314-C3, section 16400, 2.4.1	Shop	CWP	Test Reports must be accepted prior to installing any components or parts in fabricated assemblies or field locations.

7.3 Factory Tests and Inspections

The following table lists the FTIs that will be performed for modifications to 241-AY-02A Pump Pit. Note that acceptance criteria are included in the individual drawings, specifications, procedures, and CWP's.

TABLE 7-3

FACTORY TESTS AND INSPECTIONS					
TEST NUMBER	TEST NAME	REFERENCE DOCUMENT	LOCATION	TEST DOCUMENT	INTERDEPENDENCIES
1.4.G.L.F.1	Hydro and Leak tests	W-314-P1, section 3.9	Factory	Purchase order submittal	Prior to shipping

7.4 Construction Tests and Inspections

The table below lists the construction tests performed during fabrication, modification and installation to verify functionality of structures, systems and components following installation. All inspection activities performed during construction are referenced in "ACCEPTANCE INSPECTION PLAN FOR 241-AI-TANK FARM UPGRADES", W-314-C3-1, REV. 0. Note that acceptance criteria are included in the individual test drawings, specifications, procedures, and CWP's. All CWP's will be reviewed and approved by the Lead Startup Engineer, Construction QA, and Construction Management.

TABLE 7-4

CONSTRUCTION TESTS AND INSPECTIONS						
TEST NUMBER	TEST	REFERENCE DOCUMENT	LOCATION	TEST DOCUMENT	INTERDEPENDENCIES	1) REVIEW 2) APPROVAL 3) WITNESS RESPONSIBILITIES
1.4.G.L.C.1	In-Place Density Test	W-314-C3, section 02220, 3.1.7.1	Field	CWP	Required prior to excavation for all excavations	QC-3
1.4.G.L.C.2	Backfill Density Test	W-314-C1, section 02220, 3.3, 3.4, 3.5, 3.6.1, 3.8.1; RVR App.A 3.3.1.6, 3.3.1.7	Field	CWP	During & after backfill	QC-3
1.4.G.L.C.3	Expansion Anchor Inspections	W-314-C3, section 05055, 3.4.1	Field	CWP	During anchor installation	QC-3
1.4.G.L.C.4	Structural Weld Examinations	W-314-C3, section 05500, 3.4.1	Shop, Field	CWP	Prior to coating any structural pieces.	QC-3
1.4.G.L.C.5	Cover Block Special Protective Coating Application	W-314-C3, section 09855, 3.3.1; RVR App.D 3.2.2.1, 3.2.2.2, 3.2.2.8, 3.2.3, 3.2.4.1	Shop, Field	CWP	During application of each coat	QC-3
1.4.G.L.C.6	Pit Special Protective Coating Application	W-314-C3, section 09855, 3.3.1; RVR App.D 3.2.2.1, 3.2.2.2, 3.2.2.8, 3.2.3, 3.2.4.1	Shop, Field	CWP	During application of each coat	QC-3
1.4.G.L.C.7	Cover Block Painting Diagrams	W-314-C3, section 09855, 3.2.3; RVR App.B 3.7.3.2.5	Shop	CWP	Verify painting diagram matches information given in drawing s referenced in section 3.2.3.	QC-3 Operations - 2
1.4.G.L.C.8	Leak Detector Fabrication Wiring Continuity	W-314-C3, section 13440, 3.2.1.1 & section 16400, 3.3.1.1	Shop, Field	CWP	Complete prior to performing ATP.	QC-3
1.4.G.L.C.9	Leak Detector Cabinet Wiring Continuity	W-314-C3, section 13440, 3.2.1.1 & section 16400, 3.3.1.1	Shop, Field	CWP	Complete prior to performing ATP.	QC-3
1.4.G.L.C.10	Cover Block Installation Wiring Continuity	W-314-C3, section 13440, 3.2.1.1 & section 16400, 3.3.1.1	Shop, Field	CWP	Complete prior to performing ATP.	QC-3
1.4.G.L.C.11	Terminal Box Conduit & Cable Installation Wiring Continuity	W-314-C3, section 13440, 3.2.1.1 & section 16400, 3.3.1.1	Shop, Field	CWP	Complete prior to performing ATP.	QC-3
1.4.G.L.C.12	Valve Limit Switch Wiring Continuity	W-314-C3, section 13440, 3.2.1.1 & section 16400, 3.3.1.1	Shop, Field	CWP	Complete prior to performing ATP.	QC-3
1.4.G.L.C.13	Leak Detector Installation Wiring Continuity	W-314-C3, section 13440, 3.2.1.1 & section 16400, 3.3.1.1	Shop, Field	CWP	Complete prior to performing ATP.	QC-3
1.4.G.L.C.14	Cover Block Wiring Shielding Resistance to Ground	W-314-C3, section 13440, 3.2.1.2	Field	CWP	Complete prior to performing ATP	QC-3

CONSTRUCTION TESTS AND INSPECTIONS

TEST NUMBER	TEST	REFERENCE DOCUMENT	LOCATION	TEST DOCUMENT	INTERDEPENDENCIES	1) REVIEW 2) APPROVAL 3) WITNESS RESPONSIBILITIES
1.4.G.L.C.15	Terminal Box Conduit & Cable Shielding Resistance to Ground	W-314-C3, section 13440, 3.2.1.2	Field	CWP	Complete prior to performing ATP	QC-3
1.4.G.L.C.16	Valve Limit Switch Shielding Resistance to Ground	W-314-C3, section 13440, 3.2.1.2	Field	CWP	Complete prior to performing ATP	QC-3
1.4.G.L.C.17	Leak Detector Shielding Resistance to Ground	W-314-C3, section 13440, 3.2.1.2	Field	CWP	Complete prior to performing ATP	QC-3
1.4.G.L.C.18	Leak Detector Fabrication Voltage Verification	W-314-C3, section 16400, 3.3.1.2	Field	CWP	Prior to energizing equipment.	QC-3
1.4.G.L.C.19	Leak Detector Installation Voltage Verification	W-314-C3, section 16400, 3.3.1.2	Field	CWP	Prior to energizing equipment.	QC-3
1.4.G.L.C.20	Holiday Testing of Piping Protective Coatings	W-314-C3, section 15493, 3.1.6.2	Field	CWP	Prior to Backfill.	QC-3
1.4.G.L.C.21	Piping Fabrication Welding Non-Destructive Examination	W-314-C3, section 15493, 3.2.1 RVR APP.A 3.3.1.5, 3.3.4; RVR APP.B 3.3.4.1	Shop, Field	CWP	Prior to any form of pressure testing.	QC-3
1.4.G.L.C.22	Jumper Fabrication Welding Non-Destructive Examination	W-314-C3, section 15493, Appendix A, 3.3 & 4.1; RVR APP.A 3.3.1.5, 3.3.4; RVR APP.B 3.3.4.1	Shop, Field	CWP	Prior to any form of pressure testing.	QC-3
1.4.G.L.C.23	Piping Fabrication Cleanliness Inspection	W-314-C3, section 15493, 3.2.3.5; HNF-SD-W314-PDS-001 3.3.4	Shop, Field	CWP	Prior to any form of pressure testing	QC-3
1.4.G.L.C.24	Piping Fabrication Pressure Tests	W-314-C3, section 15493, 3.2.4; RVR APP.A 3.3.1.2	Field	CWP		QC-3 Lead Test Engr. - 2
1.4.G.L.C.25	Piping Installation Cleanliness Inspection	W-314-C3, section 15493, 3.2.3.5; RVR APP.A 3.3.4	Shop, Field	CWP	Prior to any form of pressure testing	QC-3
1.4.G.L.C.26	Piping Installation Pressure Tests	W-314-C3, section 15493, 3.2.4; RVR APP.A 3.3.1.2	Field	CWP		QC-3 Lead Test Engr. -2,3
1.4.G.L.C.27	Jumper Pressure Tests	W-314-C3, section 15493, Appendix A, 3.6 & 4.3; RVR APP.B 3.2.1.2.5	Shop	CWP	Test all Jumpers prior to installation in the valve pit	QC-3 Lead Test Engr. -2,3
1.4.G.L.C.28	Jumper Fabrication Inspections	W-314-C3, section 15493, Appendix A, 4.2	Shop	CWP	Prior to shop hydro	QC-3
1.4.G.L.C.29	Jumper in service Leak Test	HNF-SD-BIO-001, section 5.3.2.18, TSR-005, AC 5.12.2.a	Field	CWP and Leak Test Procedure	Installation of all jumpers and required changes at associated tank central pump pits and valve pits.	QC-3 Lead Test Engr. -2,3 Operations -2,3 COG Engr. -2
1.4.G.L.C.30	Leak Detector Cabinet Installation Elec. & Inst. Configuration & Code Compliance	W-314-C3, section 16400, 3.4.1; RVR APP.A 3.3.1.10, 3.3.1.11, 3.3.1.12; RVR APP.C 3.3.1.1, 3.3.1.2	Field	CWP	Prior to performing OTP	NEC Insp. -3
1.4.G.L.C.31	Terminal Box Conduit & Cable Installation Elec. & Inst. Configuration & Code Compliance	W-314-C3, section 16400, 3.4.1; RVR APP.A 3.3.1.10, 3.3.1.11, 3.3.1.12; RVR APP.C 3.3.1.1, 3.3.1.2	Field	CWP	Prior to performing OTP	NEC Insp. -3

CONSTRUCTION TESTS AND INSPECTIONS

TEST NUMBER	TEST	REFERENCE DOCUMENT	LOCATION	TEST DOCUMENT	INTERDEPENDENCIES	1) REVIEW 2) APPROVAL 3) WITNESS RESPONSIBILITIES
1.4.G.L.C.32	Leak Detector Installation Elec. & Inst. Configuration & Code Compliance	W-314-C3, section 16400, 3.4.1; RVR APP.A 3.3.1.10, 3.3.1.11, 3.3.1.12; RVR APP.C 3.3.1.1, 3.3.1.2	Field	CWP	Prior to performing OTP	NEC Insp. -3
1.4.G.L.C.33	Valve Limit Switch Installation Elec. & Inst. Configuration & Code Compliance	W-314-C3, section 16400, 3.4.1; RVR APP.A 3.3.1.10, 3.3.1.11, 3.3.1.12; RVR APP.C 3.3.1.1, 3.3.1.2	Field	CWP	Prior to performing OTP	NEC Insp. -3
1.4.G.L.C.34	Piping Installation 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 wall nozzles and piping	QC-3
1.4.G.L.C.35	Jumper Installation 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 wall nozzles and piping	QC-3
1.4.G.L.C.36	Cathodic Protection	W-314-C3, section 16640, 3.3.1, 3.3.2	Field	CWP	After piping installation and prior to application of protective coating on pipe	QC-3 Cog. Engr. - 2,3
1.4.G.L.C.37	Jumper Fit Up & Installation	TWRS Operations Requirement	Field	CWP	TWRS Operations witness jumper fit up, balance, & installation	Operations - 3
1.4.G.L.C.38	Jumper support leg adjustment	H-14-102651, sh 1, Note 7	Field	CWP	Prior to Cover Block Installation	QC-3

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 CTI 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 ATPs that will be performed for 241-AY-02A Pump Pit acceptance testing. 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	1) REVIEW 2) APPROVAL 3) WITNESS RESPONSIBILITIES
TWR-XXXX	Pit Leak Detection	RVR APP. A 3.3.2, 3.7.2.1.2.1, 3.7.2.1.2.2, 3.7.2.1.2.3, 3.7.2.1.3.1, 3.7.2.1.3.2, 3.7.2.1.3.3; RVR APP. B 3.3.2; RVR APP. C 3.2.2.5, 3.3.2	Field	Leak Detector installed and energized	QC -3 Design Agent -2 Design Auth. -2 Lead Test Engr. -2,3 Operations -2 Chief Test Engr. -1 Const. Mgr. -2
TWR-XXXX	Encasement Leak Detection	RVR APP. A 3.2.4.5, 3.3.2, 3.7.2.1.2.1, 3.7.2.1.2.2, 3.7.2.1.2.3, 3.7.2.1.3.1, 3.7.2.1.3.2, 3.7.2.1.3.3; RVR APP. B 3.3.2; RVR APP. C 3.2.2.5, 3.3.2	Field	Leak Detector installed and energized	Same as above
TWR-XXXX	Valve Manifold and Indicators (Position Switches)	RVR APP. B 3.7.2.1.1.4, 3.7.2.2.1, 3.7.2.2.3, 3.7.2.2.4	Field	After equipment installation on cover block	Same as above

7.6 Operational Testing

Operational testing will be conducted by utilizing OTPs. OTPs will be planned, scheduled, and conducted, on the installed SSCs, after completion and acceptance of all other test results. These detailed procedures shall determine if the installed SSCs meet the PDS functional requirements. Included in the OTP will be acceptance criteria to delineate pass/fail requirements. Operational testing is performed with actual plant equipment, operating procedures, and personnel. If an OTP has been generated but the testing of the corresponding SSC won't be performed for an extended period of time (e.g., a year or more), then the OTP must be reviewed again, prior to performance of the test, to ensure that it is still applicable. A Operational Test Report (OTR) will be generated when all test exceptions have been cleared and the test has been successfully completed. Testing of valve operators (with the valves connected), drain plug and leak detectors will be conducted with these components in their normal operating positions. Test conditions will meet the required code, design and authorization basis (i.e., Basis for Interim Operation, Technical Safety Requirements, and HNF-IP-1266, "TANK FARM OPERATIONS ADMINISTRATIVE CONTROLS") to verify that the system is functional and safe to operate. The following table describes the various sections of the OTP for the 241-AV-02A Pump Pit modifications. Note that acceptance criteria are included in the individual test document.

TABLE 7-6

OPERATIONAL TEST PROCEDURE					
Test Document	Test Description	Reference Document	Location	Inferdependencies	1) Review 2) Approval 3) Witness Responsibilities
OTP-314-XXX	Architectural: This section verifies that all components are physically in place per the drawings, that they have been correctly labeled, painted, etc. Items included are electrical boxes, cover blocks, shielding blocks, valve operators, position indicators, valve handles, drain plug handles, and jumpers between cover blocks and terminal boxes. Piping jumpers and internal pit coating are specifically excluded from this inspection as they will be verified as part of earlier construction tests witnessed by operations.	RVR APP.A 3.3.3.1; RVR APP.B 3.2.1.1.1, 3.2.2.1, 3.2.2.2, 3.3.3.1, 3.7.3.1.1.1, 3.7.3.2.1, 3.7.3.2.3; RVR APP.C 3.3.3.1	Field	All equipment in place	Design Agent -1 Design Authority -2 CM -1 Lead Test Engr. -2,3 Operations -2,3 QC -3 Chief Test Engr. -2 COG Engr. -1
	Valve Operation: This section tests the operation of the valve operators and valve position indication. Operators are verified to be able to move the valves and remote indication of the position switches at the terminal box is verified for all positions of each valve. Verify functionality of valve locking devices.		Field	All equipment in place. Locks and tags in place to prevent inadvertent transfer of waste.	
	Leak Detector and Drain plug Operation: This section verifies the operation of the leak detector and the drain plug by adding water to the pit until the leak detector actuates the alarms at 271-AN and all other appropriate locations, and actuates the master pump shutdown. Acceptance criteria for operation is the amount and rate of water that the system should detect per the design verification report. This detection test shall be repeated no less than three (3) times).	RVR APP.A 3.3.5; RVR APP.C 3.2.4.4	Field	All equipment in place, current calibration of the leak detector and the master pump shutdown system not in alarm.	

7.7 241-AY-02A Pump Pit Upgrade Test Completion

The 241-AY-02A Pump Pit 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 241-AY-02A Pump Pit Upgrade ABU (HNF-SD-W314-ABU-012) 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-C3, *Construction Specification for Tank Farm Restoration and Safe Operations AY Tank Farm 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-2700, Rev. 0, *Requirements Verification Report for AY Tank Farm Upgrades (WBS 1.4.E)*, Fluor Daniel Northwest, Inc., Richland, Washington.
- HNF-SD-W314-ABU-012, Rev. 0, *AY-02A Pump Pit Upgrade 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-C3-1, Rev. 0, *Acceptance Inspection Plan for 200 East/West Upgrades*, Fluor Daniel Hanford Corporation, Richland, Washington.

241-AY-02A PUMP PIT UPGRADE 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.G.LCG.1	Rebar Tensile Test and Physical Inspection				
1.4.G.LCG.2	Steel Plate, bar and shape Tensile test and physical inspection				
1.4.G.LCG.3	Commercial Grade Dedication for Instrumentation				
1.4.G.LCG.4	Commercial Grade Dedication for Piping Materials				
1.4.G.LCG.5	Commercial Grade Dedication for Electrical				
FACTORY TESTS AND INSPECTIONS					
1.4.G.LF.1	Hydro and Leak tests				
CONSTRUCTION TESTS AND INSPECTIONS					
1.4.G.LC.1	In-Place Density Test				
1.4.G.LC.2	Backfill Density Test				
1.4.G.LC.3	Expansion Anchor Inspections				
1.4.G.LC.4	Structural Weld Examinations				
1.4.G.LC.5	Cover Block Special Protective Coating Surface Preparation Inspection				

241-AY-02A PUMP PIT UPGRADE 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
1.4.G.L.C.6	Pit Special Protective Coating Application					
1.4.G.L.C.7	Cover Block Painting Diagrams					
1.4.G.L.C.8	Leak Detector Fabrication Wiring Continuity					
1.4.G.L.C.9	Leak Detector Cabinet Installation Wiring Continuity					
1.4.G.L.C.10	Cover Block Installation Wiring Continuity					
1.4.G.L.C.11	Terminal Box Conduit & Cable Installation Wiring Continuity					
1.4.G.L.C.12	Valve Limit Switch Wiring Continuity					
1.4.G.L.C.13	Leak Detector Installation Wiring Continuity					
1.4.G.L.C.14	Cover Block Wiring Shielding Resistance to Ground					
1.4.G.L.C.15	Terminal Box Conduit & Cable Shielding Resistance to Ground					
1.4.G.L.C.16	Valve Limit Switch Shielding Resistance to Ground					
1.4.G.L.C.17	Leak Detector Shielding Resistance to Ground					
1.4.G.L.C.18	Leak Detector Fabrication Voltage Verification					

241-AY-02A PUMP PIT UPGRADE TEST COMPLETION CHECKLIST

TEST NUMBER	TEST NAME	TEST PROCEDURE DOCUMENT NUMBER	DATE TEST COMPLETED	TEST COMPLETED AND RESULTS ACCEPTED (i.e., ALL EXCEPTIONS RESOLVED)	PRINT NAME	SIGNATURE
1.4.G.L.C.19	Leak Detector Installation Voltage Verification					
1.4.G.L.C.20	Holiday Testing of Piping Protective Coatings					
1.4.G.L.C.21	Piping Fabrication Welding Non-Destructive Examination					
1.4.G.L.C.22	Jumper Fabrication Welding Non-Destructive Examination					
1.4.G.L.C.23	Piping Fabrication Cleanliness Inspection					
1.4.G.L.C.24	Piping Fabrication Pressure Tests					
1.4.G.L.C.25	Piping Installation Cleanliness Inspection					
1.4.G.L.C.26	Piping Installation Pressure Tests					
1.4.G.L.C.27	Jumper Pressure Tests					
1.4.G.L.C.28	Jumper Fabrication Inspections					
1.4.G.L.C.29	Jumper In service Leak Test & Pit Configuration Verification					
1.4.G.L.C.30	Leak Detector Cabinet Installation Electrical & Instrumentation Configuration & Code Compliance					
1.4.G.L.C.31	Terminal Box Conduit & Cable Installation Electrical & Instrumentation Configuration & Code Compliance					

241-AY-02A PUMP PIT UPGRADE TEST COMPLETION CHECKLIST

PAGE ____ OF ____

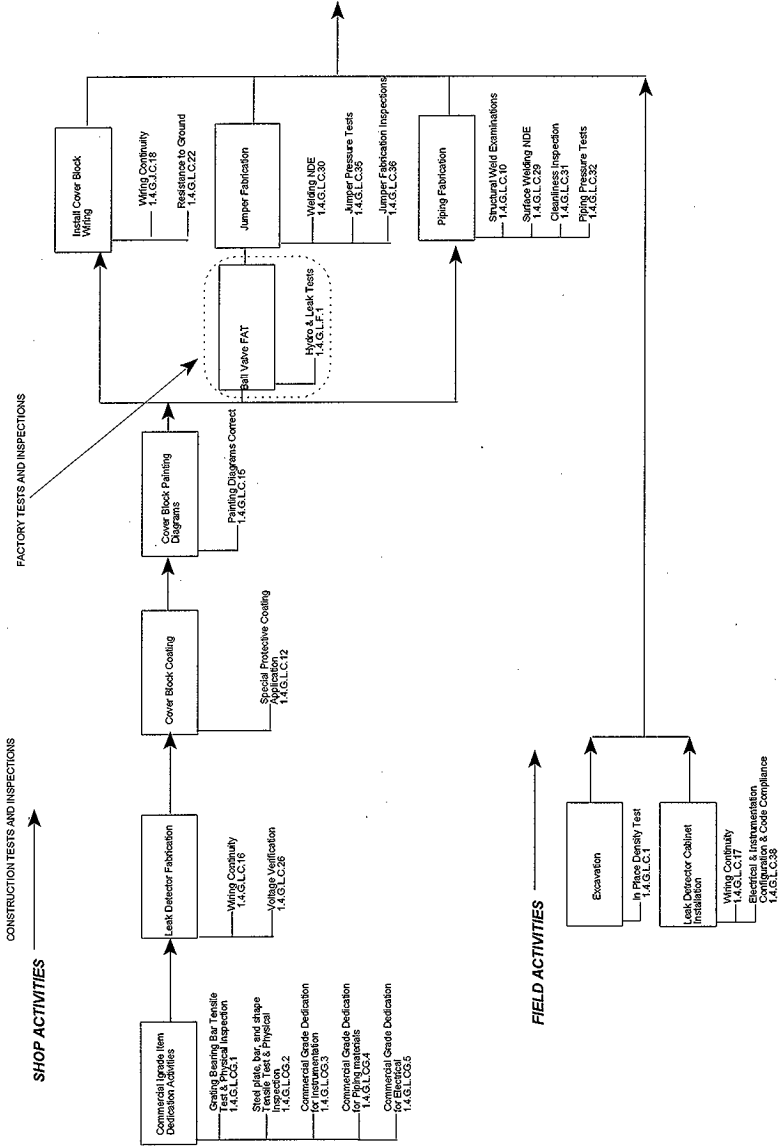
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1.4.G.L.C.32	Leak Detector Installation Electrical & Instrumentation Configuration & Code Compliance					
1.4.G.L.C.33	Valve Limit Switch Installation Electrical & Instrumentation Configuration & Code Compliance					
1.4.G.L.C.34	Piping Installation Configuration Verification					
1.4.G.L.C.35	Jumper Installation Piping Configuration Verification					
1.4.G.L.C.36	Cathodic Protection					
1.4.G.L.C.37	Jumper Fit Up & Installation					
1.4.G.L.C.38	Jumper support leg adjustment					
ACCEPTANCE TEST PROCEDURES						
TWR-XXXX	Pit Leak Detection					
TWR-XXXX	Encasement Leak Detection					
TWR-XXXX	Valve Manifold and Indicators (Position Switches)					

241-AY-02A PUMP PIT UPGRADE TEST COMPLETION CHECKLIST

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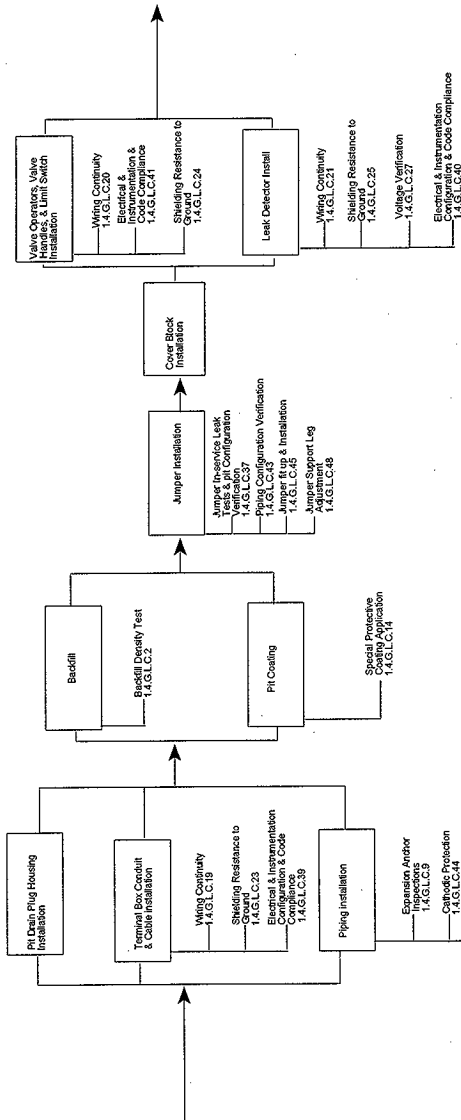
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OPERATIONAL TEST PROCEDURE						
	Architectural: This section verifies that all components are physically in place per drawings and that they have been correctly labeled, painted, etc. Items included are electrical boxes, cover blocks, shielding blocks, valve operators, position indicators, valve handles, drain plug handles, and jumpers between cover blocks and terminal boxes. Piping jumpers shall remain in place and not specifically excluded from this inspection as they will be verified as part of earlier construction tests witnessed by operations.					
	Valve Operation: This section tests the operation of the valve operators and valve position indicators. Operators are verified to be able to move the valves and remote indication of the position switches at the terminal box is verified for all positions of each valve. Verify functionality of valve locking devices.					
	Leak Detector and Drain plug Operation: This section verifies the operation of the leak detector and the drain plug by adding water to the pit until the leak detector actuates the alarms at 271-AN and all other appropriate locations, and actuates the master pump shutdown. Response checks for operation is the detection and rate of water that the system should detect per the design verification report. This detection test shall be repeated no less than three (3) times).					

241-AY-02A PUMP PIT UPGRADE LOGIC DIAGRAM (SEE TEP FIGURE B-3 FOR HIGHER LEVEL LOGIC)



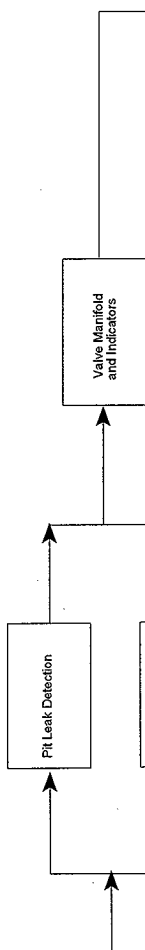
241-AY-02A PUMP PIT UPGRADE LOGIC DIAGRAM [cont.]
(SEE STEP FIGURE B-3 FOR HIGHER LEVEL LOGIC)

CONSTRUCTION TESTS AND INSPECTIONS (cont.)

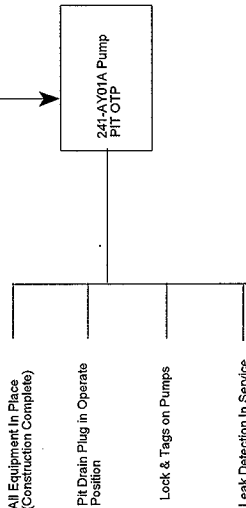


241-AY-02A PUMP PIT UPGRADE LOGIC DIAGRAM [cont.]
(SEE TEP FIGURE B-3 FOR HIGHER LEVEL LOGIC)

ACCEPTANCE TEST PROCEDURES



OPERATIONAL TEST PROCEDURE



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