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ACCEPTANCE TEST PROCEDURE FOR NEW PUMPING AND INSTRUMENTATION CONTROL SKID "L"

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Abstract:

This Acceptance Test Procedure (ATP) provides for the inspection and testing of the new Pumping and Instrumentation Control (PIC) skid designed as "L". The ATP will be performed after the construction of the PIC skid in the shop.

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ACCEPTANCE TEST PROCEDURE FOR NEW PUMPING AND INSTRUMENTATION CONTROL SKID "L"

1.0 PURPOSE

This Acceptance Test Procedure (ATP) verifies proper construction per the design drawings and tests for proper functioning of the Pumping and Instrumentation Control (PIC) skid "L". The Scope section lists the systems and functions to be checked. This ATP will be performed at the Site Fabrication Service's (SFS) shop upon completion of construction of the PIC skid.

2.0 INFORMATION

2.1 SCOPE

This Acceptance Test Procedure verifies and/or tests the following systems:

- 2.1.1 Drawing verification (Prerequisites)
- 2.1.2 Code inspections (Prerequisites)
- 2.1.3 Instrument calibrations
- 2.1.4 Continuity, megger and voltage checks
- 2.1.5 PLC Programming
- 2.1.6 Air system
- 2.1.7 Water system
- 2.1.8 PLC inputs and outputs
- 2.1.9 Heaters and air conditioner
- 2.1.10 Leak Detector Interlocks

2.2 TERMS AND DEFINITIONS

- 2.2.1 DOV - Diaphragm Operated Valve
- 2.2.2 GPM - Gallons Per Minute
- 2.2.3 IA - Instrument Air
- 2.2.4 LDE - Leak Detector Element
- 2.2.5 PRV - Pressure Relief Valve
- 2.2.6 SGT - Specific Gravity Transmitter
- 2.2.7 WFT - Weight Factor Transmitter
- 2.2.8 LT - Level Transmitter
- 2.2.9 WFIE - Weight Factor Instrument Enclosure
- 2.2.10 PLC - Programmable Logic Controller
- 2.2.11 DTAM - Data Table Access Module
- 2.2.12 PSPT - Pump Suction Pressure Transducer
- 2.2.13 PDPT - Pump Discharge Pressure Transducer
- 2.2.14 JFPT - Jumper Flush Pressure Transducer
- 2.2.15 RFPT - Recirculation Flush Pressure Transducer
- 2.2.16 PIC - Person In Charge

2.3 RESPONSIBILITIES

- 2.3.1 LMHC Quality Assurance is responsible for:

- 2.3.1.1 Witnessing and signing steps as identified in Acceptance Test Procedure.
 - 2.3.1.2 Verifying that the procedure sections were performed correctly.

- 2.3.2 Engineering personnel are responsible for:

- 2.3.2.1 Identifying the equipment needed for this procedure.
 - 2.3.2.2 Recording equipment status and data per this procedure.
 - 2.3.2.3 Conducting pre-job system walk down.
 - 2.3.2.4 Recording data, exceptions and other notes as required.
 - 2.3.2.5 Providing technical support during testing.
 - 2.3.2.6 Providing programming support during testing.
 - 2.3.2.7 Forcing data in Programmable Logic Controller program during testing.

2.4 SAFETY

Warning: 120 VAC energized circuits and leads will be encountered during test when accessing PLC input/output terminals or the serial communication port. Observe appropriate electrical precautions as directed by HNF-PRO-088, Electrical Work Safety.

Warning: Cabinets on the PIC skid contain circuits energized with 480vac and 120vac. Comply with HNF-PRO-088, Electrical Work Safety.

2.5 QUALITY ASSURANCE

Ensure that the testing is performed per this procedure. The LMHC Quality Assurance Inspector shall sign and date each procedure section verifying the data obtained, and verifying that the procedure section has been performed correctly.

2.6 GENERAL INFORMATION

- 2.6.1 All data entries recorded in this procedure shall be made in black or blue ink.
- 2.6.2 Editorial changes required to this ATP may be made by redlining the affected section by the engineer as long as the change does not impact personnel safety or the technical aspects of this procedure. These changes shall be recorded on the ATP log sheet.
- 2.6.3 Unexpected results during testing shall be logged in the Acceptance Test Procedure "Exception Log" and documented on an Acceptance Test Procedure "Exception Record."
- 2.6.4 Technical changes to this test shall be logged as "Exceptions" and documented on the "Exception Record."
- 2.6.5 Do not perform any part of this procedure on faulty equipment. If faulty equipment is discovered, STOP the execution of that section of this procedure and resolve the problem OR continue with another section until the problem is repaired.
- 2.6.6 If the performance of this procedure is suspended for any reason, ensure the equipment is left in a safe condition per direction of the test engineer and/or PIC.
- 2.6.7 This procedure DOES NOT contain separate data/verification sheets. Verification of procedural steps and validity of data is recorded in this procedure next to each step as required.
- 2.6.8 If performance of this procedure is suspended for any reason, ensure if necessary, any Lock and Tag system requirements are met before leaving the test site.

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- 2.6.9 A Job Hazard Analysis form shall be used in conjunction with the pre-job safety meeting form when any unusual hazards are identified. The pre-job meeting form shall be used to document all attendees.
- 2.6.10 An ATP log shall be used to record comments concerning ATP performance such as each day's testing activities.
- 2.6.11 The engineer or PIC may deviate from test steps if necessary to ensure safe equipment configuration during testing or suspension of testing. Configuration shall be noted so the equipment may be restored at resumption of testing.
- 2.6.12 Alarms may be acknowledged during testing at the direction of the test engineer or PIC if specific instructions are not given in the test steps.
- 2.6.13 Sections 4.2, 4.3 and 5.13 can be performed out of sequence in order to facilitate completion of this ATP.

2.7 LIMITS AND PRECAUTIONS

NONE

3.0 RECORDS

3.1 RECORD COPY

The record copy of this procedure when completed shall be kept with the fabrication work package.

3.2 TEST RESULTS

A test report, RPP-5056 shall be issued with the final test results upon completion of this ATP.

4.0 PREREQUISITES

4.1 DRAWING VERIFICATION

A check of the constructed skid is to be compared to either the redlined drawings or the final unreleased skid drawings. Engineering and Quality Assurance shall verify the accuracy of the essential and support drawings. Engineering shall determine a resolution for all discrepancies by either correcting the drawings or changing the equipment.

The following drawings shall be walked down for verification of proper construction of the skid:

- 4.1.1 Wire terminations and wiring labeling on drawings H-14-103538, sheets 7 through 12 and H-14-103541, sheet 5.
- 4.1.2 Panel board arrangement on drawing H-14-103537.
- 4.1.3 Flow diagrams on drawings H-14-103538, sheet 5 and H-14-103543.

Drawing verification completed. (Final drawing release is not required to continue with this ATP.)

Cognizant Engineer Signature

Date

Quality Assurance Inspector Signature

Date

4.2 PRESSURE VESSEL INSPECTION

A pressure vessel inspection by a third party inspector is required for the air compressor, the air receiver tank and relief valves located in the air compressor cabinet and the water tank and relief valves in the water cabinet. The inspection is to verify that the equipment meets National Codes for pressure vessels. An outside-certified inspector will perform this inspection. (This inspection shall be completed prior to checking the air compressor and water systems.)

Pressure vessel inspection report received. (The ATP can continue before the report is received, but must be received prior to performing section 5.8.)

Report # _____

Quality Assurance Inspector Signature

Date

4.3 NATIONAL ELECTRICAL CODE (NEC) INSPECTION

- 4.3.1 An NEC inspection shall be performed to verify compliance to NFPA 70, latest version.
- 4.3.2 Areas in particular to be inspected are 480vac and 120vac wiring and grounding.
- 4.3.3 An NEC inspection sticker is to be placed inside the panel board door upon the NEC inspector's acceptance of the electrical portion of the skid.

The NEC inspection performed and an NEC inspection sticker placed on the panel board door. (This needs to be completed prior to the section 5.0 functional checks.)

Report # _____

Quality Assurance Inspector Signature

Date

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4.4 SUPPLIES

The following supplies are required for this ATP:

Note: Test sections may commence prior to assembly of all the test equipment. Engineer and/or PIC are to ensure test equipment available prior to the start of each section.

4.4.1 Volt/ohm meter (VOM): Portable, 0-600vac.

Calibration No. _____ Exp. Date _____ QA _____

Calibration No. _____ Exp. Date _____ QA _____

4.4.2 Transmation current (milliamp) simulator or equivalent

Calibration No. _____ Exp. Date _____ QA _____

Calibration No. _____ Exp. Date _____ QA _____

4.4.3 Manometer (capable of a minimum of 5 inches water gauge to a maximum of 20 inches water gauge for this ATP) must have a read out of variable test pressure.

Calibration No. _____ Exp. Date _____ QA _____

Calibration No. _____ Exp. Date _____ QA _____

4.4.4 Megaohm meter, at least 500vac range.

Calibration No. _____ Exp. Date _____ QA _____

4.4.5 _____ 480vac, 3 phase, 30-ampere power source for PIC skid.

4.4.6 _____ Selector switches (2 each) with at least one NO and one NC contact.

4.4.7 _____ Proximity switches (for simulating LS-1 and LS-2), 2 each.

4.4.8 _____ Leak detector probes (2 each), (Not required to be green tagged.) or 2 ON/OFF switches can be used to simulate leak detectors.

4.5 PRESTART CONDITIONS

- 4.5.1 _____ Fill the water tank at least one-third to half full of water.
- 4.5.2 _____ Ensure the PIC skid is grounded in preparation for ATP testing.
- 4.5.3 Ensure the following PIC skid valves in the WFIE cabinet are OPEN prior to starting this ATP.

_____ SALW-V-6035L (EQUALIZING)
_____ SALW-V-6036L (EQUALIZING)

- 4.5.4 Ensure the following PIC skid valves are CLOSED prior to starting this ATP.

Air Compressor cabinet:

_____ SALW-V-6025L
_____ SALW-V-6026L
_____ SALW-V-6034L
_____ SALW-V-6043L
_____ SALW-V-6044L
_____ SALW-V-6046L
_____ SALW-V-6047L
_____ SALW-V-6048L
_____ SALW-V-6049L

Water cabinet:

SALW-V-6027L
SALW-V-6028L
SALW-V-6029L
SALW-V-6030L
SALW-V-6031L
SALW-V-6032L
SALW-V-6037L

WFIE Cabinet:

_____ SALW-V-6001L	_____ SALW-V-6015L
_____ SALW-V-6002L	_____ SALW-V-6016L
_____ SALW-V-6003L	_____ SALW-V-6017L
_____ SALW-V-6004L	_____ SALW-V-6018L
_____ SALW-V-6005L	_____ SALW-V-6019L
_____ SALW-V-6006L	_____ SALW-V-6020L
_____ SALW-V-6007L	_____ SALW-V-6021L
_____ SALW-V-6008L	_____ SALW-V-6035L LOW
_____ SALW-V-6011L	_____ SALW-V-6035L HIGH
_____ SALW-V-6012L	_____ SALW-V-6036L LOW
_____ SALW-V-6013L	_____ SALW-V-6036L HIGH
_____ SALW-V-6014L	

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- 4.5.5 Ensure the following PIC skid circuit disconnects, breakers and fuses are OPEN or OFF prior to starting this ATP.

____ SALW-DS-6002L ____ SALW-DS-6003L ____ SALW-DS-6004L
____ SALW-DS-6005L

The following breakers are in distribution panel SALW-DP-6001L:

____ Breaker "MAIN"	____ Breaker 2
____ Breaker 1	____ Breaker 4
____ Breaker 3	____ Breaker 6
____ Breaker 5	____ Breaker 8
____ Breaker 7	____ Breaker 10
____ Breaker 9	____ Breaker 12
____ Breaker 11	____ Breaker 14
____ Breaker 13	

The following fuses are inside the Instrument Enclosure:

____ Fuses FA/FB ____ Fuses FC/FD
____ Fuses (Leak detector/Heat trace)

- 4.5.6 Check for loose electrical connections at the following locations:

____ Terminal boards in Instrument Enclosure
____ Motor starters and disconnect switches
____ Terminal board in junction box inside the WFIE cabinet
____ Terminal board in junction box for FGM outside WFIE cabinet
____ Terminal board in heat trace splice box outside WFIE cabinet
____ Distribution panel board
____ 480vac power plug

- 4.5.7 ____ Ensure desiccant and filters are installed in the air compressor dryer and the before and after filters.
- 4.5.8 ____ All personnel initialing and/or signing this procedure shall enter their signature and initials on the Procedure Performer Signature Sheet on the last page of this document.
- 4.5.9 ____ A pre-job safety meeting has been held before starting section 5.0 of this ATP.

5.0 PROCEDURE

5.1 CONTINUITY CHECKS

Continuity checks shall be performed with a calibrated VOM. Perform the checks as identified below. Readings are to be less than 1 ohm. Record ohms reading on the line(s) provided. Out of tolerance readings must be corrected and rechecked prior to going to the next section. NOTE: NEC inspection must be completed prior to proceeding.

- 5.1.1 480vac main power plug to line side of main disconnect switch (SALW-DS-6002L). Check all three phases and ground.

____(RED) ____ (YELLOW) ____ (BLUE) ____ (GND)

- 5.1.2 Load side of main disconnect switch (SALW-DS-6002L) to line side of transformer disconnect switch (SALW-DS-6003L). Check all three phases and ground.

____(RED) ____ (YELLOW) ____ (BLUE) ____ (GND)

- 5.1.3 Load side of main disconnect switch (SALW-DS-6002L) to line side of jet pump motor starter (SALW-DS-6005L). Check all three phases and ground.

____(RED) ____ (YELLOW) ____ (BLUE) ____ (GND)

- 5.1.4 Load side of main disconnect switch (SALW-DS-6002L) to line side of air compressor motor starter (SALW-DS-6004L). Check all three phases and ground.

____(RED) ____ (YELLOW) ____ (BLUE) ____ (GND)

- 5.1.5 Load side of transformer disconnect switch (SALW-DS-6003L) through primary of transformer (SALW-XFMR-6001L). Check between the two-phase wires going to the transformer.

____(continuity through transformer primary)

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- 5.1.6 Line side of main breaker in panel board (SALW-DP-6001L) through secondary of transformer (SALW-XFMR-6001L). Check between the two phases and between each phase and neutral going to the transformer secondary.

____ (Phase-A to phase-C, continuity through transformer secondary)

____ (Phase-A to neutral, continuity through transformer secondary)

____ (Phase-C to neutral, continuity through transformer secondary)

- 5.1.7 Load side of breakers in distribution panel (SALW-DP-6001L) to terminal point identified:

____ Circuit 3 to TB10 in Instrument Enclosure

____ Circuit 5 to TB13 in Instrument Enclosure

____ Circuit 12 to Air Conditioner/Heater receptacle in Instrument Enclosure

____ Circuit 6 to safe side terminal board in Intrinsic Safe Panel

____ Circuit 1 to terminal board in FGM power junction box

____ Circuit 11 to terminal board in FGM power junction box

____ Circuit 13 to terminal board in FGM power junction box

____ Circuit 14 to terminal board in FGM power junction box

____ Circuit 2 to terminal board in FGM heat trace splice box

____ Circuit 10 to terminal board in FGM heat trace splice box

____ Circuit 4 to receptacle in air compressor cabinet

____ Circuit 7 to receptacles in WFIE cabinet

____ Circuit 8 to receptacle in Water cabinet

____ Circuit 9 to outside receptacle below panel board

Section 5.1 completed and all recorded readings within tolerance.

Quality Assurance Inspector Signature

Date

5.2 MEGGERING OF POWER WIRES

The power wires shall be checked for resistance to ground and phase to phase. A 500-volt megger shall be used for this check. Minimum acceptable readings expected are greater than 1000 megaohm or infinity. Test the circuits listed below. Record readings on the lines provided. Out of tolerance readings must be corrected and rechecked before going to the next section.

- 5.2.1 Each of the three phases at the pins of the power plug to ground and phase to phase. (Ensure main disconnect SALW-DS-6002L is OPEN.)

A-GND _____; B-GND _____; C-GND _____; A-B _____; A-C _____; B-C _____

- 5.2.2 Each of the three phases at the load side of the main disconnect switch (SALW-DS-6002L) to ground and phase to phase. (Ensure switches SALW-DS-6003L, SALW-DS-6004L and SALW-DS-6005L are OPEN.)

A-GND _____; B-GND _____; C-GND _____; A-B _____; A-C _____; B-C _____

- 5.2.3 Each of the two phases on the load side of the transformer disconnect switch (SALW-DS-6003L) to ground.

A-GND _____; B-GND _____;

- 5.2.4 Each of the three phases on the load side of the air compressor motor to ground.

A-GND _____; B-GND _____; C-GND _____

- 5.2.5 _____ Disconnect the neutral at the distribution panel from ground.

- 5.2.6 Each of the two phases and neutral to ground at the distribution panel.

A-GND _____; B-GND _____; NEUTRAL-GND _____

- 5.2.7 _____ Reconnect the ground to the neutral at the distribution panel.

- 5.2.8 _____ Disconnect the circuit 6 wire at the safe side terminal block in the intrinsic safe panel.

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- 5.2.9 Megger each of the 14 circuits from the wire disconnected at the load side of the breaker to ground in the distribution panel.

NOTE: Disconnect each wire from the load side of the breaker prior to performing the megger check. Reconnect after meggering.

CKT.#1 to GND____; CKT.#2 to GND____; CKT.#3 to GND____; CKT.#4 to GND____; CKT.#5 to GND____; CKT.#6 to GND____; CKT.#7 to GND____; CKT.#8 to GND____; CKT.#9 to GND____; CKT.#10 to GND____; CKT.#11 to GND____; CKT.#12 to GND____; CKT.#13 to GND____; CKT.#14 to GND____;

- 5.2.10 _____Ensure the load-side wire at each breaker is connected.

- 5.2.11 _____Reconnect the circuit-6-wire to the safe side terminal board at the Intrinsic safe panel.

Section 5.2 completed and all recorded readings are within tolerance.

Quality Assurance Inspector Signature

Date

5.3 ELECTRICAL POWER CHECKS

The voltage checks are to verify proper voltages throughout the skid at specific termination points. Voltages checked are 480vac, 3 phase; 120vac, single phase; and 24vdc. Out of tolerance readings must be corrected when found before going to the next step in this section.

- 5.3.1 _____ Ensure that all electrical connections are completed. Wires lifted during the megger checks are to be reconnected.
- 5.3.2 _____ Ensure all switches and breakers are open and the six fuses in the instrument cabinet are open.
- 5.3.3 _____ Ensure that all the fuses are in the two safety switches (SALW-DS-6002L) (SALW-DS-6003L) and motor starters (SALW-DS-6004L) (SALW-DS-6005L) including the control transformers are installed.
- 5.3.4 _____ Connect the main power plug on the skid to a three phase, 480vac power source. Source to be protected by no greater than 30 amperes over current protection.
- 5.3.5 _____ Turn ON the power source to the skid.
- 5.3.6 _____ Verify 480vac +10vac/-20vac on the line side of the main disconnect switch (SALW-DS-6002L). Record the voltage.
- _____ vac A-B
_____ vac A-C
_____ vac B-C
- 5.3.7 _____ Close the main disconnect switch (SALW-DS-6002L).
- 5.3.8 _____ Verify 480vac +10vac/-20vac on the line side of the transformer disconnect switch (SALW-DS-6003L). Record the voltage.
- _____ vac A-C
- 5.3.9 _____ Verify 480vac +10vac/-20vac on the line side of the air compressor motor starter (SALW-DS-6003L). Record the voltage.
- _____ vac A-B
_____ vac A-C
_____ vac B-C

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- 5.3.10 _____ Verify 480vac +10vac/-20vac on the line side of the pump motor starter (SALW-DS-6005L). Record the voltage. _____ vac A-B
_____ vac A-C
_____ vac B-C
- 5.3.11 _____ Remove the dead front on the panel board (SALW-DP-6001L) for access to the main breaker for a voltage measurement.
- 5.3.12 _____ Close the transformer disconnect switch (SALW-DS-6003L).
- 5.3.13 _____ Check for 240vac +10/-20 at the line side of the main breaker. Record voltage. _____ vac
- 5.3.14 _____ Open the transformer disconnect switch (SALW-DS-6003L).
- 5.3.15 _____ Replace the dead front on the panel board (SALW-DP-6001L).
- 5.3.16 _____ Close the transformer disconnect switch (SALW-DS-6003L).
- 5.3.17 _____ Close the 100 ampere main breaker in the panel board (SALW-DP-6001L).

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5.3.18 _____ Check voltages for circuits at the following locations. Record the voltage reading on the space provided.

CKT #	CHECK VOLTAGE AT	BKR OPEN VOLTAGE (NEAR 0vac)	BKR CLOSED VOLTAGE (120+/-10vac)	OPEN BKR
1	FGM J-BOX			
2	FGM HT BOX			
3	TB10, INSTR PNL			
4	RCPT, AIR COMP			
5	TB13, INSTR PNL			
6	TB, INTRINSIC PNL			
7	RCPT, WFIE			
8	RCPT, WATER CAB			
9	OUTSIDE RCPT.			
10	FGM HT BOX			
11	FGM J-BOX			
12	RCPT, INSTR PNL			
13	FGM J-BOX			
14	FGM J-BOX			

5.3.19 _____ Install fuses FA, FB, FC and FD and close fuseholder.

5.3.20 _____ Install fuses and close heat trace/leak detector fuseholder.

5.3.21 _____ Verify 120vac +/-10vac at the following fuseholder load side locations.

FA _____; FB _____; FC _____; FD _____;

Heat trace fuse(wire CKT3H-B) _____;

Leak Detector fuse(wire CKT3H-A) _____

5.3.22 _____ Verify 24vdc +/-2vdc at each 24vdc power supply.

First power supply _____; second power supply _____

5.3.23 _____ Open the 100 ampere main breaker in the panel board (SALW-DP-6001L).

5.3.24 _____ Open the transformer disconnect switch (SALW-DS-6003L).

5.3.25 _____ Open the main disconnect switch (SALW-DS-6002L).

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Voltage checks completed satisfactorily.

Quality Assurance Inspector Signature

Date

5.5 SKID ELECTRICAL POWER UP

During the following sections for instrument calibration and PLC/DTAM programming, electrical power will be required to the skid. The following sequence can be used to power up and power down the skid. Record breakers closed or opened in table below. Only circuits required to be powered need to be closed.

SWITCH OR BREAKER	Close	Open	Close	Open	Close	Open	Close	Open
SALW-DS-6002L								
SALW-DS-6003L								
CKT. #1								
CKT. #2								
CKT. #3								
CKT. #4								
CKT. #5								
CKT. #6								
CKT. #7								
CKT. #8								
CKT. #9								
CKT. #10								
CKT. #11								
CKT. #12								
CKT. #13								
CKT. #14								

5.6 CALIBRATIONS

Instrumentation equipment on the skid requires calibration prior to the functional testing. Lockheed Martin procedures will be used for this calibration. The table below identifies the equipment requiring calibration and the procedure for performing the calibration.

INSTRUMENT	LOCATION	PROCEDURE
SALW-PS-6004L	INSTRU. AIR CAB.	6-PCD-508
SALW-WFT-6002L	WFIE CABINET	6-PCD-361
SALW-LT-6003L	WATER CABINET	6-PCD-361
SALW-SGT-6001L	WFIE CABINET	6-PCD-361
SALW-CONV-6001L	WFIE CABINET	6-CVT-520
SALW-FQIT-6001L	INSTRUMENT CAB.	Data sheet & Vendor Man.
SALW-PI-6006L	AIR COMPRS. CABINET	6-TF-509
SALW-PI-6001L	WFIE CABINET	6-TF-509
SALW-PI-6005L	WFIE CABINET	6-TF-509
SALW-PI-6002L	WFIE CABINET	6-TF-509
SALW-PI-6003L	WFIE CABINET	6-TF-509
SALW-PI-6004L	WFIE CABINET	6-TF-509
SALW-PI-6007L	AIR COMPRS. CABINET	6-TF-509
SALW-PI-6008L	WATER CABINET	6-TF-509

Calibrations completed. Work package no. _____

Engineer Signature

Date

5.7 PLC/DTAM PROGRAMMING

This section is where the programs for the PLC and DTAM will be entered. Power will be required at the instrument cabinet to power up the PLC and DTAM. Power will also be required to the GFCI receptacle for power to the laptop computer. Lockheed Martin Interim Stabilization engineering will perform the programming of the PLC and DTAM. The final software programs shall be documented as required by HNF-3828, section 3.4. This documentation is not part of this ATP, but will be tracked by the Acceptance for Beneficial Use (ABU) document.

PLC/DTAM programmed.

Engineer Signature

Date

5.8 SKID ELECTRICAL AND PROCESS AIR POWER-UP

NOTE: The Third Party Pressure Vessel inspection report must be received prior to proceeding with this section. Refer to section 4.2.

5.8.1 **ENSURE** the skid and remote equipment are connected before proceeding with the functional testing.

5.8.2 **ENERGIZE** the Pumping and Instrumentation Control Skid by **CLOSING** the following DISCONNECT SWITCHES in the order found below:

DISCONNECT SWITCH	ENERGIZED (✓)
SALW-DS-6002L	
SALW-DS-6003L	
SALW-DS-6004L	
SALW-DS-6005L	

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5.8.3 _____ **ENERGIZE** the Pumping and Instrumentation Control Skid by
CLOSING the following Circuit Breakers located in SALW-DP-6001L
"SALW SKID DIST PNL" in the order found below:

DISCONNECT SWITCH	ENERGIZED (✓)
"MAIN"	
1, FGM AND HEATER (SPARE)	
3, HEAT TRACE & LEAK DETECTION IN INSTRUMENT ENCLOSURE	
5, INSTRUMENT CABINET	
7, WEIGHT FACTOR INSTRUMENT ENCLOSURE RECEPTACLES	
9, RECEPTACLE NEAR PNLBD	
11, FGM AND HEATER	
13, FGM SAMPLE/RETURN HEAT TRACE (SPARE)	
2, HEAT TRACE/FGM IA LINE (SPARE)	
4, AIR COMPRESSOR CABINET FAN, HEATER & RECEPTACLE (GFCI)	
6, INTRINSICALLY SAFE PANEL	
8, WATER TANK CABINET HEATER	
10, HEAT TRACE FOR DIPTUBES & FGM IA LINE	
12, INSTR CAB A/C & HTR RCPT	
14, FGM SAMPLE/RETURN HEAT TRACE	

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- 5.8.4 _____ **ACKNOWLEDGE** any initial skid alarms.
- 5.8.5 _____ **OPEN** valve SALW-V-6034L (located in the Air COMP Cabinet).
- 5.8.6 _____ **START** air compressor SALW-CMP-6001L "SALW SKID IA
COMP" by **POSITIONING** switch on the SALW-DS-6004L to the ON
position.
- 5.8.7 _____ **VERIFY** that Air Compressor starts and builds up pressure **AND**
shuts off at 86 to 94 psig, as indicated by pressure gauge SALW-PI-6006L
(AIR DRYER INLET PRESS). Record shut off pressure: _____psig
- _____
Engineer Signature Date
- 5.8.8 **CHECK** the tubing in the instrument air cabinet using a soap and water
test to visually identify any air leaks. Repair as necessary. Deenergize the
compressor motor and bleed off air as necessary to make repairs.
- 5.8.9 _____ **BLEED** off air by slowly opening valve SALW-V-6043L until the
compressor restarts, then close the valve and note the restart pressure.
- 5.8.10 _____ **VERIFY** the air compressor restarts upon low pressure of 58 to 62
psig. Record pressure: _____psig
- 5.8.11 _____ **VALVE** in air to the PIC Skid Water Tank by **SLOWLY**
PERFORMING the following (Refer to H-14-103543 Sheet 1):
- 5.8.12 **CHECK** for air leaks as each remaining step in this section is performed.
Make repairs as necessary. Deenergize compressor motor and bleed off
air pressure if necessary to make the repairs.
- 5.8.13 _____ **SLOWLY OPEN** valve SALW-V-6025L located in the air
compressor cabinet.
- 5.8.14 _____ **SLOWLY OPEN** valve SALW-V-6027L (located near the water
tank).
- 5.8.15 _____ **SLOWLY OPEN** valve SALW-V-6028L (located near the water
tank).

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- 5.8.16 **ADJUST** Pressure Regulator Valve SALW-PCV-6006L to 30 psi ($\pm$ 3 psig) as indicated by pressure gauge SALW-PI-6008L (WTR TK PRESS).
- 5.8.17 **VALVE IN** air to WFIE Cabinet by **PERFORMING** the following (Refer to H-14-103543 Sheet 1):
- 5.8.18 **SLOWLY OPEN** valve SALW-V-6026L located in the Air Compressor Cabinet.
- 5.8.19 **SLOWLY OPEN** valve SALW-V-6001L, located in the bottom of WFIE Cabinet. (NOTE: SALW-PRV-6002L may open if pressure through SALW-PCV-6001L is too high.)
- 5.8.20 **ADJUST** pressure control valve SALW-PCV-6001L in WFIE Cabinet to 20 psi ($\pm$ 2.5 psi) as indicated by the pressure gauge located on the face of the valve.
- 5.8.21 **SLOWLY OPEN** valve SALW-V-6004L, located in the middle of WFIE Cabinet.
- 5.8.22 **SLOWLY OPEN** valve SALW-V-6003L, located in the middle of WFIE Cabinet.

CAUTION: The next three steps cause air to flow from ports on outside of WFIE cabinet.

- 5.8.23 **SLOWLY OPEN** valve SALW-V-6005L, located in the bottom left of WFIE Cabinet.
- 5.8.24 **SLOWLY OPEN** valve SALW-V-6006L, located in the bottom left of WFIE Cabinet.
- 5.8.25 **SLOWLY OPEN** valve SALW-V-6007L, located in the bottom left of WFIE Cabinet.
- 5.8.26 **SLOWLY OPEN** valve SALW-V-6020L, located in the middle left of WFIE Cabinet.
- 5.8.27 **SLOWLY OPEN** valve SALW-V-6021L, located in the middle left of WFIE Cabinet.
- 5.8.28 **SLOWLY OPEN** valve SALW-V-6019L, located in the middle left of WFIE Cabinet.

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5.8.29 _____ **ADJUST** the air flow through the diptubes by **PERFORMING** the following:

5.8.30 _____ **ADJUST** flow to dip tubes to 1.5 CFH ($\pm$ 0.5 CFH) as indicated by SALW-FIV-6002L.

Flow	Engineer Signature	Date
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5.8.31 _____ **ADJUST** flow to dip tubes to 1.5 CFH ($\pm$ 0.5 CFH) as indicated by SALW-FIV-6003L.

Flow	Engineer Signature	Date
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5.8.32 _____ **ADJUST** flow to dip tubes to 1.5 CFH ($\pm$ 0.5 CFH) as indicated by SALW-FIV-6004L.

Flow	Engineer Signature	Date
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5.8.33 _____ **VALVE IN SALW-WFT-6002L AND SALW-SGT-6001L** by **PERFORMING** the following:

5.8.34 _____ **ENSURE** the LOW side **AND** HIGH side isolation valves, located on SALW-V-6036L in cabinet WFIE Cabinet are OPEN.

5.8.35 _____ **ENSURE** SALW-WFT-6002L EQUALIZING valve on valve manifold SALW-V-6036L in cabinet WFIE Cabinet is CLOSED.

5.8.36 _____ **ENSURE** the LOW side **AND** the HIGH side isolation valves, located on SALW-V-6035L in cabinet WFIE Cabinet are OPEN.

5.8.37 _____ **ENSURE** SALW-SGT-6001L equalizing valve on valve manifold SALW-V-6035L in cabinet WFIE Cabinet is CLOSED.

5.8.38 _____ **CONFIRM** that a signal is present between WFIE Cabinet instruments and the Programmable Logic Controller by **PERFORMING** the following:

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- 5.8.39 _____ **VERIFY** Weight Factor is approximately 0.0" (± 0.5 ") Water Gauge as indicated by Data Table Access Module. If DTAM displays "<<<<" indicating less than zero, verify continuity between the transmitter and the Programmable Logic Controller and proceed with the test.

Engineer Signature

Date

- 5.8.41 _____ **VERIFY** Specific Gravity is approximately 0.0" (± 0.5 ") Water Gauge as indicated by Data Table Access Module. If DTAM displays "<<<<" indicating less than zero, verify continuity between the transmitter and the Programmable Logic Controller and proceed with the test.

Engineer Signature

Date

- 5.8.42 _____ **OPEN** valve SALW-V-6035L Equalizing.

- 5.8.43 _____ **CLOSE** valves SALW-V-6035L HI and LO.

- 5.8.44 _____ **OPEN** valve SALW-V-6036L Equalizing.

- 5.8.45 _____ **CLOSE** valves SALW-V-6036L HI and LO.

- 5.8.46 _____ **CLOSE** valves SALW-V-6019L, SALW-V-6021L and SALW-V-6020L.

- 5.8.47 _____ **VERIFY** all air leaks repaired.

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5.8.48 Engineer to **VERIFY** that section 5.8 is complete by **SIGNING** below.

Engineer Signature

Date

5.8.49 Quality Assurance Inspector to **VERIFY** that section 5.8 is complete by signing below.

Quality Assurance Inspector Signature

Date

5.9 SKID WATER DRIP SYSTEM

5.9.1 _____ **Provide** a container to capture water expelled from the dip tubes and pressure relief valve SALW-PRV-6001L on the outside of the WFIE cabinet.

5.9.2 _____ **ACTUATE** the Dip Tube Drip system by **SLOWLY OPENING** the following valves:

VALVES	OPEN (✓)
SALW-V-6016L located in the middle of WFIE Cabinet	
SALW-V-6013L located in the middle of WFIE Cabinet	
SALW-V-6008L located in the middle of WFIE Cabinet	

CAUTION

Relief valve (SALW-PRV-6001L) will actuate and relieve pressure at 25 psig.

5.9.3 _____ **SLOWLY OPEN SALW-V-6018L WHILE CAREFULLY ADJUSTING** Pressure Regulator SALW-PCV-6005L, located in the bottom of WFIE Cabinet to 20 psig (± 2 psig) as indicated by SALW-PI-6001L in the middle of WFIE Cabinet.

5.9.4 _____ **ADJUST** valve SALW-V-6014L to allow **APPROXIMATELY 2** drops/second as indicated by sight glass SALW-FG-6001L (± 1 drop/second).

5.9.5 _____ **ADJUST** valve SALW-V-6015L to allow **APPROXIMATELY 2** drops/second as indicated by sight glass SALW-FG-6002K (± 1 drop/second).

5.9.6 _____ **VALVE OUT** the dip tube drip water by **SLOWLY CLOSING** the following:

VALVE	CLOSED (✓)
SALW-V-6015L located in the middle of WFIE Cabinet	
SALW-V-6014L located in the middle of WFIE Cabinet	
SALW-V-6008L located in the middle of WFIE Cabinet	
SALW-V-6013L located in the middle of WFIE Cabinet	

5.9.7 _____ **Ensure** equalizing valve SALW-V-6035L is **OPEN**.

5.9.8 _____ **Ensure** HI and LO isolation valves on SALW-V-6035L are **CLOSED**.

5.9.9 _____ **Ensure** equalizing valve SALW-V-6036L is **OPEN**.

5.9.10 _____ **Ensure** HI and LO isolation valves on SALW-V-6036L are **CLOSED**.

5.9.11 _____ **Ensure** the following valves in the order listed: SALW-V-6019L, SALW-V-6021L, SALW-V-6020L, SALW-V-6007L, SALW-V-6006L, and SALW-V-6005L are **CLOSED**.

5.9.12 _____ **SLOWLY** open valve SALW-V-6044L in the Air Compressor Cabinet.

5.9.13 _____ **Verify** air flows from pressure regulator SALW-PCV-6007L outside Air Compressor Cabinet.

5.9.14 _____ **CLOSE** valve SALW-V-6044L in the Air Compressor Cabinet.

5.9.15 _____ **SLOWLY** open valve SALW-V-6048L in Air Compressor Cabinet.

5.9.16 _____ **Verify** air flows from pressure regulator SALW-PCV-6008L outside Air Compressor Cabinet.

5.9.17 _____ **CLOSE** valve SALW-V-6048L in the Air Compressor Cabinet.

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- 5.9.18 _____ **SLOWLY** crack open valve SALW-V-6046L in the Air Compressor Cabinet to **VERIFY** air flow at the fitting for the AOV, then **RECLOSE** SALW-V-6046L.
- 5.9.19 _____ **SLOWLY** crack open valves SALW-V-6047L and SALW-V-6046L in the Air Compressor Cabinet to **VERIFY** air flow at the drain line.
- 5.9.20 _____ **CLOSE** valves SALW-V-6047L and SALW-V-6046L in the Air Compressor Cabinet.
- 5.9.21 _____ **SLOWLY** crack open valve SALW-V-6043L in the Air Compressor Cabinet to **VERIFY** air flow at the tank drain line.
- 5.9.22 _____ **CLOSE** valve SALW-V-6043L in the Air Compressor Cabinet.
- 5.9.23 Engineer to **VERIFY** that section 5.9 is complete by **SIGNING** below.

Engineer Signature

Date

- 5.9.24 Quality Assurance Inspector to **VERIFY** that section 5.9 is complete by signing below.

Quality Assurance Inspector Signature

Date

5.10 ANALOG INPUT SIGNALS TO THE PLC AND DTAM

Water Tank Level Transmitter

- 5.10.1 _____ **PREPARE** the Water Tank Level Transmitter SALW-LT-6003L for test signals by **PERFORMING** the following:
- 5.10.2 _____ **ENSURE** valve SALW-V-6029L, located in the bottom of WATER TANK ENCL, is CLOSED.
- 5.10.3 _____ **ENSURE** valve SALW-V-6031L, located in the bottom of WATER TANK ENCL, is CLOSED.
- 5.10.4 _____ **CONNECT** 0-62" test Manometer pressure source to the HIGH PRESSURE vent/test port of the level transmitter SALW-LT-6003L.
- 5.10.5 _____ **VERIFY** the LOW PRESSURE vent/test port of the level transmitter SALW-LT-6003L is OPEN to atmosphere.
- 5.10.6 _____ **ADJUST** the test Manometer on the SALW-LT-6003L to a pressure of 31" Water Gauge (± 1 ").
- 5.10.7 _____ **RECORD** the following:

<p>DATA TABLE ACCESS MODULE WATER TANK LEVEL (RANGE: 28.5 TO 33.5 Inches)</p>

NOTE - In the next step, the alarm should annunciate between 11.75" and 12.75" Water Gauge.

- 5.10.8 _____ **VERY SLOWLY DECREASE** the Level Transmitter test Manometer pressure **UNTIL** the Data Table Access Module "PIC WATER LEVEL LOW" alarm (alarm 9) annunciates.
- 5.10.9 _____ **ACKNOWLEDGE** the Water Tank Low Level alarm at the Data Table Access Module.

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- 5.10.10 **OBSERVE** the Data Table Access Module **AND RECORD** the water tank level readings below:

DATA TABLE ACCESS MODULE WATER TANK LEVEL (RANGE 11.75 to 12.75 inches Water Gauge)

- 5.10.11 **SLOWLY INCREASE** the Level Transmitter test Manometer pressure to 15.5" Water Gauge.

- 5.10.12 **OBSERVE** the Data Table Access Module **AND RECORD** the water tank level readings below:

DATA TABLE ACCESS MODULE WATER TANK LEVEL (RANGE 14.5 to 16.5 inches)

- 5.10.13 **VERIFY** "PIC WATER" is back to "norm" on DTAM.

- 5.10.14 **REMOVE** the test manometer from the SALW-LT-6003L high pressure vent/test port, **AND RE-INSTALL** vent plugs.

- 5.10.15 **RESTORE** the Water Tank Level Transmitter SALW-LT-6003L by **PERFORMING** the following:

- 5.10.16 **OPEN** valve SALW-V-6029L, located in the bottom of WATER TANK ENCL.

- 5.10.17 **OPEN** valve SALW-V-6031L, located in the bottom of WATER TANK ENCL.

- 5.10.18 **VERIFY** "WATER TANK" on DTAM shows a value in inches.

WEIGHT FACTOR TEST

- 5.10.19 **__ VERIFY** that NO Programmable Logic Controller input signals are FORCED and that the forcing function is DISABLED.
- 5.10.20 **__ CONNECT** the 0-500" Water Gauge test Manometer pressure source to the HIGH PRESSURE dip tube on the side of the "WFIE Cabinet."
- 5.10.21 **__ ENSURE** SALW-V-6001L is CLOSED.
- 5.10.22 **__ ENSURE** SALW-V-6005L is OPEN.
- 5.10.23 **__ ENSURE** SALW-V-6006L is OPEN.
- 5.10.24 **__ ENSURE** adjustment valves on SALW-FIV-6002L, SALW-FIV-6003L, SALW-FIV-6004L are CLOSED.
- 5.10.25 **__ ENSURE** SALW-WFT-6002L EQUALIZING valve located on SALW-V-6036L 3-Valve Manifold in cabinet WFIE Cabinet is CLOSED.
- 5.10.26 **__ ENSURE** the LOW side and HIGH side isolation valves, located on SALW-V-6036L 3-Valve Manifold in cabinet WFIE Cabinet are OPEN.
- 5.10.27 **__ SET** the test Manometer to 125" Water Gauge.
- 5.10.28 **__ OBSERVE** Data Table Access Module **AND RECORD** the Weight Factor on the table below.

DATA TABLE ACCESS MODULE WEIGHT FACTOR READING (RANGE 120 to 130 inches)

- 5.10.29 **__ BLEED** off pressure from the manometer.
- 5.10.30 **__ CLOSE** SALW-V-6006L.
- 5.10.31 **__ OPEN** SALW-WFT-6002L equalizing valve, located on SALW-V-6036L 3-Valve Manifold in cabinet WFIE Cabinet.
- 5.10.32 **__ CLOSE** the LOW side and HIGH side isolation valves, located on SALW-V-6036L 3-Valve Manifold in cabinet WFIE Cabinet.

SPECIFIC GRAVITY TEST

- 5.10.33 ENSURE SALW-V-6007L is OPEN.
- 5.10.34 ENSURE SALW-V-6005L is OPEN.
- 5.10.35 ENSURE the LOW side and the HIGH side isolation valves, located on SALW-V-6035L in cabinet WFIE Cabinet are OPEN.
- 5.10.36 CLOSE the Specific Gravity Transmitter equalizing valve located on SALW-V-6035L in cabinet WFIE Cabinet.
- 5.10.37 SET the test Manometer to 5" Water Gauge ($\pm .3$ ").
- 5.10.38 OBSERVE Data Table Access Module **AND RECORD** the Specific Gravity reading on the table below.

DATA TABLE ACCESS MODULE SPECIFIC GRAVITY READING (RANGE 4.65 to 5.35 inches)

- 5.10.39 BLEED off pressure from the manometer.
- 5.10.40 DISCONNECT the test manometer pressure source.
- 5.10.41 CLOSE SALW-V-6007L.
- 5.10.42 CLOSE SALW-V-6005L.
- 5.10.43 OPEN SALW-SGT-6001L equalizing valve, located on SALW-V-6035L 3-Valve Manifold in cabinet WFIE Cabinet.
- 5.10.44 CLOSE the LOW side and HIGH side isolation valves, located on SALW-V-6035L 3-Valve Manifold in cabinet WFIE Cabinet.

FLOW METER TEST

- 5.10.45 IF necessary **CONNECT** the brain terminal to the SALW-FQIT-6001L (SUPERNATANT FLOW XMIT), located in cabinet Instrument Cabinet.

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5.10.46 **ENSURE** SALW-FQIT-6001L is powered and configured for simulated flow signals.

5.10.47 **SIMULATE** a flow signal of 2.0 gpm (50% span) with the hand held calibrator, or from flowmeter face plate.

5.10.48 **VERIFY** the SALW-FQIT-6001L transmitter is operating properly by **RECORDING** the following:

DATA TABLE ACCESS MODULE SUPERNATANT FLOW (RANGE: 1.8 TO 2.2 GPM)	SUPERNATANT FLOW XMIT SUPERNATANT FLOW (RANGE: 1.8 TO 2.2 GPM)

5.10.49 **RESTORE** the SALW-FQIT-6001L (SUPERNATANT FLOW TRANSMITTER) to its original configuration.

SUCTION AND DISCHARGE PRESSURE SIGNAL

5.10.50 **CONNECT** a current source to PSPT+ and PSPT- at the intrinsic side terminal board in the Intrinsic Safe panel.

5.10.51 **SET** the current to 4mA and record the suction pressure on SALW-PI-6012L in the table below. Reading is to be approximately zero.

5.10.52 **SET** the current source to 20mA and record the suction pressure in the table below. Reading is to be approximately 100psi.

5.10.53 **DISCONNECT** the current source.

5.10.54 **CONNECT** a current source to PDPT+ and PDPT- at the intrinsic side terminal board in the Intrinsic Safe panel.

5.10.55 **SET** the current to 4mA and record the discharge pressures on SALW-PI-6011L and on the DTAM in the table below. Readings are to be approximately zero.

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5.10.56___**SET** the current source to 20mA and record the discharge pressures in the table below. Readings are to be approximately 300psi.

5.10.57___**DISCONNECT** the current source.

5.10.58___**RECORD** the following pressures on the table below:

SALW-PI-6012L JET PUMP SUCTION PRESSURE		DTAM DISCHARGE PRESSURE	SALW-PI-6011L JET PUMP DISCHARGE PRESSURE	
	At 4mA			At 4mA
	At 20mA			At 20mA

PIT FLAMMABLE GAS MONITOR ANALOG SIGNAL TO PLC

5.10.59___**CONNECT** a current source to terminal board TB1 in the PICS Instrument Enclosure, points FGM 0(+) and FGM 0(-).

5.10.60___**SET** current source to 4 mA ($\pm .25$ mA).

5.10.61___**RECORD** the Data Table Access Module Flammable Gas DISPLAY on the "Pit FGM Input/Output Table" below. (Expected value to be approximately 0%.)

5.10.62___**SET** current source to 10 mA ($\pm .25$ mA).

5.10.63___**RECORD** the Data Table Access Module Flammable Gas display on the "Pit FGM Input/Output Table" below. (Expected value to be approximately 11%.)

5.10.64___**SET** current source to 20 mA ($\pm .25$ mA).

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- 5.10.65 **RECORD** the Data Table Access Module Flammable Gas display on the "Pit FGM Input/Output Table" below. (Expected value to be approximately 30%.)

Pit FGM Input/Output Table	
Input (mA)	Output (as displayed on Data Table Access Module)
4	
10	
20	

- 5.10.66 **DISCONNECT** the current source.

DOME SPACE FLAMMABLE GAS MONITOR ANALOG SIGNAL TO PLC

- 5.10.67 **CONNECT** a current source to terminal board TB1 in the PICS Instrument Enclosure, points FGM 1(+) and FGM 1(-).
- 5.10.68 **SET** current source to 4mA (+/- .25mA).
- 5.10.69 **RECORD** the Data Table Access Module Flammable Gas DISPLAY on the "Dome Space FGM Input/Output Table" below. (Expected value to be approximately 0%.)
- 5.10.70 **SET** current source to 10 mA ($\pm$.25 mA).
- 5.10.71 **RECORD** the Data Table Access Module Flammable Gas display on the "Dome Space FGM Input/Output Table" below. (Expected value to be approximately 11%.)
- 5.10.72 **SET** current source to 20 mA ($\pm$.25 mA).

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- 5.10.73 **RECORD** the Data Table Access Module Flammable Gas display on the "Dome Space FGM Input/Output Table" below. (Expected value to be approximately 30%.)

Dome Space FGM Input/Output Table	
Input (mA)	Output (as displayed on Data Table Access Module)
4	
10	
20	

- 5.10.74 **DISCONNECT** the current source.

THERMOCOUPLE INPUTS TO PLC

- 5.10.75 **WARM** thermocouple SALW-TE-6004L, located in the Instrument Enclosure.
- 5.10.76 **VERIFY** Data Table Access Module displays a changed temperature.

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- 5.10.77 **VERIFY** SALW-TE-6004L temperature decreases after heat source removed.
- 5.10.78 **WARM** thermocouple SALW-TE-6003L, located in INSTRUMENT AIR ENCLOSURE.
- 5.10.79 **VERIFY** Data Table Access Module displays a changed temperature.

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- 5.10.80 **VERIFY** SALW-TE-6003L temperature decreases after heat source removed.

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- 5.10.81 **CONNECT** a thermocouple probe to the intrinsic side of top thermocouple module (MTL 3081) in the Intrinsic Safe Panel. (This will simulate pump temperature.)
- 5.10.82 **WARM** the connected thermocouple probe.
- 5.10.83 **VERIFY** Data Table Access Module displays a changed temperature.

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- 5.10.84 **VERIFY** the connected probe temperature decreases after heat source removed.
- 5.10.85 **DISCONNECT** the temperature probe.
- 5.10.86 **CONNECT** a thermocouple probe to the second thermocouple module in the Intrinsic Safe panel. (This will simulate jumper temperature.)
- 5.10.87 **WARM** the thermocouple probe.
- 5.10.88 **VERIFY** Data Table Access Module (screen 25) displays a changed temperature

Engineer Signature

Date

- 5.10.89 **VERIFY** SALW-TE-6002L temperature decreases after heat source removed.
- 5.10.90 **DISCONNECT** the temperature probe.

RECIRCULATION FLUSH PRESSURE SIGNAL TO PLC

- 5.10.91 **CONNECT** a current source to points RFPT+ and RFPT- at the intrinsic side terminal board in the Intrinsic Safe panel. (Set the current source to "TRANSMITTER SIMULATE.")
- 5.10.92 **SET** the current source to 4mA.
- 5.10.93 **SLOWLY** increase the current output until an alarm on the DTAM for High Recirc. Flush Pressure(alarm 9) occurs. (Approx. 12.5mA.)

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- 5.10.94 ___ **ACKNOWLEDGE** alarm.
- 5.10.95 ___ **VERIFY** the pressure on the DTAM for RFPT is approximately 15psi.
- 5.10.96 ___ **DECREASE** the current source to approximately 4mA.
- 5.10.97 ___ **VERIFY** the High Recirc. Flush Pressure alarm clears on the DTAM.
- 5.10.98 ___ **DISCONNECT** the current source.
- 5.10.99 ___ **VERIFY** a "RFPT SIGNAL LOSS" alarm (14) occurs.
- 5.10.100 ___ **ACKNOWLEDGE** the alarm.

JUMPER FLUSH PRESSURE SIGNAL TO PLC

- 5.10.101 ___ **CONNECT** a current source to points JFPT+ and JFPT- at the intrinsic side terminal board in the Intrinsic Safe panel.
- 5.10.102 ___ **SET** the current source to 4mA.
- 5.10.103 ___ **SLOWLY** increase the current output until an alarm on the DTAM for High Flush Pressure(alarm 3) occurs and the BLUE light on the instrument panel is ON. (Approx. 12.5mA.)
- 5.10.104 ___ **ACKNOWLEDGE** alarm.
- 5.10.105 ___ **VERIFY** the pressure on the DTAM for JFPT is approximately 15psi.
- 5.10.106 ___ **DECREASE** the current source to 4mA.
- 5.10.107 ___ **VERIFY** the High Flush Pressure alarm clears on the DTAM and the BLUE light turns OFF.
- 5.10.108 ___ **DISCONNECT** the current source.
- 5.10.109 ___ **VERIFY** a "JFPT SIGNAL LOSS" alarm (16) occurs.
- 5.10.110 ___ **ACKNOWLEDGE** the alarm.

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5.10.111 Engineer **VERIFY** that section 5.10 is complete by **SIGNING** below.

Engineer Signature

Date

5.10.112 Quality Assurance Inspector **VERIFY** that section 5.10 is complete by signing below.

Quality Assurance Inspector Signature

Date

5.11 DISCRETE SIGNAL INPUTS TO PLC AND DTAM

NOTE: The DIP switches on the Intrinsic Safe Panel may require changing in order to get the proper responses for LS-1 and LS-2.

JR-1 VALVE POSITION (LS-1/LS-2) INPUT

- 5.11.1 _____ **CONNECT** a normally closed transducer across the LS-1+ and LS-1- and a normally open transducer across the LS-2+ AND LS-2- points on the intrinsic safe terminal board in the Intrinsic Safe panel.
- 5.11.2 _____ **ACTUATE** both transducers by placing a piece of steel in front of the each transducer face.
- 5.11.3 _____ **VERIFY** the JR-1 valve indicates "norm" at the Data Table Access Module.
- 5.11.4 _____ **REMOVE** the metal from in front of the LS-1 switch installed in the above step.
- 5.11.5 _____ **VERIFY** the JR-1 valve indicates "NON-PROCESS" at the Data Table Access Module and address N20:32/0 is actuated on ladder 5 (rung 89).
- 5.11.6 _____ **REMOVE** the metal from in front of the LS-2 switch.
- 5.11.7 _____ **VERIFY** the JR-1 valve still indicates "NON-PROCESS" at the Data Table Access Module and address N20:32/1 is actuated on ladder 5 (rung 91).
- 5.11.8 _____ **REPLACE** the metal in front of the LS-2 and the LS-1 transducers.

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5.11.9 **VERIFY** the JR-1 valve indicates " norm" at the Data Table Access Module and addresses N20:32/0 and N20:32/1 are clear on ladder 5 (rungs 89 and 91).

5.11.10 **REMOVE** the transducers.

LOW PRESSURE INTERLOCK (PS-1) INPUT

5.11.11 **CONNECT** a normally closed switch across points PS-1-NO and PS-1-1(H) at the intrinsic safe terminal board in the Intrinsic Safe panel.

5.11.12 **VERIFY** the GREEN light on the instrument panel is ON.

5.11.13 **APPLY** software forces to allow the pump to start.

5.11.14 **PRESS** the pump start from DTAM.

5.11.15 **VERIFY** the RED light on the instrument panel is ON and the GREEN light is OFF.

5.11.16 **OPEN** the PS-1 switch.

5.11.17 **VERIFY** that the amber light on the instrument panel turns ON immediately after the switch is open.

5.11.18 **VERIFY** a "XFR Pressure LOW" alarm (alarm 1) occurs at the DTAM and a pump shutdown occurs indicated by the horn sounding, strobe flashing, shutdown alarm on the DTAM, the red light turning OFF, and the green light turning ON. **ACKNOWLEDGE** alarms at Data Table Access Module to verify the various alarms.

5.11.19 **CLOSE** the PS-1 switch to clear the "XFR PRESSURE LOW" alarm and turn OFF amber light.

5.11.20 **REMOVE** the test switch.

5.11.21 **LEAVE** the forces in place for the high pressure test.

HIGH PRESSURE INTERLOCK (PS-1-1) INPUT

5.11.22 **CONNECT** a normally closed switch at points PS-1-NC and PS-1-1(H) at the intrinsic safe terminal board in the Intrinsic Safe panel.

5.11.23 **PRESS** the pump start from DTAM.

5.11.24 **VERIFY** the RED light on the instrument panel is ON and the GREEN light is OFF.

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- 5.11.25 ___ **OPEN** the switch across the PS-1-1 points.
- 5.11.26 ___ **VERIFY** a "XFR Pressure HIGH" alarm (alarm 2) at the DTAM, and a pump shutdown occurs indicated by the horn sounding, strobe flashing, shutdown alarm on the DTAM, the red light turning OFF, and the green light turning ON after a 3 second delay. **ACKNOWLEDGE** the alarms at the DTAM to verify the various alarms.
- 5.11.27 ___ **DISCONNECT** the switch.
- 5.11.28 ___ **REMOVE** the software forces.

DILUTION TANK NO FLOW INPUT

- 5.11.24 ___ **PLACE** a normally closed switch across terminal points DIL-F and CKT5H-A on terminal board TB4 in the Instrument Cabinet.
- 5.11.25 ___ **VERIFY** no dilution tank no flow alarm on the DTAM (alarm 35, screen 135).
- 5.11.26 ___ **OPEN** the switch at TB4.
- 5.11.27 ___ **VERIFY** a dilution tank no flow alarm on the DTAM.
- 5.11.28 ___ **ACKNOWLEDGE** the alarm.
- 5.11.29 ___ **CLOSE** the switch.
- 5.11.30 ___ **VERIFY** alarm clears.
- 5.11.31 ___ **DISCONNECT** the switch.

FLAMMABLE GAS MONITOR INPUT

- 5.11.32 ___ **CONNECT** a normally closed switch to points FGM and CKT5H-A on terminal board TB 4 in the instrument cabinet.
- 5.11.33 ___ **VERIFY** no FGM interlock alarm on the DTAM (alarm 22).
- 5.11.34 ___ **OPEN** the switch.
- 5.11.35 ___ **VERIFY** an FGM alarm on the DTAM.
- 5.11.36 ___ **ACKNOWLEDGE** the alarm.

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5.11.37___**CLOSE** the switch.

5.11.38___**VERIFY** the FGM alarm clears.

5.11.39___**LEAVE** the switch connected for the Heat Trace check.

HEAT TRACE CONTROL FOR PUMP AND JUMPER

5.11.40___**VERIFY** that heat trace relays HT-1 and HT-2 are deenergized by checking for zero voltage across points 2 and 7 at each relay.

5.11.41___**VERIFY** zero voltage at TB12 between HT-1 and CKT3-N.

5.11.42___**TURN ON** heat trace from DTAM to actuate relays HT-1 and HT-2.

5.11.43___**CHECK** for 120vac at TB-12, points HT-1 and CKT3-N.

5.11.44___**OPEN** the FGM switch.

5.11.45___**VERIFY** 0vac at TB-12, points HT-1 and CKT3-N.

5.11.46___**TURN OFF** heat trace from the DTAM.

5.11.47___**REMOVE** the switch.

5.11.48Engineer **VERIFY** that section 5.11 is complete by **SIGNING** below.

Engineer Signature

Date

5.11.49Quality Assurance Inspector **VERIFY** that section 5.11 is complete by signing below.

Quality Assurance Inspector Signature

Date

5.12 HEATERS AND AIR CONDITIONER

- 5.12.1 ____ **TURN** the heater ON in the air compressor cabinet. Set the thermostat high enough to allow the unit to operate.
- 5.12.2 ____ **RESET** the thermostat to approximately 40 degrees F to allow the unit to turn OFF.
- 5.12.3 ____ **TURN** the fan thermostat switch low to allow the fan in the air compressor cabinet to run.
- 5.12.4 ____ **RESET** the fan switch to approximately 90 degrees.
- 5.12.5 ____ **TURN** the heater ON in the WFIE cabinet. Set the thermostat high enough to allow the unit to operate.
- 5.12.6 ____ **RESET** the thermostat to approximately 40 degrees F to allow the heater to turn OFF.
- 5.12.7 ____ **TURN** the heater ON in the Water cabinet. Set the thermostat high enough to allow the unit to operate.
- 5.12.8 ____ **RESET** the thermostat to approximately 40 degrees F to allow the heater to turn OFF.
- 5.12.9 ____ **TURN** the heater ON in the Instrument cabinet. Set the thermostat high enough to allow the unit to operate.
- 5.12.10 ____ **RESET** the thermostat to approximately 40 degrees F to allow the heater to turn OFF.
- 5.12.11 ____ **TURN ON** the air conditioner in the Instrument cabinet. If necessary, remove the front grill on the unit and adjust the temperature setting lower to get the unit to operate.
- 5.12.12 ____ **RESET** the temperature setting to approximately 90 to 95 degrees.

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5.12.13 Engineer **VERIFY** that section 5.12 is complete by **SIGNING** below.

Engineer Signature

Date

5.12.14 Quality Assurance Inspector **VERIFY** that section 5.12 is complete by signing below.

Quality Assurance Inspector Signature

Date

5.13 LEAK DETECTION INTERLOCK CHECK

- 5.13.1 _____ Set up two buckets for leak detector testing if leak detector probes are used for testing.

NOTE - A supply of water needs to be available to pour into the buckets during testing.

 - Pump operation will be simulated during the remainder of the ATP.

WARNING

Energized circuits and leads are contained inside the cabinet. Observe appropriate electrical. Comply with HNF-PRO-088, ELECTRICAL WORK SAFETY to avoid personnel electrical shock hazards.

- 5.13.2 _____ **PERFORM** or **VERIFY** performed the CGI dedication for the leak detector relays per HNF-4275 and WTF-1-18 and WTF-30-16.

- 5.13.3 _____ **CONNECT** a leak detector probe to the primary leak detector terminals at TB11 in the Instrument Cabinet, points SD-1A, SD-1B, SA-1A, and SA-1B and **CONNECT** a leak detector probe to leak detector #1 terminals at TB11 in the Instrument Cabinet, points SD-2A, SD-2B, SA-2A, and SA-2B. **IF NECESSARY** remove the jumpers from the terminal block for leak detector #1.

OR

_____ **CONNECT** a normally open switch to the primary leak detector terminals at TB11 in the Instrument Cabinet, points SD-1A, SD-1B, SA-1A, and SA-1B and **CONNECT** a normally open switch to leak detector #1 terminals at TB11 in the Instrument Cabinet, points SD-2A, SD-2B, SA-2A, and SA-2B. (NOTE: Connect SD-LA and SA-LA wires to one pole of the switch and SD-LB and SA-LB wires to the other pole of the switch.) **IF NECESSARY** remove the jumpers from the terminal block for leak detector #1.

- 5.13.4 _____ **VERIFY** no primary leak detector alarms at the DTAM (alarms 6 and 7).

- 5.13.5 _____ **PLACE** the primary leak detector assembly in a bucket of water or close the test switch on the primary leak detector.

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- 5.13.6 **VERIFY** a leak detector leak and trouble alarm for the primary leak detector is received at the DTAM (alarm 6) after a 3 second delay.
- 5.13.7 **ACKNOWLEDGE** the Leak Detector Alarm at the Data Table Access Module.
- 5.13.8 **REMOVE** the leak detector assembly from the bucket and allow the water to drain off the assembly into the bucket **or** open the test switch.
- 5.13.9 **VERIFY** the leak detector alarms clear at the DTAM.
- 5.13.10 **DISCONNECT** one of the "SD" wires going to the probe or switch.
- 5.13.11 **VERIFY** trouble alarm 7 occurs.
- 5.13.12 **ACKNOWLEDGE** the alarm.
- 5.13.13 **VERIFY** no leak detector #1 alarms at the DTAM (alarms 18 and 19).
- 5.13.14 **PLACE** the leak detector #1 assembly in a bucket of water **or** close the switch for leak detector #1.
- 5.13.15 **VERIFY** a leak detector leak and trouble alarm for leak detector #1 is received at the DTAM.
- 5.13.16 **ACKNOWLEDGE** the Leak Detector Alarm at the Data Table Access Module.
- 5.13.17 **REMOVE** the leak detector assembly from the bucket and allow the water to drain off the assembly into the bucket **or** open the test switch.
- 5.13.18 **VERIFY** the leak detector alarms clear at the DTAM.
- 5.13.19 **DISCONNECT** one of the "SD" wires going to the probe or switch.
- 5.13.20 **VERIFY** trouble alarm 19 occurs.
- 5.13.21 **ACKNOWLEDGE** the alarm.
- 5.13.22 **DISCONNECT** the probes or switches from TB11.
- 5.13.23 **ENSURE** the jumpers for leak detector #1 are installed at TB11.

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5.13.24 Engineer **VERIFY** that section 5.13 is complete by **SIGNING** below.

Engineer Signature

Date _____

5.13.25 Quality Assurance Inspector **VERIFY** that section 5.13 is complete by signing below.

Quality Assurance Inspector Signature

Date _____

5.14 SKID SHUTDOWN AFTER ATP

5.14.1 Drain water from water tank in the Water Cabinet by opening valve SALW-V-6030L. Catch water in a container or route to an appropriate drain.

5.14.2 Ensure the following PIC skid valves in the WFIE cabinet are OPEN.

____ SALW-V-6035L (EQUALIZING)
____ SALW-V-6036L (EQUALIZING)

5.14.3 Ensure the following PIC skid valves are CLOSED.

Air Compressor cabinet:

____ SALW-V-6025L
____ SALW-V-6026L
____ SALW-V-6034L
____ SALW-V-6043L
____ SALW-V-6044L
____ SALW-V-6046L
____ SALW-V-6047L
____ SALW-V-6048L
____ SALW-V-6049L

Water cabinet:

SALW-V-6027L
SALW-V-6028L
SALW-V-6029L
SALW-V-6030L
SALW-V-6031L
SALW-V-6032L
SALW-V-6037L

WFIE Cabinet:

____ SALW-V-6001L	____ SALW-V-6015L
____ SALW-V-6002L	____ SALW-V-6016L
____ SALW-V-6003L	____ SALW-V-6017L
____ SALW-V-6004L	____ SALW-V-6018L
____ SALW-V-6005L	____ SALW-V-6019L
____ SALW-V-6006L	____ SALW-V-6020L
____ SALW-V-6007L	____ SALW-V-6021L
____ SALW-V-6008L	____ SALW-V-6035L LOW
____ SALW-V-6011L	____ SALW-V-6035L HIGH
____ SALW-V-6012L	____ SALW-V-6036L LOW
____ SALW-V-6013L	____ SALW-V-6036L HIGH
____ SALW-V-6014L	

5.14.4 Ensure the following PIC skid circuit disconnects, breakers and fuses are OPEN or OFF.

____ SALW-DS-6002L ____ SALW-DS-6003L ____ SALW-DS-6004L
____ SALW-DS-6005L

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The following breakers are in distribution panel SALW-DP-6001L:

<u> </u> Breaker "MAIN"	<u> </u> Breaker 2
<u> </u> Breaker 1	<u> </u> Breaker 4
<u> </u> Breaker 3	<u> </u> Breaker 6
<u> </u> Breaker 5	<u> </u> Breaker 8
<u> </u> Breaker 7	<u> </u> Breaker 10
<u> </u> Breaker 9	<u> </u> Breaker 12
<u> </u> Breaker 11	<u> </u> Breaker 14
<u> </u> Breaker 13	

- 5.14.5 _____DISCONNECT the power plug from the 480vac power source.
- 5.14.6 _____ENSURE the power plug on the power cable is the correct model per H-14-103538, item 41.
- 5.14.7 Engineer **VERIFY** that section 5.14 is complete by **SIGNING** below.

Engineer Signature _____ Date _____

- 5.14.8 Quality Assurance Inspector **VERIFY** that section 5.14 is complete by signing below.

Quality Assurance Inspector Signature	Date
---------------------------------------	------

5.15 REDLINE INCORPORATION

- 5.15.1 _____ VERIFY the redlines identified in the redline log in the Fabrication work package are incorporated into the revised drawings for skid "L".

NOTE: Redlines incorporation must meet the intent of the redline log. The redlines may not be exactly the same as marked on the working drawings. Example: If a part was added to a drawing and then it is discovered that the part already existed on the drawing, then the final incorporation may be to increase the quantity of the existing part. Drawing views may change from the redline version in order to meet drafting standards.

- 5.15.2 Engineer to VERIFY section 5.15 is completed by signing below.

Engineer Signature

Date

- 5.15.3 Quality Assurance Inspector to VERIFY section 5.15 is completed by signing below.

Quality Assurance Inspector Signature

Date

ACCEPTANCE TEST PROCEDURE

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ACCEPTANCE TEST PROCEDURE LOG		
Name	Date	Comment

ACCEPTANCE TEST PROCEDURE EXCEPTION RECORD

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ATP step number:	ATP Exception Log Number
Description of Exception:	
Resolution of Exception:	
Date of Resolution:	
Cognizant Engineer signature:	
Quality Assurance signature:	
Design Authority:	
RESOLUTION COMPLETED: (date)	
Quality Assurance:	
Cognizant Engineer:	

ACCEPTANCE TEST PROCEDURE ACCEPTANCE RECORD

This Acceptance Test Procedure has been completed and the results, including red-line changes, exceptions, and exception resolutions, have been reviewed for compliance with the intent of the Purpose (Section 1.0). The test results are accepted by the undersigned:

Cognizant Engineer (Signature)

(Print Name)

Date

Quality Assurance (Signature)

(Print Name)

Date

PROCEDURE PERFORMER SIGNATURE SHEET

All personnel who will be performing, initialing and signing the procedure shall enter their printed name, signature and initials below.