

ENGINEERING CHANGE NOTICE

1. ECN 661676

Proj. ECN

2. ECN Category (mark one) Supplemental <input type="checkbox"/> Direct Revision <input checked="" type="checkbox"/> Change ECN <input type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersedeure <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. B. R. Johns, ISE, S7-24, 373-3429		4. USQ Required? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5. Date 08/01/00
	6. Project Title/No./Work Order No. Interim Stabilization,		7. Bldg./Sys./Fac. No. 241-G/200-GEN	8. Approval Designator QS
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.) RPP-6201, REVISION 1		10. Related ECN No(s). N/A	11. Related PO No. N/A

12a. Modification Work <input type="checkbox"/> Yes (fill out Blk. 12b) <input checked="" type="checkbox"/> No (NA Blks. 12b, 12c, 12d)	12b. Work Package No. N/A	12c. Modification Work Completed N/A Design Authority/Cog. Engineer Signature & Date	12d. Restored to Original Condition (Temp. or Standby ECNs only) N/A Design Authority/Cog. Engineer Signature & Date
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13a. Description of Change
This ECN revises the ATP for skid "V". The following changes are made.

New steps 5.8.97 through 5.8.127 were added to section 5.8. The remaining steps of section 5.8 were renumbered from 5.8.128 to 5.8.163.

The thermocouple identifier was added to steps 5.8.128, 5.8.133, 5,8.136, 5.8.141, 5,8.142, 5.8.157, 5,8.159, and 5.8.161.

These changes are made due to additional heat trace control installed on the PIC skid.

13b. Design Baseline Document? Yes No

14a. Justification (mark one) Criteria Change <input checked="" type="checkbox"/> Design Improvement <input type="checkbox"/> Environmental <input type="checkbox"/> Facility Deactivation <input type="checkbox"/> As-Found <input type="checkbox"/> Facilitate Const. <input type="checkbox"/> Const. Error/Omission <input type="checkbox"/> Design Error/Omission <input type="checkbox"/>	14b. Justification Details The ATP is revised to accommodate the latest changes in the skid design. Design verification by Informal review per HNF-IP-0842, volume IV, section 4.24. USQ tracking #TF-00-0478, revision 1. This ECN will not change collective dose since it has no impact on radiological sources, contamination control or shielding. A NEPA review screening was performed as evidenced by the Environmental signature on page 2.
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15. Distribution (include name, MSIN, and no. of copies)	
B. R. Johns	S7-24
M. R. Koch	S7-24
W. F. Zuroff	S7-24
T. J. Volkman	S7-34
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1. ECN (use no. from pg. 1)

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16. Design Verification Required

Yes

No

17. Cost Impact

ENGINEERING	CONSTRUCTION
Additional <input type="checkbox"/> \$ <u>N/A</u>	Additional <input type="checkbox"/> \$ <u>N/A</u>
Savings <input type="checkbox"/> \$ <u>N/A</u>	Savings <input type="checkbox"/> \$ <u>N/A</u>

18. Schedule Impact (days)

Improvement N/A

Delay N/A

19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.

<input type="checkbox"/> SDD/DD	<input type="checkbox"/> Seismic/Stress Analysis	<input type="checkbox"/> Tank Calibration Manual
<input type="checkbox"/> Functional Design Criteria	<input type="checkbox"/> Stress/Design Report	<input type="checkbox"/> Health Physics Procedure
<input type="checkbox"/> Operating Specification	<input type="checkbox"/> Interface Control Drawing	<input type="checkbox"/> Spares Multiple Unit Listing
<input type="checkbox"/> Criticality Specification	<input type="checkbox"/> Calibration Procedure	<input type="checkbox"/> Test Procedures/Specification
<input type="checkbox"/> Conceptual Design Report	<input type="checkbox"/> Installation Procedure	<input type="checkbox"/> Component Index
<input type="checkbox"/> Equipment Spec.	<input type="checkbox"/> Maintenance Procedure	<input type="checkbox"/> ASME Coded Item
<input type="checkbox"/> Const. Spec.	<input type="checkbox"/> Engineering Procedure	<input type="checkbox"/> Human Factor Consideration
<input type="checkbox"/> Procurement Spec.	<input type="checkbox"/> Operating Instruction	<input type="checkbox"/> Computer Software
<input type="checkbox"/> Vendor Information	<input type="checkbox"/> Operating Procedure	<input type="checkbox"/> Electric Circuit Schedule
<input type="checkbox"/> OM Manual	<input type="checkbox"/> Operational Safety Requirement	<input type="checkbox"/> ICRS Procedure
<input type="checkbox"/> FSAR/SAR	<input type="checkbox"/> IEFD Drawing	<input type="checkbox"/> Process Control Manual/Plan
<input type="checkbox"/> Safety Equipment List	<input type="checkbox"/> Cell Arrangement Drawing	<input type="checkbox"/> Process Flow Chart
<input type="checkbox"/> Radiation Work Permit	<input type="checkbox"/> Essential Material Specification	<input type="checkbox"/> Purchase Requisition
<input type="checkbox"/> Environmental Impact Statement	<input type="checkbox"/> Fac. Proc. Samp. Schedule	<input type="checkbox"/> Tickler File
<input type="checkbox"/> Environmental Report	<input type="checkbox"/> Inspection Plan	<input checked="" type="checkbox"/> <u>NONE</u>
<input type="checkbox"/> Environmental Permit	<input type="checkbox"/> Inventory Adjustment Request	<input type="checkbox"/>

20. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number/Revision
N/A	N/A	N/A

21. Approvals

	Signature	Date	Signature	Date
Design Authority <u>WF ZUROFF</u>		<u>8/8/00</u>	Design Agent _____	_____
Cog. Eng. <u>BR JOHNS</u>		<u>8/7/00</u>	PE _____	_____
Cog. Mgr. <u>John Schofield</u>		<u>8/9/00</u>	QA _____	_____
QA <u>MC Tippes</u>		<u>8-11-00</u>	Safety _____	_____
Safety <u>LA Flowers</u>		<u>8/11/00</u>	Design _____	_____
Environ. <u>LE Penn</u>		<u>8/9/00</u>	Environ. _____	_____
Other _____	_____	_____	Other _____	_____

Informal Review: D. DeFord 8/7/00

DEPARTMENT OF ENERGY

Signature or a Control Number that tracks the Approval Signature

ADDITIONAL

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

M. R. KOCH

CH2MHILL HANFORD GROUP, INC

Richland, WA 99352

U.S. Department of Energy Contract DE-AC06-99RL14047

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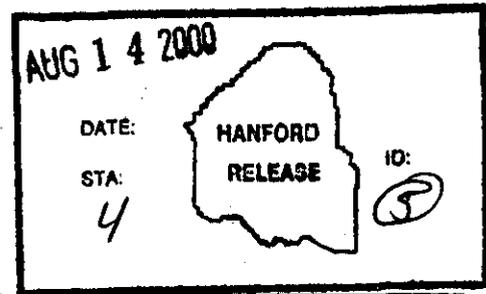
Abstract:

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

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Release Approval 8/14/00
Date



Release Stamp

Approved For Public Release

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

1.0 PURPOSE

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

2.0 INFORMATION

2.1 SCOPE

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

- 2.1.1 Drawing verification (Prerequisites)
- 2.1.2 Red-line incorporation
- 2.1.3 Code Inspections (Prerequisites)
- 2.1.4 Instrument calibrations
- 2.1.5 Continuity, megger and voltage checks
- 2.1.6 Programmable Logic Controller (PLC) and Data Table Access Module (DTAM) programming
- 2.1.7 Air system
- 2.1.8 Water system
- 2.1.9 PLC inputs and outputs
- 2.1.10 Alarms and interlocks
- 2.1.11 Heaters, air conditioner and lights

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 PXPT - Pump Transfer Pressure Transducer
- 2.2.15 JFPT - Jumper Flush Pressure Transducer
- 2.2.16 RFPT - Recirculation Flush Pressure Transducer
- 2.2.17 PIC - Person In Charge

2.3 RESPONSIBILITIES

- 2.3.1 CHG Quality Assurance is responsible for:
 - 2.3.1.1 Witnessing and signing steps as identified in the Acceptance Test Procedure.
 - 2.3.1.2 Verifying that the ATP sections were performed correctly.
 - 2.3.1.3 Approving Exception resolution and exception closure.
- 2.3.2 Test Engineer (or representative) and/or PIC are responsible for:
 - 2.3.2.1 Identifying the equipment required for the ATP.
 - 2.3.2.2 Recording equipment status and data per this ATP.
 - 2.3.2.3 Conducting pre-job system walk-down.
 - 2.3.2.4 Recording data and other notes during the ATP performance.
 - 2.3.2.5 Providing technical support during the ATP.
 - 2.3.2.6 Providing PLC/DTAM programming support during the ATP.
 - 2.3.2.7 Acting as Test Director during the ATP.
 - 2.3.2.8 Approving Exception resolution and exception closure.

2.4 SAFETY

Warning: 120vac energized circuits and leads may be encountered during testing when accessing PLC input/output terminals. Observe appropriate electrical precautions as directed by RPP-PRO-088, Electrical Work Safety.

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

2.5 QUALITY ASSURANCE

CHG Quality Assurance Inspector is to ensure that testing is performed per this ATP document. The Quality Assurance Inspector shall sign and date each ATP section verifying the data obtained and that the section was 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 shall be made by redlining the affected section by the engineer as long as the changes do not impact the personnel safety or the technical aspects of this ATP. 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 ATP shall be logged as "Exceptions and documented on the "Exception Record."
- 2.6.5 Do not perform any part of this ATP on faulty equipment. If faulty equipment is discovered, STOP the execution of that section of the ATP and resolve the problem OR continue with another section until the problem is repaired.
- 2.6.6 If the performance of the ATP is suspended for any reason, ensure the equipment is left in a safe condition per the direction of the test engineer and/or PIC and any Lock and Tag system requirements are met before leaving the test site.
- 2.6.7 This ATP DOES NOT contain separate data/verification sheets. Verification of the ATP steps and validity of data is recorded in this ATP next to each step as required.
- 2.6.8 A Job Hazard Analysis for shall be used in conjunction with the Pre-job safety meeting form when any unusual hazards are identified. The Pre-job meeting form (attached to this ATP) shall be used to document all attendees. NOTE: No unusual hazards are expected during the performance of this ATP.
- 2.6.9 An ATP log shall be used to record comments concerning the ATP performance such as each day's testing activities.

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- 2.6.10 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 the resumption of testing.
- 2.6.11 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.
- 2.6.12 Sections 4.2, 4.3, 4.4, 5.4 and 5.5 can be performed out of sequence in order to facilitate the completion of this ATP.
- 2.6.13 Sections 5.8 through 5.10 can be performed out of order as directed by the test engineer and/or PIC as necessary to facilitate ATP performance.
- 2.6.14 All personnel performing, initialing and/or signing this ATP shall enter their signature and initials on the Procedure Performer Signature Sheet on the last page of this document.

2.7 LIMITS AND PRECAUTIONS

NONE

3.0 RECORDS

3.1 RECORD COPY

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

3.2 TEST RESULTS

A test report, RPP-6202 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 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 labels on drawings H-14-104151, sheets 7 through 12 and H-14-104154, sheet 5.
- 4.1.2 Panel board arrangement on drawing H-14-104157.
- 4.1.3 Flow diagram on drawing H-14-104156.

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

Engineer Signature

Date

4.2 REDLINE INCORPORATION

- 4.2.1 _____ Ensure the relines identified on the construction drawings in the fabrication work package are incorporated on the final drawings for skid "V" prior to the drawings being released. NOTE: Redlines must meet the intent of the markups and may not be exactly the same in order to meet drafting standards or for clarity.
- 4.2.2 Engineer to verify the redline incorporation is completed by signing below.

Engineer Signature

Date

4.3 PRESSURE VESSEL INSPECTION

A pressure vessel inspection by a third party inspector is required for the air compressor receiver tank and relief valves located in the air compressor cabinet and the water tank and relief valves located in the water cabinet. The inspection is to verify that the equipment meets National Codes for pressure vessels. An outside-certified inspector shall perform this inspection. (This inspection shall be completed prior to testing 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 sections 5.6 and 5.7.)

Report #'s: (Inspection #'s on tanks)

Engineer Signature

Date

Information has been supplied to the PMS database to add relief valve inspection for the air compressor and water tanks. Completion of the database update will be tracked by the Acceptance for Beneficial Use documentation.

Engineer Signature

Date

4.4 NATIONAL ELECTRICAL CODE (NEC) INSPECTION

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

The NEC inspection sticker is placed on the panel board door. (This needs to be completed prior to the section 5.0 functional checks.) Report # (from sticker) _____

Engineer Signature

Date

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4.5 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 is available prior to the start of each section.

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

Calibration No. _____ Exp. Date _____ QA _____

Calibration No. _____ Exp. Date _____ QA _____

Calibration No. _____ Exp. Date _____ QA _____

4.5.2 Transmation current (milliamp) simulator or equivalent

Calibration No. _____ Exp. Date _____ QA _____

4.5.3 Manometer capable of a minimum of 5 inches water gauge to a maximum of 125 inches water gauge for this ATP and a read-out of variable test pressure.

Calibration No. _____ Exp. Date _____ QA _____

Calibration No. _____ Exp. Date _____ QA _____

Calibration No. _____ Exp. Date _____ QA _____

4.5.4 Megaohm meter, at least 500vac range.

Calibration No. _____ Exp. Date _____ QA _____

4.5.5 Temperature simulator capable of 100 to 150 degrees F.

Calibration No. _____ Exp. Date _____ QA _____

Calibration No. _____ Exp. Date _____ QA _____

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- 4.5.6 _____ 480vac, 3 phase, 30-ampere power supply for PIC skid.
- 4.5.7 _____ Selector switches (3 each) with at least one contact.
- 4.5.8 _____ Proximity switches (for simulating LS-1 and LS-2), 2 each.
- 4.5.9 _____ Leak detector probes (2 each) not required to be green tagged.
- 4.5.10 _____ Heat gun to warm thermocouple probes.
- 4.5.11 _____ Two thermocouple simulators for testing the thermocouples for the pump and jumper.
- 4.5.12 _____ Buckets or pans for water for leak detector test and catching water from DIP tubes and relief valves.
- 4.5.13 _____ Water supply and hose to fill water tank.
- 4.5.14 _____ Ice water or cold air spray to cool thermocouple probes.

4.6 PRESTART CONDITIONS

- 4.6.1 Fill the water tank at least one-third to half full of water. Operate the appropriate valves in the water cabinet to accomplish this task.
- 4.6.2 Ensure the PIC skid is grounded in preparation for ATP testing.
- 4.6.3 Ensure the following PIC skid valves in the WFIE cabinet are OPEN prior to starting this ATP.

NOTE: All valves, electrical equipment and instruments are prefixed with "SALW".

V-6035V (EQUALIZING)
 V-6036V (EQUALIZING)

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

Air Compressor Cabinet

V-6025V
 V-6026V
 V-6034V
 V-6043V
 V-6044V
 V-6046V
 V-6047V
 V-6048V
 V-6049V
 V-6050V
 V-6051V
 V-6053V

Water Cabinet

V-6027V
 V-6029V
 V-6030V
 V-6031V
 V-6032V
 V-6037V
 V-6052V
 V-6054V
 V-6055V

WFIE Cabinet

V-6001V
 V-6002V
 V-6003V
 V-6004V
 V-6005V
 V-6006V
 V-6007V
 V-6008V
 V-6011V
 V-6012V
 V-6013V
 V-6014V

V-6015V
 V-6016V
 V-6017V
 V-6018V
 V-6019V
 V-6020V
 V-6021V
 V-6035V(LOW)
 V-6035V(HIGH)
 V-6036V(LOW)
 V-6036V(HIGH)
 V-6056V

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

_____ DS-6002V _____ DS-6003V
_____ DS-6004V _____ DS-6005V

(The following breakers are located in distribution panel DP-6001V.)

_____ 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 located in the Instrument Enclosure.)

_____ FA _____ FB _____ FC
_____ FD _____ LD _____ HT

4.6.6 Check for loose electrical connections at the following locations:

_____ Terminal boards in the Instrument Enclosure.
_____ Motor starters and disconnect switches.
_____ Terminal board in junction box inside the WFIE cabinet.
_____ Terminal board in heat trace splice box outside WFIE cabinet.
_____ Terminal board in junction box for FGM outside WFIE cabinet.
_____ Distribution panel board.

4.6.7 _____ Ensure desiccant and filters are installed in the air compressor dryer and filters prior to performing sections 5.6 and 5.7.

4.6.8 _____ Ensure check valves in the air compressor and water cabinet are installed in the proper direction. Reference H-14-104156, sheets 1 and 2.

4.6.9 _____ A pre-job safety meeting shall be held prior to performing section 5.0. Attendees shall sign the Pre-job Brief Signature and Performer Signature pages at the back of this document.

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 ohm readings 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 with this section.

NOTE: All valves, electrical equipment and instruments labels are prefixed with "SALW".

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

____(RED) ____ (YELLOW OR WHITE) ____ (BLUE) ____ (GND)

- 5.1.2 Load side of main disconnect switch (DS-6002V) to the line side of transformer disconnect switch (DS-6003V). Check the two phases used and ground.

____(RED) ____ (YELLOW OR WHITE OR BLUE) ____ (GND)

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

____(RED) ____ (YELLOW OR WHITE) ____ (BLUE) ____ (GND)

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

____(RED) ____ (YELLOW OR WHITE) ____ (BLUE) ____ (GND)

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

____ Continuity through the transformer primary.

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5.1.6 Line side of the main breaker in panel board (DP-6001V) through the secondary of transformer (XFMR-6001V). 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 (DP-6001V) to terminal point identified.

_____ Circuit 3 to TB10 in Instrument Enclosure (CKT3-H)

_____ Circuit 5 to TB13 in Instrument Enclosure (CKT5H)

_____ Circuit 2 to TB10 in Instrument Enclosure (CKT2H)

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

_____ Circuit 6 to safe side terminal block in Intrinsic Safe panel

_____ Circuit 1 to terminal block in FGM power junction box

_____ Circuit 11 to terminal block in FGM power junction box

_____ Circuit 13 to terminal block in FGM power junction box

_____ Circuit 14 to terminal block in FGM power junction box

_____ Circuit 10 to terminal block 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

5.1.8 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 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 prior to 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 DS-6002V 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 (DS-6002V) to ground and phase to phase. (Ensure switches DS-6003V, DS-6004V and DS-6005V 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 (DS-6003V) 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 neutral back to ground at the distribution panel.

- 5.2.8 ____ Disconnect the circuit 6 wire at the safe side terminal block in the Intrinsic Safe panel.

- 5.2.9 ____ Disconnect the circuit 5 wire at TB13 for the Instrument Enclosure light.

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- 5.2.10 _____ Ensure all the heaters, lights and air conditioner are disconnected or unplugged from the 120vac circuits. Ensure the fan thermostat switch in the air compressor cabinet is set high enough for the switch contacts to be open.
- 5.2.11 Megger each of the 14 circuits from the load side of the breaker or 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 on all the ground fault breakers prior to performing the megger check. This will prevent damage to the ground fault circuitry in the breaker. Reconnect the wire 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 _____

- 5.2.12 _____ Ensure the load-side wire at each breaker where disconnected is reconnected.
- 5.2.13 _____ Reconnect the circuit 6 wire to the safe side terminal block in the Intrinsic safe panel.
- 5.2.14 _____ Reconnect the circuit 5 wire at TB13 for the Instrument Enclosure light.
- 5.2.15 _____ Reconnect any wires disconnected in step 5.2.10 above. (Unplugged items do not have to be plugged back in.)
- 5.2.16 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; 24vdc; and 32vdc. 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 meggering checks are to be reconnected.

5.3.2 _____ Ensure all switches and breakers are open and the six fuses in the Instrument Enclosure are open.

5.3.3 _____ Ensure all the fuses are installed in the two safety switches (DS-6002V and DS-6003V) and motor starters (DS-6004V and DS-6005V) including the control transformer fuses.

5.3.4 _____ Connect the main power plug on the skid to a three phase, 480vac power source. Source is to be protected by no greater than a 30 ampere over current protection device.

5.3.5 _____ Turn ON the power source to the skid.

5.3.6 _____ Ensure 480vac +/-20vac on the line side of the main disconnect switch (DS-6002V). Record the voltage readings.

_____ vac, A-B _____ A-C _____ B-C

5.3.7 _____ Close the main disconnect switch (DS-6002V).

5.3.8 _____ Ensure 480vac +/-20vac on the line side of the transformer disconnect switch (DS-6003V). Record the voltage readings.

_____ vac

5.3.9 _____ Ensure 480vac +/-20vac on the line side of the air compressor motor starter (DS-6004V). Record the voltage readings.

_____ vac, A-B _____ vac, A-C _____ B-C

5.3.10 _____ Ensure 480vac +/-20vac on the line side of the pump motor starter (DS-6005V). Record the voltage readings.

_____ vac, A-B _____ vac, A-C _____ B-C

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- 5.3.11 _____ Ensure the dead front on the panel board (DP-6001V) is removed for access to the main breaker for a voltage measurement.
- 5.3.12 _____ Close the transformer disconnect switch (DS-6003V).
- 5.3.13 _____ Check for 240vac +/-20vac on the line side of the main breaker. Record the voltage reading.
_____ vac
- 5.3.14 _____ Open the transformer disconnect switch (DS-6003V).
- 5.3.15 _____ Replace the dead front on the panel board (DP-6001V).
- 5.3.16 _____ Close the transformer disconnect switch (DS-6003V).
- 5.3.17 _____ Close the 100 ampere main breaker in the panel board (DP-6001V).
- 5.3.18 _____ Check the voltages for the circuits at the locations designated. Record the voltages in the space provided.

CKT #	Check voltage at	Bkr Open voltage (appr. 0vac)	Bkr Closed voltage (120 +/-10vac)	Open Bkr
1	FGM JUNCTION BOX			
2	TB10, INSTR ENCL			
3	TB10, INSTR ENCL			
4	RCPT, AIR COMPR			
5	TB13, INSTR ENCL			
6	TB, INTRINSIC PNL			
7	RCPT, WFIE CAB.			
8	RCPT, WATER CAB.			
9	OUTSIDE RCPT			
10	FGM HT BOX			
11	FGM JUNCTION BOX			
12	RCPT, INSTR ENCL			
13	FGM JUNCTION BOX			
14	FGM JUNCTION BOX			

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- 5.3.19 _____ Ensure fuses FA, FB, FC, FD, LD, and HT are installed in the fuseholders and the fuse switches are closed in the Instrument Enclosure.
- 5.3.20 _____ Close breakers 2, 3 and 5 in the distribution panel (DP-6001V).
- 5.3.21 _____ Ensure 120vac +/-10vac on the load side at the following fuseholders.
- FA _____ vac; FB _____ vac; FC _____ vac;
- FD _____ vac; (LD) _____ vac; (HT) _____ vac.
- 5.3.22 _____ Ensure 24vdc +/-2vdc at the 24volt power supply.
- _____ vdc.
- 5.3.23 _____ Close breaker 6 in the distribution panel (DP-6001V).
- 5.3.24 _____ Ensure 32vdc +0/-4vdc at the output of the 3991 power supply in the Intrinsic safe panel (terminals 3 and 4). NOTE: Low voltage reading may indicate the 240/120vac input power switch on the side of the 3991 supply is in the wrong position.) _____ VDC
- 5.3.25 _____ Open breakers 2, 3, 5, and 6 in the panel board (DP-6001V).
- 5.3.26 _____ Open the 100 ampere main breaker in the panel board (DP-6001V).
- 5.3.27 _____ Open the transformer disconnect switch (DS-6003V).
- 5.3.28 _____ Open the main disconnect switch (DS-6002V).
- 5.3.29 Voltage checks completed and readings within tolerance.

Quality Assurance Inspector Signature

Date

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5.4 CALIBRATIONS

Instrumentation equipment on the skid requires calibration prior to the functional testing. Engineering will verify the calibration completion by checking for current calibration stickers on the equipment and checking off the completed calibrations in the table below.

INSTRUMENT	LOCATION	CAL. STICKER ON
SALW-PS-6004V	AIR COMPR. CABINET	
SALW-WFT-6002V	WFIE CABINET	
SALW-LT-6003V	WATER CABINET	
SALW-SGT-6001V	WFIE CABINET	
SALW-CONV-6001V	WFIE CABINET	
SALW-FQIT-6001V	INSTRUMENT ENCL.	
SALW-PI-6006V	AIR COMPR. CABINET	
SALW-PI-6007V	AIR COMPR. CABINET	
SALW-PI-6008V	WATER CABINET	
SALW-PI-6001V	WFIE CABINET	
SALW-PI-6002V	WFIE CABINET	
SALW-PI-6003V	WFIE CABINET	
SALW-PI-6004V	WFIE CABINET	
SALW-PI-6005V	WFIE CABINET	
SALW-PI-6011V	INSTRUMENT ENCL.	
SALW-PI-6012V	INSTRUMENT ENCL.	

Calibrations completed. Work package nos. _____

Engineer Signature

Date

5.5 PLC/DTAM PROGRAMMING

This section is where the programs for the PLC and DTAM will be entered into the equipment. Power will be required (circuit 5) at the Instrument enclosure to power up the PLC and DTAM and for the GFCI receptacle. Engineering will program the equipment from a laptop computer. Final software programs shall be documented as required by HNF-5034. This documentation is not part of this ATP, but will be documented after the OTP in a software report document.

PLC/DTAM programmed.

Engineer Signature

Date

5.6 SKID ELECTRICAL AND PROCESS AIR POWER-UP

NOTE: The pressure vessel inspection report must be received prior to proceeding with this section. Refer to section 4.3. Ensure desiccant is in the air dryer and the filters installed.

5.6.1 _____ Ensure the skid is connected to the 480vac power source and grounded before proceeding with this functional test.

5.6.2 _____ Energize or ensure energized the PIC skid by CLOSING the following disconnect switches in the order listed below.

_____ DS-6002V
_____ DS-6003V
_____ DS-6004V
_____ DS-6005V

5.6.3 _____ Energize or ensure energized the breakers in the panel board (DP-6001V).

_____ 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	

5.6.4 _____ ACKNOWLEDGE any initial skid alarms.

5.6.5 _____ OPEN valves ___ V-6034V, ___ V-6050V, and ___ V-6053V in the Air compressor cabinet.

5.6.6 _____ START the air compressor by positioning the positioning the switch on DS-6004V to the ON position.

5.6.7 _____ Ensure the air compressor starts and builds up pressure and shuts off at 86 to 94 psig as indicated by pressure gauge PI-6006V. RECORD the shut off pressure: _____ psig.

5.6.8 _____ CHECK the tubing in the air compressor 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.

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- 5.6.9 _____ BLEED off air by slowly opening valve V-6043V until the compressor restarts and note the restart pressure as read on gauge PI-6006V. CLOSE valve V-6043V when the compressor restarts. RECORD the restart pressure reading: _____psig.
- 5.6.10 _____ ENSURE the compressor restarts between 58 to 62 psig.
- 5.6.11 Valve in air to the PIC skid water tank by performing the following steps.
- 5.6.12 Check for air leaks as each of the remaining steps in this section are performed.
- 5.6.13 _____ SLOWLY OPEN valve V-6025V located in the air compressor cabinet.
- 5.6.14 _____ SLOWLY OPEN valve V-6027V located near the water tank.
- 5.6.15 _____ SLOWLY OPEN valve V-6052V located near the water tank
- 5.6.16 _____ ADJUST pressure regulator valve PCV-6006V to 30psi (+/-3psi) as indicated by pressure gauge PI-6008V on the outside of the water cabinet.
_____psi
- 5.6.17 _____ ACTUATE the lever on relief valve PRV-6004V on the top of the air compressor tank and hold open approximately 5 seconds. (Air system is to be at full pressure of approximately 90psi.)
- 5.6.18 _____ ENSURE the relief valve PRV-6004V seats properly when the lever is released.
- 5.6.19 _____ ACTUATE the lever on relief valve PRV-6005V on the top of the water tank and hold open approximately 5 seconds. (Water system air pressure is to be at full pressure of approximately 30psi.)
- 5.6.20 _____ ENSURE the relief valve PRV-6005V seats properly when the lever is released.
- 5.6.21 VALVE IN air to the WFIE cabinet by performing the following steps.
- 5.6.22 _____ SLOWLY OPEN valves _____ V-6051V located inside the air compressor cabinet and _____ V-6026V located on the outside of the air compressor cabinet.
- 5.6.23 _____ SLOWLY OPEN valve V-6001V located in the WFIE cabinet. (NOTE: PRV-6002V may open if pressure through PCV-6001V is too high.)

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- 5.6.24 _____ ADJUST pressure control valve PCV-6001V in the WFIE cabinet to 20psi (+/-2.5psi) as indicated by the pressure gauge located on the face of the valve.
- 5.6.25 _____ SLOWLY OPEN valve V-6004V located in the WFIE cabinet.
- 5.6.26 _____ SLOWLY OPEN valve V-6003V located in the WFIE cabinet.
- 5.6.27 _____ SLOWLY OPEN valve V-6005V located in the WFIE cabinet.
- 5.6.28 _____ SLOWLY OPEN valve V-6006V located in the WFIE cabinet.
- 5.6.29 _____ SLOWLY OPEN valve V-6007V located in the WFIE cabinet.
- 5.6.30 _____ SLOWLY OPEN valve V-6020V located in the WFIE cabinet.
- 5.6.31 _____ SLOWLY OPEN valve V-6021V located in the WFIE cabinet.
- 5.6.32 _____ SLOWLY OPEN valve V-6019V located in the WFIE cabinet.
- 5.6.33 ADJUST the air flow through the diptubes by performing the following steps.

NOTE: Ensure the DIP tubes are not capped on the outside of the WFIE cabinet when performing steps 5.6.34 through 5.6.36.

- 5.6.34 _____ ADJUST flow to dip tube to 1.5 CFH (+/-0.5 CFH) as indicated by FIV-6002V.
- 5.6.35 _____ ADJUST flow to dip tube to 1.5 CFH (+/-0.5 CFH) as indicated by FIV-6003V.
- 5.6.36 _____ ADJUST flow to dip tube to 1.5 CFH (+/-0.5 CFH) as indicated by FIV-6004V.
- 5.6.37 _____ ENSURE air flow from pressure regulator PCV-6007V by slowly opening valve V-6044V in the air compressor cabinet and then reclose the valve.
- 5.6.38 _____ ENSURE air flow from pressure regulator PCV-6008V by slowly opening valve V-6048V in the air compressor cabinet and then reclose the valve.
- 5.6.39 _____ ENSURE air flow from the V-6042V port at the air compressor cabinet by slowly opening valve V-6046V in the air compressor cabinet and then reclose the valve.

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5.6.40 _____ ENSURE air flow from the drain line by slowly opening valves V-6047V and V-6046V in the air compressor cabinet and then reclose the two valves.

5.6.41 Engineer to ENSURE section 5.6 is completed and sign below.

Engineer Signature

Date

5.6.42 Quality Assurance Inspector to VERIFY that section 5.6 is complete and sign below.

Quality Assurance Inspector Signature

Date

5.7 SKID WATER DRIP SYSTEM

5.7.1 _____ PROVIDE a container to capture water expelled from the dip tubes and the pressure relief valve PRV-6001V on the outside of the WFIE cabinet.

5.7.2 ACTUATE the Dip Tube Drip system by SLOWLY OPENING the following valves in the WFIE cabinet:

_____ V-6016V
_____ V-6013V
_____ V-6008V

CAUTION: Relief valve PRV-6001V will actuate and relieve pressure at 25psig.

5.7.3 _____ SLOWLY OPEN V-6018V WHILE CAREFULLY ADJUSTING Pressure Regulator PCV-6005V located in the WFIE cabinet to 20psig (+/- 2psig) as indicated on gauge PI-6001V in the WFIE cabinet. _____psig

5.7.4 _____ ADJUST valve V-6014V to allow approximately 2 drops/second as indicated by sight glass FG-6001V.

5.7.5 _____ ADJUST valve V-6015V to allow approximately 2 drops/second as indicated by sight glass FG-6002V.

5.7.6 _____ OPEN valve V-6056V very slightly to verify water flow from the "Water Supply to Remote Drip Control" port located on the outside of the WFIE cabinet, then CLOSE valve V-6056V when water is observed.

5.7.7 VALVE OUT the dip tube drip system by SLOWLY CLOSING or ENSURING CLOSED the following valves located in the WFIE cabinet.

_____ V-6015V
_____ V-6014V
_____ V-6008V
_____ V-6013V
_____ V-6019V
_____ V-6021V
_____ V-6020V
_____ V-6007V
_____ V-6006V
_____ V-6005V

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5.7.8 Engineer to ENSURE section 5.7 is completed and sign below.

Engineer Signature

Date

5.7.9 Quality Assurance Inspector to VERIFY that section 5.7 is complete and sign below.

Quality Assurance Inspector Signature

Date

5.8 INPUT SIGNALS TO THE PLC AND DTAM

- 5.8.1 _____ ENSURE the two leak detector probes are connected to the skid at the Instrument Enclosure.
- 5.8.2 _____ ENSURE a normally closed switch is connected to "CGM-AX" and "CKT5H-A" on terminal board TB4 in the Instrument Enclosure. (Can leave existing wires connected.)
- 5.8.3 _____ ENSURE a normally closed switch is connected to "CGM-F" and "CKT5H-A" on terminal board TB4 in the Instrument Enclosure. (Can leave existing wires connected.)
- 5.8.4 _____ ENSURE a normally closed switch is connected to "DIL-F" and "CKT5H-A" on terminal board TB4 in the Instrument Enclosure.
- 5.8.5 _____ ENSURE two proximity switches are connected to the intrinsic safe terminal block in the Intrinsic Safe panel. Connect a normally closed proximity switch temporarily labeled as LS-1 to "LS-1(+)" and "LS-1(-)" and a normally open proximity switch temporarily labeled as LS-2 to "LS-2(+)" and "LS-2(-)". ACTUATE the proximity switches by placing metal in front the switch faces.
- 5.8.6 _____ ENSURE the DIP switches for the Pepperl-Fuch module in the Intrinsic Safe panel are set to the correct positions: S1 and S2 in position II; and S3 in position I.

WATER TANK LEVEL TRANSMITTER

- 5.8.7 _____ ENSURE valve V-6029V located in the water tank cabinet is CLOSED.
- 5.8.8 _____ ENSURE valve V-6031V located in the water cabinet is CLOSED.
- 5.8.9 _____ CONNECT a test manometer pressure source that can output at least 62" water gauge to the HIGH PRESSURE vent/test port of level transmitter LT-6003V.
- 5.8.10 _____ ENSURE the LOW PRESSURE vent/test port of level transmitter LT-6003V is OPEN to atmosphere.
- 5.8.11 _____ ADJUST the test manometer connected to LT-6003V to a pressure of 31" water gauge (+/-1"). Record reading _____

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- 5.8.12 _____ RECORD the water tank level reading on the DTAM. _____ 31"
(+/-2")
- 5.8.13 The next step will cause a low water level alarm on the DTAM.
- 5.8.14 _____ VERY SLOWLY DECREASE the test manometer pressure until the
"PIC WATER LEVEL LOW" (alarm 9) occurs on the DTAM. (This alarm
should occur at 12.25" +/-0.5" water gauge.)
- 5.8.15 _____ ACKNOWLEDGE the alarm at the DTAM.
- 5.8.16 _____ RECORD the manometer pressure and the DTAM water level readings.
Pressure on manometer _____ Water Level on DTAM _____
- 5.8.17 _____ SLOWLY INCREASE the manometer pressure until the alarm clears
on the DTAM. (This should occur at 15.5" +/-0.5" water gauge.)
- 5.8.18 _____ RECORD the manometer pressure and the DTAM water level readings.
Pressure on manometer _____ Water Level on DTAM _____
- 5.8.19 _____ ENSURE the "PIC Water" alarm indicates "norm".
- 5.8.20 _____ REMOVE the test manometer from the LT-6003V high pressure
vent/test port and reinstall the vent plugs on both the high and low sides.
- 5.8.21 _____ OPEN valve V-6029V located in the Water Cabinet.
- 5.8.22 _____ OPEN valve V-6031V located in the Water Cabinet.
- 5.8.23 _____ ENSURE "Water Tank" reading on the DTAM shows a value in inches.
Record the reading _____

WEIGHT FACTOR TEST

- 5.8.24 _____ CONNECT a test manometer pressure source that can output at least
125" water gauge to the HIGH PRESSURE dip tube on the side of the WFIE
Cabinet.
- 5.8.25 _____ ENSURE V-6001V is CLOSED.
- 5.8.26 _____ ENSURE V-6005V is OPEN.

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- 5.8.27 _____ ENSURE V-6006V is OPEN.
- 5.8.28 _____ ENSURE adjustment valves on FIV-6002V, FIV-6003V and FIV-6004V are CLOSED.
- 5.8.29 _____ ENSURE the LOW and HIGH side isolation valves located on the V-6036V 3-Valve manifold in the WFIE cabinet are OPEN.
- 5.8.30 _____ ENSURE the EQUALIZING valve located on the V-6036V 3-Valve manifold in the WFIE cabinet is CLOSED.
- 5.8.31 _____ SET the test manometer to 125" (+/-1") water gauge. Record the manometer reading. _____
- 5.8.32 _____ RECORD the "WFT" reading on the DTAM. The reading is to be 125" (+/- 5"). _____
- 5.8.33 _____ BLEED off the pressure on the test manometer. Leave connected for testing the specific gravity transmitter.
- 5.8.34 _____ CLOSE V-6006V.
- 5.8.35 _____ OPEN the EQUALIZING valve located on V-6036V 3-Valve manifold in the WFIE cabinet.
- 5.8.36 _____ CLOSE the LOW and HIGH side isolation valves located on the V-6036V 3-Valve manifold in the WFIE cabinet.

SPECIFIC GRAVITY TRANSMITTER

- 5.8.37 _____ ENSURE V-6007V is OPEN.
- 5.8.38 _____ ENSURE V-6005V is OPEN.
- 5.8.39 _____ ENSURE the LOW and HIGH side isolation valves located on V-6035V 3-Valve manifold in the WFIE cabinet are OPEN.
- 5.8.40 _____ ENSURE the specific gravity transmitter equalizing valve located on the V-6035V 3-Valve manifold located in the WFIE cabinet is CLOSED.
- 5.8.41 _____ SET the test manometer to 5" water gauge (+/- 0.3"). _____
- 5.8.42 _____ RECORD the "SGT" reading on the DTAM. Reading to be 5" +/- 0.35". _____

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- 5.8.43 _____ BLEED off pressure on the manometer.
- 5.8.44 _____ ENSURE "SGT LOW" alarm occurs (alarm 13).
- 5.8.45 _____ ACKNOWLEDGE the alarm.
- 5.8.46 _____ DISCONNECT the test manometer.
- 5.8.47 _____ CLOSE V-6007V.
- 5.8.48 _____ CLOSE V-6005V.
- 5.8.49 _____ OPEN the EQUALIZING valve located on V-6035V 3-Valve manifold in the WFIE cabinet.
- 5.8.50 _____ CLOSE the LOW side and HIGH side isolation valves located on V-6035V 3-Valve manifold in the WFIE cabinet.

FLOW METER SIGNAL CHECK

- 5.8.51 _____ Prepare the flow converter FQIT-6001V located in the Instrument Enclosure to simulate a flow either using the buttons on the front face or using a "brain terminal".
- 5.8.52 _____ SIMULATE a flow signal of 50% span (4 or 7gpm) with the hand-held brain terminal or from the flow converter face switches.
- 5.8.53 _____ RECORD the flow readings on the front of the flow converter and on the DTAM (PMP FLOW). Readings to be within +/- 0.1gpm of each other.

Flow converter _____ DTAM (PMP FLOW) _____
- 5.8.54 _____ RESTORE the flow converter, FQIT-6001V to its original configuration.

SUCTION AND DISCHARGE PRESSURE SIGNAL

- 5.8.55 _____ ENSURE a current source is connected to PSPT+ and PSPT- on the intrinsic side terminal board in the Intrinsic Safe panel. Set the source to "transmitter simulate."
- 5.8.56 _____ SET the current source to approximately 4mA and record the suction pressure reading on PI-6012V. Reading to be approximately zero.
_____ psi
- 5.8.57 _____ SET the current source to approximately 20mA and record the suction pressure reading on PI-6012V. Reading to be approximately 100psi.
_____ psi
- 5.8.58 _____ DISCONNECT the current source.
- 5.8.59 _____ ENSURE a current source is connected to PDPT+ and PDPT- at the intrinsic side terminal board in the Intrinsic Safe panel. Set the source to transmitter simulate.
- 5.8.60 _____ SET the current source to approximately 4mA and record the discharge pressures on PI-6011V and on the DTAM. Readings should be approximately zero.
PI-6011V _____ psi DTAM (PMP DISC) _____ psi
- 5.8.61 _____ SET the current source to approximately 20mA and record the discharge pressures on PI-6011V and on the DTAM. Readings should be approximately 300psi.
PI-6011V _____ psi DTAM (PMP DISC) _____ psi
- 5.8.62 _____ DISCONNECT the current source.

COMBUSTIBLE GAS MONITOR ANALOG SIGNAL TO PLC

- 5.8.63 _____ ENSURE a current source is connected to the CGM loop by lifting the CGM 0(+) wire going to the CGM transmitter at terminal board TB1 in the Instrument Enclosure, and connecting the current source between CGM 0(+) and 24vdc COM at TB1.
- 5.8.64 _____ SET the current source to approximately 4mA.

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- 5.8.65 _____ RECORD the "CGM" percent reading from the DTAM. Reading is to be approximately zero. _____%
- 5.8.66 _____ SET the current source to approximately 12mA.
- 5.8.67 _____ RECORD the "CGM" percent reading from the DTAM. Reading is to be approximately 50%. _____%
- 5.8.68 _____ SET the current source to approximately 20mA.
- 5.8.69 _____ RECORD the "CGM" percent reading from the DTAM. Reading is to be approximately 100%. _____%
- 5.8.70 _____ DISCONNECT the current source and reconnect the CGM 0 (+) wire to TB1.

DOMESTIC SPACE FLAMMABLE GAS MONITOR ANALOG SIGNAL TO PLC

- 5.8.71 _____ ENSURE a current source is connected to terminal board TB1 in the Instrument Enclosure, points FGM 1(+) and FGM 1(-)
- 5.8.72 _____ SET the current source to approximately 4mA.
- 5.8.73 _____ RECORD the "FGM" percent reading from the DTAM. Reading is to be approximately zero. _____%
- 5.8.74 _____ SET the current source to approximately 12mA.
- 5.8.75 _____ RECORD the "FGM" percent reading from the DTAM. Reading is to be approximately 50%. _____%
- 5.8.76 _____ SET the current source to approximately 20mA.
- 5.8.77 _____ RECORD the "FGM" percent reading from the DTAM. Reading is to be approximately 100%. _____%
- 5.8.78 _____ DISCONNECT the current source.

THERMOCOUPLE INPUTS TO THE PLC

- 5.8.79 _____ WARM thermocouple TE-6004V located in the Instrument Enclosure.

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- 5.8.80 _____ ENSURE the “PLC CAB temp” on the DTAM displays a temperature change.
- 5.8.81 _____ CONTINUE to warm the thermocouple until “PLC Enclosure HI” (alarm 10) occurs. This will be approximately 130 degrees F.
- 5.8.82 _____ ACKNOWLEDGE the alarm.
- 5.8.83 _____ ENSURE “PLC CAB temp” on the DTAM shows a temperature DECREASE after the heat source is removed from the TE-6004V thermocouple.
- 5.8.84 _____ ENSURE the “PLC temp” alarm returns to “norm” when the temperature decreases below 125 degrees F.
- 5.8.85 _____ WARM thermocouple TE-6001V located in the Air Compressor Cabinet.
- 5.8.86 _____ ENSURE the “COMPRS temp” on the DTAM displays a temperature change.
- 5.8.87 _____ CONTINUE to warm the thermocouple until “Air Compressor Temp HI” (alarm 11) occurs. This will be approximately 130 degrees F.
- 5.8.88 _____ ACKNOWLEDGE the alarm.
- 5.8.89 _____ ENSURE “COMPRS temp” on the DTAM shows a temperature DECREASE after the heat source is removed from the TE-6001V thermocouple.
- 5.8.90 _____ ENSURE the “CMPRSR temp” alarm returns to “norm” when the temperature decreases below 125 degrees F.
- 5.8.91 _____ COOL the thermocouple probe TE-6006V in the WFIE cabinet using ice water or cool air spray. Temperature needs to drop below 35 degrees F.
- 5.8.92 _____ ENSURE alarm 50, “WFIE CAB Temp Low” occurs at the DTAM.
- 5.8.93 _____ WARM or ALLOW to warm the thermocouple probe TE-6006V in the WFIE cabinet and ENSURE the “WFIE CAB Temp” alarm is “norm” when the temperature goes above 40 degrees F.
- 5.8.94 _____ COOL the thermocouple probe TE-6005V in the Water cabinet using ice water or cool air spray. Temperature needs to drop below 35 degrees F.
- 5.8.95 _____ ENSURE alarm 49, “WATER CAB Temp Low” occurs at the DTAM.

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- 5.8.96 _____ WARM or ALLOW to warm the thermocouple probe TE-6005V in the Water cabinet and ENSURE the "WATER CAB Temp" alarm is "norm" when the temperature goes above 40 degrees F.
- 5.8.97 _____ CONNECT two temperature simulators to the intrinsic side of the thermocouple modules (MTL 3081) for temperature elements TE-6007 and TE-6008 in the Intrinsic Safe panel.
- 5.8.98 _____ SET both temperature simulators to approximately 120 degrees F.
- 5.8.99 _____ ENSURE the "Recirc" and "Assembly" temperature readings at the DTAM are approximately 120 degrees F.
- 5.8.100 _____ SET the three Heat trace setpoints at the DTAM to 200 degrees F.
- 5.8.101 _____ TURN ON the Heat trace at the DTAM.
- 5.8.102 _____ ENSURE the CGM-AX and CGM-F switches in the Instrument Enclosure are in the closed position.
- 5.8.103 _____ ENSURE approximately 120vac at TB15, at HT-10 and CKT3-N.
_____ vac
- 5.8.104 _____ ENSURE approximately 120vac at TB15, at HT-11 and CKT3-N.
_____ vac
- 5.8.105 _____ INCREASE the temperature simulator at TE-6007 to approximately 206 degrees F or higher until the voltage at TB-15 for HT-10 goes to approximately 0vac. _____ vac _____ DTAM temperature reading for "recirc"
- 5.8.106 _____ ENSURE the voltage at TB-15 for HT-11 remains at 120vac.
- 5.8.107 _____ DECREASE the temperature simulator at TE-6007 to approximately 194 degrees F or lower until the voltage at TB-15 for HT-10 goes to approximately 120vac. _____ vac _____ DTAM temperature reading for "recirc"
- 5.8.108 _____ INCREASE the temperature simulator at TE-6008 to approximately 206 degrees F or higher until the voltage at TB-15 for HT-11 goes to approximately 0vac. _____ vac _____ DTAM temperature reading for "assembly"
- 5.8.109 _____ ENSURE the voltage at TB-15 for HT-10 remains at 120vac.

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- 5.8.110 DECREASE the temperature simulator at TE-6008 to approximately 194 degrees F or lower until the voltage at TB-15 for HT-11 goes to approximately 120vac. _____ vac _____ DTAM temperature reading for "assembly"
- 5.8.111 OPEN the "CGM-AX" switch in the Instrument Enclosure.
- 5.8.112 ENSURE alarm "25" occurs and then ACKNOWLEDGE.
- 5.8.113 ENSURE approximately 0vac between HT-10 and CKT3-N
_____ vac; HT-11 and CKT3-N _____ vac at TB-15.
- 5.8.114 CLOSE the "CGM-AX" switch in the Instrument Enclosure.
- 5.8.115 ENSURE approximately 120vac between HT-10 and CKT3-N
_____ vac; HT-11 and CKT3-N _____ vac at TB-15.
- 5.8.116 ENSURE alarm for "CGM HI LFL" is "norm".
- 5.8.117 OPEN the "CGM-F" switch in the Instrument Enclosure.
- 5.8.118 ENSURE alarm "31" occurs and then ACKNOWLEDGE.
- 5.8.119 ENSURE approximately 0vac between HT-10 and CKT3-N
_____ vac; HT-11 and CKT3-N _____ vac at TB-15.
- 5.8.120 CLOSE the "CGM-F" switch in the Instrument Enclosure.
- 5.8.121 ENSURE approximately 120vac between HT-10 and CKT3-N
_____ vac; HT-11 and CKT3-N _____ vac at TB-15.
- 5.8.122 ENSURE alarm for "CGM Fault" is "norm".
- 5.8.123 TURN OFF the heat trace from the DTAM.
- 5.8.124 ENSURE approximately 0vac between HT-10 and CKT3-N
_____ vac; HT-11 and CKT3-N _____ vac at TB-15.
- 5.8.125 TURN ON the heat trace from the DTAM.
- 5.8.126 ENSURE approximately 120vac between HT-10 and CKT3-N
_____ vac; HT-11 and CKT3-N _____ vac at TB-15.
- 5.8.127 DISCONNECT the two temperature simulators at the Intrinsic Safe panel from the 3081 modules for TE-6007 and TE-6008.

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- 5.8.128 _____ CONNECT two temperature simulators to the intrinsic side of the two thermocouple modules (MTL 3081) ~~for TE-6002 and TE-6003~~ in the Intrinsic Safe panel.
- 5.8.129 _____ SET the motor temperature alarm setpoints at the DTAM to 125 degrees F for the high and 135 degrees F for the high high. NOTE: The security code is 11 for the restricted screen for entry.
- 5.8.130 _____ SET both temperature simulators to approximately 120 degrees F.
- 5.8.131 _____ ENSURE the “PUMP temp” and the “JMPER TEMP” each read approximately 120 degree at the DTAM. _____ (Pump) _____ (Jumper)
- 5.8.132 _____ ENSURE the “Jmp Htr” is ON at the DTAM.
- 5.8.133 _____ DECREASE the temperature simulator ~~for TE-6002~~ to approximately 39 degrees or lower until alarm 8 “Pump/Jumper Temp Trouble” alarms on the DTAM.
- 5.8.134 _____ ACKNOWLEDGE the alarm.
- 5.8.135 _____ ENSURE the “PUMP TEMP” reads approximately 39 degree at the DTAM. _____
- 5.8.136 _____ INCREASE the temperature simulator ~~for TE-6002~~ to approximately 120 degrees. _____
- 5.8.137 _____ ENSURE the “JMPR HT” alarm on the DTAM reads “norm”.
- 5.8.138 _____ ENSURE the “Jmp Htr” is ON at the DTAM.
- 5.8.139 _____ ENSURE the switches installed on TB4 between points “CGM-AX” and “CKT5H-A”; and “CGM-F” and “CKT5H-A” are in the CLOSED position.
- 5.8.140 _____ ENSURE approximately 120vac between HT-1 and CKT3-N at TB12.
_____ vac
- 5.8.141 _____ WHILE MONITORING the voltage at TB12, INCREASE the temperature on ~~TE-6003~~ to 206 degrees F or higher until the voltage at TB12 goes to approximately zero. DTAM temp. _____
- 5.8.142 _____ WHILE MONITORING the voltage at TB12, decrease the temperature on ~~TE-6003~~ to 194 degrees F or lower until the voltage at TB12 goes to approximately 120vac. DTAM temp. _____

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- 5.8.143 _____ OPEN the switch on TB4 that is across “CGM-AX” and “CKT5H-A”.
- 5.8.144 _____ ENSURE alarm “25” occurs and ACKNOWLEDGE.
- 5.8.145 _____ ENSURE the voltage at TB12 goes to approximately zero.
- 5.8.146 _____ CLOSE the switch on TB4 that is across “CGM-AX” and “CKT5H-A”.
- 5.8.147 _____ ENSURE the voltage at TB12 returns to approximately 120vac.
- 5.8.148 _____ OPEN the switch on TB4 that is across “CGM-F” and “CKT5H-A”.
- 5.8.149 _____ ENSURE alarm “31” occurs and ACKNOWLEDGE.
- 5.8.150 _____ ENSURE the voltage at TB12 goes to approximately zero.
- 5.8.151 _____ CLOSE the switch on TB4 that is across “CGM-F” and “CKT5H-A”.
- 5.8.152 _____ ENSURE the voltage at TB12 returns to approximately 120vac.
- 5.8.153 _____ TURN OFF the heat trace from the DTAM.
- 5.8.154 _____ ENSURE the voltage at TB12 goes to approximately zero.
- 5.8.155 _____ TURN ON the heat trace from the DTAM.
- 5.8.156 _____ ENSURE the voltage at TB12 returns to approximately 120vac.
- 5.8.157 _____ INCREASE the temperature simulator ~~for TE-6003~~ to approximately 226 degrees or higher until alarm 8 “Pump/Jumper Temp Trouble” alarms on the DTAM.
- 5.8.158 _____ ACKNOWLEDGE the alarm.
- 5.8.159 _____ DECREASE the temperature simulator ~~for TE-6003~~ to less than 225 degrees.
- 5.8.160 _____ ENSURE the “JMPR HT” alarm 8 returns to “norm” on the DTAM.
- 5.8.161 _____ REMOVE the temperature simulator ~~from TE-6003~~, but leave the ~~TE-6002~~ temperature simulator connected for the interlock checks in section 5.9.

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5.8.162 Engineer to Ensure section 5.8 is completed and sign below.

Engineer Signature

Date

5.8.163 Quality Assurance Inspector to Verify that section 5.8 is complete and sign below.

Quality Assurance Inspector Signature

Date

5.9 JET PUMP INTERLOCK CIRCUITS

- 5.9.1 _____ ENSURE the LS-1 and LS-2 proximity switches at the Intrinsic safe panel; the two leak detector probes; the two CGM, and the Dilution switches at TB4 in the Instrument Enclosure are in place as per steps 5.8.1 to 5.8.5.
- 5.9.2 _____ IF POSSIBLE, CONNECT three current sources to the following points. One to JFPT+ and JFPT- in the Intrinsic Safe panel at the intrinsic terminal board; one to RFPT+ and RFPT- in the Instrument Enclosure at TB2; and one to PXPT+ and PXPT- at the intrinsic terminal board in the Intrinsic safe panel. Set the current sources to "transmitter simulate" and at 6mA. NOTE: If three current sources are not available, then software forces will be used during this section to bypass the inputs not being tested.
- 5.9.3 _____ SET the temperature simulator at the Intrinsic Safe panel to 120 degrees F.
- 5.9.4 _____ ENSURE the temperature setpoint for the motor-bearing temperature high-alarm is set to 125 degrees F and the high-high-alarm is set to 135 degrees F.
- 5.9.5 _____ ENSURE the laptop computer is connected to the PLC to set forces and observe logic when required.
- 5.9.6 _____ RECORD the reading of the Hourmeter on the front of the Instrument Enclosure. _____

RECIRCULATION FLUSH PRESSURE SIGNAL TO PLC

- 5.9.7 _____ ENSURE a current source is connected to points RFPT+ and RFPT- in the Instrument Enclosure at TB2 and is set to approximately 6mA.
- 5.9.8 _____ ENSURE the green light on the Instrument Enclosure and on the Jet Pump motor starter are ON.
- 5.9.9 _____ APPLY software forces to allow the jet pump to start. (Engineering will apply the forces from the laptop computer connected to the PLC. Normally this will be the COMM Failure and any leak station interlocks. These can be forced out by setting the timers to a high set value such as 7200 seconds with the laptop on-line. If the timers need to be reset to start counting, this is done by turning the key switch on the PLC from "RUN" to "PROGRAM" and then back to "RUN".)
- 5.9.10 _____ TURN the selector switch on the Jet Pump Motor Starter to ON.

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- 5.9.11 _____ START the jet pump from the DTAM and OBSERVE that the red lights at the Instrument Enclosure and motor starter come ON and the green lights at both locations turn OFF.
- 5.9.12 _____ SLOWLY INCREASE the RFPT current source output to approximately 12.5mA or until the pump shuts down after a 3 second delay. OBSERVE the following: (Acknowledge the alarms as necessary to observe all the alarms.) NOTE: The horn sound can be adjusted by turning the set screw on the front of the horn for sound level as directed by the engineer or PIC.
- _____ Record current reading on current source. _____ mA
- _____ The strobe light flashes and the horn sounds.
- _____ Alarm 12 occurs, "JET PUMP SHUTDOWN".
- _____ Alarm 39 occurs, "RECIRC FLUSH PRESS HI".
- _____ Red lights at the motor starter and Instrument Enclosure are OFF.
- _____ Green lights at the motor starter and Instrument Enclosure are ON.
- _____ The "RECR FL PR" is approximately 15psi. _____ psi
- _____ Ensure addresses N20:32/2 and N20:32/6 are actuated as observed on the laptop computer in ladder 5.
- 5.9.13 _____ DECREASE the current source to approximately 4mA.
- 5.9.14 _____ ENSURE the "Recirc Press" alarm at the DTAM returns to "norm".
- 5.9.15 _____ ENSURE address N20:32/6 clears as observed on the laptop.
- 5.9.16 _____ START the jet pump from the DTAM and OBSERVE that the red lights at the Instrument Enclosure and motor starter come ON and the green lights at both locations turn OFF.
- 5.9.17 _____ DECREASE the current source to zero.
- 5.9.18 _____ ENSURE the jet pump shuts down.
- 5.9.19 _____ ENSURE alarm 14, "RFPT SIGNAL LOSS ALARM" occurs.
- 5.9.20 _____ ACKNOWLEDGE the alarm.
- 5.9.21 _____ ENSURE address N20:32/7 is actuated as observed on the laptop.
- 5.9.22 _____ INCREASE the current source to approximately 6mA.
- 5.9.23 _____ ENSURE the "RFPT SIGNAL" alarm returns to "norm" on the DTAM.
- 5.9.24 _____ ENSURE address N20:32/7 clears as observed on the laptop.

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JUMPER FLUSH PRESSURE SIGNAL TO PLC

- 5.9.25 _____ ENSURE a current source is connected to points JFPT+ and JFPT- in the Intrinsic Safe panel intrinsic terminal board and is set to approximately 6mA.
- 5.9.26 _____ ENSURE the green light on the Instrument Enclosure and on the Jet Pump motor starter are ON.
- 5.9.27 _____ APPLY software forces as necessary to allow the jet pump to start. (Engineering will apply the forces from the laptop computer connected to the PLC.)
- 5.9.28 _____ START the jet pump from the DTAM and OBSERVE that the red lights at the Instrument Enclosure and motor starter come ON and the green lights at both locations turn OFF.
- 5.9.29 _____ ENSURE address N20:32/2 is clear as observed on the laptop.
- 5.9.30 _____ SLOWLY INCREASE the JFPT current source output to approximately 12.5mA or until the pump shuts down after a 3 second delay. OBSERVE the following: (Acknowledge the alarms as necessary to observe all the alarms.)
- _____ The jet pump shuts down.
- _____ Record current reading on current source. _____ mA
- _____ Alarm 3 occurs, "Flush Pressure HI".
- _____ Alarm 12 occurs, "JET PUMP SHUTDOWN".
- _____ Blue light at the Instrument Enclosure is ON.
- _____ The "PS2 FL PR" is approximately 15psi. _____ psi
- _____ Ensure address N20:32/5 is actuated as observed on the laptop.
- 5.9.31 _____ DECREASE the current source to approximately 4mA.
- 5.9.32 _____ ENSURE the "Flush Press" alarm at the DTAM returns to "norm".
- 5.9.33 _____ ENSURE the blue light at the Instrument Enclosure turns OFF.
- 5.9.34 _____ ENSURE address N20:32/5 clears as observed on the laptop.
- 5.9.35 _____ START the jet pump from the DTAM.
- 5.9.36 _____ DECREASE the current source to zero.
- 5.9.37 _____ ENSURE the jet pump shuts down.
- 5.9.38 _____ ENSURE alarm 16, "JFPT SIGNAL LOSS ALARM" occurs.

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- 5.9.39 _____ ACKNOWLEDGE the alarm.
- 5.9.40 _____ ENSURE address N20:32/8 actuates as observed on the laptop.
- 5.9.41 _____ INCREASE the current source to approximately 6mA.
- 5.9.42 _____ ENSURE the "JFPT SIGNAL" alarm returns to "norm" on the DTAM.
- 5.9.43 _____ ENSURE address N20:32/8 clears as observed on the laptop.

TRANSFER PRESSURE INTERLOCK INPUT

- 5.9.44 _____ ENSURE a current source is connected to points PXPT+ and PXPT- in the Intrinsic Safe panel intrinsic terminal board and is set to approximately 6mA.
- 5.9.45 _____ ENSURE the laptop computer is connected to the PLC and is "on-line".
- 5.9.46 _____ ENSURE the green light on the Instrument Enclosure and on the Jet Pump motor starter are ON.
- 5.9.47 _____ APPLY software forces to allow the jet pump to start. (Engineering will apply the forces from the laptop computer connected to the PLC.)
- 5.9.48 _____ START the jet pump from the DTAM.
- 5.9.49 _____ DECREASE the PXPT current source to approximately 4.8mA or until Timer 4.1 on the ladder logic of the PLC (rung 0 of ladder 5) starts timing.
- 5.9.50 _____ ENSURE the amber light on the Instrument Enclosure turns ON immediately after the timer starts.
- 5.9.51 _____ ENSURE after 30 seconds, the following occurs: (Acknowledge alarms as necessary to view all the alarms.)
 - _____ The jet pump shuts down.
 - _____ "XFR Pressure LOW" (alarm 1) occurs at the DTAM.
 - _____ "JET PUMP SHUTDOWN" (alarm12) occurs at the DTAM.
- 5.9.52 _____ INCREASE the current source to approximately 6mA.
- 5.9.53 _____ ENSURE the "XFR Pressure" alarm is "norm" on the DTAM and the amber light is OFF on the Instrument Enclosure.
- 5.9.54 _____ START the pump from the DTAM.

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- 5.9.55 _____ INCREASE the current source to approximately 11.5mA or until Timer 4.2 on rung 2 of ladder 5 starts timing as observed on the laptop computer.
- 5.9.56 _____ ENSURE after a 3 second delay, the following occurs: (Acknowledge alarms as necessary to view all the alarms.)
- _____ The jet pump shuts down.
_____ "XFR Pressure HIGH" (alarm 2) occurs at the DTAM.
_____ "JET PUMP SHUTDOWN" (alarm12) occurs at the DTAM.
- 5.9.57 _____ DECREASE the current source to approximately 6mA.
- 5.9.58 _____ ENSURE the "XFR Pressure" alarm indicates "norm" on the DTAM.

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

- 5.9.59 _____ ENSURE the amber lights for LS-1 and LS-2 are ON at the Pepperl-Fuchs modules in the IS panel.
- 5.9.60 _____ START the pump from the DTAM.
- 5.9.61 _____ REMOVE the metal from the front face of LS-1.
- 5.9.62 _____ ENSURE the following occurs immediately: (Acknowledge alarms as necessary to view all the alarms.)
- _____ The jet pump shuts down.
_____ "JR-1 Position NON-PROCESS" (alarm 5) occurs at the DTAM.
_____ "JET PUMP SHUTDOWN" (alarm12) occurs at the DTAM.
_____ Address N20:32/0 on ladder 5 is actuated as observed on the laptop.
_____ ENSURE the amber light is OFF and the red light is ON for light set 1.
- 5.9.63 _____ REMOVE the metal form the front face of LS-2.
- 5.9.64 _____ ENSURE the "JR-1" still indicates "NON-PROCESS" at the DTAM.
_____ ENSURE the amber light is OFF and the red light is ON for light set 2.
- 5.9.65 _____ ENSURE address N20:32/1 is actuated on ladder 5 as observed on the laptop.
- 5.9.66 _____ REPLACE the metal in front of LS-1 and LS-2.
- 5.9.67 _____ ENSURE the "JR-1" indicates "norm" on the DTAM and addresses N20:32/0 and N20:32/1 are clear on ladder 5 as observed on the laptop.
_____ ENSURE the amber lights are ON and the red lights are OFF.

COMBUSTIBLE GAS MONITOR INTERLOCK INPUTS

- 5.9.68 _____ START the pump from the DTAM.
- 5.9.69 _____ OPEN the CGM-AX switch at TB4.
- 5.9.70 _____ ENSURE the following occurs immediately: (Acknowledge alarms as necessary to view the alarms.)
- _____ The jet pump shuts down.
_____ "JET PUMP SHUTDOWN" (alarm 12) occurs at the DTAM.
_____ "HIGH LFL ON CGM" (alarm 25) occurs at the DTAM.
- 5.9.71 _____ CLOSE the CGM-AX switch at TB4.
- 5.9.72 _____ ENSURE the "HI LFL CGM" alarm indicates "norm" at the DTAM.
- 5.9.72 _____ START the pump from the DTAM.
- 5.9.73 _____ OPEN the CGM-F switch at TB4.
- 5.9.74 _____ ENSURE the following occurs after a 3-second delay: (Acknowledge alarms as necessary to view the alarms.)
- _____ The jet pump shuts down.
_____ "JET PUMP SHUTDOWN" (alarm 12) occurs at the DTAM.
_____ "CGM TROUBLE" (alarm 31) occurs at the DTAM.
- 5.9.75 _____ CLOSE the CGM-F switch at TB4.
- 5.9.76 _____ ENSURE the "CGM TROUBLE" alarm indicates "norm" at the DTAM.
- 5.9.77 _____ START the pump from the DTAM.
- 5.9.78 _____ OPEN the dilution switch at TB4 in the Instrument Enclosure.
- 5.9.79 _____ ENSURE the following occurs after a 5-minute delay: (Acknowledge alarms as necessary to view the alarms.)
- _____ The jet pump shuts down.
_____ "JET PUMP SHUTDOWN" (alarm 12) occurs at the DTAM.
_____ "DILUTION TANK NO FLOW" (alarm 35) occurs at the DTAM.
- 5.9.80 _____ CLOSE the dilution switch.

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- 5.9.81 _____ ENSURE the “Dilution tk” alarm indicates “norm” on the DTAM (The “norm” returns once the alarm is acknowledge since the MR-1 contact is in series with alarm and opens when the pump shut downs thus clearing the alarm.)

MOTOR HIGH TEMPERATURE

- 5.9.82 _____ START the pump from the DTAM.
- 5.9.83 _____ INCREASE the temperature on the temperature simulator to approximately 126 degrees F or greater until alarm 58, “MOTOR TEMP HIGH” actuates.
- 5.9.84 _____ INCREASE the temperature on the temperature simulator to approximately 136 degrees F or greater until the following occurs:
- _____ The jet pump shuts down.
 - _____ “JET PUMP SHUTDOWN” (alarm12) occurs at the DTAM.
 - _____ “Motor Temp Hi Shutdown” (alarm 59) occurs at the DTAM.
- 5.9.85 _____ DECREASE the temperature simulator to approximately 125 degrees F or lower until alarm “PMP HIHI TEMP” indicates “norm” at the DTAM.
- 5.9.86 _____ ENSURE the “PMP HI TEMP” alarm indicates “norm” at the DTAM.

LEAK DETECTION INTERLOCK

- 5.9.87 _____ ENSURE there is a water supply and bucket available to actuate the leak detector probes.
- 5.9.88 _____ START the pump from the DTAM.
- 5.9.89 _____ PLACE the primary leak detector probe in a bucket of water.
- 5.9.90 _____ ENSURE the following occurs after a 3-second delay: (Acknowledge alarms as necessary to view the alarms.)
- _____ The jet pump shuts down.
 - _____ “PUMP PIT LEAK” (alarm 6) occurs at the DTAM.
 - _____ “JET PUMP SHUTDOWN” (alarm12) occurs at the DTAM.
 - _____ The red light for the “Primary” leak detector is ON at the Instrument Enclosure.
 - _____ Ensure address N20:32/3 in ladder 5 actuates as observed on the laptop.

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- 5.9.91 _____ REMOVE the leak detector probe from the bucket and allow the water to drain off.
- 5.9.92 _____ ENSURE the "Pump Pit" leak alarm returns to "norm".
- 5.9.93 _____ ENSURE the red light for the "Primary" leak detector is OFF.
- 5.9.94 _____ ENSURE address N20:32/3 clears as observed on the laptop.
- 5.9.95 _____ START the pump from the DTAM.
- 5.9.96 _____ DISCONNECT one of the "SD" wires going to the primary leak detector probe.
- 5.9.97 _____ ENSURE the following occurs after a 3-second delay: (Acknowledge alarms as necessary to view the alarms.)
- _____ The jet pump shuts down.
 - _____ "PUMP PIT LEAK TROUBLE" (alarm 7) occurs at the DTAM.
 - _____ "JET PUMP SHUTDOWN" (alarm12) occurs at the DTAM.
 - _____ The red light for the "Primary" leak detector at the Instrument Enclosure is ON.
 - _____ Ensure address N20:32/3 actuates as observed on the laptop.
- 5.9.98 _____ RECONNECT the "SD" wire.
- 5.9.99 _____ ENSURE the "Pump Pit" trouble alarm indicates "norm" on the DTAM.
- 5.9.100 _____ ENSURE the red light for the "Primary" leak detector is OFF.
- 5.9.101 _____ ENSURE address N20:32/3 clears as observed on the laptop.
- 5.9.102 _____ START the pump from the DTAM.
- 5.9.103 _____ PLACE the leak detector 1 probe in a bucket of water.
- 5.9.104 _____ ENSURE the following occurs after a 3-second delay: (Acknowledge alarms as necessary to view the alarms.)
- _____ The jet pump shuts down.
 - _____ "JET PUMP SHUTDOWN" (alarm12) occurs at the DTAM.
 - _____ "LEAK DETECTOR NO 1 LEAK DETECTED" (alarm 18) occurs at the DTAM.
 - _____ The red light for "Leak Detector 1" at the Instrument Enclosure is ON.
 - _____ Ensure address N20:32/4 actuates in ladder 5 as observed on the laptop.

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- 5.9.105 _____ REMOVE the leak detector probe from the bucket and allow the water to drain off.
- 5.9.106 _____ ENSURE the “Leak 1” alarm returns to “norm”.
- 5.9.107 _____ ENSURE the red light for “Leak Detector 1” is OFF.
- 5.9.108 _____ ENSURE address N20:32/4 clears as observed on the laptop.
- 5.9.109 _____ START the pump from the DTAM.
- 5.9.110 _____ DISCONNECT one of the “SD” wires going to the leak detector 1 probe.
- 5.9.111 _____ ENSURE the following occurs after a 3-second delay: (Acknowledge alarms as necessary to view the alarms.)
- _____ The jet pump shuts down.
 - _____ “JET PUMP SHUTDOWN” (alarm 12) occurs at the DTAM.
 - _____ “LEAK DETECTOR NO 1 TROUBLE” (alarm 19) occurs at the DTAM.
 - _____ The red light for “Leak Detector 1” at the Instrument Enclosure is ON.
 - _____ Ensure address N20:32/4 actuates as observed by the laptop.
- 5.9.112 _____ RECONNECT the “SD” wire.
- 5.9.113 _____ ENSURE the “Leak 1 ck” alarm indicates “norm” on the DTAM.
- 5.9.114 _____ ENSURE the red light for “Leak Detector 1” is OFF.
- 5.9.115 _____ ENSURE address N20:32/4 clears as observed on the laptop.
- 5.9.116 _____ RECORD the hourmeter reading. _____
- 5.9.117 _____ VERIFY by comparing the readings in steps 5.9.6 and 5.9.108 that the hourmeter is recording time.
- 5.9.118 _____ REMOVE the software forces and disconnect the laptop computer from the PLC.
- 5.9.119 _____ TURN OFF breakers 2, 3, 5, and 6 in the distribution panel.
- 5.9.120 _____ DISCONNECT the current sources from the PXPT, RFPT and JFPT termination points.

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5.9.121 _____ DISCONNECT the test switches from the CGM and Dilution termination points.

5.9.122 _____ DISCONNECT the proximity switches from the Intrinsic Safe panel.

5.9.123 _____ DISCONNECT the temperature simulator from the Intrinsic Safe panel.

5.9.124 _____ DISCONNECT the leak detector probes from the Instrument Enclosure.

5.9.125 _____ TURN ON breakers 2, 3, 5, and 6 at the distribution panel.

5.9.126 Engineer to ENSURE section 5.9 is completed and sign below.

Engineer Signature

Date

5.9.127 Quality Assurance Inspector to VERIFY that section 5.9 is completed and sign below.

Quality Assurance Inspector Signature

Date

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5.10 HEATERS, AIR CONDITIONER AND LIGHTS

- 5.10.1 _____ TURN the heater ON in the air compressor cabinet. Set the thermostat high enough to allow the unit to operate.
- 5.10.2 _____ RESET the thermostat to approximately 40 degrees F to allow the heat to turn OFF. Then unplug the heater.
- 5.10.3 _____ TURN the fan thermostat switch to allow the fan in the air compressor cabinet to run.
- 5.10.4 _____ RESET the fan switch to approximately 90 degrees F to allow the fan to turn OFF.
- 5.10.5 _____ TURN the heater ON in the WFIE cabinet. Set the thermostat high enough to allow the unit to operate.
- 5.10.6 _____ RESET the thermostat to approximately 40 degrees F to allow the heat to turn OFF. Then unplug the heater.
- 5.10.7 _____ TURN the heater ON in the Water cabinet. Set the thermostat high enough to allow the unit to operate.
- 5.10.8 _____ RESET the thermostat to near the "LO" setting to allow the heat to turn OFF. Then unplug the heater.
- 5.10.9 _____ TURN the heater ON in the Instrument Enclosure. Set the thermostat high enough to allow the unit to operate.
- 5.10.10 _____ RESET the thermostat to approximately 40 degrees F to allow the heat to turn OFF. Then unplug the heater.
- 5.10.11 _____ TURN ON the air conditioner in the Instrument Enclosure. If necessary, remove the front grill on the unit and adjust the temperature setting to get the unit to operate.
- 5.10.12 _____ RESET the temperature setting on the air conditioner to between 90 to 95 degrees F. Remove the grill and filter on the front of the air conditioner for access to the adjustment. Then unplug the air conditioner.
- 5.10.13 _____ ENSURE the light in the WFIE cabinet operates.
- 5.10.14 _____ ENSURE the light in the Instrument Enclosure operates.

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5.10.15 Engineer to ENSURE that section 5.10 is completed and sign below.

Engineer Signature

Date

5.10.16 Quality Assurance Inspector to VERIFY that section 5.10 is completed and sign below.

Quality Assurance Inspector Signature

Date

5.11 SKID PREPARATION FOR SHIPPING

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

_____ DS-6002V
_____ DS-6003V
_____ DS-6004V
_____ DS-6005V

The breakers below are located in the distribution panel DP-6001V:

_____ 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	

5.11.2. _____ Disconnect the power plug from the 480vac power source and ground wire.

5.11.3. _____ ENSURE the power plug on the power cable is a Crouse-Hinds model APJ3475.

5.11.4. _____ DRAIN the water tank in the Water Cabinet.

5.11.5. _____ Bleed the air pressure off the air system by OPENING the following valves:

_____ V-6043V
_____ V-6046V
_____ V-6047V
_____ V-6037V

NOTE: After the air system has bled down, proceed with the following valve positioning.

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

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

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5.11.7. _____ Ensure the following valves are CLOSED.

Air Compressor

_____ V-6025V
_____ V-6026V
_____ V-6034V
_____ V-6043V
_____ V-6044V
_____ V-6046V
_____ V-6047V
_____ V-6048V
_____ V-6049V
_____ V-6050V
_____ V-6051V
_____ V-6053V

Water Cabinet

_____ V-6027V
_____ V-6029V
_____ V-6030V
_____ V-6031V
_____ V-6032V
_____ V-6037V
_____ V-6052V
_____ V-6054V
_____ V-6055V

WFIE Cabinet

_____ V-6001V
_____ V-6002V
_____ V-6003V
_____ V-6004V
_____ V-6005V
_____ V-6006V
_____ V-6007V
_____ V-6008V
_____ V-6011V
_____ V-6012V
_____ V-6013V
_____ V-6014V
_____ V-6015V
_____ V-6016V
_____ V-6017V
_____ V-6018V
_____ V-6019V
_____ V-6020V
_____ V-6021V
_____ V-6035V LOW
_____ V-6035V HIGH
_____ V-6036V LOW
_____ V-6036V HIGH
_____ V-6056V

5.11.8. Engineer to determine if the skid will be used on a "B-phase grounded" system. (Yes/No) _____ If yes, perform the following: (Otherwise N/A steps 5.11.9 through 5.11.11.)

5.11.9. _____ Replace the "B-phase" fuse in disconnects DS-6002V, DS-6004V and DS-6005V with a dummy fuse NTS-R-30.

5.11.10. _____ Install the "B-phase grounded" label on DS-6002V, DS-6004V and DS-6005V.

5.11.11. _____ Ensure the "B-phase" wires are white or taped white at disconnects DS-6002V, DS-6004V and DS-6005V.

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5.11.12 Engineer to ENSURE that section 5.11 is completed and sign below.

Engineer Signature

Date

5.11.13. Quality Assurance Inspector to VERIFY that section 5.11 is completed and sign below.

Quality Assurance Inspector Signature

Date

ACCEPTANCE TEST PROCEDURE EXCEPTION RECORD

This page may be reproduced as necessary.

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

Section 5.0 of the Acceptance Test Procedure has been completed including completion of all exceptions. The test results are accepted by the undersigned:

Cognizant Engineer (Signature)

(Print Name)

Date

Quality Assurance (Signature)

(Print Name)

Date

