S

DEC

5 2000

Sta 4

58

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT

629947

2. To: (Receiving Organization) DISTRIBUTION		3. From: (Originating Organization) INTERIM STABILIZATION		4. Related EDT No.: N/A							
5. Proj./Prog./Dept./Div.: INTERIM STABILIZATION		6. Design Authority/Design Agent/Cog. Engr.: W. F. ZUROFF		7. Purchase Order No.: N/A							
8. Originator Remarks: ATTACHED IS AN ACCEPTANCE TEST PLAN (ATP) FOR THE NEW PUMPING INSTRUMENTATION AND CONTROL (PIC) SKIDS BEING FABRICATED BY SITE FABRICATION SERVICES.				9. Equip./Component No.: N/A							
				10. System/Bldg./Facility: 241-G							
				12. Major Assm. Dwg. No.: N/A							
				13. Permit/Permit Application No.: N/A							
11. Receiver Remarks: NONE		11A. Design Baseline Document? ☒ Yes ☐ No		14. Required Response Date: 12/05/2000							
USQ Tracking # TF-00-479, Rev 0											
15. DATA TRANSMITTED					(F)	(G)	(H)	(I)			
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Designator	Reason for Transmittal	Originator Disposition	Receiver Disposition			
1	RPP-6207	N/A	0	ACCEPTANCE TEST PROCEDURE	SQ	1	1	1			
				FOR NEW PUMPING							
				INSTRUMENTATION AND							
				CONTROL SKID "U"							
16. KEY											
Approval Designator (F)		Reason for Transmittal (G)			Disposition (H) & (I)						
E, S, Q, D OR N/A (See WHC-CM-3-5, Sec. 12.7)		1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)			1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged						
17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)											
(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
1	1	Design Authority	W. F. ZUROFF	11/28/00	57-24						
1	1	Design Agent	B. R. JOHNS	11/28/00	57-24						
1	1	Cog. Eng.	B. R. JOHNS	11/28/00	57-24						
1	1	Cog. Mgr.	M. R. KOCH	11/28/00	57-24						
1	1	QA	T. J. VOLKMAN	12/5/00							
1	1	Safety	P. J. VOPALENSKY	12-4-00	57-07						
		Env.	N/A								
18. B. R. JOHNS Signature of EDT Originator			19. M. R. KOCH Authorized Representative for Receiving Organization			20. W. F. ZUROFF Design Authority/Cognizant Manager			21. DOE APPROVAL (if required) Ctrl No. N/A ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments		

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

M. R. KOCH

CH2MHILL HANFORD GROUP, INC

Richland, WA 99352

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

EDT/ECN: 629947

UC:

Cost Center: 74D00

Charge Code: 103361

B&R Code: EW3120071

Total Pages: 61

Key Words: PICS, SALT WELL, SKID, INTERIM STABILIZATION, ACCEPTANCE TEST

Abstract:

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

TRADEMARK DISCLAIMER. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

Printed in the United States of America. To obtain copies of this document, contact: Document Control Services, P.O. Box 950, Mailstop H6-08, Richland WA 99352, Phone (509) 372-2420; Fax (509) 376-4989.

Release Approval

12/5/00
Date

Release Stamp

Approved For Public Release

TABLE OF CONTENTS

1.0	PURPOSE.....	2
2.0	INFORMATION.....	2
2.1	SCOPE	2
2.2	TERMS AND DEFINITIONS.....	3
2.3	RESPONSIBILITIES	3
2.4	SAFETY	4
2.5	QUALITY ASSURANCE	4
2.6	GENERAL INFORMATION	4
2.7	LIMITS AND PRECAUTIONS	5
3.0	RECORDS	5
3.1	RECORD COPY.....	5
3.2	TEST RESULTS.....	5
3.3	SOFTWARE DOCUMENTATION	5
4.0	PREREQUISITES	6
4.1	DRAWING VERIFICATION	6
4.2	REDLINE INCORPORATION.....	6
4.3	PRESSURE VESSEL INSPECTION.....	7
4.4	NATIONAL ELECTRICAL CODE (NEC) INSPECTION.....	7
4.5	SUPPLIES.....	8
4.6	PRESTART CONDITIONS	10
5.0	PROCEDURE	12
5.1	CONTINUITY CHECKS	12
5.2	MEGGERING OF POWER WIRES	14
5.3	ELECTRICAL POWER CHECKS	16
5.4	CALIBRATIONS	19
5.5	SKID ELECTRICAL AND PROCESS AIR POWER-UP	20
5.6	SKID WATER DRIP SYSTEM	24
5.7	INPUT SIGNALS TO THE PLC AND DTAM	26
5.8	JET PUMP INTERLOCK CIRCUITS	35
5.9	HEATERS, AIR CONDITIONER AND LIGHTS	50
5.10	SKID PREPARATION FOR SHIPPING.....	52
5.11	APPENDIX A.....	54

ACCEPTANCE TEST PROCEDURE FOR NEW PUMPING INSTRUMENTATION AND CONTROL SKID “U”

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 “U”. 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 PIC skid construction.

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 ATP - Acceptance Test Procedure
- 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.
 - 2.3.1.4 Verifying instrument calibration completion.
 - 2.3.1.5 Ensuring drawings verification completion.
 - 2.3.1.6 Acceptance of completed ATP.
- 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 of the 5.0 sections 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 Failed equipment or components shall be evaluated for documentation on a Nonconformance Report (NCR).
- 2.6.7 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.
- 2.6.8 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.
- 2.6.9 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.

RPP-6707
REVISION 0

- 2.6.10 An ATP log shall be used to record comments concerning the 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 the 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, 4.4, and 5.4 can be performed out of sequence in order to facilitate the completion of this ATP.
- 2.6.14 Sections 5.7 through 5.9 can be performed out of order as directed by the test engineer and/or PIC as necessary to facilitate ATP performance.
- 2.6.15 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

See section 2.4, Safety.

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-6708 shall be issued with the final test results upon completion of this ATP.

3.3 SOFTWARE DOCUMENTATION

Final software programs shall be documented as required by HNF-5034. This documentation is not part of this ATP, but will be documented in a software report after performance of the OTP in the field.

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-14-104187, sheets 7 through 12 and H-14-104190, sheet 5.
- 4.1.2 Panel board arrangement on drawing H-14-104193.
- 4.1.3 Flow diagram on drawing H-14-104192.

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

Engineer Signature	Date
--------------------	------

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

4.2 REDLINE INCORPORATION

- 4.2.1 _____ Ensure the redlines identified on the construction drawings in the fabrication work package are incorporated on the final drawings for skid "U" 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
--------------------	------

Quality Assurance Inspector 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

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 _____

Calibration No. _____ Exp. Date _____ QA _____

Calibration No. _____ Exp. Date _____ QA _____

Calibration No. _____ Exp. Date _____ QA _____

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, with a 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 _____

RPP-6707
REVISION 0

4.5.6 Temperature simulator for RTD with a temperature range of 350 to 400 degrees F.

Calibration No. _____ Exp. Date _____ QA _____

4.5.7 Stopwatch for timing minutes of flow time.

Calibration No. _____ Exp. Date _____ QA _____

4.5.8 _____ 480vac, 3 phase, 30-ampere power supply for PIC skid.

4.5.9 _____ Selector switches (3 each) with at least one contact.

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

4.5.11 _____ Leak detector probes (2 each) not required to be green tagged.

4.5.12 _____ Heat gun to warm thermocouple probes.

4.5.13 _____ Two thermocouple simulators for testing the thermocouples for the pump and jumper.

4.5.14 _____ Buckets or pans for water for leak detector test and catching water from DIP tubes and relief valves.

4.5.15 _____ Water supply and hose to fill water tank.

4.5.16 _____ Ice water or cold air spray to cool thermocouple probes.

4.5.17 _____ Injection pump simulator box. (See Appendix A)

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 PLC and DTAM programs are loaded into the PLC and DTAM by Engineering.
- 4.6.4 _____ 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-6035U (EQUALIZING)
_____ V-6036U (EQUALIZING)

- 4.6.5 _____ Ensure the following valves are CLOSED prior to starting this ATP.

Air Compressor Cabinet

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

Water Cabinet

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

WFIE Cabinet

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

RPP-6707
REVISION 0

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

_____ DS-6002U	_____ DS-6003U
_____ DS-6004U	_____ DS-6005U

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

_____ 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

- 4.6.7 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.

- 4.6.8 _____ Ensure desiccant and filters are installed in the air compressor dryer and filters prior to performing sections 5.6 and 5.7.
- 4.6.9 _____ Ensure check valves in the air compressor and water cabinet are installed in the proper direction. Reference H-14-104192, sheets 1 and 2.
- 4.6.10 _____ 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-6002U). Check all three phases and ground.

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

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

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

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

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

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

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

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

____ Continuity through the transformer primary.

RPP-6707
REVISION 0

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

_____ Circuit 3 to TB10 in Instrument Enclosure (CKT3H)

_____ Circuit 5 to TB13 in Instrument Enclosure (CKT5H)

_____ Circuit 2 to TB10 in the 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 flood light receptacle

_____ Circuit 14 to flood light receptacle

_____ 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-6002U 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-6002U) to ground and phase to phase. (Ensure switches DS-6003U, DS-6004U and DS-6005U 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-6003U) 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.

RPP-6707
REVISION 0

- 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 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-6002U and DS-6003U) and motor starters (DS-6004U and DS-6005U) 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-6002U). Record the voltage readings.
_____ vac, A-B _____ A-C _____ B-C
- 5.3.7 _____ Close the main disconnect switch (DS-6002U).
- 5.3.8 _____ Ensure 480vac +/-20vac on the line side of the transformer disconnect switch (DS-6003U). Record the voltage readings.
_____ vac
- 5.3.9 _____ Ensure 480vac +/-20vac on the line side of the air compressor motor starter (DS-6004U). 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-6005U). Record the voltage readings.
_____ vac, A-B _____ vac, A-C _____ B-C

RPP-6707
REVISION 0

- 5.3.11 _____ Ensure the dead front on the panel board (DP-6001U) is removed for access to the main breaker for a voltage measurement.
- 5.3.12 _____ Close the transformer disconnect switch (DS-6003U).
- 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-6003U).
- 5.3.15 _____ Replace the dead front on the panel board (DP-6001U).
- 5.3.16 _____ Close the transformer disconnect switch (DS-6003U).
- 5.3.17 _____ Close the 100 ampere main breaker in the panel board (DP-6001U).
- 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	RCPT, FLOOD LIGHT			
14	RCPT, FLOOD LIGHT			

RPP-6707
REVISION 0

- 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-6001U).
- 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-6001U).
- 5.3.24 _____ Ensure 32vdc +3/-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-6001U).
- 5.3.26 _____ Open the 100 ampere main breaker in the panel board (DP-6001U).
- 5.3.27 _____ Open the transformer disconnect switch (DS-6003U).
- 5.3.28 _____ Open the main disconnect switch (DS-6002U).
- 5.3.29 Voltage checks completed and readings within tolerance.

Quality Assurance Inspector Signature

Date

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-6004U	AIR COMPR. CABINET	
SALW-WFT-6002U	WFIE CABINET	
SALW-LT-6003U	WATER CABINET	
SALW-SGT-6001U	WFIE CABINET	
SALW-CONV-6001U	WFIE CABINET	
SALW-FQIT-6001U	INSTRUMENT ENCL.	
SALW-PI-6006U	AIR COMPR. CABINET	
SALW-PI-6007U	AIR COMPR. CABINET	
SALW-PI-6008U	WATER CABINET	
SALW-PI-6001U	WFIE CABINET	
SALW-PI-6002U	WFIE CABINET	
SALW-PI-6003U	WFIE CABINET	
SALW-PI-6004U	WFIE CABINET	
SALW-PI-6005U	WFIE CABINET	
SALW-PI-6011U	INSTRUMENT ENCL.	
SALW-PI-6012U	INSTRUMENT ENCL.	

Work package nos. _____

Ensure the calibrations are completed and there is a current calibration sticker on each of the above instruments.

Engineer Signature

Date

Quality Assurance Inspector Signature

Date

5.5 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.

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

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

NOTE: Ensure the Air Compressor selector switch on DS-6004U is in the OFF position.

_____ DS-6002U
_____ DS-6003U
_____ DS-6004U
_____ DS-6005U

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

_____ 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	

5.5.4 _____ ACKNOWLEDGE any initial skid alarms.

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

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

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

RPP-6707
REVISION 0

- 5.5.8 _____ 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.
- 5.5.9 _____ BLEED off air by slowly opening valve V-6043U until the compressor restarts and note the restart pressure as read on gauge PI-6006U. CLOSE valve V-6043U when the compressor restarts. RECORD the restart pressure reading: _____psig.
- 5.5.10 _____ ENSURE the compressor restarts between 58 to 62 psig.
- 5.5.11 Valve in air to the PIC skid water tank by performing the following steps.
- 5.5.12 Check for air leaks as each of the remaining steps in this section are performed.
- 5.5.13 _____ SLOWLY OPEN valve V-6025U located in the air compressor cabinet.
- 5.5.14 _____ SLOWLY OPEN valve V-6027U located near the water tank.
- 5.5.15 _____ SLOWLY OPEN valve V-6052U located near the water tank
- 5.5.16 _____ ADJUST pressure regulator valve PCV-6006U to 30psi (+/-3psi) as indicated by pressure gauge PI-6008U on the outside of the water cabinet.
_____psi
- 5.5.17 _____ ACTUATE the lever on relief valve PRV-6004U 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.)
- 5.5.18 _____ ENSURE the relief valve PRV-6004U seats properly when the lever is released.
- 5.5.19 _____ ACTUATE the lever on relief valve PRV-6005U 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.)
- 5.5.20 _____ ENSURE the relief valve PRV-6005U seats properly when the lever is released.
- 5.5.21 VALVE IN air to the WFIE cabinet by performing the following steps.
- 5.5.22 _____ SLOWLY OPEN valves _____ V-6051U located inside the air compressor cabinet and _____ V-6026U located on the outside of the air compressor cabinet.

RPP-6707
REVISION 0

- 5.5.23 _____ SLOWLY OPEN valve V-6001U located in the WFIE cabinet. (NOTE: PRV-6002U may open if pressure through PCV-6001U is too high.)
- 5.5.24 _____ ADJUST pressure control valve PCV-6001U in the WFIE cabinet to 20psi (+/-2.5psi) as indicated by the pressure gauge located on the face of the valve.
- 5.5.25 _____ SLOWLY OPEN valve V-6004U located in the WFIE cabinet.
- 5.5.26 _____ SLOWLY OPEN valve V-6003U located in the WFIE cabinet.
- 5.5.27 _____ SLOWLY OPEN valve V-6005U located in the WFIE cabinet.
- 5.5.28 _____ SLOWLY OPEN valve V-6006U located in the WFIE cabinet.
- 5.5.29 _____ SLOWLY OPEN valve V-6007U located in the WFIE cabinet.
- 5.5.30 _____ SLOWLY OPEN valve V-6020U located in the WFIE cabinet.
- 5.5.31 _____ SLOWLY OPEN valve V-6021U located in the WFIE cabinet.
- 5.5.32 _____ SLOWLY OPEN valve V-6019U located in the WFIE cabinet.
- 5.5.33 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.
- 5.5.34 _____ ADJUST flow to dip tube to 1.5 CFH (+/-0.5 CFH) as indicated by FIV-6002U.
- 5.5.35 _____ ADJUST flow to dip tube to 1.5 CFH (+/-0.5 CFH) as indicated by FIV-6003U.
- 5.5.36 _____ ADJUST flow to dip tube to 1.5 CFH (+/-0.5 CFH) as indicated by FIV-6004U.
- 5.5.37 _____ ENSURE air flow from pressure regulator PCV-6007U by slowly opening valve V-6044U in the air compressor cabinet and then reclose the valve.
- 5.5.38 _____ ENSURE air flow from pressure regulator PCV-6008U by slowly opening valve V-6048U in the air compressor cabinet and then reclose the valve.

RPP-6707
REVISION 0

- 5.5.39 _____ ENSURE air flow from the V-6042U port at the air compressor cabinet by slowly opening valve V-6046U in the air compressor cabinet and then close the valve.
- 5.5.40 _____ ENSURE air flow from the drain line by slowly opening valves V-6047U and V-6046U in the air compressor cabinet and then close the two valves.
- 5.5.41 Engineer to ENSURE section 5.5 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

5.6 SKID WATER DRIP SYSTEM

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

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

_____ V-6016U

_____ V-6013U

_____ V-6008U

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

NOTE: Back off regulator PCV-6005U prior to performing step 5.7.3.

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

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

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

5.6.6 _____ OPEN valve V-6056U 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-6056U when water is observed.

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

_____ V-6015U

_____ V-6014U

_____ V-6008U

_____ V-6013U

_____ V-6019U

_____ V-6021U

_____ V-6020U

_____ V-6007U

_____ V-6006U

_____ V-6005U

RPP-6707
REVISION 0

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

Engineer Signature

Date

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

Quality Assurance Inspector Signature

Date

5.7 INPUT SIGNALS TO THE PLC AND DTAM

WATER TANK LEVEL TRANSMITTER

- 5.7.1 _____ ENSURE valve V-6029U located in the water tank cabinet is CLOSED.
- 5.7.2 _____ ENSURE valve V-6031U located in the water cabinet is CLOSED.
- 5.7.3 _____ 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-6003U.
- 5.7.4 _____ ENSURE the LOW PRESSURE vent/test port of level transmitter LT-6003U is OPEN to atmosphere.
- 5.7.5 _____ ADJUST the test manometer connected to LT-6003U to a pressure of 31" water gauge (+/-1"). Record reading _____
- 5.7.6 _____ RECORD the water tank level reading on the DTAM. _____ 31" (+/-2")
- 5.7.7 The next step will cause a low water level alarm on the DTAM.
- 5.7.8 _____ 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.)
- 5.7.9 _____ ACKNOWLEDGE the alarm at the DTAM.
- 5.7.10 _____ RECORD the manometer pressure and the DTAM water level readings.
Pressure on manometer _____ Water Level on DTAM _____
- 5.7.11 _____ SLOWLY INCREASE the manometer pressure until the alarm clears on the DTAM. (This should occur at 15.5" +/-0.5" water gauge.)
- 5.7.12 _____ RECORD the manometer pressure and the DTAM water level readings.
Pressure on manometer _____ Water Level on DTAM _____
- 5.7.13 _____ ENSURE the "PIC Water" alarm indicates "norm".
- 5.7.14 _____ REMOVE the test manometer from the LT-6003U high pressure vent/test port and reinstall the vent plugs on both the high and low sides.

RPP-6707
REVISION 0

- 5.7.15 ____ OPEN valve V-6029U located in the Water Cabinet.
- 5.7.16 ____ OPEN valve V-6031U located in the Water Cabinet.
- 5.7.17 ____ ENSURE "Water Tank" reading on the DTAM shows a value in inches.
Record the reading _____

WEIGHT FACTOR TEST

- 5.7.18 ____ 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.
- 5.7.19 ____ ENSURE V-6001U is CLOSED.
- 5.7.20 ____ ENSURE V-6005U is OPEN.
- 5.7.21 ____ ENSURE V-6006U is OPEN.
- 5.7.22 ____ ENSURE adjustment valves on FIV-6002U, FIV-6003W and FIV-6004U are CLOSED.
- 5.7.23 ____ ENSURE the LOW and HIGH side isolation valves located on the V-6036U 3-Valve manifold in the WFIE cabinet are OPEN.
- 5.7.24 ____ ENSURE the EQUALIZING valve located on the V-6036U 3-Valve manifold in the WFIE cabinet is CLOSED.
- 5.7.25 ____ SET the test manometer to 125" (+/-1") water gauge. Record the manometer reading. _____
- 5.7.26 ____ RECORD the "WFT" reading on the DTAM. The reading is to be 125" (+/- 5"). _____
- 5.7.27 ____ BLEED off the pressure on the test manometer. Leave connected for testing the specific gravity transmitter.
- 5.7.28 ____ OPEN the EQUALIZING valve located on V-6036U 3-Valve manifold in the WFIE cabinet.
- 5.7.29 ____ CLOSE the LOW and HIGH side isolation valves located on the V-6036U 3-Valve manifold in the WFIE cabinet.

5.7.30 _____CLOSE V-6006U.

SPECIFIC GRAVITY TRANSMITTER

5.7.31 _____ENSURE V-6007U is OPEN.

5.7.32 _____ENSURE V-6005U is OPEN.

5.7.33 _____ENSURE the LOW and HIGH side isolation valves located on V-6035U 3-Valve manifold in the WFIE cabinet are OPEN.

5.7.34 _____ENSURE the specific gravity transmitter equalizing valve located on the V-6035U 3-Valve manifold located in the WFIE cabinet is CLOSED.

5.7.35 _____SET the test manometer to 5"water gauge (+/- 0.3"). _____

5.7.36 _____RECORD the "SGT" reading on the DTAM. Reading to be 5" +/- 0.35". _____

5.7.37 _____BLEED off pressure on the manometer.

5.7.38 _____ENSURE "SGT LOW" alarm occurs (alarm 13).

5.7.39 _____ACKNOWLEDGE the alarm.

5.7.40 _____DISCONNECT the test manometer.

5.7.41 _____OPEN the EQUALIZING valve located on V-6035U 3-Valve manifold in the WFIE cabinet.

5.7.42 _____CLOSE the LOW side and HIGH side isolation valves located on V-6035U 3-Valve manifold in the WFIE cabinet.

5.7.43 _____CLOSE V-6005U.

5.7.44 _____CLOSE V-6007U.

FLOW METER SIGNAL CHECK

5.7.45 _____Prepare the flow converter FQIT-6001U located in the Instrument Enclosure to simulate a flow either using the buttons on the front face or using a "brain terminal".

RPP-6707
REVISION 0

5.7.46 _____SIMULATE a flow signal of 50% span (4 or 7gpm) with the hand-held brain terminal or from the flow converter face switches. (Set H1 to 1 and H2 to 050.)

5.7.47 _____RECORD the flow readings on the front of the flow converter and on the DTAM (PMP FLOW). Readings to be within +/- 0.2gpm of each other.

Flow converter _____ DTAM (PMP FLOW) _____

5.8.48 _____RESTORE the flow converter, FQIT-6001U to its original configuration. (Set H1 to 0. H2 can be left as 050.)

SUCTION AND DISCHARGE PRESSURE SIGNAL

5.7.49 _____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."

5.7.50 _____SET the current source to approximately 4mA and record the suction pressure reading on PI-6012U. Reading to be approximately zero.

_____psi

5.7.51 _____SET the current source to approximately 20mA and record the suction pressure reading on PI-6012U. Reading to be approximately 100psi.

_____psi

5.7.52 _____DISCONNECT the current source.

5.7.53 _____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.

5.7.54 _____SET the current source to approximately 4mA and record the discharge pressures on PI-6011U and on the DTAM. Readings should be approximately zero.

PI-6011W _____psi DTAM (PMP DISC) _____psi

5.7.55 _____SET the current source to approximately 20mA and record the discharge pressures on PI-6011U and on the DTAM. Readings should be approximately 300psi.

PI-6011W _____psi DTAM (PMP DISC) _____psi

RPP-6707
REVISION 0

5.7.56 _____DISCONNECT the current source.

THERMOCOUPLE INPUTS TO THE PLC

5.7.57 _____WARM thermocouple TE-6004U located in the Instrument Enclosure.

5.7.58 _____ENSURE the “PLC CAB temp” on the DTAM displays a temperature change.

5.7.59 _____CONTINUE to warm the thermocouple until “PLC Enclosure HI” (alarm 10) occurs. This will be approximately 130 degrees F.

5.7.60 _____ACKNOWLEDGE the alarm.

5.7.61 _____ENSURE “PLC CAB temp” on the DTAM shows a temperature DECREASE after the heat source is removed from the TE-6004U thermocouple.

5.7.62 _____ENSURE the “PLC temp” alarm returns to “norm” when the temperature decreases below 125 degrees F.

5.7.63 _____WARM thermocouple TE-6001U located in the Air Compressor Cabinet.

5.7.64 _____ENSURE the “COMPRS temp” on the DTAM displays a temperature change.

5.7.65 _____CONTINUE to warm the thermocouple until “Air Compressor Temp HI” (alarm 11) occurs. This will be approximately 130 degrees F.

5.7.66 _____ACKNOWLEDGE the alarm.

5.7.67 _____ENSURE “COMPRS temp” on the DTAM shows a temperature DECREASE after the heat source is removed from the TE-6001U thermocouple.

5.7.68 _____ENSURE the “CMPRS temp” alarm returns to “norm” when the temperature decreases below 125 degrees F.

5.7.69 _____COOL the thermocouple probe TE-6006U in the WFIE cabinet using ice water or cool air spray. Temperature needs to drop below 35 degrees F.

5.7.70 _____ENSURE alarm 50, “WFIE CAB Temp Low” occurs at the DTAM.

RPP-6707
REVISION 0

- 5.7.71 _____ WARM or ALLOW to warm the thermocouple probe TE-6006U in the WFIE cabinet and ENSURE the “WFIE CAB Temp” alarm is “norm” when the temperature goes above 40 degrees F.
- 5.7.72 _____ COOL the thermocouple probe TE-6005U in the Water cabinet using ice water or cool air spray. Temperature needs to drop below 35 degrees F.
- 5.7.73 _____ ENSURE alarm 49, “WATER CAB Temp Low” occurs at the DTAM.
- 5.7.74 _____ WARM or ALLOW to warm the thermocouple probe TE-6005U in the Water cabinet and ENSURE the “WATER CAB Temp” alarm is “norm” when the temperature goes above 40 degrees F.
- 5.7.75 _____ CONNECT a temperature simulator to the intrinsic side of the thermocouple module (MTL 3081) for temperature element TE-6009 in the Intrinsic Safe panel.
- 5.7.76 _____ SET the temperature simulator to approximately 120 degrees F.
- 5.7.77 _____ ENSURE the “F Wtr” temperature reading at the DTAM is approximately 120 degrees F. _____ degrees F
- 5.7.78 _____ SET the temperature simulator to approximately 180 degrees F.
- 5.7.79 _____ ENSURE the “F Wtr” temperature reading at the DTAM is approximately 180 degrees F. _____ degrees F
- 5.7.80 _____ SET the temperature simulator to approximately 40 degrees F.
- 5.7.81 _____ ENSURE the “F Wtr” temperature reading at the DTAM is approximately 40 degrees F. _____ degrees F
- 5.7.82 _____ DISCONNECT the temperature simulator at the Intrinsic Safe panel from the 3081 module for TE-6009.
- 5.7.83 _____ CONNECT two temperature simulators to the intrinsic side of the two thermocouple modules (MTL 3081) for TE-6003 and TE-6007 in the Intrinsic Safe panel.
- 5.7.84 _____ ENSURE the temperature setpoints for the “JumperTemp” and “PumpAssy Temp” are set for 160 degrees F.
- 5.7.85 _____ SET both temperature simulators to approximately 120 degrees F.
- 5.7.86 _____ ENSURE the “PMPASY temp” and the “JMPER TEMP” each read approximately 120 degree at the DTAM. _____ (Pump) _____ (Jumper)

RPP-6707
REVISION 0

- 5.7.87 _____ ENSURE the “HEAT TRACE Htr” is ON at the DTAM.
- 5.7.88 _____ DECREASE the temperature simulator for TE-6007 to approximately 39 degrees or lower until alarm 8 “Pump/Jumper Temp Trouble” alarms on the DTAM.
- 5.7.89 _____ ACKNOWLEDGE the alarm.
- 5.7.90 _____ ENSURE the “PMPASY TEMP” reads approximately 39 degree at the DTAM. _____
- 5.7.91 _____ INCREASE the temperature simulator for TE-6007 to approximately 120 degrees. _____
- 5.7.92 _____ ENSURE the “PMP/JMPR HT” alarm on the DTAM reads “norm”.
- 5.7.93 _____ ENSURE the “Heat Trace Htr” is ON at the DTAM.
- 5.7.94 _____ ENSURE approximately 120vac between HT-1 and CKT3-N at TB12.
_____ vac
- 5.7.95 _____ WHILE MONITORING the voltage at TB12, INCREASE the temperature on TE-6003 to 166 degrees F or higher until the voltage at TB12 goes to approximately zero. DTAM temp. _____
- 5.7.96 _____ WHILE MONITORING the voltage at TB12, decrease the temperature on TE-6003 to 154 degrees F or lower until the voltage at TB12 goes to approximately 120vac. DTAM temp. _____
- 5.7.97 _____ TURN OFF the heat trace from the DTAM.
- 5.7.98 _____ ENSURE the voltage at TB12 goes to approximately zero.
- 5.7.99 _____ TURN ON the heat trace from the DTAM.
- 5.7.100 _____ ENSURE the voltage at TB12 returns to approximately 120vac.
- 5.7.101 _____ ENSURE approximately 120vac between HT-12 and CKT3-N at TB15.
_____ vac
- 5.7.102 _____ WHILE MONITORING the voltage at TB15, INCREASE the temperature on TE-6007 to 166 degrees F or higher until the voltage at TB15 goes to approximately zero. DTAM temp. _____

RPP-6707
REVISION 0

- 5.7.103 _____ WHILE MONITORING the voltage at TB15, decrease the temperature on TE-6007 to 154 degrees F or lower until the voltage at TB15 goes to approximately 120vac. DTAM temp. _____
- 5.7.104 _____ TURN OFF the heat trace from the DTAM.
- 5.7.105 _____ ENSURE the voltage at TB15 goes to approximately zero.
- 5.7.106 _____ TURN ON the heat trace from the DTAM.
- 5.7.107 _____ ENSURE the voltage at TB15 returns to approximately 120vac.
- 5.7.108 _____ REMOVE the temperature simulators from TE-6003 and TE-6007.
- 5.7.109 _____ CONNECT a temperature simulator to the MTL 5074 module in the Intrinsic Safe panel to simulate an RTD.
- 5.7.110 _____ SET the simulator to approximately 360 degrees F.
- 5.7.111 _____ ENSURE the "MTR WINDING" temperature at the DTAM reads approximately 360 degrees F.
- 5.7.112 _____ INCREASE the temperature on the simulator to 380 degrees F or higher until alarm 59, "MOTOR WINDING HI TEMP WARNING" comes in at the DTAM. Acknowledge the alarm.
- 5.7.113 _____ RECORD temperature reading at DTAM _____ and on simulator _____.
- 5.7.114 _____ DECREASE the temperature on the simulator to 370 degrees F or lower until the "MTR WNDG TEMP" on the DTAM indicates "NORM."
- 5.7.115 _____ LEAVE the simulator connected for section 5.9, for the checking of the motor winding temperature interlock.
- 5.7.116 _____ ENSURE a normally closed switch is connected to "BM-1" and "BM-2" on the intrinsic safe terminal board in the Intrinsic Safe panel.
- 5.7.117 _____ ENSURE the "PUMP BEARING" reads "NORM" at the DTAM.
- 5.7.118 _____ OPEN the "BM" switch at the Intrinsic Safe panel.
- 5.7.119 _____ ENSURE alarm 58, "PUMP WORN BEARING ALERT" actuates at the DTAM. Acknowledge the alarm.
- 5.7.120 _____ CLOSE the "BM" switch.

RPP-6707
REVISION 0

5.7.121_____ ENSURE the “PUMP BEARING” reads “NORM” at the DTAM.

5.7.122_____DISCONNECT the “BM” switch at the Intrinsic Safe panel.

5.7.123Engineer to Ensure section 5.8 is completed and sign below.

Engineer Signature

Date

5.7.124Quality Assurance Inspector to Verify that section 5.8 is complete and sign below.

Quality Assurance Inspector Signature

Date

5.8 JET PUMP INTERLOCK CIRCUITS

- 5.8.1 _____ ENSURE two proximity switches are connected to the intrinsic safe terminal block in the Intrinsic Safe panel. Connect a proximity switch temporarily labeled as LS-1 to “LS-1(+) and LS-1(-)” and a 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.
- 5.8.2 _____ IF POSSIBLE, CONNECT two current sources to the following points. One to JFPT+ and JFPT- at the intrinsic terminal board; 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 two current sources are not available, then software forces will be used during this section to bypass the inputs not being tested.
- 5.8.3 _____ SET the temperature simulator connected to the MTL 5074 module at the Intrinsic Safe panel to 360 degrees F.
- 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 a normally closed switch is connected to “C2” and “NC1” on the power monitor in the Jet Pump motor starter. Connect to the “C2” terminal on the power monitor and lift the “NC1” wire and connect to the lifted “NC1” wire.
- 5.8.6 _____ ENSURE a normally closed switch is connected to “BY105” and “CKT5H-A” on terminal board TB4 in the Instrument Enclosure.
- 5.8.7 _____ ENSURE a normally closed switch is connected to “BX-DCRT” and “CKT5H-A” on terminal board TB4 in the Instrument Enclosure.
- 5.8.8 _____ ENSURE the two leak-detector probes are connected to the skid at the Instrument Enclosure.
- 5.8.9 _____ ENSURE the injection pump simulator box (See Appendix A) is connected to the following points in the Instrument Enclosure. **WARNING: DO NOT plug in the box until the connections are made.** Connect wires 1 and 1A to points 1 and 1A at TB3. Connect wires FWFS-1 and CKT5H-B to the corresponding points on TB6. After connections are made, connect the box to a 120vac power source.
- 5.8.10 _____ 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.

RPP-6707
REVISION 0

- 5.8.11 _____ ENSURE the laptop computer is connected to the PLC to set forces and observe logic when required.
- 5.8.12 _____ RECORD the reading of the Hourmeter on the front of the Instrument Enclosure. _____
- 5.8.13 _____ ENSURE the green light on the Instrument Enclosure and on the Jet Pump motor starter are ON.
- 5.8.14 _____ 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".)
- 5.8.15 _____ RESET the injection total volume to zero from the DTAM screen. The security code for the reset is "13".
- 5.8.16 _____ SET the injection flow rate to 0.350 at the DTAM. The security screen code is "11".
- 5.8.17 _____ TURN the selector switch on the Jet Pump Motor Starter to ON.
- 5.8.18 _____ ENSURE all the interlocks for starting the jet pump are made up **except** for the injection water flow switch by checking the last two rungs of ladder 5 on the laptop computer.
- 5.8.19 _____ ENSURE the jet pump will **not** start by attempting to start from the DTAM screen.
- NOTE:** A stopwatch is required for the next step. The stopwatch will remain running until near the end of this section.
- 5.8.20 _____ PRESS the "start" button on the injection simulator box and ENSURE the red light on the box comes ON and IMMEDIATELY start the stopwatch.
- 5.8.21 _____ ENSURE the 10-minute timer for the flow switch in ladder 5 on the laptop starts timing. (To expedite this test, the timer can be set to a lower value below 10 minutes.)
- 5.8.22 _____ ENSURE the jet pump will **not** start until the timer in the above step times out by attempting to start from the DTAM screen.

RPP-6707
REVISION 0

5.8.23 _____ ENSURE the jet pump interlocks are made up upon the timing out of the above timer.

5.8.24 _____ OBSERVE that after 4 minutes after the "start" button on the injection simulator box is pressed, the injection total on the DTAM screen is a value greater than zero.

CAUTION: The jet pump starting control has been revised to perform a bump start the first time the pump starts upon the making up of the flow switch interlock. The bump start consists of three cycles of a one-second run time followed by a 10-second stop time. Upon the completion of the three bump cycles, the pump will automatically go to the normal run mode.

5.8.25 _____ START the jet pump from the DTAM.

5.8.26 _____ ENSURE the following occur:

_____ "BUMP START" on the DTAM start screen shows ON.

_____ "NORMAL START" on the DTAM start screen shows OFF.

_____ ENSURE the pump runs for approximately 1 second.

_____ ENSURE the pump red ON light comes ON during the 1-second run time.

_____ ENSURE the pump green OFF light comes ON during the 10-second stop time.

_____ ENSURE the pump stops for approximately 10 seconds.

_____ ENSURE the horn does not sound during the 10-second stop time.

_____ ENSURE that the shutdown output in ladder 5, N20:32/2 does not activate during the 10-second stop time during the bump sequence.

_____ ENSURE the bump sequence goes through three complete cycles.

5.8.27 _____ ENSURE the jet pump goes to normal starting upon the completion of the three bump cycles by observing the following:

_____ The pump RED run light remains ON continuously.

_____ The pump GREEN off light remains OFF.

_____ The "NORMAL START" on the DTAM screen shows ON.

_____ The "BUMP START" on the DTAM screen shows OFF.

RPP-6707
REVISION 0

NOTE: The following several steps will be checking the pump interlocks. The pump will be started and stopped during this time. No bump starting should be experience until the flow switch interlock is checked. If the interlock testing is interrupted and the pump shutdown for an extended period, then a bump sequence will be repeated prior to continuing the interlock check. The interlock circuit and pump trouble circuits are also tied into the bump control and will be checked after the interlock check during pump normal run. If the injection simulator box and PLC are turned OFF, the stopwatch is to be stopped and time recorded in the ACCEPTANCE TEST LOG. The stopwatch will be restarted when the injection box is turned back ON.

JUMPER FLUSH PRESSURE SIGNAL TO PLC

- 5.8.28 _____ 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.
- 5.8.29 _____ ENSURE the green light on the Instrument Enclosure and on the Jet Pump motor starter are ON.
- 5.8.30 _____ 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.)
- 5.8.31 _____ 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.
- 5.8.32 _____ 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.
 - _____ Red lights at the Instrument Enclosure and Motor Starter turn OFF
 - _____ Green lights at the Instrument Enclosure and Motor Starter come ON
 - _____ Horn sounds
 - _____ Strobe light flashes
 - _____ 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 addresses N20:32/2 and N20:32/5 are actuated as observed on the laptop.
- 5.8.33 _____ ENSURE the pump does not start from the DTAM.

RPP-6707
REVISION 0

- 5.8.34 _____ DECREASE the current source to approximately 4mA.
- 5.8.35 _____ ENSURE the “Flush Press” alarm at the DTAM returns to “norm”.
- 5.8.36 _____ ENSURE the blue light at the Instrument Enclosure turns OFF.
- 5.8.37 _____ ENSURE address N20:32/5 clears as observed on the laptop.
- 5.8.38 _____ START the jet pump from the DTAM.
- 5.8.39 _____ ENSURE address N20:32/2 clears as observed on the laptop.

NOTE: The following “starts” and “stops” assume the red and green lights, horn and strobe light respond appropriately and will not be recorded in the ATP steps.

- 5.8.40 _____ DECREASE the current source to zero.
- 5.8.41 _____ ENSURE the jet pump shuts down.
- 5.8.42 _____ ENSURE alarm 16, “JFPT SIGNAL LOSS ALARM” occurs.
- 5.8.43 _____ ACKNOWLEDGE the alarm.
- 5.8.44 _____ ENSURE address N20:32/8 actuates as observed on the laptop.
- 5.8.45 _____ INCREASE the current source to approximately 6mA.
- 5.8.46 _____ ENSURE the “JFPT SIGNAL” alarm returns to “norm” on the DTAM.
- 5.8.47 _____ ENSURE address N20:32/8 clears as observed on the laptop.

TRANSFER PRESSURE INTERLOCK INPUT

- 5.8.48 _____ 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.
- 5.8.49 _____ ENSURE the laptop computer is connected to the PLC and is “on-line”.
- 5.8.50 _____ ENSURE the green light on the Instrument Enclosure and on the Jet Pump motor starter are ON.
- 5.9.51 _____ START the jet pump from the DTAM.

RPP-6707
REVISION 0

- 5.8.52 _____ 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.
- 5.8.53 _____ ENSURE the amber light on the Instrument Enclosure turns ON immediately after the timer starts.
- 5.8.54 _____ 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.
- _____ Record the "XFR PRESS" from the DTAM screen. _____ PSI (approximately 15PSI)
- 5.8.55 _____ INCREASE the current source to approximately 6mA.
- 5.8.56 _____ ENSURE the "XFR Pressure" alarm is "norm" on the DTAM and the amber light is OFF on the Instrument Enclosure.
- 5.8.57 _____ START the pump from the DTAM.
- 5.8.58 _____ INCREASE the PXPT 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.
- 5.8.59 _____ 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.
- _____ Record the "XFR PRESS" from the DTAM screen. _____ PSI (approximately 140PSI)
- 5.8.60 _____ DECREASE the current source to approximately 6mA.
- 5.8.61 _____ ENSURE the "XFR Pressure" alarm indicates "norm" on the DTAM.

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

- 5.8.62 _____ ENSURE the amber lights are ON and the red lights are Off for LS-1 and LS-2 at the Pepperl-Fuchs modules in the IS panel.
- 5.8.63 _____ START the pump from the DTAM.

RPP-6707
REVISION 0

- 5.8.64 _____ REMOVE the metal from the front face of LS-1.
- 5.8.65 _____ 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 on the Pepperl-Fuchs is OFF for light set 1.
- 5.8.66 _____ REMOVE the metal form the front face of LS-2.
- 5.8.67 _____ ENSURE the “JR-1” still indicates “NON-PROCESS” at the DTAM.
- 5.8.68 _____ ENSURE the amber light on the Pepperl-Fuchs is OFF for light set 2.
- 5.8.69 _____ ENSURE address N20:32/1 is actuated and address N20:32/0 is clear on ladder 5 as observed on the laptop.
- 5.8.70 _____ REPLACE the metal in front of LS-1 and LS-2.
- 5.8.71 _____ 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.
- 5.8.72 _____ ENSURE the amber lights on the Pepperl-Fuchs are ON for both LS-1 and LS-2.

DILUTION LOW FLOW

- 5.8.73 _____ START the pump from the DTAM.
- 5.8.74 _____ OPEN the dilution switch at TB4 in the Instrument Enclosure.
- 5.8.75 _____ 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” (alarm12) occurs at the DTAM.
- _____ “DILUTION TANK NO FLOW” (alarm 36) occurs at the DTAM.
- 5.8.76 _____ CLOSE the dilution switch.

RPP-6707
REVISION 0

- 5.8.77 _____ 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 WINDING HIGH TEMPERATURE

- 5.8.78 _____ START the pump from the DTAM.
- 5.8.79 _____ INCREASE the temperature on the temperature simulator to approximately 390 degrees F or greater until the following occurs:
- _____ The jet pump shuts down.
 - _____ "JET PUMP SHUTDOWN" (alarm 12) occurs at the DTAM.
 - _____ "Motor Winding High Temp Shutdown" (alarm 14) occurs at the DTAM.
- 5.8.80 _____ DECREASE the temperature simulator to approximately 370 degrees F or lower until alarm "MTR TEMP" indicates "norm" at the DTAM.

POWER MONITOR INTERLOCK

- 5.8.81 _____ START the pump from the DTAM.
- 5.8.82 _____ OPEN the power monitor switch and observe the following.
- _____ "JET PUMP SHUTDOWN" (alarm 12) occurs at the DTAM.
 - _____ "POWER MONITOR HI/LO SHUTDOWN" (alarm 38) occurs at the DTAM.
- 5.8.83 _____ CLOSE the power monitor switch and ensure the "PWR MONITOR" returns to "norm" on the DTAM.

BY-105 LEAK DETECTION INTERLOCK

- 5.8.84 _____ START the pump from the DTAM.
- 5.8.85 _____ OPEN the "BY105" switch and observe the following.
- _____ "JET PUMP SHUTDOWN" (alarm 12) occurs at the DTAM.
 - _____ "BY-105 LEAK OR TROUBLE" (alarm 17) occurs at the DTAM.
- 5.8.86 _____ CLOSE the "BY105" switch and ensure the "BY105 LK/TRB" returns to "norm" on the DTAM.

BX-DCRT ALARM INTERLOCK

- 5.8.87 ____ START the pump from the DTAM.
- 5.8.88 ____ OPEN the "BX-DCRT" switch and observe the following.
- ____ "JET PUMP SHUTDOWN" (alarm 12) occurs at the DTAM.
- ____ "244-BX-DCRT ALARMS" (alarm 23) occurs at the DTAM.
- 5.8.89 ____ CLOSE the "BX-DCRT" switch and ensure the "BX DCRT ALARMS" returns to "norm" on the DTAM.

JET PUMP TROUBLE INTERLOCK

- 5.8.90 ____ START the pump from the DTAM.
- 5.8.91 ____ TURN the selector switch on the jet pump motor starter to OFF.
- 5.8.92 ____ ENSURE the following occurs:
- ____ Pump shuts down
- ____ Alarm 4, "Jet Pump Trouble" occurs.
- ____ Alarm 12, "Jet Pump Shutdown" occurs.
- 5.8.93 ____ TURN the selector switch on the jet pump motor starter to ON.
- 5.8.94 ____ ENSURE the pump does not automatically restart.

LEAK DETECTION INTERLOCK

- 5.8.95 ____ ENSURE there is a water supply and bucket available to actuate the leak detector probes.
- 5.8.96 ____ START the pump from the DTAM.
- 5.8.97 ____ PLACE the primary leak detector probe in a bucket of water.
- 5.8.98 ____ 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" (alarm 12) occurs at the DTAM.
- ____ The red light for the "Primary" leak detector is ON at the Instr. Encl.
- ____ Ensure address N20:32/3 in ladder 5 actuates as observed on the laptop.

RPP-6707
REVISION 0

- 5.8.99 _____ REMOVE the leak detector probe from the bucket and allow the water to drain off.
- 5.8.100 _____ ENSURE the “Pump Pit” leak alarm returns to “norm”.
- 5.8.101 _____ ENSURE the red light for the “Primary” leak detector is OFF.
- 5.8.102 _____ ENSURE address N20:32/3 clears as observed on the laptop.
- 5.8.103 _____ START the pump from the DTAM.
- 5.8.104 _____ DISCONNECT one of the “SD” wires going to the primary leak detector probe.
- 5.8.105 _____ 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.
- 5.8.106 _____ RECONNECT the “SD” wire.
- 5.8.107 _____ ENSURE the “Pump Pit” trouble alarm indicates “norm” on the DTAM.
- 5.8.108 _____ ENSURE the red light for the “Primary” leak detector is OFF.
- 5.8.109 _____ ENSURE address N20:32/3 clears as observed on the laptop.
- 5.8.110 _____ START the pump from the DTAM.
- 5.8.111 _____ PLACE the leak detector 1 probe in a bucket of water.
- 5.8.112 _____ 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.

RPP-6707
REVISION 0

- 5.8.113 _____ REMOVE the leak detector probe from the bucket and allow the water to drain off.
- 5.8.114 _____ ENSURE the "Leak Det 1" alarm returns to "norm".
- 5.8.115 _____ ENSURE the red light for "Leak Detector 1" is OFF.
- 5.8.116 _____ ENSURE address N20:32/4 clears as observed on the laptop.
- 5.8.117 _____ START the pump from the DTAM.
- 5.8.118 _____ DISCONNECT one of the "SD" wires going to the leak detector 1 probe.
- 5.8.119 _____ 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 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.
- 5.8.120 _____ RECONNECT the "SD" wire.
- 5.8.121 _____ ENSURE the "Leak Det 1 ck" alarm indicates "norm" on the DTAM.
- 5.8.122 _____ ENSURE the red light for "Leak Detector 1" is OFF.
- 5.8.123 _____ ENSURE address N20:32/4 clears as observed on the laptop.

INJECTION FLOW SWITCH

- 5.8.124 _____ START the pump from the DTAM.
- 5.8.125 _____ PRESS the "stop" button on the injection simulator box and IMMEDIATELY STOP the stopwatch and OBSERVE that the RED light on the injection simulator box turns OFF. Record the time on the stopwatch.
- _____ minutes

RPP-6707
REVISION 0

5.8.126 _____ ENSURE the following occurs:

_____ “JET PUMP SHUTDOWN” (alarm12) occurs at the DTAM.

_____ “PUMP INJECTION WATER LOW FLOW” (alarm 39) occurs at the DTAM.

5.8.127 _____ RECORD the injection total volume from the DTAM screen.
_____ Gallons

5.8.128 _____ CALCULATE the total gallons from the recorded stopwatch time and flow rate. Total gallons = _____ minutes X _____ gpm flow rate (step 5.9.14)

5.8.129 _____ COMPARE the totals from steps 5.9.116 and 5.9.117. Values to be within +/-3 gallons.

5.8.130 _____ PRESS the “start” on the injection simulator box and ENSURE the “red” light comes ON.

5.8.131 _____ ENSURE the “INJECTION WTR” returns to “norm” **after** the 10-minute timer times out in ladder 5 on the laptop. (If the timer has been set lower, then the return to “norm” will be when the timer times out at the new time.)

PUMP START/STOP FROM DTAM

5.8.132 _____ START the pump from the DTAM.

5.8.133 _____ ENSURE the pump starts in the bump mode.

5.8.134 _____ ALLOW the bump cycles to complete and the pump go to the normal run mode.

5.8.135 _____ STOP the pump from the DTAM and observed that the following occurs:

_____ “JET PUMP SHUTDOWN” (alarm12) occurs at the DTAM.

_____ ENSURE the 30-minute timer in ladder 7 observed on the laptop starts timing. (To expedite the testing, the time can be decreased on the timer.)

5.8.136 _____ UPON time-out of the 30-minute timer, ENSURE the injection simulator red light turns OFF

RPP-6707
REVISION 0

NOTE: The following steps will check the bump start control logic. The pump will be put through a few bump sequences (some only partial sequences) to ensure the logic meets the same safety requirements as in the normal run mode such as interlock shutdowns. Not all interlocks will be checked since the same interlock contact is used in both the bump and normal run modes.

- 5.8.137 _____ PRESS the “start” on the injection simulator box and ENSURE the “red” light comes ON.
- 5.8.138 _____ ENSURE the “INJECTION WTR” returns to “norm” **after** the 10-minute timer times out in ladder 5 on the laptop. (If the timer has been set lower, then the return to “norm” will be when the timer times out at the new time.)
- 5.8.139 _____ START the jet pump from the DTAM after the flow switch interlock is made up.
- 5.8.140 _____ ENSURE the pump starts in the BUMP start mode.
- 5.8.141 _____ INCREASE the motor winding temperature simulator to 390 degrees F or higher **during the first bump cycle** until a shutdown occurs and observe the following.
- _____ ENSURE the bump start on the DTAM screen shows OFF
 - _____ ENSURE the horn sounds
 - _____ ENSURE the strobe light flashes
 - _____ ENSURE alarm 12 occurs
 - _____ ENSURE alarm 14 occurs
 - _____ ENSURE address N20:32/2 in ladder 5 is actuated.
 - _____ ENSURE the counter in ladder 7 resets to zero.
- 5.8.142 _____ DECREASE the motor winding temperature simulator to 370 degrees or lower until the alarm clears.
- 5.8.143 _____ ENSURE the pump does not automatically restart when the interlock is cleared.
- 5.8.144 _____ START the pump from the DTAM.
- 5.8.145 _____ ENSURE the pump starts in the BUMP start mode.
- 5.8.146 _____ TURN the pump selector-switch to OFF at the motor starter **during the second bump cycle**.

RPP-6707
REVISION 0

5.8.147 _____ ENSURE the following occurs (Several seconds may elapse depending upon where in the bump cycle the switch is turned OFF).

- _____ ENSURE the bump start on the DTAM screen shows OFF
- _____ ENSURE the horn sounds
- _____ ENSURE the strobe light flashes
- _____ ENSURE alarm 4 occurs
- _____ ENSURE alarm 12 occurs
- _____ ENSURE address N20:32/2 in ladder 5 is actuated.
- _____ ENSURE the counter in ladder 7 resets to zero.

5.8.148 _____ TURN the selector switch to ON.

5.8.149 _____ ENSURE the pump does not automatically start.

5.8.150 _____ START the pump from the DTAM.

5.8.151 _____ ENSURE the pump starts in the bump mode.

5.8.152 _____ STOP the pump from the DTAM **during the third bump cycle** and ENSURE the following occurs.

- _____ ENSURE the bump start on the DTAM screen shows OFF
- _____ ENSURE the horn sounds
- _____ ENSURE the strobe light flashes
- _____ ENSURE alarm 12 occurs
- _____ ENSURE address N20:32/2 in ladder 5 is actuated.
- _____ ENSURE the counter in ladder 7 resets to zero.

5.8.153 _____ START the pump from the DTAM.

5.8.154 _____ ENSURE the pump starts in the bump mode.

5.8.155 _____ PRESS the “stop” button on the injection simulator box and OBSERVE that the RED light on the injection simulator box turns OFF.

5.8.156 _____ ENSURE the following occurs:

- _____ “JET PUMP SHUTDOWN” (alarm12) occurs at the DTAM.
- _____ “PUMP INJECTION WATER LOW FLOW” (alarm 39) occurs at the DTAM.

HOURL-METER CHECK

5.8.157 _____ RECORD the hour-meter reading. _____

5.8.158 _____ VERIFY by comparing the readings in steps 5.9.10 and 5.9.122 that the hour-meter is recording time.

INTERLOCK TEST SHUTDOWN

5.8.159 _____ REMOVE the software forces and disconnect the laptop computer from the PLC. This includes resetting any timers back to the original settings.

5.8.160 _____ TURN OFF breakers 2, 3, 5, and 6 in the distribution panel.

5.8.161 _____ DISCONNECT the current sources from the PXPT and JFPT termination points.

5.8.162 _____ DISCONNECT the test switches from the BY105, BX-DCRT, power monitor, injection simulator box, and Dilution termination points.

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

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

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

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

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

Engineer Signature

Date

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

Quality Assurance Inspector Signature

Date

5.9 HEATERS, AIR CONDITIONER AND LIGHTS

- 5.9.1 _____ TURN the heater ON in the air compressor cabinet. Set the thermostat high enough to allow the unit to operate.
- 5.9.2 _____ RESET the thermostat to approximately 40 degrees F to allow the heat to turn OFF. Then unplug the heater.
- 5.9.3 _____ TURN the fan thermostat switch to allow the fan in the air compressor cabinet to run.
- 5.9.4 _____ RESET the fan switch to approximately 90 degrees F to allow the fan to turn OFF.
- 5.9.5 _____ TURN the heater ON in the WFIE cabinet. Set the thermostat high enough to allow the unit to operate.
- 5.9.6 _____ RESET the thermostat to approximately 40 degrees F to allow the heat to turn OFF. Then unplug the heater.
- 5.9.7 _____ TURN the heater ON in the Water cabinet. Set the thermostat high enough to allow the unit to operate.
- 5.9.8 _____ RESET the thermostat to near the "LO" setting to allow the heat to turn OFF. Then unplug the heater.
- 5.9.9 _____ TURN the heater ON in the Instrument Enclosure. Set the thermostat high enough to allow the unit to operate.
- 5.9.10 _____ RESET the thermostat to approximately 40 degrees F to allow the heat to turn OFF. Then unplug the heater.
- 5.9.11 _____ 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.
- 5.9.12 _____ 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.
- 5.9.13 _____ ENSURE the light in the WFIE cabinet operates.
- 5.9.14 _____ ENSURE the light in the Instrument Enclosure operates.

RPP-6707
REVISION 0

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

Engineer Signature

Date

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

Quality Assurance Inspector Signature

Date

5.10 SKID PREPARATION FOR SHIPPING

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

_____ DS-6002U
_____ DS-6003U
_____ DS-6004U
_____ DS-6005U

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

_____ 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	

- 5.10.2. _____ Disconnect the power plug from the 480vac power source.
- 5.10.3. _____ ENSURE the power plug on the power cable is a Crouse-Hinds model APJ3475.
- 5.10.4. _____ DRAIN the water tank in the Water Cabinet. If the tank is drained with pressure on the tank, then use at least a 3/4" or 1" diameter hose. If a small hose is used, then bleed pressure off the tank by closing V-6027U and opening V-6037U prior to opening drain valve V-6030U.
- 5.10.5. _____ Bleed the air pressure off the air system by OPENING the following valves:

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

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

RPP-6707
REVISION 0

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

_____ V-6035U (EQUALIZING)

_____ V-6036U (EQUALIZING)

5.10.7. _____ Ensure the following valves are CLOSED.

Air Compressor

Water Cabinet

_____ V-6025U

_____ V-6050U

_____ V-6027U

_____ V-6026U

_____ V-6051U

_____ V-6029U

_____ V-6034U

_____ V-6053U

_____ V-6030U

_____ V-6043U

_____ V-6031U

_____ V-6044U

_____ V-6032U

_____ V-6046U

_____ V-6037U

_____ V-6047U

_____ V-6052U

_____ V-6048U

_____ V-6054U

_____ V-6049U

_____ V-6055U

WFIE Cabinet

_____ V-6001U

_____ V-6012U

_____ V-6021U

_____ V-6002U

_____ V-6013U

_____ V-6035U LOW

_____ V-6003U

_____ V-6014U

_____ V-6035U HIGH

_____ V-6004U

_____ V-6015U

_____ V-6036U LOW

_____ V-6005U

_____ V-6016U

_____ V-6036U HIGH

_____ V-6006U

_____ V-6017U

_____ V-6056U

_____ V-6007U

_____ V-6018U

_____ FIV-6002U

_____ V-6008U

_____ V-6019U

_____ FIV-6003U

_____ V-6011U

_____ V-6020U

_____ FIV-6004U

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

Engineer Signature

Date

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

Quality Assurance Inspector Signature

Date

5.11 APPENDIX A

ACCEPTANCE TEST PROCEDURE

This page may be reproduced as necessary

PAGE _____ of

ACCEPTANCE TEST PROCEDURE LOG		
Name	Date	Comment

PAGE _____ of _____

[illegible]

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

PROCEDURE PERFORMER SIGNATURE SHEET

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

[illegible]

PRE-JOB BRIEF SIGNATURE PAGE

PRINT NAME	SIGNATURE