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Title/Desc:

OPERATIONAL TEST PROCEDURE FOR PUMPING &  
INSTRUMENTATION CONTROL SKID SALW-6001B MONITOR &  
CONTROL SYSTEM

Pages: 92

STL 4 (w)

NOV 15 1995 ENGINEERING DATA TRANSMITTAL

Page 1 of 12  
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1	1	QA	C. M. TAYLOR *								
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Prepared By

B.E. Raymond 2750E/D228  
373-3649  
Name

- Operational Test Procedure
- Alarm Response Procedure
- Operator Round Sheet
- Operating Specification Document
- Criticality Specifications
- Facility Sampling Schedule

Sr Engineering Wtr/TFPG  
Title/Organization

- New or Revised - Full Review Required
- One time Work Plan/Procedure
- Temporary Work Plan/Procedure

OPERATIONAL TEST PROCEDURE FOR PUMPING AND INSTRUMENTATION  
CONTROL SKID SALW-6001B MONITOR AND CONTROL SYSTEM  
Document Title

Work Plan/Procedure Complete

Procedure Changes/Changed Pages/Summary of change \_\_\_\_\_

## PROCEDURE REVIEWERS SIGNATURES

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<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>[Signature]</u>	<u>MICHAEL R KOCH</u>	<u>ENG/TSES</u>	<u>11/8/95</u>
<small>Ensures that the technical aspects of the procedure are correct, and that the procedure has been reviewed per the approval designator.</small>					

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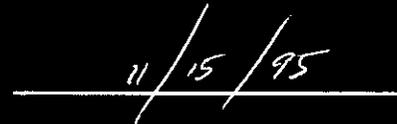
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11/15/95

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## 2. Title

Operational Test Procedure for Pumping and Instrumentation Control Skid SALW-6001B Monitor and Control System

## 3. Number

WHC-SD-WM-OTP-191

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## 5. Key Words

Operator Control Station, Analog Signal Verification, Discrete Signal Verification, Monitor and Alarm Function Verification, Remote Setpoint Change, Remote Leak Detector Test, Remote Jet Pump Shutdown, CASS Alarm, Leak Detector Test for Pump Pit and Valve Pits C &amp; D

## 6. Author

Name: M. F. Garcia

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Organization/Charge Code 77420/N1267

## 7. Abstract

This OTP shall verify and document that the monitor and control system comprised of PICS SALW-6001B PLC, 242S PLC, Operator Control Station, and communication network is functioning per operational requirements.

## 8. RELEASE STAMP

OFFICIAL RELEASE  
BY WHC  
DATE NOV 15 1995

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OPERATIONAL TEST PROCEDURE FOR PUMPING AND INSTRUMENTATION CONTROL SKID SALW-6001B MONITOR AND CONTROL SYSTEM

The original signatures are on file.

PCA Incorporated:		<u>NEW</u>	<u>SQ</u>
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## 1.0 PURPOSE

- 1.1 The purpose of this Operational Test Procedure (OTP) is to provide a record of functional testing results and verification that the Saltwell Pumping Instrument Skids (PICS) monitor and control system meet operational requirements.
- 1.2 This OTP shall verify and document that the monitor and control system comprised of PICS SKID SALW-6001B PLC (located at 241S 110), 242S PLC (located in 242S relay cabinet), and the Operator Control Station (OCS) (located in the 242S control room) is functioning per operational requirements. The OCS is a Wonderware graphical interface software package loaded on a personal computer, and monitor located in the 242S control room.
- 1.3 The following specifics of the monitor and control system are tested by this OTP:
  - Verification of PICS SALW-6001B Jet Pump shutdown initiated by the 242S PLC
  - General Saltwell Cass Alarm output from 242S PLC to CASS
  - Verification of communication between OCS, SALW-6001B PLC, and 242S PLC
  - Verification of alarm acknowledgement at the OCS
  - Verification of PICS SALW-6001B Jet Pump shutdown initiated from OCS
  - Verification of discrete signal inputs at the OCS
  - Verification of analog signal inputs at the OCS
  - Verification of C and D Valve Pit Leak Detection at the OCS

NOTE - Minor modifications of PLC code or Wonderware software package configuration to satisfy Operational Test Procedure will be permitted to facilitate completion of OTP. The intent of this OTP is to provide a method for documenting the condition and capabilities of the PICS monitor and control system. The attached OTP Exception Log and Exception Record provides the means of documenting Operational Testing results and equipment conditions. Additional sheets are to be used as necessary to delineate the progress of the OTP.

## 2.0 INFORMATION

### 2.1 SCOPE

#### 2.1.1 DATA HIGHWAY COMMUNICATION NETWORK

The Allen Bradley DH-485 communication network is a token passing bus made up of a series of daisy-chained segments of Belden 9842 cable. It is used to pass data between nodes on the network.

#### 2.1.2 DOUBLE CONTAINMENT RECEIVER TANK (DCRT) SIGNALS

The 244S DCRT signals that initiate a shutdown are as follows:

- 244S Catch Tank Weight Factor High Alarm (ANN-2-4A)
- 244S Pump Pit Leak (ANN-4-3A)
- 244S Sump Weight Factor High (ANN-4-3A)
- 244S Annulus Radiation High (ANN-5-6A)

The 242S PLC receives the DCRT signals and communicates with PICS SALW-6001B PLC via the DH-485 to initiate the shutdown signal for the PICS SALW-6001B.

#### 2.1.3 MASTER SHUTDOWN RELAY SIGNAL

A relay K-MS-1 is installed in parallel to K-MS (master shutdown relay) and will generate an input to the 242S PLC.

#### 2.1.4 241S GENERAL SALTWELL CASS ALARM

An input to CASS from the 242S PLC is initiated if a Jet Pump shutdown signal is received from the PICS SALW-6001B PLC. The message associated with the CASS alarm point should read "241S General Saltwell Alarm".

**2.0 INFORMATION (Cont.)**

2.1.5 OPERATOR CONTROL STATION (OCS)

The OCS is a PC with associated Wonderware software located in the 242S Control Room. The following features of the OCS will be tested during the test procedure:

- Monitor and Alarm Functions
- Communication Between Network Nodes
- OCS Initiated Shutdown of Jet Pump
- Remote Set Point Change
- Remote Leak Detector Test
- Remote Jet Pump Shutdown

**2.2 TERMS AND DEFINITIONS**

- 2.2.1 ANN - Annunciator
- 2.2.2 CASS - Computer Automated Surveillance System
- 2.2.3 DTAM - Data Table Access Module
- 2.2.4 ECN - Engineering Change Notice
- 2.2.5 OCS - Operator Control Station
- 2.2.6 OTP - Operation Test Procedure
- 2.2.7 PIC - Person In Charge
- 2.2.8 PICS - Pumping and Instrumentation Control Skid
- 2.2.9 PLC - Programmable Logic Controller
- 2.2.10 GPM - Gallons Per Minute
- 2.2.11 WG - Water Gauge

**2.3 RESPONSIBILITIES**

2.3.1 The Maintenance craft personnel are responsible for:

- Providing assistance during the test.

2.3.2 Quality Control (QC) responsible for:

- Witnessing and signing steps as identified in OTP.
- Verifying that the procedure sections were performed correctly.

2.3.3 Test Director responsible:

- Provides the equipment found in step 4.1 of this procedure.
- Records equipment status and data per this procedure.
- Conducts pre-job planning meeting as necessary.
- Conducts pre-job system walkdown.
- Scheduling/rescheduling of the test as required.
- Recording data exceptions and other notes as required on the OTP Data Sheets.

2.3.4 The Engineering Personnel responsible for:

- Providing technical support during testing.
- Providing programming support during testing.
- Forcing data in PLC program during testing.

2.3.5 Operations Personnel responsible for:

- Performing valving manipulations on PICS Systems and Test Equipment.
- Starting, stopping and controlling equipment related to saltwell operations.
- Controlling and monitoring parameters from DTAM, OCS, and Control Room.

**2.4 REFERENCES**

2.4.1 The following documents were used to write or are referenced in this procedure:

- WHC-CM-4-3, INDUSTRIAL SAFETY MANUAL, STANDARD A-3, "PRE-JOB SAFETY PLANNING/JOB SAFETY ANALYSIS," STANDARD E-2, "ELECTRICAL SAFETY PRACTICES"
- WHC-CM-6-1 EP 4.2., STANDARD ENGINEERING PRACTICE "TESTING PRACTICES"
- WHC-IP-1026 APPX L, "ENGINEERING PRACTICES GUIDELINES"
- H-2-85426 Shts 1-13 Rev 0, PUMPING AND INSTRUMENTATION CONTROL SKIDS
- H-2-85425 Shts 1-6 Rev 0, INSTRUMENT WEIGHT FACTOR ENCLOSURE ARRANGEMENT
- H-2-73990 S1 R6, S2 R7, S3 R4, S4 R4, S5 R0, SALTWELL PUMP ASSEMBLIES & DETAILS
- H-2-78320 Shts 1-3 Rev 1, JUMPER ASSEMBLY SALT WELL JET PUMP
- H-2-85221 Shts 1-5 Rev 0, INSTRUMENT AIR AND WATER DETAILS, BROOKS WAFER-MAG 7400 ELECTROMAGNETIC FLOWMETER VENDOR INFORMATION
- FOXBORO 823 DP SERIES ELECTRONIC DIFFERENTIAL PRESSURE CELL VENDOR INFORMATION
- YOKOGAWA 4153 THREE PEN RECORDER VENDOR INFORMATION
- S-FARM PROCESS CONTROL PROGRAMMING GUIDE
- WHC-SD-WM-OTP-178, Operational Test Procedure.
- ALLEN BRADLEY ADVANCED PROGRAMMING SOFTWARE (APS) User Manual.
- ALLEN BRADLEY ADVANCED PROGRAMMING SOFTWARE (APS) Reference Manual.
- PSCP -1-073 BROOKS FLOWMETER CALIBRATION PROCEDURE.

## 2.5 SAFETY

Warning - 120 VAC energized circuits and leads will be encountered during test if access to PLC Input/Output terminals or serial communication port is required at any time. Observe appropriate electrical precautions as directed by WHC-CM-1-10 Safety Manual, WKS-15, Electrical Work Safety.

Warning - Circuit boards are energized. Terminal strips in the Instrument Enclosure have 120 VAC exposed leads. USE appropriate electrical safety precautions as described in WHC-CM-1-10 Safety Manual, WKS-15, Electrical Work Safety.

2.5.1 The following administrative procedures control work performed in this procedure:

- Safety Manual, WHC-CM-1-10
- Building Emergency Plan, WHC-IP-0263-TF
- Industrial Hygiene Manual, WHC-CM-4-40
- Tank Farm Health and Safety Plan (HASP), WHC-SD-WM-HSP-002

## 2.6 RADIATION AND CONTAMINATION CONTROL

2.6.1 The following administrative procedures control work performed in this procedure:

- Hanford Site Radiological Control Manual (HSRCM)
- Environmental Compliance Manual, WHC-CM-7-5

## 2.7 QUALITY ASSURANCE

2.7.1 Ensure that the test(s) are performed per procedure. The QC Inspector shall sign, and date each procedure section authenticating the validity of the data obtained and verifying that the procedure section has been performed correctly.

## 2.8 GENERAL INFORMATION

2.8.1 Complete each procedure step in the given order, unless otherwise noted or as directed by the Test Director.

2.8.2 All entries recorded in this procedure shall be made in black ink.

2.8.3 Editorial changes required to this OTP may be made per the red line method by the Test Director and Cognizant Engineer as long as they do not impact operational facility safety function, or performance and will not compromise or influence the test data. Any changes affecting the above stated criteria shall be made in accordance with WHC-CM-6-1, *Standard Engineering Practices*, EP-2.2 Change Control.

## 2.8 GENERAL INFORMATION (Cont.)

- 2.8.4 Any non-conformance of the communication network, instrumentation, or unexpected results during testing shall be logged in the OTP EXCEPTION LOG and thoroughly documented on an OTP EXCEPTION RECORD.
- 2.8.5 Do not perform any part of this procedure on faulty equipment. If faulty equipment is discovered, STOP the execution of this procedure and resolve the problem.
- 2.8.6 If the performance of this procedure is suspended for any reason, ensure the equipment is left in a safe state.
- 2.8.7 This procedure DOES NOT contain any separate data/verification sheets. Verification of procedural steps and validity of the data is incorporated into the specific section.

## 2.9 LIMITS AND PRECAUTIONS

General Recovery Action - If any Specification Limit in this procedure is violated, immediately notify TFO Shift Manager of the condition, unless a specific Recovery Action is stated with the limit.

## 3.0 RECORDS

- 3.1 The completed working copy of this procedure and all exception logs and exception records generated by this procedure, will be kept as permanent records.
- 3.2 In the event minor drawing changes are required to successfully complete this OTP, such as changing a relay contact from Normally Open (NO) to Normally Closed (NC), the change shall be noted as an exception and incorporated in an ECN after the completion of this OTP.
- 3.3 PLC and OCS program changes shall be allowed to successfully complete this OTP.

### 4.0 PREREQUISITES

4.1 The following supplies shall be available at the workplace:

- Volt/ohm meter (VOM): Portable, 0-600 volts ac, ± 2% accuracy.  
Calibration No. \_\_\_\_\_ Expiration Date \_\_\_\_\_
- Thermocouple Voltage Source (West Portable Potentiometer).  
Calibration No. \_\_\_\_\_ Expiration Date \_\_\_\_\_
- Shorting jumpers with on-off switch (12 gauge or larger wire).
- Manometer - minimum range 0-500" water gauge. Must have a read out of variable test pressure.  
Calibration No. \_\_\_\_\_ Expiration Date \_\_\_\_\_
- Manometer - minimum range 0-20" water gauge. Must have a read out of variable test pressure.  
Calibration No. \_\_\_\_\_ Expiration Date \_\_\_\_\_
- Saltwell JetPump Jumper and PICS.
- Test Recirculation Apparatus (Jumper Test Assembly).
- Brooks hand held flowmeter calibrator.  
Calibration No. \_\_\_\_\_ Expiration Date \_\_\_\_\_
- 2 Way radios for communication with the Tank Farm and the 242-S Evaporator.
- Test Director shall walk down entire test area.

4.1.1 Test Director SHALL VERIFY that section 4.1 is complete by signing below.

\_\_\_\_\_  
Test Director Signature

\_\_\_\_\_  
Date

**4.0 PREREQUISITES (Cont.)**

4.1.2 QC Inspector SHALL VERIFY that section 4.1 is complete by signing below.

\_\_\_\_\_  
QC Inspector Signature

\_\_\_\_\_  
Date

4.2 The following documents may be needed to perform this procedure:

- Vendor Information Manuals listed in section 2.4

4.3 The following conditions must be met before this test may commence:

4.3.1 A pre-job safety meeting has been held before performing this procedure in accordance with WHC-CM-1-10, WSK-6, Pre-Job Safety Planning, and WHC-IP-0842, Section 15.3, PRE-JOB SAFETY MEETING FORM. VERIFY ~~WAS~~ WHC-SD-WM-DTP-178 WAS COMPLETED AND ALL EXCEPTIONS RESOLVED.

4.3.2 The Pumping and Instrumentation Control Skid (PICS) has been set adjacent to the test area. All PICS valves are to be CLOSED and all PICS breakers are OPEN prior to starting test.

4.3.3 The associated Jet Pump Jumper and Jumper test assembly has been placed at the test site.

4.3.4 PICS water tank has been filled above 20" of water.

4.3.5 The PICS has been grounded.

4.3.6 The Jet Pump Jumper has been wired with appropriate mating connectors and plugged into the PICS.

4.3.7 The recirculation apparatus has been filled with water and mated to skid.

4.0 PREREQUISITES (Cont.)

4.3.8 Test Director SHALL VERIFY that section 4.3 is complete by signing below.

\_\_\_\_\_  
Test Director Signature

\_\_\_\_\_  
Date

4.3.9 QC Inspector SHALL VERIFY that section 4.3 is complete by signing below.

\_\_\_\_\_  
QC Inspector Signature

\_\_\_\_\_  
Date

### 5.0 PROCEDURE

#### 5.1 PICS ELECTRICAL AND PROCESS AIR POWER UP

5.1.1 ENERGIZE the PICS by performing the following:

5.1.1.1 CLOSE the PICS main disconnect switch SALW-DS-6002B, "MAIN".

5.1.1.2 CLOSE TRANSFORMER T-1 PRIMARY SW 480 VAC SALW-DS-6003B.

5.1.1.3 CLOSE INSTR AIR CPRSR 480 VAC SALW-DS-6004B VAC.

5.1.1.4 CLOSE SALT WELL PUMP 480 VAC SALW-DS-6005B.

5.1.2 IN PANELBOARD "A" 120/240 VAC SALW-DP-6001B, PERFORM the following:

NOTE - Breakers in panelboard are arranged vertically in two rows.

5.1.2.1 CLOSE breaker 1, "MAIN".

5.1.2.2 CLOSE Breaker 2, "WFIE GFCI".

5.1.2.3 CLOSE Breaker 4, "AIR CABINET GFCI".

5.1.2.4 CLOSE Breaker 5, "RECEPTACLES".

5.1.2.5 CLOSE Breaker 6, "WATER TANK HEATER AND HEAT TRACE".

5.1.2.6 CLOSE Breaker 7, "INSTR CAB".

**5.1 PICS ELECTRICAL AND PROCESS AIR POWER Up (Cont.)**

- 5.1.2.7 CLOSE Breaker 8, "LEAK DETECTOR ENCLOSURE".
- 5.1.3 START the air compressor by placing the START Switch in the HAND position.
- 5.1.4 OPEN SALW-V-6034A.
- 5.1.5 VERIFY that Air Compressor starts and builds up pressure as indicated by SALW-PI-6007B. Air Compressor should kick off at 90 psi (+ or -4 psi).
- 5.1.6 VALVE IN Air to the PICS Water Tank by SLOWLY PERFORMING the following steps (Refer to Figure 1):
  - 5.1.6.1 SLOWLY OPEN SALW-V-6025A In the air compressor cabinet.
  - 5.1.6.2 SLOWLY OPEN SALW-V-6027A Near the instrument water tank.
  - 5.1.6.3 SLOWLY OPEN SALW-V-6028A Near the instrument water tank.
  - 5.1.6.4 ADJUST Pressure Regulating Valve SALW-PCV-6006A to 30 psi (+ or -3 psi) as indicated by Pressure Indicator SALW-PI-6008A.
- 5.1.7 VALVE IN Air to the Weight Factor Instrument Enclosure by PERFORMING the following (Refer to Figure 1 and 2):
 

NOTE - If Diptubes are not installed in test area, process air and drip water will be expelled from the bottom of the WFIE.
- 5.1.8 IF Required, ATTRACH temporary portable hose from diptube outlet to high and medium diptubes in the side of the weight factor enclosure, (from valves SALW-V-6005A and SALW-V-6007A).
- 5.1.8.1 ROUTE the flexible hose to a suitable drain and secure.

**5.1 PICS ELECTRICAL AND PROCESS AIR POWER Up (Cont.)**

- 5.1.8.2 SLOWLY OPEN SALW-V-6026A In the Instrument Air Enclosure.
- 5.1.8.3 SLOWLY OPEN SALW-V-6001A In the bottom of the WFIE.
- 5.1.8.4 ADJUST Pressure Regulator SALW-PCV-6001A in the WFIE to 20 psi (+ or -2 psi) as indicated by the Pressure Indicator located on the face of the regulator.
- 5.1.8.5 SLOWLY OPEN SALW-V-6004A In the middle of the WFIE
- 5.1.8.6 SLOWLY OPEN SALW-V-6003A In the middle of the WFIE
- 5.1.8.7 SLOWLY OPEN SALW-V-6005A In the bottom left of the WFIE.
- 5.1.8.8 SLOWLY OPEN SALW-V-6006A In the bottom left of the WFIE.
- 5.1.8.9 SLOWLY OPEN SALW-V-6007A In the bottom left of the WFIE.
- 5.1.8.10 SLOWLY OPEN SALW-V-6002A In the bottom left of the WFIE.
- 5.1.8.11 SLOWLY OPEN SALW-V-6020A In the middle left of the WFIE.
- 5.1.8.12 SLOWLY OPEN SALW-V-6021A In the middle left of the WFIE.
- 5.1.8.13 SLOWLY OPEN SALW-V-6019A In the middle left of the WFIE.

**5.1 PICS ELECTRICAL AND PROCESS AIR POWER Up (Cont.)**

5.1.9 **ADJUST** the air flow through the diptubes by **PERFORMING** the following:

5.1.9.1 **ADJUST** SALW-FIV-6002A In the top of the WFIE to approximately 1.5 CFM (+ or - .5 CFM) as indicated by the attached flow indicator.

5.1.9.2 **ADJUST** SALW-FIV-6003A In the top of the WFIE to approximately 1.5 CFM (+ or - .5 CFM) as indicated by the attached flow indicator.

5.1.9.3 **ADJUST** SALW-FIV-6004A In the top of the WFIE to approximately 1.5 CFM (+ or - .5 CFM) as indicated by the attached flow indicator.

5.1.10 **REQUEST** Test Director to **VERIFY** that section 5.1 is complete by signing below.

\_\_\_\_\_  
Test Director Signature

\_\_\_\_\_  
Date

5.1.11 **REQUEST** QC Inspector to **VERIFY** that section 5.1 is complete by signing below.

\_\_\_\_\_  
QC Inspector Signature

\_\_\_\_\_  
Date

**5.2 PICS WATER DRIP SYSTEM**

NOTE - If Driptubes are not installed in test area, process air and drip water will be expelled from the bottom of the WFIE.

5.2.1 IF necessary, ATTACH temporary portable hose from diptube outlet to high and medium diptubes in the bottom of the weight factor enclosure, (from valves SALW-V-6005A and SALW-V-6007A).

5.2.1.1 ROUTE the flexible hose to a suitable drain and secure.

5.2.2 VALVE IN the Dip Tube Drip system by performing the following:

5.2.2.1 SLOWLY OPEN SALW-V-6018A in the bottom right of the WFIE

5.2.2.2 SLOWLY OPEN SALW-V-6016A in the middle of the WFIE

5.2.2.3 ADJUST Pressure Regulator SALW-PCV-6005A in the bottom of the WFIE to 20 psi (+ or -2 psi) as indicated by SALW-PI-6001A in the middle of the WFIE

5.2.2.4 SLOWLY OPEN SALW-V-6013A in the middle of the WFIE

5.2.2.5 SLOWLY OPEN SALW-V-6008A in the middle of the WFIE

**5.2 PICS WATER DRIP SYSTEM (Cont.)**

5.2.2.6 SLOWLY ADJUST SALW-V-6014A to allow approximately 2 drops/second (+ or -1 drop/second) as indicated by SALW-FG-6001A

5.2.2.7 SLOWLY ADJUST SALW-V-60015A to allow approximately 2 drops/second (+ or -1 drop/second) as indicated by SALW-FG-6002A

5.2.3 VALVE OUT the Diptube purge air and drip water by performing the following:

NOTE - Instrument Air to the DOV will remain valved in for testing in subsequent steps.

5.2.3.1 SLOWLY CLOSE SALW-V-6025A near the instrument air compressor

5.2.3.2 SLOWLY CLOSE SALW-V-6027A near the inside top of the Service Water Enclosure

5.2.3.3 SLOWLY CLOSE SALW-V-6028A near the inside top of the Service Water Enclosure

5.2.3.4 SLOWLY CLOSE SALW-V-6018A in the bottom of the WFIE

5.2.3.5 SLOWLY CLOSE SALW-V-6016A in the middle of the WFIE

5.2.3.6 SLOWLY CLOSE SALW-V-6015A in the middle of the WFIE

5.2.3.7 SLOWLY CLOSE SALW-V-6014A in the middle of the WFIE

5.2 PICS WATER DRIP SYSTEM (Cont.)

5.2.3.8 SLOWLY CLOSE SALW-V-6013A in the middle of the WFIE

5.2.3.9 SLOWLY CLOSE SALW-V-6008A in the middle of the WFIE

5.2.3.10 SLOWLY CLOSE valve SALW-V-6006A in the bottom of the WFIE

5.2.3.11 SLOWLY CLOSE valve SALW-V-6005A in the bottom of the WFIE

5.2.3.12 SLOWLY CLOSE valve SALW-V-6007A in the bottom of the WFIE

5.2.4 REQUEST Test Director to VERIFY that section 5.2 is complete by signing below.

\_\_\_\_\_  
Test Director Signature

\_\_\_\_\_  
Date

5.2.5 REQUEST QC Inspector to VERIFY that section 5.2 is complete by signing below.

\_\_\_\_\_  
QC Inspector Signature

\_\_\_\_\_  
Date

**5.3 ANALOG INPUT SIGNAL VERIFICATION AT OCS.**

NOTE - In this section analog signals are simulated in the field and verified and recorded at the OCS.

- The method of forcing data is used to simulate inputs generated in the field. The technique involves accessing the data of the PLC wired directly to the field inputs and setting (forcing) a specific detectable condition (bit) or value (integer value representing an analog signal). The monitor and control system then is responsible for producing the desired monitor and control action.

5.3.1 **VERIFY** that no PLC input signals are forced and that the forcing function is disabled.

5.3.2 **CONNECT** the test Manometer with pressure source (0-500") to the WFT. The pressure source is to be connected to the high pressure inlet side, the low pressure side is to be opened to atmosphere, the equalizing valve is to be closed, and the manometer will read the pressure as seen by the WFT.

5.3.3 **CONNECT** the test Manometer with pressure source (0-20") to the SGT. The pressure source is to be connected to the high pressure inlet side, the low pressure side is to be opened to atmosphere, the equalizing valve is to be closed, and the manometer will read the pressure as seen by the SGT.

5.3.4 **SET** the WFT Manometer to 125" w.g.  $\pm$  2" **SET** the SGT Manometer to 5" w.g.  $\pm$  .25".

5.3.4.1 **RECORD** the Weight Factor Reading as indicated at the OCS. Acceptable Range (125  $\pm$  5) \_\_\_\_\_

5.3.4.2 **RECORD** the Weight Factor Reading as indicated at the DTAM. Acceptable Range (125  $\pm$  5) \_\_\_\_\_

5.3.4.3 **RECORD** the Specific Gravity Reading as indicated at the OCS. Acceptable Range (5  $\pm$  .35) \_\_\_\_\_

5.3.4.4 **RECORD** the Specific Gravity Reading as indicated at the DTAM. Acceptable Range (5  $\pm$  .35) \_\_\_\_\_

5.3 ANALOG INPUT SIGNAL VERIFICATION AT OCS (Cont.)

5.3.5 REMOVE the Test Manometer from the WFT ONLY. ISOLATE the WFT from the system by opening the WFT Equalizing valve and closing the isolation valves on the three valve manifold SALW-V-6036B. BLEED off pressure from the SGT manometer, and leave it hooked up for subsequent test steps.

5.3.6 PREPARE the Water Tank Level Transmitter SALW-LT-6001B for test signals by performing the following:

5.3.6.1 CLOSE valve SALW-V-6029B.

5.3.6.2 CLOSE valve SALW-V-6031B.

5.3.6.3 ATTACH a test manometer to the vent/test ports of the Level Transmitter. The Low side of the level transmitter should be open to atmosphere and the high side should be attached to the manometer pressure source capable of 0 - 50" of water.

5.3.7 ADJUST the manometer on the Level Transmitter to a pressure of 25" ± 2" Water Gauge.

5.3.8 VERIFY the following:  
WATER LEVEL as indicated by the DTAM (25" ± 2.5"). \_\_\_\_\_

5.3.9 VERIFY the following:  
WATER LEVEL as indicated by the OCS (25" ± 2.5"). \_\_\_\_\_

5.3.10 REMOVE the manometer from the Level Transmitter, and replace plugs on Level Transmitter.

**5.3 ANALOG INPUT SIGNAL VERIFICATION AT OCS (Cont.)**

- 5.3.11 UNPLUG the Power Cord to FQIT-6001B in the WFIE cabinet.
- 5.3.12 CONFIGURE the flowmeter to receive mock signals from the Brooks Hand Held Calibrator.
- 5.3.13 SIMULATE a flow signal of 2 GPM using the Hand Held Calibrator.
- 5.3.14 VERIFY the FQIT Reading at the OCS. Acceptable Range (2 GPM ± .2 gpm)
- 5.3.15 VERIFY the flow reading at the DTAM is 2 gpm (Acceptable Range 2 gpm ± .2)
- 5.3.16 UNPLUG Hand Held Calibrator from the Flow Meter.
- 5.3.17 CONFIGURE FQIT for operation.

NOTE - The K Factor of the S110 Flowmeter is 21661.3, and the Analog Factor is 4.737.

**WARNING**

Circuit boards are energized. Terminal strips in the Instrument Enclosure have 120 VAC exposed leads. USE appropriate electrical safety precautions as described in WHC-CM-1-10 Safety Manual, WKS-15, Electrical Work Safety.

- 5.3.18 REMOVE Thermocouple leads for TE-6002 from the thermocouple input module in the instrument enclosure.
- 5.3.19 INSTALL a type T Thermocouple Test Source at the terminals where TE-6002 was previously landed.

**5.3 ANALOG INPUT SIGNAL VERIFICATION AT OCS (Cont.)**

5.3.20 **SIMULATE** a thermocouple input temperature of approximately 120 ° F.

5.3.21 **RECORD** the following:

- **SIMULATED TEMPERATURE** from thermocouple simulator. \_\_\_\_\_
- **JUMPER HEATER TEMP (TE-6002)** as indicated at OCS. \_\_\_\_\_  
Acceptable range (+ or -5° of simulated)
- **JUMPER HEATER TEMP (TE-6002)** as indicated at DTAM. \_\_\_\_\_  
Acceptable range (+ or -5° of simulated)

5.3.22 **REMOVE** thermocouple test source.

5.3.23 **RELAND** thermocouple leads for thermocouple TE-6002 (wire number 2 (red) and (blue)) to the thermocouple input module in the instrument enclosure.

5.3.24 **REMOVE** Thermocouple leads for TE-6004 from the thermocouple input module in the instrument enclosure.

5.3.25 **INSTALL** a type T Thermocouple Test Source at the terminals where TE-6004 was previously landed.

**5.3 ANALOG INPUT SIGNAL VERIFICATION AT OCS (Cont.)**

5.3.26 SIMULATE a thermocouple input temperature of approximately 90 ° F.

5.3.27 RECORD the following:

- SIMULATED TEMPERATURE from thermocouple simulator. \_\_\_\_\_
- INSTRUMENT ENCLOSURE TEMP (TE-6004) as indicated at OCS. Acceptable range (+ or -5° of simulated) \_\_\_\_\_
- INSTRUMENT ENCLOSURE TEMP (TE-6004) as indicated at DTAM. Acceptable range (+ or -5° of simulated) \_\_\_\_\_

5.3.28 REMOVE Thermocouple Test Source.

5.3.29 RELAND thermocouple leads for thermocouple TE-6004 (wire number 2 (red) and (blue)) to the thermocouple input module in the instrument enclosure.

5.3.30 REMOVE Thermocouple leads for TE-6001 (wire number 2 (red) and (blue)) from the thermocouple input module in the instrument enclosure.

5.3.31 INSTALL a type T Thermocouple Test Source at the terminal where TE-6001 was previously landed.

5.3.32 SIMULATE a thermocouple input temperature of approximately 90 ° F.

5.3 ANALOG INPUT SIGNAL VERIFICATION AT OCS (Cont.)

5.3.33 RECORD the following:

- SIMULATED TEMPERATURE from thermocouple simulator. \_\_\_\_\_
- AIR COMP ENC ~~WR~~  
~~JUMPER HEATER TEMP (TE-6001)~~  
 as indicated at OCS. \_\_\_\_\_  
 Acceptable range (+ or -5° of simulated)
- AIR COMP ENC ~~WR~~  
~~JUMPER HEATER TEMP (TE-6001)~~  
 as indicated at DTAM. \_\_\_\_\_  
 Acceptable range (+ or -5° of simulated)

5.3.34 REMOVE Thermocouple Test Source.

5.3.35 RELAND thermocouple leads for thermocouple TE-6001 to the thermocouple input module in the instrument enclosure.

5.3.36 REMOVE Thermocouple leads for TE-6003<sup>B MA</sup> (wire number 3 (red) and (blue)) from the thermocouple input module in the Instrument Enclosure.

5.3.37 INSTALL a type T Thermocouple Test Source at the terminals where TE-6003<sup>B MA</sup> was previously landed.

5.3.38 SIMULATE a thermocouple input temperature ~~between the temperatures recorded in step 5.3.19.~~ of 100° F +/- 5.

~~5.3.39 ENSURE JUMPER HEATER TEMP (TE-6002) as indicated by DTAM is between the temperatures recorded in step 5.3.19.~~  MD

~~NOTE - The Control Temperature setpoints may be adjusted as necessary at the DTAM to accomplish 5.3.19.~~ MD

5.3 ANALOG INPUT SIGNAL VERIFICATION AT OCS (Cont.)

5.3.40 RECORD the following:

- Simulated temperature from thermocouple simulator. \_\_\_\_\_
- JUMPER HEATER TEMP (TE-6003) as indicated by DTAM. \_\_\_\_\_  
Acceptable range (+ or -10 deg of simulated)

5.3.40.1 VERIFY "JUMPER HEAT TR ON" is displayed at DTAM.

5.3.40.2 VERIFY "JUMPER HEAT TRACE PROBLEM" (ALARM 8) is NOT displayed at DTAM.

5.3.40.3 VERIFY 120 VAC power is NOT present across wire 10 BLK and wire 11 WHITE on the terminal strip located in the SALT WELL PUMP JUMPER INTERCONNECT CABLE enclosure.

5.3.41 SIMULATE a temperature ~~ABOVE the setpoints recorded in step 5.3.19.~~ of 160° F +/- 5.

5.3.42 RECORD the following:

- Simulated temperature from thermocouple simulator. \_\_\_\_\_
- JUMPER HEATER TEMP (TE-6003) as indicated by DTAM. \_\_\_\_\_  
Acceptable range (+ or -10 deg of simulated)

5.3.42.1 VERIFY "JUMPER HEAT TR ON" is displayed at DTAM.

5.3.42.2 VERIFY "JUMPER HEAT TRACE PROBLEM" (ALARM 8) is displayed at DTAM.

5.3.42.3 VERIFY 120 VAC power is NOT present across wire 10 BLK and wire 11 WHITE on the terminal strip located in the SALT WELL PUMP JUMPER INTERCONNECT CABLE enclosure.

5.3 ANALOG INPUT SIGNAL VERIFICATION AT OCS (Cont.)

5.3.43 REMOVE the thermocouple test source from the thermocouple input module.

5.3.44 RELAND the TE-6003A<sup>B mb</sup> (wire number 3) leads at the thermocouple input module.

5.3.45 REQUEST Test Director to VERIFY that section 5.3 is complete by signing below.

\_\_\_\_\_  
Test Director Signature

\_\_\_\_\_  
Date

5.3.46 REQUEST QC Inspector to VERIFY that section 5.3 is complete by signing below.

\_\_\_\_\_  
QC Inspector Signature

\_\_\_\_\_  
Date

5.4 DISCRETE SIGNAL INPUT VERIFICATION

5.4.1 PLACE the saltwell jumper JR-1 valve in the PROCESS position.

5.4.1.1 VERIFY jumper JR-1 PROCESS position at the OCS.

5.4.2 PLACE the saltwell jumper JR-1 valve in the FLUSH position.

5.4.2.1 VERIFY jumper JR-1 FLUSH position at the OCS.

5.4.3 PLACE the saltwell jumper JR-1 valve in the PRIME position.

5.4.3.1 VERIFY jumper JR-1 PRIME position at the OCS.

5.4.4 REQUEST Test Director to VERIFY that section 5.4 is complete by signing below.

\_\_\_\_\_  
Test Director Signature

\_\_\_\_\_  
Date

5.4.5 REQUEST QC Inspector to VERIFY that section 5.4 is complete by signing below.

\_\_\_\_\_  
QC Inspector Signature

\_\_\_\_\_  
Date

**5.5 MONITOR AND ALARM FUNCTION VERIFICATION AT OCS.**

- NOTE - When the alarm condition goes false (alarm condition NOT detected) and the alarm is acknowledged, the alarm clears.
- The method of forcing data is used to simulate inputs generated in the field. The technique involves accessing the data of the PLC wired directly to the field inputs and setting (forcing) a specific detectable condition (bit) or value (integer value representing an analog signal). The monitor and control system then is responsible for producing the desired monitor and control action.

5.5.1 SET the SGT Manometer to 13" w.g. +/- .25".

5.5.2 RECORD the Specific Gravity Reading as indicated at the OCS.  
Acceptable Range (13 ± .35) \_\_\_\_\_

5.5.3 RECORD the Specific Gravity Reading as indicated at the DTAM.  
Acceptable Range (13 ± .35) \_\_\_\_\_

5.5.4 VERIFY the SGT Saltwell LOW Level Alarm is functional by performing the following:

5.5.4.1 SLOWLY TURN DOWN the Specific Gravity manometer until the Specific Gravity Saltwell LOW Level Alarm Occurs at the DTAM.  
Acceptable Range (3.5"wg + or -1) \_\_\_\_\_

5.5.4.2 RECORD the Specific Gravity Reading as indicated at the DTAM.  
Acceptable Range (3.5"wg + or - 1) \_\_\_\_\_

5.5.4.3 RECORD the Specific Gravity Reading as indicated at the OCS.  
Acceptable Range (3.5"wg + or - 1) \_\_\_\_\_

**5.5 MONITOR AND ALARM FUNCTION VERIFICATION AT OCS (Cont.)**

- 5.5.5      **VERIFY** that the Specific Gravity Low Alarm (Saltwell LOW Level) is displayed at the OCS.
  
- 5.5.6      **ACKNOWLEDGE** the Specific Gravity Low Alarm (Saltwell LOW Level) at the OCS.
  
- 5.5.7      **SLOWLY TURN UP** the Specific Gravity manometer to 10"wg. Acceptable Range (10"wg + or -1) \_\_\_\_\_
  
- 5.5.8      **RECORD** the Specific Gravity Reading as indicated at the DTAM. Acceptable Range (10"wg + or - 1) \_\_\_\_\_
  
- 5.5.9      **RECORD** the Specific Gravity Reading as indicated at the OCS. Acceptable Range (10"wg + or - 1) \_\_\_\_\_
  
- 5.5.10     **VERIFY** that the Specific Gravity Low Alarm (Saltwell LOW Level) clears at the OCS.
  
- 5.5.11     **CONNECT** manometer to ~~±~~ test ports.   
*LEVEL TRANSMITTER TWA*
  
- 5.5.12     **SET** the Level Transmitter Manometer to 25" w.g. +/- .25".
  
- 5.5.13     **RECORD** the Water Tank Level Reading as indicated at the OCS. Acceptable Range (25 + or - .1) \_\_\_\_\_
  
- 5.5.14     **RECORD** the Water Tank Level Reading as indicated at the DTAM. Acceptable Range (25 + or - .1) \_\_\_\_\_

**5.5 MONITOR AND ALARM FUNCTION VERIFICATION AT OCS (Cont.)**

5.5.15 **VERIFY** the Water Tank Low Level Alarm is functional by performing the following:

5.5.15.1 **SLOWLY TURN DOWN** the Water Tank Level manometer until the Water Tank Low Level Alarm Occurs at the DTAM.  
Acceptable Range (10"wg + or -1) \_\_\_\_\_

5.5.15.2 **RECORD** the Water Tank Level as indicated at the DTAM.  
Acceptable Range (10"wg + or - 1) \_\_\_\_\_

5.5.15.3 **RECORD** the Water Tank Level as indicated at the OCS.  
Acceptable Range (10"wg + or - 1) \_\_\_\_\_

5.5.16 **VERIFY** that the Water Tank Low Level Alarm is displayed at the OCS.

5.5.17 **ACKNOWLEDGE** the Water Tank Low Level Alarm at the OCS.

5.5.17.1 **SLOWLY TURN UP** the Water Tank Level manometer to 12"wg.  
Acceptable Range (12"wg + or -1) \_\_\_\_\_

5.5.17.2 **RECORD** the Water Tank Level as indicated at the DTAM.  
Acceptable Range (12"wg + or - 1) \_\_\_\_\_

5.5.17.3 **RECORD** the Water Tank Level as indicated at the OCS.  
Acceptable Range (12"wg + or - 1) \_\_\_\_\_

5.5.18 **VERIFY** that the Water Tank Low Level Alarm clears at the OCS.

**5.5 MONITOR AND ALARM FUNCTION VERIFICATION AT OCS (Cont.)**

- 5.5.19 REMOVE Thermocouple leads for TE-6004 from the thermocouple input module in the instrument enclosure.
- 5.5.20 INSTALL a type T Thermocouple Test Source at the terminals where TE-6004 was previously landed.
- 5.5.21 VERIFY the PLC Enclosure High Temperature Alarm is functional by performing the following:
  - 5.5.21.1 SLOWLY INCREASE the simulated PLC Enclosure Temperature until the High Temperature Alarm Occurs at the DTAM.  
Acceptable Range (125° F + or -2) \_\_\_\_\_
  - 5.5.21.2 RECORD the PLC Enclosure Temperature as indicated at the DTAM.  
Acceptable Range (125° F + or -5) \_\_\_\_\_
  - 5.5.21.3 RECORD the PLC Enclosure Temperature as indicated at the OCS.  
Acceptable Range (125° F + or -5) \_\_\_\_\_
- 5.5.22 VERIFY that the High Temperature Alarm is displayed at the OCS.
- 5.5.23 ACKNOWLEDGE the High Temperature Alarm at the OCS. 
  - 5.5.23.1 SLOWLY DECREASE the simulated PLC Enclosure Temperature to 115° F.  
Acceptable Range (115° F + or -2) \_\_\_\_\_
  - 5.5.23.2 RECORD the PLC Enclosure Temperature as indicated at the DTAM.  
Acceptable Range (115° F + or -5) \_\_\_\_\_
  - 5.5.23.3 RECORD the PLC Enclosure Temperature as indicated at the OCS.  
Acceptable Range (115° F + or -5) \_\_\_\_\_

**5.5 MONITOR AND ALARM FUNCTION VERIFICATION AT OCS (Cont.)**

- 5.5.24 **VERIFY** that the PLC Enclosure High Temperature Alarm clears at the OCS.
- 5.5.25 **REMOVE** Thermocouple Test Source.
- 5.5.26 **RELAND** thermocouple leads for thermocouple TE-6004 to the thermocouple input module in the PLC enclosure.
- 5.5.27 **REMOVE** Thermocouple leads for TE-6001 from the thermocouple input module in the PLC enclosure.
- 5.5.28 **INSTALL** a type T Thermocouple Test Source at the terminal where TE-6001 was previously landed.
- 5.5.29 **VERIFY** the Air Compressor Enclosure High Temperature Alarm is functional by performing the following: 
  - 5.5.29.1 **SLOWLY INCREASE** the simulated Air Compressor Enclosure Temperature until the High Temperature Alarm Occurs at the DTAM.  
Acceptable Range (125° F + or -2) \_\_\_\_\_
  - 5.5.29.2 **RECORD** the Air Compressor Enclosure Temperature as indicated at the DTAM.  
Acceptable Range (125° F + or -5) \_\_\_\_\_
  - 5.5.29.3 **RECORD** the Air Compressor Enclosure Temperature as indicated at the OCS.  
Acceptable Range (125° F + or -5) \_\_\_\_\_
- 5.5.30 **VERIFY** that the High Temperature Alarm is displayed at the OCS.

**5.5 MONITOR AND ALARM FUNCTION VERIFICATION AT OCS (Cont.)**

5.5.31 **ACKNOWLEDGE** the High Temperature Alarm at the OCS.

5.5.31.1 **SLOWLY DECREASE** the simulated Air Comp Enclosure Temperature to 115° F.  
Acceptable Range (115° F + or -2) \_\_\_\_\_

5.5.31.2 **RECORD** the Air Comp Enclosure Temperature as indicated at the DTAM.  
Acceptable Range (115° F + or -5) \_\_\_\_\_

5.5.31.3 **RECORD** the Air Comp Enclosure Temperature as indicated at the OCS.  
Acceptable Range (115° F + or -5) \_\_\_\_\_

5.5.32 **VERIFY** that the Air Comp Enclosure High Temperature Alarm clears at the OCS.

5.5.33 **REMOVE** Thermocouple Test Source.

5.5.34 **RELAND** thermocouple leads for thermocouple TE-6001 to the thermocouple input module in the Air Comp enclosure.

5.5.35 **FORCE** input I:4/2 from 1 to 0.

5.5.36 **VERIFY** PS-1 Low Pressure Alarm at the OCS and DTAM.

**5.5 MONITOR AND ALARM FUNCTION VERIFICATION AT OCS (Cont.)**

- 5.5.37 ACKNOWLEDGE PS-1 Low Pressure Alarm at the OCS and DTAM
- 5.5.38 FORCE input I:4/2 from 0 to 1.
- 5.5.39 VERIFY PS-1 Low Pressure Alarm clears at OCS.
- 5.5.40 FORCE input I:4/3 from 1 to 0.
- 5.5.41 VERIFY PS-1-1 High Pressure Alarm at the OCS and DTAM.

**5.5 MONITOR AND ALARM FUNCTION VERIFICATION AT OCS (Cont.)**

- 5.5.42 ACKNOWLEDGE PS-1-1 High Pressure Alarm at the OCS and DTAM.
- 5.5.43 FORCE input I:4/3 from 0 to 1.
- 5.5.44 VERIFY PS-1-1 High Pressure Alarm clears at OCS and DTAM.
- 5.5.45 FORCE input I:4/4 from 1 to 0.
- 5.5.46 VERIFY PS-2 High Pressure Alarm at the OCS and DTAM.
- 5.5.47 ACKNOWLEDGE PS-2 High Pressure Alarm at the OCS and DTAM.
- 5.5.48 FORCE input I:4/4 from 0 to 1.
- 5.5.49 VERIFY PS-2 High Pressure Alarm clears at OCS and DTAM.
- 5.5.50 FORCE input I:5/0 from 0 to 1.
- 5.5.51 VERIFY Jet Pump Trouble Alarm at the OCS and DTAM.
- 5.5.52 ACKNOWLEDGE Jet Pump Trouble Alarm at the OCS and DTAM.
- 5.5.53 FORCE input I:5/0 from 1 to 0.

**5.5 MONITOR AND ALARM FUNCTION VERIFICATION AT OCS (Cont.)**

- 5.5.54 VERIFY Jet Pump Trouble Alarm clears at OCS and DTAM.
- 5.5.55 FORCE input I:4/1 from 0 to 1.
- 5.5.56 VERIFY JR-1 Flush Position Alarm at the OCS and DTAM.
- 5.5.57 ACKNOWLEDGE JR-1 Flush Position Alarm at the OCS and DTAM.
- 5.5.58 FORCE input I:4/1 from 1 to 0.
- 5.5.59 INPUT I: 4/0 from 0 to 1.
- 5.5.60 VERIFY JR-1 Flush Position Alarm clears at OCS and DTAM
- 5.5.61 INPUT I:5/1 from 1 to 0.
- 5.5.62 VERIFY Pump Pit Leak Alarm at the OCS and DTAM.
- 5.5.63 ACKNOWLEDGE Pump Pit Leak Alarm at the OCS and DTAM.
- 5.5.64 FORCE input I:5/1 from 0 to 1.
- 5.5.65 VERIFY Pump Pit Leak Alarm clears at OCS and DTAM.

**5.5 MONITOR AND ALARM FUNCTION VERIFICATION AT OCS (Cont.)**

- 5.5.66 FORCE input I:5/2 from 1 to 0.
- 5.5.67 VERIFY Pump Pit Leak Detector Trouble Alarm at the OCS and DTAM.
- 5.5.68 ACKNOWLEDGE Pump Pit Leak Detector Trouble Alarm at the OCS and DTAM.
- 5.5.69 FORCE input I:5/2 from 0 to 1.
- 5.5.70 VERIFY Pump Pit Leak Detector Trouble Alarm clears at OCS and DTAM.
- 5.5.71 FORCE input "Jumper Heat Trace Trouble Alarm" to Alarm State.
- 5.5.72 VERIFY Jumper Heat Trace Trouble Alarm at the OCS and DTAM.
- 5.5.73 ACKNOWLEDGE Jumper Heat Trace Trouble Alarm at the OCS and DTAM.
- 5.5.74 FORCE input "Jumper Heat Trace Trouble Alarm" to No Alarm State.
- 5.5.75 VERIFY Jumper Heat Trace Trouble Alarm clears at OCS and DTAM.
- 5.5.76 FORCE input I:5/0 from 1 to 0.

**5.5 MONITOR AND ALARM FUNCTION VERIFICATION AT OCS (Cont.)**

- 5.5.77 VERIFY Jet Pump Shutdown Alarm at the OCS and DTAM.
- 5.5.78 ACKNOWLEDGE Jet Pump Shutdown Alarm at the OCS and DTAM.
- 5.5.79 FORCE input I:5/0 from 0 to 1.
- 5.5.80 VERIFY Jet Pump Shutdown Alarm clears at OCS and DTAM.
- 5.5.81 FORCE input I:5/1 from 0 to 1.
- 5.5.82 VERIFY Pump Pit Leak Detector Test Failure Alarm at the OCS and DTAM.
- 5.5.83 ACKNOWLEDGE Pump Pit Leak Detector Test Failure Alarm at the OCS and DTAM.
- 5.5.84 FORCE input I:5/1 from 1 to 0.
- 5.5.85 VERIFY Pump Pit Leak Detector Test Failure Alarm clears at OCS and DTAM.
- 5.5.86 FORCE input "Data Communications Failure Alarm" to Alarm State.
- 5.5.87 VERIFY Data Communications Failure Alarm at the OCS and DTAM.
- 5.5.88 ACKNOWLEDGE Data Communications Failure Alarm at the OCS and DTAM.

**5.5 MONITOR AND ALARM FUNCTION VERIFICATION AT OCS (Cont.)**

- 5.5.89 FORCE input "Data Communications Failure Alarm" to No Alarm State.
- 5.5.90 VERIFY Data Communications Failure Alarm clears at OCS and DTAM.
- 5.5.91 FORCE input "Valve Pit C Leak Alarm" to Alarm State.
- 5.5.92 VERIFY Valve Pit C Leak Alarm at the OCS and DTAM.
- 5.5.93 ACKNOWLEDGE Valve Pit C Leak Alarm at the OCS and DTAM.
- 5.5.94 FORCE input "Valve Pit C Leak Alarm" to No Alarm State.
- 5.5.95 VERIFY Valve Pit c Leak Alarm at the OCS and DTAM.
- 5.5.96 FORCE input "Valve Pit D Alarm" to Alarm State.
- 5.5.97 VERIFY Valve Pit D Leak Alarm at the OCS and DTAM.
- 5.5.98 ACKNOWLEDGE Valve Pit D Leak Alarm at the OCS and DTAM.
- 5.5.99 FORCE input "Valve Pit D Alarm" to No Alarm State.

**5.5 MONITOR AND ALARM FUNCTION VERIFICATION AT OCS (Cont.)**

5.5.100 VERIFY Valve Pit D Leak Alarm clears at OCS and DTAM.

5.5.101 REQUEST Test Director to VERIFY that section 5.5 is complete by signing below.

\_\_\_\_\_  
Test Director Signature

\_\_\_\_\_  
Date

5.5.102 REQUEST QC Inspector to VERIFY that section 5.5 is complete by signing below.

\_\_\_\_\_  
QC Inspector Signature

\_\_\_\_\_  
Date

**5.6 REMOTE (OCS) SET POINT CHANGE**

5.6.1 SET the Specific Gravity Setpoint to 8" wg from the OCS.

5.6.2 VERIFY that the Specific Gravity Setpoint is 8" wg at PICS SALW-6001B PLC and at DTAM.

5.6.3 REQUEST Test Director to VERIFY that section 5.6 is complete by signing below.

\_\_\_\_\_  
Test Director Signature

\_\_\_\_\_  
Date

5.6.4 REQUEST QC Inspector to VERIFY that section 5.6 is complete by signing below.

\_\_\_\_\_  
QC Inspector Signature

\_\_\_\_\_  
Date

**5.7 DOV AUTOMATIC AND MANUAL OPERATION**

5.7.1 **ENSURE** the Saltwell Jumper and PICS is configured for Automatic DOV level control by **PERFORMING** the following (Refer to Figures 3 and 4):

- 5.7.1.1 **SET** the SGT Manometer to 0" w.g.
- 5.7.1.2 **ENSURE** the DTAM is configured for automatic control
- 5.7.1.3 **PLACE** the saltwell jumper JR-1 valve in the **PROCESS** position
- 5.7.1.4 **ENSURE** Pump recirculation apparatus is filled with water and configured to circulate water through the saltwell Jetpump
- 5.7.1.5 **USE** the DTAM to **START** the Jetpump

**NOTE -** This system is A Proportional, Integral, Derivative (PID) controller for controlling the liquid level in the saltwell screen. The system uses the signal from the SGT as the Process Variable. The SGT reads unadjusted liquid level once the middle diptube leg is uncovered by declining liquid levels. The controller compares the process variable to the setpoint and adjusts the DOV position accordingly (manipulated variable).

- The purpose of this test section is to verify that the DOV trend is toward achieving the setpoint while different process variables are simulated.

- 5.7.1.6 **PLACE** DOV in **AUTO VERIFY** at OCS.
- 5.7.1.7 **SET** the SGT Manometer to 20" w.g.
- 5.7.1.8 **VERIFY** that the DOV moves to a more open position.

**5.7 DOV AUTOMATIC AND MANUAL OPERATION (Cont.)**

5.7.1.9 TURN the SGT Manometer down to 4" w.g.

5.7.1.10 VERIFY that the DOV moves to a more closed position

**5.7.2 ENSURE that the Saltwell Low Level Alarm is functional  
PERFORM the following steps:**

5.7.2.1 SET the SGT Manometer to 15" w.g.

5.7.2.2 VERIFY that the DOV is NOT fully closed. DOV should be OPEN somewhat to try to achieve the setpoint.

5.7.2.3 VERY SLOWLY TURN down the SGT Manometer.

5.7.2.4 WHEN the Saltwell Low Level (Saltwell LOW Level) alarm is received (alarm 13 at DTAM) RECORD the following:

- SGT MANOMETER READING  
Acceptable Range (3.5" + or -1") \_\_\_\_\_
- DOV POSITION (% OPEN)  
Acceptable Range (DOV FULL CLOSED) \_\_\_\_\_
- Pressure Reading from SALW-PI-6005A  
located in WFIE  
Acceptable Range (3 psi + or - 1) \_\_\_\_\_

5.7.2.5 VERIFY that the DTAM has received Alarm(13) Saltwell Low Level (Saltwell LOW Level).

**5.7 DOV AUTOMATIC AND MANUAL OPERATION (Cont.)**

**5.7.3 ENSURE** that the MANUAL CONTROL of the DOV is operational by performing the following steps:

5.7.3.1 SET the SGT Manometer to 15" w.g.

5.7.3.2 ENSURE the DTAM is configured for MANUAL CONTROL.

5.7.3.3 VERIFY OCS reflects MANUAL CONTROL.

5.7.3.4 SET the DOV to 0% Open using the manual control on the DTAM.

5.7.3.5 RECORD the following:

- DOV POSITION (% OPEN) \_\_\_\_\_  
Acceptable Range (DOV FULL CLOSED)
- Pressure Reading from SALW-PI-6005A located in WFIE  
Acceptable Range (3 psi + or - 1)

5.7.3.6 SET the DOV to 25% Open using the manual control on the DTAM.

5.7.3.6.1 VERIFY setting at OCS.

5.7.3.7 RECORD the following:

- DOV POSITION (% OPEN) \_\_\_\_\_  
Acceptable Range (25% + or -10)
- Pressure Reading from SALW-PI-6005A located in WFIE  
Acceptable Range (6 psi + or - 1)

5.7.3.8 SET the DOV to 75% Open using the manual control on the DTAM.

5.7.3.8.1 VERIFY setting at OCS.

**5.7 DOV AUTOMATIC AND MANUAL OPERATION (Cont.)**

5.7.3.9 RECORD the following:

- DOV POSITION (% OPEN)  
Acceptable Range (75% + or -10) \_\_\_\_\_
- Pressure Reading from SALW-PI-6005A  
located in WFIE  
Acceptable Range (12 psi + or - 1) \_\_\_\_\_

5.7.3.10 SET the DOV to 100% Open using the manual control on the DTAM.

5.7.3.11 RECORD the following:

- DOV POSITION (% OPEN)  
Acceptable Range (100% + or -10) \_\_\_\_\_
- Pressure Reading from SALW-PI-6005A  
located in WFIE  
Acceptable Range (15 psi + or - 1) \_\_\_\_\_

5.7.3.12 VERY SLOWLY TURN down the SGT Manometer while OBSERVING the DOV.

5.7.3.13 VERIFY that DOV remains FULL OPEN while the SGT Manometer is turned down until the Saltwell Low Level Alarm is received. Once the alarm is received the DOV should immediately fall closed.

5.7.4 USE the DTAM to STOP the Jetpump.

5.7.4.1 VERIFY Jetpump shutdown at OCS.

NOTE - Leave the SGT manometer attached. It will be necessary in the next test section.

5.7.5 REQUEST Test Director to VERIFY that section 5.7 is complete by signing below.

\_\_\_\_\_  
Test Director Signature

\_\_\_\_\_  
Date

5.7.6 REQUEST QC Inspector to VERIFY that section 5.7 is complete by signing below.

\_\_\_\_\_  
QC Inspector Signature

\_\_\_\_\_  
Date

**5.8 JETPUMP FLOWMETER OPERATION**

5.8.1 ENSURE that the Saltwell Jumper Flow Element is communicating properly with the Constant Velocity Transmitter in the WFIE and DTAM by performing the following:

5.8.1.1 ENSURE Pump recirculation apparatus is filled with water and configured to circulate water through the saltwell Jetpump.

5.8.1.2 PLACE the saltwell jumper JR-1 valve in the PROCESS position.

5.8.1.3 ENSURE test manometer is still attached to the SGT and set to 15" w.g.

5.8.1.4 ENSURE a (rotameter) has been installed in series with the jumper flow element as part of the Jumper Test Assembly (see Figures 3 and 4).

5.8.1.5 ENSURE DTAM and OCS is configured for MANUAL CONTROL.

5.8.1.6 SET the DOV to 0% Open using the manual control on the DTAM and OCS.

5.8.1.7 ENSURE Jetpump Jumper Valve JR-2 is CLOSED.

5.8.1.8 USE the DTAM to START the Jetpump

5.8.1.8.1 VERIFY START-UP at OCS.

5.8.1.9 USE the OCS manual DOV control to OBTAIN a flowrate of approximately 1 GPM through the jumper as indicated by the test flowmeter.

5.8 JETPUMP FLOWMETER OPERATION (Cont.)

5.8.1.10 RECORD the following:

- Manual control value of DOV Position. In Percentage as indicated by DTAM. VERIFY at OCS \_\_\_\_\_
- DOV POSITION (% OPEN). \_\_\_\_\_
- Test Flowmeter Reading in GPM. \_\_\_\_\_
- Brooks CRE reading SALW-FQIT-6001A in the WFIE in GPM. (multiply percent of full scale times 4 GPM to get GPM). \_\_\_\_\_
- FQIT Flowrate as indicated by DTAM in GPM. \_\_\_\_\_
- FQIT Flowrate as indicated by OCS in GPM. \_\_\_\_\_
- VERIFY that Test Flowmeter reading and Books CRE reading are within + or - .4 GPM.
- VERIFY that FQIT reading as indicated by DTAM and Books CRE on OCS reading are within + or - .4 GPM.

5.8.1.11 USE the OCS manual DOV control to OBTAIN a flowrate of approximately 2.5 GPM through the jumper as indicated by the test flowmeter.

5.8 JETPUMP FLOWMETER OPERATION (Cont.)

5.8.1.12 RECORD the following:

- Manual control value of DOV Position. In Percentage as indicated by DTAM and OCS. \_\_\_\_\_
- DOV POSITION (% OPEN). \_\_\_\_\_
- Test Flowmeter Reading in GPM. \_\_\_\_\_
- Brooks CRE reading SALW-FQIT-6001A in the WFIE in GPM. (multiply percent of full scale times 4 GPM to get GPM). \_\_\_\_\_
- FQIT Flowrate as indicated by DTAM and OCS in GPM. \_\_\_\_\_
- VERIFY that Test Flowmeter reading and Books CRE reading are within + or - .4 GPM
- VERIFY that FQIT reading as indicated by DTAM, OCS and Books CRE reading are within + or - .4 GPM

5.8.1.13 USE the manual DOV control at OCS and DTAM to OBTAIN a flowrate of approximately 3.0 GPM through the jumper as indicated by the test flowmeter

5.8 JETPUMP FLOWMETER OPERATION (Cont.)

5.8.1.14 RECORD the following:

- Manual control value of DOV Position. In Percentage as indicated by DTAM and OCS. \_\_\_\_\_
- DOV POSITION (% OPEN). \_\_\_\_\_
- Test Flowmeter Reading in GPM. \_\_\_\_\_
- Brooks CRE reading SALW-FQIT-6001A in the WFIE in GPM. (multiply percent of full scale times 4 GPM to get GPM). \_\_\_\_\_
- FQIT Flowrate as indicated by DTAM and OCS in GPM. \_\_\_\_\_
- VERIFY that Test Flowmeter reading and Books CRE reading are within + or - .4 GPM.
- VERIFY that FQIT reading as indicated by DTAM and OCS and Books CRE reading are within + or - .4 GPM.

5.8.1.15 USE the manual DOV control at DTAM and OCS to CLOSE the DOV.

5.5.1.16 RECORD the following:

- Manual control value of DOV Position. In Percentage as indicated by DTAM and OCS. \_\_\_\_\_
- DOV POSITION (% OPEN). \_\_\_\_\_
- Test Flowmeter Reading in GPM. \_\_\_\_\_
- Brooks CRE reading SALW-FQIT-6001A in the WFIE in GPM. (multiply percent of full scale times 4 GPM to get GPM). \_\_\_\_\_
- FQIT Flowrate as indicated by DTAM and OCS in GPM. \_\_\_\_\_
- VERIFY that Test Flowmeter reading and Books CRE reading are within + or - .4 GPM
- VERIFY that FQIT reading as indicated by DTAM, OCS and Books CRE reading are within + or - .4 GPM

**5.8 JETPUMP FLOWMETER OPERATION (Cont.)**

5.8.2 REMOVE the manometer from the SGT and isolate the transmitter from the system by opening the equalization valve and closing the isolation valves on the SGT three valve manifold SALW-V-6035A.

5.8.3 USE the DTAM to STOP the Jetpump.

5.8.4 REQUEST Test Director to VERIFY that section 5.8 is complete by signing below.

\_\_\_\_\_  
Test Director Signature

\_\_\_\_\_  
Date

5.8.5 REQUEST QC Inspector to VERIFY that section 5.8 is complete by signing below.

\_\_\_\_\_  
QC Inspector Signature

\_\_\_\_\_  
Date

**5.9 REMOTE (OCS) LEAK DETECTOR TEST**

**WARNING**

Leak detector probes are energized. USE appropriate electrical safety precautions while performing this test section as described by WHC-CM-1-10, Safety Manual, WKS-15, Electrical Work Safety.

- 5.9.1 ENSURE Pump recirculation apparatus is filled with water and configured to circulate water through the saltwell Jetpump.
- 5.9.2 PLACE the saltwell jumper JR-1 valve in the PROCESS position.
- 5.9.3 ENSURE no alarms are present at the DTAM or OCS.
- 5.9.4 USE the DTAM to START the Jetpump.
- 5.9.4.1 VERIFY start at OCS.
- 5.9.5 FORCE a Leak Detector signal from the OCS.
- 5.9.5.1 VERIFY the leak detection light on the instrument cabinet "Primary Leak Detection" is activated.
- 5.9.5.2 VERIFY the instrument cabinet horn is activated.
- 5.9.5.3 VERIFY the instrument cabinet strobe is activated.

**5.9 REMOTE (OCS) LEAK DETECTOR TEST (Cont.)**

- 5.9.5.4 **VERIFY ALARM (6) PUMP PIT LEAK DETECTOR is present at the DTAM.**
- 5.9.5.5 **VERIFY Jetpump continues to run.**
- 5.9.5.6 **VERIFY the Leak Alarm at the OCS.**
- 5.9.5.7 **ACKNOWLEDGE the alarm at the OCS.**
- 5.9.5.8 **VERIFY the HORN is silenced and the STROBE is OFF.**
- 5.9.5.9 **ACKNOWLEDGE the alarm at DTAM.**
- 5.9.5.10 **VERIFY the Pump Pit Leak Alarm is acknowledged.**
- 5.9.6 **REMOVE Leak Detector Force at the OCS.**
- 5.9.6.1 **VERIFY the leak detection light on the instrument cabinet "Primary Leak Detection" is NOT activated.**
- 5.9.6.2 **VERIFY the instrument cabinet horn is NOT activated**

5.9 REMOTE (OCS) LEAK DETECTOR TEST (Cont.)

5.9.6.3 VERIFY the instrument cabinet strobe is NOT activated.

5.9.6.4 VERIFY ALARM (6) PUMP PIT LEAK DETECTOR is NOT present at the DTAM.

5.9.6.5 VERIFY that the Leak Alarm has clears at the OCS.

5.9.6.6 STOP Setpump WITH DTAM.

5.9.7 REQUEST Test Director to VERIFY that section 5.9 is complete by signing below.

\_\_\_\_\_  
Test Director Signature

\_\_\_\_\_  
Date

5.9.8 REQUEST QC Inspector to VERIFY that section 5.9 is complete by signing below.

\_\_\_\_\_  
QC Inspector Signature

\_\_\_\_\_  
Date

5.10 JET PUMP VALVING INTERLOCK

- 5.10.1 ENSURE Pump recirculation apparatus is filled with water and configured to circulate water through the saltwell Jetpump.
- 5.10.2 PLACE the saltwell jumper JR-1 valve in the PROCESS position.
- 5.10.3 ENSURE no alarms are present at the DTAM and OCS.
- 5.10.4 USE the DTAM to START the Jetpump.
- 5.10.4.1 VERIFY run at OCS.
- 5.10.5 PLACE the JR-1 Valve on the Jet Pump Jumper in the NOT PROCESS position.
- 5.10.6 VERIFY the following:
  - 5.10.6.1 VERIFY the Jet Pump shuts down instantaneously.
  - 5.10.6.2 VERIFY the Jet Pump can not be restarted at the power enclosure with JR-1 in the NOT PROCESS position.
  - 5.10.6.3 VERIFY ALARM (5) JR-1 in NOT PROCESS Position is received at DTAM and OCS.
  - 5.10.6.4 VERIFY ALARM (12) JET PUMP SHUTDOWN is received at the DTAM and OCS.
- 5.10.7 REQUEST Test Director to VERIFY that section 5.10 is complete by signing below.

\_\_\_\_\_  
Test Director Signature

\_\_\_\_\_  
Date

- 5.10.8 REQUEST QC Inspector to VERIFY that section 5.10 is complete by signing below.

\_\_\_\_\_  
QC Inspector Signature

\_\_\_\_\_  
Date

**5.11 JET PUMP SHUTDOWN HIGH PRESSURE TEST.**

- 5.11.1 PLACE the saltwell jumper JR-1 valve in the PROCESS position.
- 5.11.2 CONNECT a raw water supply to the Jumper Flush hose.
- 5.11.3 ENSURE Pump recirculation apparatus is filled with water and configured to circulate water through the saltwell Jetpump.
- 5.11.4 ENSURE no alarms are present at the DTAM and OCS.
- 5.11.5 ENSURE that the DOV valve is closed and will remain closed when Jet Pump starts.
- 5.11.6 USE the DTAM to START the Jetpump. 
  - 5.11.6.1 VERIFY start at OCS.
- 5.11.7 PRESSURIZE the Jumper Flush Hose line to actuate PS-2. 
  - 5.11.7.1 VERIFY the Jet Pump Shuts Down (OFF) immediately.
  - 5.11.7.2 VERIFY PS-2 actuates at DTAM and OCS.
- 5.11.8 REQUEST Test Director to VERIFY that section 5.11 is complete by signing below.

\_\_\_\_\_  
Test Director Signature

\_\_\_\_\_  
Date

- 5.11.9 REQUEST QC Inspector to VERIFY that section 5.11 is complete by signing below.

\_\_\_\_\_  
QC Inspector Signature

\_\_\_\_\_  
Date

**5.12 LEAK DETECTOR TEST VALVE PIT C**

- 5.12.1 ENSURE Pump recirculation apparatus is filled with water and configured to circulate water through the saltwell Jetpump.
- 5.12.2 PLACE the saltwell jumper JR-1 valve in the PROCESS position.
- 5.12.3 ENSURE no alarms are present at DTAM and OCS.
- 5.12.4 USE the DTAM to START the Jetpump.
- 5.12.4.1 VERIFY start at OCS.
- 5.12.5 PLACE the VPC leak detector in a bucket of water and ENSURE the following:
- 5.12.5.1 VERIFY the S110 Jet Pump remains RUNNING.
- 5.12.5.2 VERIFY the leak detection light on the instrument cabinet "Leak Detector 1" is activated.
- 5.12.5.3 VERIFY the instrument cabinet strobe is activated.

**5.12 LEAK DETECTOR TEST VALVE PIT C (Cont.)**

5.12.5.4 VERIFY ALARM "VALVE PIT C LEAK" is present at the DTAM.

5.12.5.5 VERIFY the Leak Alarm at the OCS.

5.12.6 ACKNOWLEDGE the alarm at the OCS.

5.12.6.1 VERIFY the STROBE is OFF.

5.12.6.2 VERIFY the Valve Pit C Leak Alarm is acknowledged.

5.12.7 REMOVE the leak detector from the pail of water and ENSURE the following:

5.12.7.1 RESET the alarm at the DTAM.

5.12.7.2 VERIFY the leak detection light in the instrument cabinet "Leak Detector 1" is NOT activated.

5.12.7.3 VERIFY the instrument cabinet horn is NOT activated

5.12 LEAK DETECTOR TEST VALVE PIT C (Cont.)

5.12.7.4 VERIFY the instrument cabinet strobe is NOT activated.

5.12.7.5 VERIFY ALARM VALVE PIT C LEAK is NOT present at the DTAM.

5.12.7.6 VERIFY that the Leak Alarm has clears at the OCS.

5.12.7.7 VERIFY the S110 Jet Pump has remained RUNNING.

5.12.7.8 USE the DTAM to STOP the Jet pump.

5.12.8 REQUEST Test Director to VERIFY that section 5.12 is complete by signing below.

\_\_\_\_\_  
Test Director Signature

\_\_\_\_\_  
Date

5.12.9 REQUEST QC Inspector to VERIFY that section 5.12 is complete by signing below.

\_\_\_\_\_  
QC Inspector Signature

\_\_\_\_\_  
Date

**5.13 LEAK DETECTOR TEST VALVE PIT D**

- 5.13.1 ENSURE Pump recirculation apparatus is filled with water and configured to circulate water through the saltwell Jetpump.
  
- 5.13.2 PLACE the saltwell jumper JR-1 valve in the PROCESS position.
  
- 5.13.3 ENSURE no alarms are present at DTAM and OCS.
  
- 5.13.4 USE the DTAM to START the Jetpump.

  - 5.13.4.1 VERIFY start at OCS.

- 5.13.5 PLACE the VPD leak detector in a bucket of water and ENSURE the following:

  - 5.13.5.1 VERIFY the Jet Pump Shuts Down (OFF) immediately.
  - 5.13.5.2 VERIFY the leak detection light on the instrument cabinet "Leak Detector 2" is activated.
  - 5.13.5.3 VERIFY the instrument cabinet horn is activated.
  - 5.13.5.4 VERIFY the instrument cabinet strobe is activated.

**5.13 LEAK DETECTOR TEST VALVE PIT D (Cont.)**

5.13.5.5 VERIFY ALARM VP D LEAK DETECTOR is present at the DTAM.

5.13.5.6 VERIFY ALARM (12) JET PUMP SHUTDOWN is present at the DTAM.

5.13.5.7 VERIFY the Jet Pump can not be restarted at DTAM or at MAIN SWITCH with the leak detector in alarm.

5.13.5.8 VERIFY the Leak Alarm at the OCS.

**5.13.6 ACKNOWLEDGE the alarm at the OCS.**

5.13.6.1 VERIFY the HORN is silenced and the STROBE REMAINS OFF.

5.13.6.2 VERIFY the VP D Leak Alarm is acknowledged.

**5.13.7 REMOVE the leak detector from the pail of water and ENSURE the following:**

5.13.7.1 RESET the alarm at the DTAM.

5.13.7.2 VERIFY the leak detection light in the instrument cabinet "Leak Detector 2" is NOT activated.

5.13.7.3 VERIFY the instrument cabinet horn is NOT activated

**5.13 LEAK DETECTOR TEST VALVE PIT D (Cont.)**

5.13.7.4 **VERIFY** the instrument cabinet strobe is NOT activated.

5.13.7.5 **VERIFY** ALARM "VALVE PIT D LEAK" is NOT present at the DTAM.

5.13.7.6 **VERIFY** that the Leak Alarm has clears at the OCS.

5.13.7.7 **VERIFY** ALARM (12) JET PUMP SHUTDOWN is present at the DTAM.

5.13.7.8 **VERIFY** JET PUMP SHUTDOWN ALARM is present at the OCS.

5.13.7.9 **ACKNOWLEDGE** JET PUMP SHUTDOWN ALARM at the OCS and DTAM.

5.13.7.10 **VERIFY** the Jet Pump can be restarted at the DTAM.

5.13.7.11 **SHUT DOWN (OFF)** the Jet Pump at the DTAM.

5.13.8 **REQUEST** Test Director to **VERIFY** that section 5.13 is complete by signing below.

\_\_\_\_\_  
Test Director Signature

\_\_\_\_\_  
Date

5.13.9 **REQUEST** QC Inspector to **VERIFY** that section 5.13 is complete by signing below.

\_\_\_\_\_  
QC Inspector Signature

\_\_\_\_\_  
Date

**5.14 REMOTE (OCS) JET PUMP SHUTDOWN**

- 5.14.1 PLACE the saltwell jumper JR-1 valve in the PROCESS position.
- 5.14.2 ENSURE Pump recirculation apparatus is filled with water and configured to circulate water through the saltwell Jetpump.
- 5.14.3 ENSURE no alarms are present at the DTAM and OCS.
- 5.14.4 USE the DTAM to START the Jetpump.
- 5.14.4.1 VERIFY start at OCS.
- 5.14.5 SHUTDOWN (OFF) the jetpump at the OCS.
- 5.14.6 VERIFY the Jet Pump Shutdown Alarm at the OCS.
- 5.14.7 ACKNOWLEDGE the Jet Pump Shutdown Alarm at the OCS.
- 5.14.8 VERIFY that the Jet Pump Shutdown Alarm clears at OCS and DTAM.

5.14 REMOTE (OCS) JET PUMP SHUTDOWN (Cont.)

5.14.9 REQUEST Test Director to VERIFY that section 5.14 is complete by signing below.

\_\_\_\_\_  
Test Director Signature

\_\_\_\_\_  
Date

5.14.10 REQUEST QC Inspector to VERIFY that section 5.14 is complete by signing below.

\_\_\_\_\_  
QC Inspector Signature

\_\_\_\_\_  
Date

**5.15 PICS SALW-6001B PLC/242S PLC JET PUMP SHUTDOWN**

5.15.1 **INSTALL** a shorting jumper with on-off switch in series with each of the following 242S PLC inputs listed below (Allen Bradley 1746-I012 I/O module). The PLC is located in the 242S Relay Cabinet.

- IN 0 (Catch Tank Weight Factor High ANN-2-4A)
- IN 1 (Pump Pit Leak ANN-4-3A)
- IN 2 (Sump Weight Factor High ANN-4-3A)
- IN 3 (Annulus Radiation High ANN-5-6A)
- IN 4 (K-MS-1 Master Shutdown Relay Status)

5.15.2 **PLACE** the shorting jumpers on-off switches in the ON position and **ACKNOWLEDGE** and **RESET** all alarms.

5.15.3 **ACKNOWLEDGE** and **RESET** all alarms at the OCS and DTAM as required to clear alarms.

5.15.4 **PLACE** the saltwell jumper JR-1 valve in the **PROCESS** position.

5.15.5 **ENSURE** Pump recirculation apparatus is filled with water and configured to circulate water through the saltwell Jetpump.

5.15.6 **ENSURE** that there are no Alarms at the DTAM or the OCS.

5.15.7 **USE** the DTAM to **START** the Jet Pump.

5.15.7.1 **VERIFY** start at OCS.

5.15.8 **SIMULATE** a 244S Catch Tank Weight Factor High signal (ANN-2-4A) by switching the ON-OFF switch in the shorting jumper connected to point IN 0 (Allen Bradley 1746 I012 module) to the OFF position.

**5.15 PICS SALW-6001B PLC/242S PLC JET PUMP SHUTDOWN (Cont.)**

- 5.15.9 VERIFY the Jet Pump Shutdown.
- 5.15.10 VERIFY the Jet Pump Shutdown Alarm at the OCS.
- 5.15.11 ACKNOWLEDGE the Jet Pump Shutdown Alarm at the OCS.
- 5.15.12 VERIFY the Jet Pump Shutdown Alarm is ACKNOWLEDGED at the OCS.
- 5.15.13 PLACE the switch of the shorting jumper connected to IN 0 to the ON position.
- 5.15.14 ACKNOWLEDGE and RESET all alarms at the OCS and DTAM as required to clear alarms.
- 5.15.15 ENSURE Pump recirculation apparatus is filled with water and configured to circulate water through the saltwell Jetpump.
- 5.15.16 PLACE the saltwell jumper JR-1 valve in the PROCESS position.
- 5.15.17 ENSURE that there are no Alarms at the DTAM or the OCS.
- 5.15.18 USE the DTAM to START the Jet Pump.
- 5.15.18.1 VERIFY start at OCS.
- 5.15.19 SIMULATE a 244S Pump Pit Leak signal (ANN-4-2A) by switching the ON-OFF switch in the shorting jumper connected to point IN 1 (Allen Bradley 1746 I012 module) to the OFF position.

**5.15 PICS SALW-6001B PLC/242S PLC JET PUMP SHUTDOWN (Cont.)**

- 5.15.20 VERIFY the Jet Pump Shutdown.
- 5.15.21 VERIFY the Jet Pump Shutdown Alarm at the OCS.
- 5.15.22 ACKNOWLEDGE the Jet Pump Shutdown Alarm at the OCS.
- 5.15.23 VERIFY the Jet Pump Shutdown Alarm is ACKNOWLEDGED at the OCS.
- 5.15.24 PLACE the switch of the shorting jumper connected to IN 1 to the ON position.
- 5.15.25 ACKNOWLEDGE and RESET all alarms at the OCS and DTAM as required to clear alarms.
- 5.15.26 ENSURE Pump recirculation apparatus is filled with water and configured to circulate water through the saltwell Jetpump.
- 5.15.27 PLACE the saltwell jumper JR-1 valve in the PROCESS position.
- 5.15.28 ENSURE that there are no Alarms at the DTAM or the OCS.
- 5.15.29 USE the DTAM to START the Jet Pump.
- 5.15.29.1 VERIFY start at OCS.
- 5.15.30 SIMULATE a 244S Sump Weight Factor High signal (ANN-4-3A) by switching the ON-OFF switch in the shorting jumper connected to point IN 2 (Allen Bradley 1746 IO12 module) to the OFF position.

5.15 PICS SALW-6001B PLC/242S PLC JET PUMP SHUTDOWN (Cont.)

- 5.15.31 VERIFY the Jet Pump Shutdown.
- 5.15.32 VERIFY the Jet Pump Shutdown Alarm at the OCS.
- 5.15.33 ACKNOWLEDGE the Jet Pump Shutdown Alarm at the OCS.
- 5.15.34 VERIFY the Jet Pump Shutdown Alarm is ACKNOWLEDGED at the OCS.
- 5.15.35 PLACE the switch of the shorting jumper connected to IN 2 to the ON position.
- 5.15.36 ACKNOWLEDGE and RESET all alarms at the OCS and DTAM as required to clear alarms.
- 5.15.37 ENSURE Pump recirculation apparatus is filled with water and configured to circulate water through the saltwell Jetpump.
- 5.15.38 PLACE the saltwell jumper JR-1 valve in the PROCESS position.
- 5.15.39 ENSURE that there are no Alarms at the DTAM or the OCS.
- 5.15.40 USE the DTAM to START the Jet Pump.
- 5.15.40.1 VERIFY start at OCS.
- 5.15.41 SIMULATE a 244S Annulus <sup>Radiation</sup> ~~Height Factor~~ High signal (ANN-5-6A) by switching the ON-OFF switch in the shorting jumper connected to point IN 3 (Allen Bradley 1746 IO12 module) to the OFF position.

**5.15 PICS SALW-6001B PLC/242S PLC JET PUMP SHUTDOWN (Cont.)**

- 5.15.42 VERIFY the Jet Pump Shutdown.
- 5.15.43 VERIFY the Jet Pump Shutdown Alarm at the OCS.
- 5.15.44 ACKNOWLEDGE the Jet Pump Shutdown Alarm at the OCS.
- 5.15.45 VERIFY the Jet Pump Shutdown Alarm is ACKNOWLEDGED at the OCS.
- 5.15.46 PLACE the switch of the shorting jumper connected to IN 3 to the ON position.
- 5.15.47 ACKNOWLEDGE and RESET all alarms at the OCS and DTAM as required to clear alarms.
- 5.15.48 ENSURE Pump recirculation apparatus is filled with water and configured to circulate water through the saltwell Jetpump.
- 5.15.49 PLACE the saltwell jumper JR-1 valve in the PROCESS position.
- 5.15.50 ENSURE that there are no Alarms at the DTAM or the OCS.
- 5.15.51 USE the DTAM to START the Jet Pump.
- 5.15.51.1 VERIFY start at OCS.
- 5.15.52 SIMULATE a 244S Master Shutdown Relay signal by switching the ON-OFF switch in the shorting jumper connected to point IN 4 (Allen Bradley 1746 I012 module) to the OFF position.

5.15 PICS SALW-6001B PLC/242S PLC JET PUMP SHUTDOWN (Cont.)

5.15.53 VERIFY the Jet Pump Shutdown.

5.15.54 VERIFY the Jet Pump Shutdown Alarm at the OCS.

5.15.55 ACKNOWLEDGE the Jet Pump Shutdown Alarm at the OCS.

5.15.56 VERIFY the Jet Pump Shutdown Alarm is ACKNOWLEDGED at the OCS.

5.15.57 PLACE the switch of the shorting jumper connected to IN 4 to the ON position.

5.15.58 ACKNOWLEDGE and RESET all alarms at the OCS and DTAM as required to clear alarms.

*na* 5.15.59 REMOVE electrical test jumpers and return wiring to normal operating condition.

*na* 5.15.5960 REQUEST Test Director to VERIFY that section 5.15 is complete by signing below.

\_\_\_\_\_  
Test Director Signature

\_\_\_\_\_  
Date

*na* 5.15.60 REQUEST QC Inspector to VERIFY that section 5.15 is complete by signing below.

\_\_\_\_\_  
QC Inspector Signature

\_\_\_\_\_  
Date

**5.16 GENERAL 241S SALTWELL ALARM INPUT TO CASS.**

NOTE - This alarm can be tested concurrent with test steps performed above.

5.16.1 **ACKNOWLEDGE** and **RESET** all alarms at the OCS and DTAM as required to clear alarms.

5.16.2 **ENSURE** Pump recirculation apparatus is filled with water and **CONFIGURED** to circulate water through the saltwell Jetpump.

5.16.3 **PLACE** the saltwell jumper JR-1 valve in the **PROCESS** position.

5.16.4 **ENSURE** no alarms are present at DTAM, OCS, and CASS.

5.16.5 **USE** the DTAM to **START** the Jetpump.

5.16.6 **SHUTDOWN** (OFF) the jetpump at the OCS.

5.16.7 **VERIFY** the Jet Pump Shutdown Alarm at the OCS.

5.16.8 **VERIFY** "241S General Saltwell Alarm" on CASS.

5.16.9 **ACKNOWLEDGE** the Jet Pump Shutdown Alarm at OCS and DTAM.

5.16.10 **VERIFY** that the Jet Pump Shutdown Alarm clears at OCS and CASS.

5.16 GENERAL 241S SALTWELL ALARM INPUT TO CASS (Cont.)

5.16.11 REQUEST Test Director to VERIFY that section 5.16 is complete by signing below.

\_\_\_\_\_  
Test Director Signature

\_\_\_\_\_  
Date

5.16.12 REQUEST QC Inspector to VERIFY that section 5.16 is complete by signing below.

\_\_\_\_\_  
QC Inspector Signature

\_\_\_\_\_  
Date

**5.17 JET PUMP SHUTDOWN LOW PRESSURE TEST.**

- 5.17.1 PLACE the saltwell jumper JR-1 valve in the PROCESS position.
  
- 5.17.2 ENSURE Pump recirculation apparatus is filled with water and configured to circulate water through the saltwell Jetpump.
  
- 5.17.3 ENSURE NO alarms are present at DTAM and OCS.
- 5.17.4 ENSURE that the DOV valve is CLOSED and will remain closed when Jet Pump starts.
  
- 5.17.5 USE the DTAM to START the Jetpump.
  
- 5.17.6 PLACE valve TV-7 in the CLOSED position.
  
- 5.17.6.1 VERIFY the Jet Pump Shuts Down (OFF) immediately.
  
- 5.17.7 REQUEST Test Director to VERIFY that section 5.15 is complete by signing below.

\_\_\_\_\_  
Test Director Signature

\_\_\_\_\_  
Date

- 5.17.8 REQUEST QC Inspector to VERIFY that section 5.15 is complete by signing below.

\_\_\_\_\_  
QC Inspector Signature

\_\_\_\_\_  
Date

**5.18 LEAK DETECTOR TROUBLE ALARM TEST**

- 5.18.1 PLACE the saltwell jumper JR-1 valve in the PROCESS position.
- 5.18.2 ENSURE Pump recirculation apparatus is filled with water and configured to circulate water through the saltwell Jetpump.
- 5.18.3 ENSURE no alarms are present at DTAM and OCS.
- 5.18.4 USE the DTAM to START the Jetpump.
- 5.18.5 UNPLUG the leak detector from the PICS SALW-6001B and ensure the following: 
  - 5.18.5.1 VERIFY the Jet Pump SHUTS DOWN.
  - 5.18.5.2 VERIFY the instrument cabinet horn is activated.
  - 5.18.5.3 VERIFY the instrument cabinet strobe is activated.

**5.18 LEAK DETECTOR TROUBLE ALARM TEST (Cont.)**

5.18.5.4 **VERIFY ALARM (7) Leak Detector Failure Alarm is present at the DTAM.**

5.18.5.5 **VERIFY the Jet Pump can not be restarted at DTAM with the leak detector in alarm.**

**5.18.6 ACKNOWLEDGE the alarm at the OCS.**

5.18.6.1 **VERIFY the HORN is silenced and the STROBE is OFF.**

5.18.6.2 **VERIFY the Leak Detector Failure Alarm is acknowledged at the OCS.**

**5.18.7 PLUG the leak detector back into the PICS SALW-6001B and ENSURE the following:**

5.18.7.1 **RESET the alarm at the DTAM.**

5.18.7.2 **VERIFY the instrument cabinet horn is NOT activated**

5.18 LEAK DETECTOR TROUBLE ALARM TEST (Cont.)

5.18.7.3 VERIFY the instrument cabinet strobe is NOT activated.

5.18.7.4 VERIFY ALARM (7) LEAK DETECTOR FAILURE ALARM is NOT present at the DTAM.

5.18.7.5 VERIFY that the Leak Detector Failure Alarm clears at the OCS.

5.18.7.6 VERIFY ALARM (12) JET PUMP SHUTDOWN is present at the DTAM.

5.18.7.7 SHUT DOWN Jetpump and SECURE test equipment.

5.18.8 REQUEST Test Director to VERIFY that section 5.18 is complete by signing below.

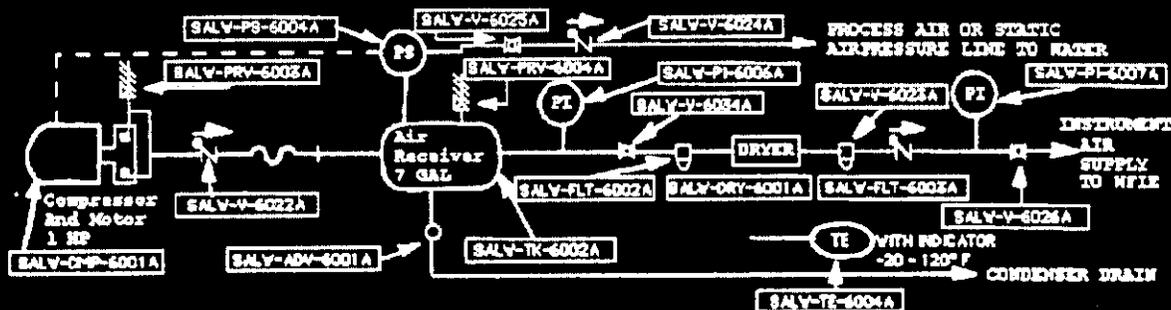
\_\_\_\_\_  
Test Director Signature

\_\_\_\_\_  
Date

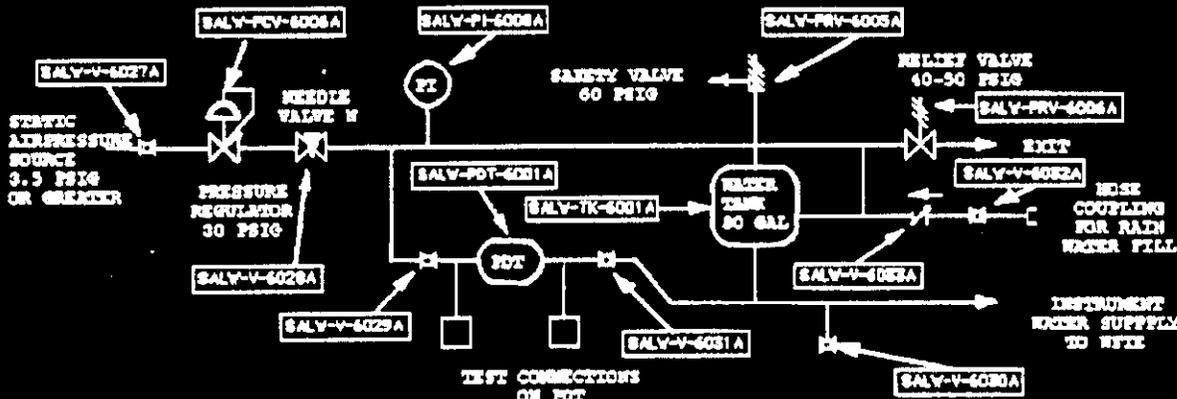
5.18.9 REQUEST QC Inspector to VERIFY that section 5.18 is complete by signing below.

\_\_\_\_\_  
QC Inspector Signature

\_\_\_\_\_  
Date



**INSTRUMENT AIR SYSTEM**  
SCALE : NONE



**INSTRUMENT WATER SYSTEM**  
SCALE : NONE

**FIGURE 1 - FLOW DIAGRAM INSTRUMENT AIR AND WATER SYSTEM**

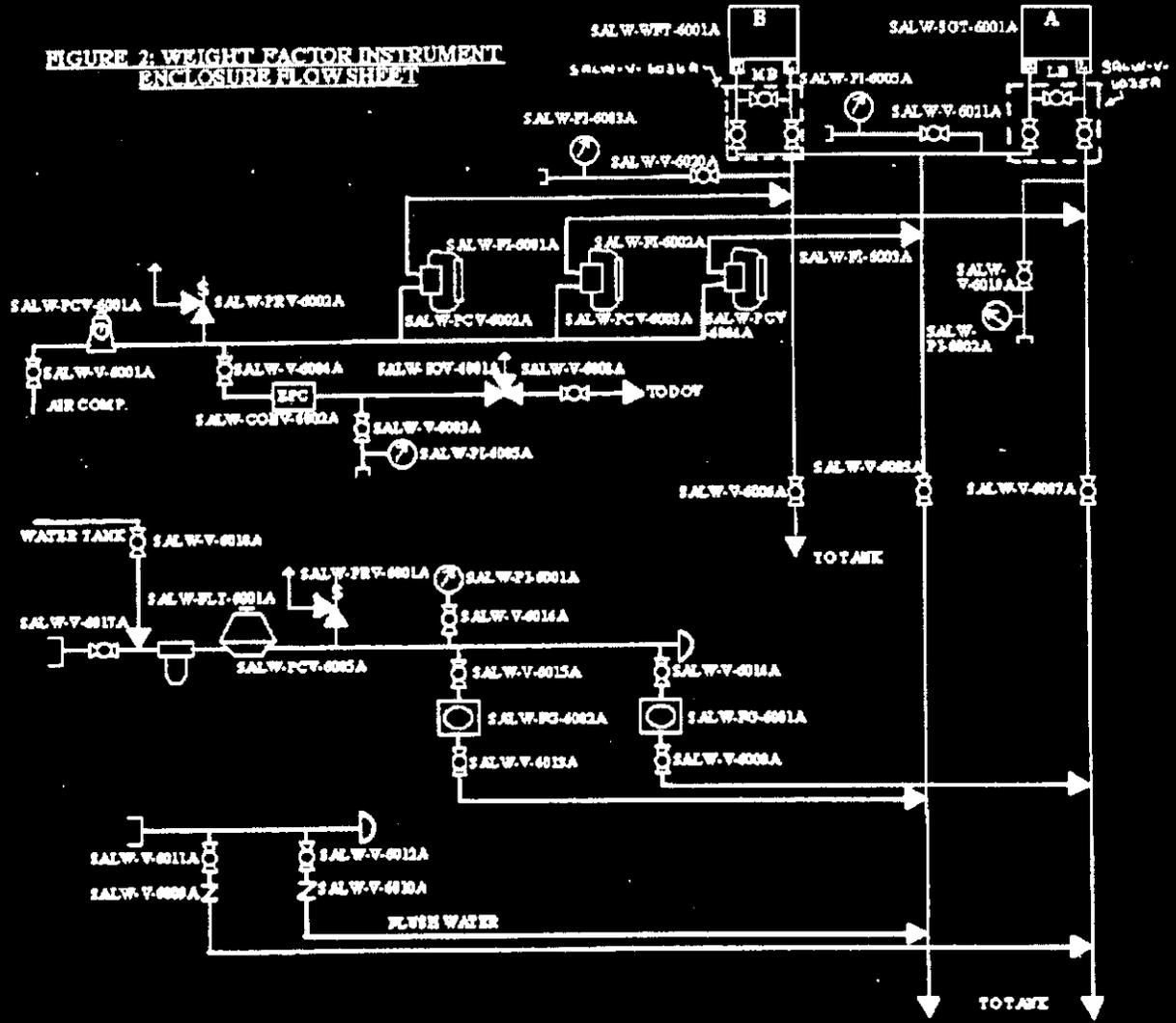


FIGURE 2 - WEIGHT FACTOR INSTRUMENT ENCLOSURE FLOW SHEET

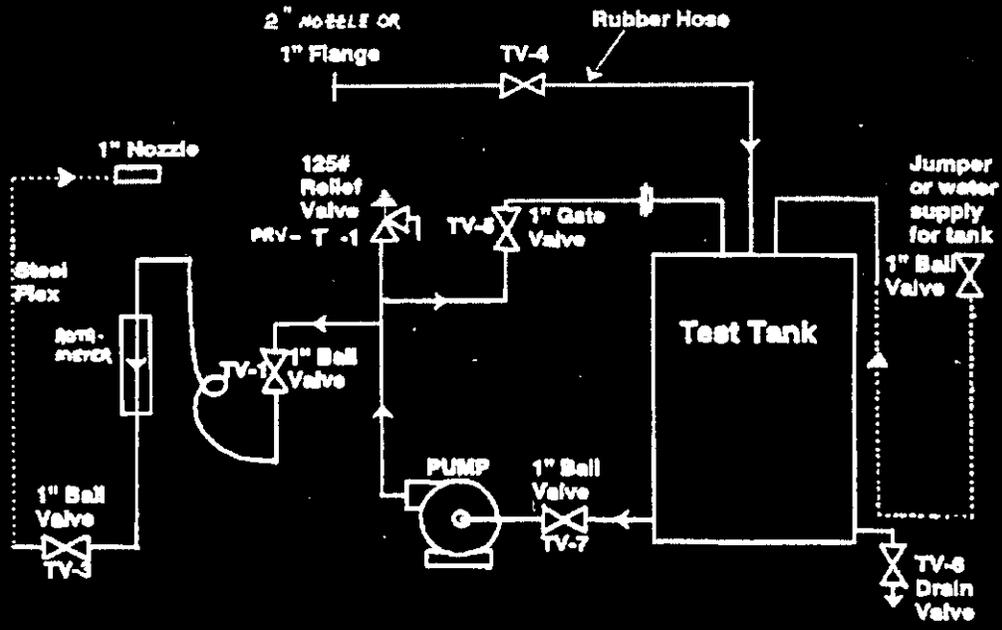


FIGURE 3 - JUMPER TEST ASSEMBLY

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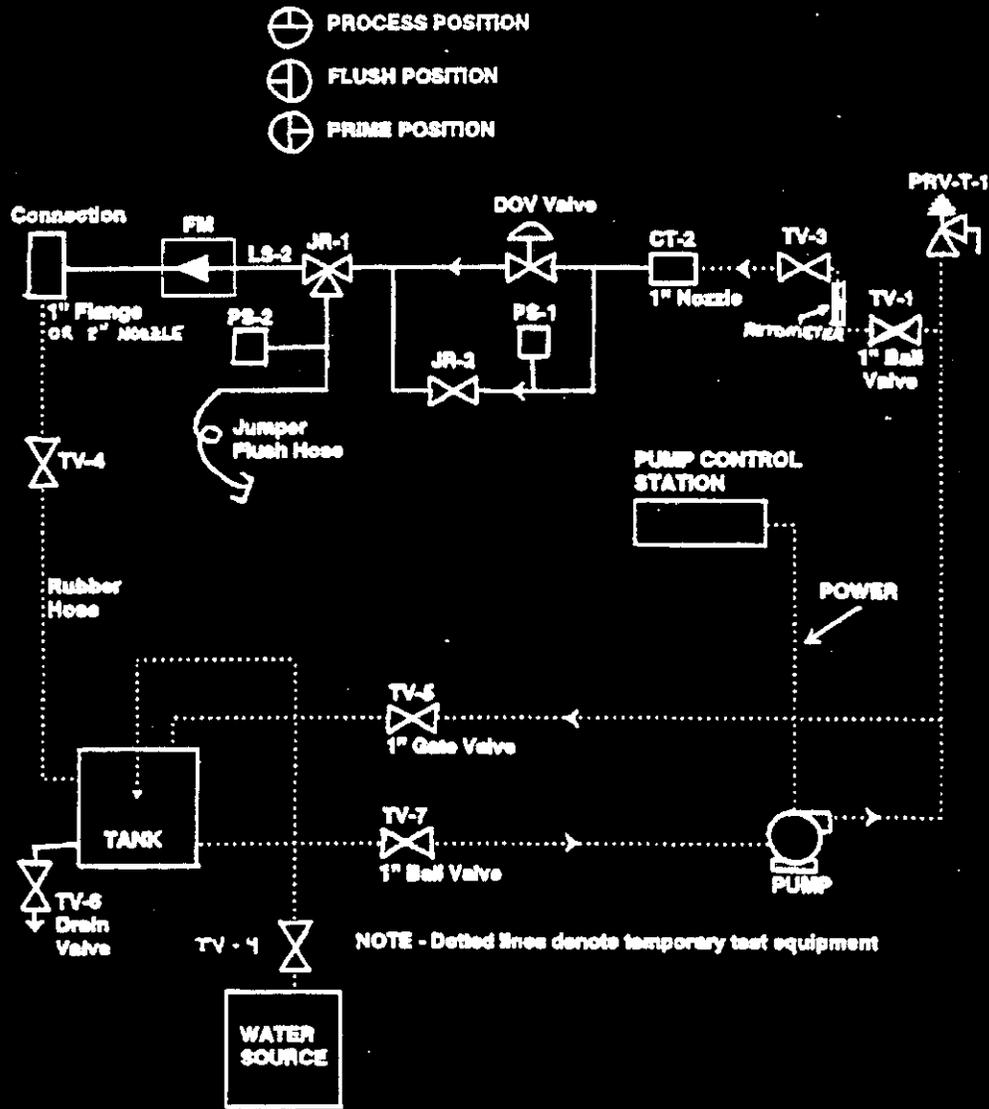


FIGURE 4 - JET PUMP JUMPER TEST CONNECTIONS



### OTP EXCEPTION RECORD

This page may be reproduced as necessary.

OTP step number:	OTP Exception Log Number
Description of Exception:	
Resolution of Exception:	
Date of Resolution:	
Test Director signature:	
Cognizant Engineer signature:	
Quality Assurance signature:	
Tank Farm Operations signature:	

**OTP ACCEPTANCE RECORD**

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

Cognizant Engineer	Date
West Tank Farm Operations	Date
Safety	Date
Quality Assurance	Date
Test Director	Date

PROCEDURE HISTORY SIGNATURE DATA

PCA Incorporated:		<u>NEW</u>	<u>SQ</u>
Procedure Signatures for WHC-SC-WM-OTP-191. A0		TYPE OF CHANGE	REVIEW DESIGNATOR
<b>POSITION/ORG</b>	<b>DELEGATE</b>	<b>DATE</b>	
Engineer/WTFTP	<u>M. Koch</u>	11/8/95	
NPO/ISO	<u>B.D. Foreman</u>	11/3/95	
SOM/WTFTP	<u>R.P. Tucker</u>	11/3/95	
Engr/TWRS Safety	<u>L.E. Thomas</u>	11/7/95	
Eng/TWRS QA	<u>C.M. Taylor</u>	11/8/95	
Acceptance Review	<u>B.E. Raymond</u>	11/9/95	
Approval Authority	<u>J.R. Biggs</u>	11/9/95	

# DISTRIBUTION SHEET

To Distribution		From Tank Stabilization & Eng Support 77420		Page 1 of 1		
				Date 10/09/95		
Project Title/Work Order OPERATIONAL TEST PROCEDURE FOR SALTWELL PUMPING AND INSTRUMENTATION CONTROL SKID MONITOR AND CONTROL SYSTEM				EDT No. <i>NA 701721</i>		
				ECN No. NA		
Name		MSI N	Text With All Attac h.	Text Only	Attach. / Append ix Only	EDT/E CN Only
V. C. BOYLES	R1-49					
J. N. DOELER	T4-07					
M. F. GARCIA	R2-80					
R. N. KERSEY	R2-80					
M. R. KOCH	R1-49					
D. D. WIGGINS	R1-49					