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16

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

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11. Receiver Remarks: 11A. Design Baseline Document? [ ] Yes [X] No		12. Major Assm. Dwg. No.: N/A
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16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
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(See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
		Design Authority			
		Design Agent			
2	1	Cog.Eng. C. A. Rieck		9/21/98	S2-48
2	1	Cog. Mgr. J. E. Van Beek		9/22/98	S2-48
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		Env.			

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18. C. A. Rieck — Signature of EDT Originator — 9/21/98 Date

19. N/A — Authorized Representative for Receiving Organization — Date

20. J. E. Van Beek — Design Authority/ Cognizant Manager — 9/22/98 Date

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[ ] Approved w/comments
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AP-102/104 Retrieval control System Qualification Test Procedure

C. A. Rieck
Numatec Hanford Corporation, Richland, WA 99352
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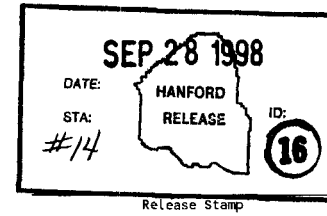
Key Words: Retrieval Control System, Qualification Test, Project W-211, Initial Tank Retrieval Systems

Abstract: This Qualification Test Procedure documents the results of the qualification testing that was performed on the Project W-211, "Initial Tank Retrieval Systems," retrieval control system (RCS) for tanks 241-AP-102 and 241-AP-104. The results confirm that the RCS has been programmed correctly and that the two related hardware enclosures have been assembled in accordance with the design documents.

9/28/98
Release Approval Date



Release Stamp

Approved for Public Release

TEST TITLE: AP-102/104 Retrieval Control System Qualification Test Procedure (QTP)

LOCATION: 200-E Area (Building 2721EA)

PROJECT NUMBER: W-211 WORK ORDER A8 5B 161

PROJECT TITLE: W-211, INITIAL TANK RETRIEVAL SYSTEMS (ITRS)

Prepared By
FLUOR DANIEL NORTHWEST, Inc.
Richland, Washington

PROCEDURE APPROVAL

FLUOR DANIEL NORTHWEST (FDNW)

G. A. Block Author	7/15/98 Date
Eric D. Johnson Checker	7/15/98 Date
G. A. Block CSE Lead Engineer	7/15/98 Date

EXECUTION AND TEST APPROVAL

EXECUTED BY

George A. Block /FDNW	8/24/98	Eric D. Johnson /FDNW	8/24/98
Test Director (Recorder)/Organization	Date	Test Performer/Organization	Date

Steve M. Dunham /FDNW	8/24/98
Test Performer/Organization	Date

WITNESS

Lanny R. Hall /FDNW	8/24/98
QA Inspector (Witness)/Organization	Date

A-E APPROVAL

FLUOR DANIEL NORTHWEST (FDNW)

Without exceptions ___	With exceptions resolved __X__	With exceptions outstanding ___

George A. Block	8/24/98
Design Engineer	Date

This document, procedure HNF-3334, was performed during the period of 8/4/98 through 8/24/98. The procedure was signed off and annotated as the test progressed and as anomalies were identified and resolved. The signed-off version has been retained on file.

The procedure was retyped to incorporate red-lined revisions developed during actual test performance and issued as Revision 0. In addition, initials were typed into Revision 0, and Revision 0 does not include the check marks that were entered on the original document in several test matrices; however, the retained original contains all the appropriate check marks and initials.

The performers reviewed the revised procedure against the original annotated procedure, and upon confirmation that Revision 0 accurately reflected the annotations made on the original, resigned Revision 0.

Revision 0 to the procedure is being distributed herewith to communicate the test methodology and provide confirmation that the tested system performs in accordance with design requirements as stated in W211 Description of Operation (DOO), Revision E.

TABLE OF CONTENTS

1 PURPOSE

The purpose of this Qualification Test Procedure (QTP) is to confirm that the W-211 AP Farm Retrieval Control System (RCS) computer control system has been programmed correctly, and that the two related hardware enclosures have been assembled correctly in accordance with requirements documents, and are ready for installation at the AP tank farm under the auspices of construction specification W-211-AP-C1. After installation, an Acceptance Test Procedure (ATP), similar to this QTP will be performed to test field devices and connections.

2 REFERENCES

2.1 DOCUMENTS

DESCRIPTION OF OPERATIONS (DOO), FOR DST 241-AP-102/104 RETRIEVAL, REVISION 0

2.2 DRAWINGS

Performance of this QTP represents checking of the drawings listed below.

H-14-102086, Sh 1, Rev 0	PIPING/INSTRM P & ID GENERAL NOTES & LEGEND
H-14-102086, Sh 2, Rev 0	PIPING/INSTRM P & ID Pump Pit 02A (WST)
H-14-102086, Sh 3, Rev 0	PIPING/INSTRM P & ID PUMP PITS 02A/02D (WT)
H-14-102086, Sh 4, Rev 0	PIPING/INSTRM P & ID Pump Pit 04A (WST)
H-14-102086, Sh 5, Rev 0	PIPING/INSTRM P & ID PUMP PITS 04A/04D (WT)
H-14-102086, Sh 6, Rev 0	PIPING/INSTRM P & ID PUMP PITS 04A/04D (WT)
H-14-102304, Sh 1, Rev 0	PIPING/INSTRM P & ID SERVICE WATER (RW)
H-14-102304, Sh 2, Rev 0	PIPING/INSTM P & ID DILUENT/FLUSH (CHEMB)
H-14-102190, Sh 2, Rev 0	CONNECTION DIAGRAM WT-ENCL-100
H-14-102191, Sh 2-7, Rev 0	CONNECTION DIAGRAM WT-ENCL-101
H-14-102151, Sh 1, Rev 0	LOGIC DIAGRAM Drawing List & Notes
H-14-102151, Sh 2, Rev 0	LOGIC DIAGRAM HVT MODE
H-14-102151, Sh 3, Rev 0	LOGIC DIAGRAM IN2 MODE
H-14-102151, Sh 4, Rev 0	LOGIC DIAGRAM IN4 MODE
H-14-102151, Sh 5, Rev 0	LOGIC DIAGRAM RTN2 MODE
H-14-102151, Sh 6, Rev 0	LOGIC DIAGRAM RTN4 MODE
H-14-102151, Sh 7, Rev 0	LOGIC DIAGRAM RTF2 MODE
H-14-102151, Sh 8, Rev 0	LOGIC DIAGRAM RTF4 MODE
H-14-102151, Sh 9, Rev 0	LOGIC DIAGRAM DIL2 MODE
H-14-102151, Sh 10, Rev 0	LOGIC DIAGRAM DIL4 MODE
H-14-102151, Sh 11, Rev 0	LOGIC DIAGRAM ITR2 MODE
H-14-102151, Sh 12, Rev 0	LOGIC DIAGRAM ITR4 MODE
H-14-102151, Sh 13, Rev 0	LOGIC DIAGRAM ITF2 MODE
H-14-102151, Sh 14, Rev 0	LOGIC DIAGRAM ITF4 MODE
H-14-102151, Sh 15, Rev 0	LOGIC DIAGRAM WT2 MODE
H-14-102151, Sh 16, Rev 0	LOGIC DIAGRAM WT4 MODE

H-14-102151, Sh 17, Rev 0 LOGIC DIAGRAM PTF2 MODE
H-14-102151, Sh 18, Rev 0 LOGIC DIAGRAM PTF4 MODE
H-14-102151, Sh 19, Rev 0 LOGIC DIAGRAM ILD2 MODE
H-14-102151, Sh 20, Rev 0 LOGIC DIAGRAM ILD4 MODE
H-14-102151, Sh 21, Rev 0 LOGIC DIAGRAM CSS Batch MODE
H-14-102151, Sh 22, Rev 0 LOGIC DIAGRAM CSS Continuous MODE
H-14-102151, Sh 23, Rev 0 LOGIC DIAGRAM SSD MODE

H-14-102152, Sh 1, Rev 0 LOGIC DIAGRAM CHEMB-FCV-131
H-14-102152, Sh 2, Rev 0 LOGIC DIAGRAM CHEMB-MOV-132
H-14-102152, Sh 3, Rev 0 LOGIC DIAGRAM WT-MOV-242
H-14-102152, Sh 4, Rev 0 LOGIC DIAGRAM WT-MOV-243
H-14-102152, Sh 5, Rev 0 LOGIC DIAGRAM WT-MOV-244
H-14-102152, Sh 6, Rev 0 LOGIC DIAGRAM WT-MOV-245
H-14-102152, Sh 7, Rev 0 LOGIC DIAGRAM WT-MOV-246
H-14-102152, Sh 8, Rev 0 LOGIC DIAGRAM WT-MOV-247
H-14-102152, Sh 9, Rev 0 LOGIC DIAGRAM WT-MOV-248
H-14-102152, Sh 10, Rev 0 LOGIC DIAGRAM WT-FCV-249
H-14-102152, Sh 11, Rev 0 LOGIC DIAGRAM WT-MOV-250
H-14-102152, Sh 12, Rev 0 LOGIC DIAGRAM WT-MOV-251
H-14-102152, Sh 13, Rev 0 LOGIC DIAGRAM WT-MOV-252
H-14-102152, Sh 14, Rev 0 LOGIC DIAGRAM WT-MOV-253
H-14-102152, Sh 15, Rev 0 LOGIC DIAGRAM WT-MOV-254
H-14-102152, Sh 16, Rev 0 LOGIC DIAGRAM WT-MOV-261
H-14-102152, Sh 17, Rev 0 LOGIC DIAGRAM WT-MOV-263
H-14-102152, Sh 18, Rev 0 LOGIC DIAGRAM CHEMB-LCV-430
H-14-102152, Sh 19, Rev 0 LOGIC DIAGRAM RW-MOV-451
H-14-102152, Sh 20, Rev 0 LOGIC DIAGRAM MOV POSITION ALARMS
H-14-102152, Sh 21, Rev 0 LOGIC DIAGRAM MOV POSITIONS SSD

H-14-102153, Sh 1, Rev 0 LOGIC DIAGRAM Alarm Interlocks-1
H-14-102153, Sh 2, Rev 0 LOGIC DIAGRAM Alarm Interlocks-2
H-14-102154, Sh 1, Rev 0 LOGIC DIAGRAM Mixer Pump 001 Control
H-14-102154, Sh 2, Rev 0 LOGIC DIAGRAM Mixer Pump 001 Turntable
H-14-102155, Sh 1, Rev 0 LOGIC DIAGRAM Mixer Pump 003 Control
H-14-102155, Sh 2, Rev 0 LOGIC DIAGRAM Mixer Pump 003 Turntable
H-14-102156, Sh 1, Rev 0 LOGIC DIAGRAM Transfer Pump 002 Speed Control
H-14-102157, Sh 1, Rev 0 LOGIC DIAGRAM Transfer Pump 019 Speed Control
H-14-102158, Sh 1, Rev 0 LOGIC DIAGRAM AP-102 RTD 1
H-14-102159, Sh 1, Rev 0 LOGIC DIAGRAM AP-104 RTD 1

H-14-102165, Sh 1, Rev 0 LOGIC DIAGRAM Mode Select 1A
H-14-102165, Sh 2, Rev 0 LOGIC DIAGRAM Mode Select 1B
H-14-102165, Sh 3, Rev 0 LOGIC DIAGRAM Mode Select 1C
H-14-102165, Sh 4, Rev 0 LOGIC DIAGRAM Mode Select 1D
H-14-102165, Sh 5, Rev 0 LOGIC DIAGRAM Mode Select 2A

H-14-102165, Sh 6, Rev 0	LOGIC DIAGRAM Mode Select 2B
H-14-102165, Sh 7, Rev 0	LOGIC DIAGRAM Mode Select 2C
H-14-102165, Sh 8, Rev 0	LOGIC DIAGRAM Mode Select 2D
H-14-102165, Sh 9, Rev 0	LOGIC DIAGRAM Mode Select 3A
H-14-102165, Sh 10, Rev 0	LOGIC DIAGRAM Mode Select 3B

3 RESPONSIBILITIES

3.1 GENERAL

Each company or organization participating in this QTP will designate personnel to assume the responsibilities and duties as defined herein for their respective roles. The designees shall become familiar with this QTP and the systems involved to the extent that they can perform their assigned duties.

3.2 FDNW PROJECT LEAD ENGINEER (PLE)

3.2.1 Designates a Test Director.

3.2.2 Acts as liaison between the participants in acceptance testing.

3.2.3 Schedules and conducts a pretest kickoff meeting with test participants when necessary.

3.2.4 Signs Execution and Test Approval page when test is complete and accepted.

3.2.5 Signs exception form when all exceptions have been resolved.

3.2.6 Provides a distribution list for the approved and accepted QTP.

3.3 TEST DIRECTOR

3.3.1 Coordinates and directs acceptance testing.

3.3.2 Coordinates testing with the Facility Manager.

3.3.3 Distributes the approved testing schedule before start of testing.

3.3.4 Notifies the persons performing and witnessing the test 2 days before the start of testing.

3.3.5 Schedules a dry run when necessary.

3.3.6 Notifies concerned parties when a change is made in the testing schedule.

3.3.7 Arranges for craft electrician labor as required.

3.3.8 Confirms that field testing and inspection of the system or portion of the system to be tested has been completed.

3.3.9 Stops any test which, in his or her judgement, may cause damage to the system until the problem has been resolved.

3.3.10 After verifying there is no adverse impact, may alter the sequence in which systems or subsystems are tested.

3.3.11 Ensures that required environmental conditions are maintained.

3.3.12 If a test is to be suspended for a period of time, ensures that the system is left in a safe mode.

3.3.13 Before restarting suspended test, reverifies the test prerequisites.

3.3.14 Initiates required changes to the QTP.

3.3.15 Reviews recorded data, discrepancies, and exceptions.

3.3.16 Obtains information or changes necessary to clear or resolve objections during the performance of the test.

3.3.17 Takes necessary action to clear exceptions to the test.

3.3.18 Signs Execution and Test Approval page when test has been performed.

3.3.19 Obtains required signatures on the QTP Master prior to reproduction and distribution.

3.4 WITNESS (PROVIDED BY QUALITY ASSURANCE)

3.4.1 Witnesses the tests.

3.4.2 Reviews results of testing.

3.4.3 Assists the Test Director when requested.

3.4.4 Signs Execution and Test Approval page when test has been performed.

3.4.5 Records names of all designated personnel on master copy of QTP prior to start of testing.

3.4.6 Records test instrument identification numbers and calibration expiration dates, if applicable.

3.5 TEST PERFORMERS

(One Test Performer will operate the Test Set and the other Test Performer will operate the PLC control system.)

3.5.1 Perform test under direction of the Test Director.

3.5.2 Signs the Execution and Test Approval page.

4 CHANGE CONTROL

Required changes to this QTP must be redlined on the Master copy. The test may continue based on red-line markups of the Master copy.

5 EXECUTION

5.1 OCCUPATIONAL SAFETY AND HEALTH

5.1.1 Individuals shall carry out their assigned work in a safe manner in accordance with FDNW Practice 134.653.1010, 4/28/98, to protect themselves and others from undue hazards and to prevent damage to property and environment. Facility line managers shall assure the safety of activities within their areas to prevent injury, property damage, or interruption of operation. Performance of test activities shall always include safety and health aspects.

5.1.2 These tests involve working near energized equipment; all procedural requirements for working near energized equipment shall be followed, and an Energized Electrical Work Permit (FDNW Form S-NW-061) shall be prepared and processed.

5.1.3 Read and sign the JSA located at the test site.

5.2 PERFORMANCE

Perform the test following the steps and requirements of this procedure.

6 EXCEPTIONS

6.1 GENERAL

Exceptions to the required test results that cannot be immediately corrected are recorded for future resolution. The procedural step that was not able to be performed is not signed off until it can be performed as initially written or as revised.

Errors/exceptions in the QTP itself may be corrected by redlined changes and/or direct revision of the QTP.

6.2 RETEST/RESOLUTION

Record the action taken to resolve each exception. Action taken may not be the same as planned action.

6.2.1 When action taken results in an acceptable retest, sign and date the appropriate procedural step.

6.3 ACCURACY/TOLERANCES

This QTP is a functional test, not a calibration. Therefore, observed analog values are considered acceptable if they are within ± 5% of the values specified in this procedure.

REFER TO SECTION 3.4.6

PRINTED NAME	SIGNATURE	INITIAL	
Lanny R. Hall	Lany R. Hall	LH	(Quality Assurance)
Eric D. Johnson	Eric D. Johnson	EDJ	(Test Performer)
Steve Dunham	Steven M. Dunham	SMD	(Test Performer)
George Block	George Block	GAB	(Test Director)

7 PREREQUISITES, EQUIPMENT/INSTRUMENTS, AND ABBREVIATIONS

7.1 EQUIPMENT/INSTRUMENTS

Supplied by Test Operator unless otherwise noted.

7.1.1 Volt-ohmmeter (VOM): Digital, portable, 0-150 V ac/dc.

Instrument No. Fluke 23 Series II Multimeter, S/N 53850912

7.1.2 Current source test set.
Description: Altek-134 S/N 194716

7.1.3 RTD Simulator. Description:
Altek-211 S/N 228751, Biddle Versa-Cal S/N 3148

7.1.4 Test leads with insulated covers for wire clips.

7.2 ABBREVIATIONS

RTD	Resistance Temperature Detector
VI	Vendor Information
VOM	Volt-ohmmeter

7.3 DEFINITIONS

7.3.1 Verify alarms: Verify that an audible signal indicates an alarm condition, the alarm icon on the screen flashes red, moves left to right and the graphic screen (page or window) containing the alarming device pops up when applicable. Verify affected graphic symbol flashes red or yellow as applicable. Close pop-up window and/or click on the alarm navigation button to display alarms screen. Click on the appropriate alarm text to acknowledge. Verify the alarm text has gone to a steady color (red, yellow or blue).

7.3.2 Verify alarm(s) is/are reset: Use the F5 key to show the active alarms and verify the alarm listed is no longer displayed and affected device is no longer flashing red or yellow.

7.4 POWER UP RCS SYSTEM

In this section the RCS system will be logged into and set up for simulated operation.

NOTE 1: Figures of screens are contained in Appendix D of Description of Operations for DST 241-AP-102/104 (see attached).

NOTE 2: If the test setup has been previously energized and is presently energized, skip to step 7.5.2.

__LH__ 7.4.1 Turn on all equipment. Verify appropriate power indicators are lighted and computer screens are energized.

7.4.2 Window's NT Log ON

Operator Workstation logon

__LH__ 7.4.2.1 On the Operator Workstation, verify that the Window NT Start Up screen is displayed.

__LH__ 7.4.2.2 Press Ctrl-Alt-Del at the keyboard of the Operator Workstation.

__LH__ 7.4.2.3 At the Windows NT logon screen type in the User Name, Password, and Domain as obtained from the Test Director.

__LH__ 7.4.2.4 After logging on, verify on the Operator Workstation monitor, that the TWRS Home screen is displayed similar to Figure 1 in Appendix D.

__LH__ 7.4.2.5 Click on the Retrieval Control tab. Verify that the Retrieval Control screen is displayed (see figure 2 in Appendix D) and click on the "AP Farm" button to display the AP-102 and -104 RCS Title screen (see figure 3 in Appendix D).

__LH__ 7.4.2.6 While the Title Screen is displayed click on the "LOGIN" button or press F3.

__LH__ 7.4.2.7 At the CITECT login screen type in the UserName and Password as obtained from the Test Director.

7.4.3 Engineering Workstation logon

__LH__ 7.4.3.1 On the Engineering Workstation, verify that the Window NT Start Up screen is displayed.

__LH__ 7.4.3.2 Press Ctrl-Alt-Del at the keyboard of the Engineering Workstation.

__LH__ 7.4.3.3 At the Windows NT logon screen type the UserName, Password, and Domain as directed by the Test Director.

NOTE: During this QTP many of the I/O analog inputs will not have external wires connected. Therefore, the I/O modules will show an "Input Failure" light, and most low level analog alarms will be activated until a simulated input is applied to the specific channel.

Where analog inputs are statically simulated by resistors or resistance bridges, these static devices must be disconnected when applying the dynamic simulations required by this QTP. When the dynamic simulation is complete, the static simulation should be reconnected to reduce the number of active alarms.

7.4.4 RCS Title Screen Login

Screen Login will be done in this section along with verifying what state or mode the RCS system is currently indicating.

__LH__ 7.4.4.1 Verify the prerequisites of Section 7.4 have been met. If still logged in from section 7.5.2, go to 7.5.4.3.

__LH__ 7.4.4.2 At the Operator Workstation, Click the "Login" button or press F3 and enter the UserName and Password as directed by the Test Director.

__LH__ 7.4.4.3 Press F2 to display the pop-up window menu (see Figure 5 in Appendix D). Click the "Mode Selection" button and verify that the Mode Selection screen is displayed (see Figure 7 in Appendix D).

__LH__ 7.4.4.4 Verify the "Ready" mode is currently selected. The button will be outlined in blue. (If not, operator shall select Ready mode). Close window by clicking on "CLOSE" button, or pressing "END" key.

__LH__ 7.4.4.5 Press F2 to display the pop-up window menu and click the "Process Overview" button. Verify that the process overview screen is displayed (see Figure 4 in Appendix D).

__LH__ 7.4.4.6 Verify that process lines are white (no modes selected).

7.5 GENERAL-SCREEN DEVELOPMENT

This section is to verify and test all major screen buttons, keyboard commands and tables when in Ready mode. The Test Director or RCS Operator will step

through each screen and verify it functions in Ready mode. No activation or changing of set points will be done in this section. Figures will be used to display what screens should look like when clicked on (see attached Appendix D).

Every operations function which can be activated/selected by clicking with the mouse can also be activated/selected by a function key (not all screens can be displayed by pressing a function key) or moving the focus with the arrow keys and pressing enter (all screens can be displayed with this method). Where possible check both methods of activation/selection in the same step. If not possible, for example, when going from one mode to the next, come back to the step and use the other method of activation/selection, when there are three methods (mouse, arrow keys and function key) try all three. Check the box (☐) provided in each step when validating the arrow keys, the Function key (when appropriate), and initial the step when validating the mouse click method of activation/selection.

After selecting a screen using one of the three methods, click the close icon button to close the window or click the "last" navigation button (back arrow) to close a *full screen page*.

7.5.1 At the Title Screen, Press F2 and verify the new screen pops up:

__LH__ 7.5.1.1 "Pop-Up Window Menu" (Figure 5)

From the Pop-Up Window Menu verify the following screens pop up by moving the focus (the white outline around selectable symbols) with the arrow keys and pressing enter, place a check in box provided next to "Key". Then return to the Pop-Up Window Menu and verify the screens pop-up by pressing the appropriate function key, place a check in the box provided next to "F-Key". Then return to previous screen and verify the screen pops up by using the mouse to click on the selection and then initial the step.

__LH__ (1) "Help" ☐ Key ☐ F-Key (no figure associated with this function)

__LH__ (2) "Retrieval Setup" ☐ Key (Figure 6)

__LH__ (a) Record set point values shown on Retrieval Setup screen in appropriate places on Figure 6 in Appendix D.

__LH__ (3) "Mode Selection" ☐ Key (Figure 7)

__LH__ (4) "Process Overview" ☐ Key (Figure 4)

__LH__ (5) "Title Screen" ☐ Key (Figure 3)

__LH__ (6) "Active Alarm Listing" ☐ Key ☐ F-Key (No Figure)

LH (7) "Alarm Set point" ☐ Key (Figure 17)

LH (a) Verify that alarm set points on the screen are the same as those listed in the steps in section 8. If the set point values shown on the screen do not agree with those used in Section 8, enter the Section 8 value on the screen and on figure 17 of Appendix D.

LH (8) "Alarm Summary" ☐ Key ☐ F-Key (No Figure)

LH (9) "Hardware Alarms" ☐ Key ☐ F-Key (No Figure)

LH (10) "Tank 241-AP-102 Overview" ☐ Key (Figure 9)

LH (11) "Tank 241-AP-104 Overview" ☐ Key (Figure 10)

LH (12) "Trending" ☐ Key (Figure 18)

LH (13) "Bypassable Interlock Table" ☐ Key (Figure 8)

LH (14) "Temp Profile" ☐ Key (Tank AP-102) (Figure 13)

LH (15) "Temp Profile" ☐ Key (Tank AP-104) (Figure 14)

LH (16) AP-102 "Mixer Pump P-001 Speed Profile" ☐ Key (Figure 11)

LH (17) AP-102 "Mixer Pump P-003 Speed Profile" ☐ Key (Figure 12)

LH (18) "Service Water System" ☐ Key (Figure 16)

LH (19) "Diluent System" ☐ Key (Figure 15)

LH (20) "Hardware Overview" ☐ Key (Figure 19)

LH (21) "Active Interlocks Table" ☐ Key (Figure 20)

LH 7.5.2 Verify that all steps of section 7 have been satisfactorily completed.

LH 7.5.3 In ENCL-100 and -101, close all fuses.

8 FIELD CONNECTION SIMULATIONS

NOTE: All terminals and instruments are in WT-ENCL-101, unless otherwise noted.

Acknowledge each alarm after it is verified.

8.1 PRESSURE INDICATORS AND ALARMS

NOTES: 1. The input current is given as a percentage of 4-20mA current signal (0% = 4 mA and 100% = 20 mA).

2. HIGH or LOW alarms will produce a flashing yellow/black border around the value display box, and HIGH/HIGH or LOW/LOW alarms will produce a flashing red/white border around the value display box, and will display as flashing indications on the PLC Interlock Bypass Screen if bypassable and on the Active Interlocks screen if not bypassable.

LH 8.1.1 To simulate WT-PIT-259, disconnect wires at PLC 2-1-8, terminals 6 and 7. Connect 4-20mA transmitter simulator, set at 0% to terminals 6(-) and 7(+). Then perform the following:

LH 8.1.1.1 Increase transmitter simulator to 86%. Verify pressure on the Process Overview screen indicates >255 psig. Verify that alarm PAH-259, "Transfer Pump WT-P-002 High Discharge Pressure" alarms.

LH 8.1.1.2 Increase transmitter simulator to 88.5%. Verify pressure on screen indicates >265 psig. Verify that alarm PAHH-259 "Transfer Pump WT-P-002 Hi-Hi Discharge Pressure" alarms.

LH 8.1.1.3 Verify that "TRANSFER PUMP DISCHARGE PRESSURE HI-HI" indicator is flashing on the Interlock screen.

LH 8.1.1.4 Decrease transmitter simulator to 71.6%. Verify displayed pressure is 215 psig. Verify that alarms PAH-259 and PAHH-259 can be reset.

NA 8.1.1.5 Removed

NA 8.1.1.6 Removed

NA 8.1.1.7 Removed

LH 8.1.1.8 Vary the input current from 0 to 100% and verify the range of the pressure (psi) indicator on screen (near tank 241-AP-102) varies from 0 to 300 psi.

LH 8.1.1.9 Remove transmitter simulator and reconnect wire PT-259-(+) to terminal 7 and PT-259-(-) to terminal 6 of PLC 2-1-8.

LH 8.1.2 To simulate WT-PIT-266, disconnect wires at PLC 2-1-8, terminals 36 and 37. Connect 4-20mA transmitter simulator, set at 0% to terminals 36(-) and 37(+). Then perform the following:

LH 8.1.2.1 Increase transmitter simulator to 86%. Verify pressure on screen indicates >255 psig. Verify that alarm PAH-266, "Transfer Pump WT-P-019 High Discharge Pressure" alarms.

LH 8.1.2.2 Increase transmitter simulator to 88.5%. Verify pressure on screen indicates >265 psig. Verify that alarm PAHH-266 "Transfer Pump WT-P-019 Hi-Hi Discharge Pressure" alarms.

LH 8.1.2.3 Verify that "TRANSFER PUMP DISCHARGE PRESSURE HI-HI" indicator is flashing on the Interlock screen.

LH 8.1.2.4 Decrease transmitter simulator to 71.6%. Verify displayed pressure is 215 psig. Verify that alarms PAH-266 and PAHH-266 can be reset.

NA 8.1.2.5 Removed

NA 8.1.2.6 Removed

NA 8.1.2.7 Removed

LH 8.1.2.8 Vary the input current from 0 to 100% and verify the range of the pressure (psi) indicator on screen (near tank 241-AP-104) varies from 0 to 300 psi.

LH 8.1.2.9 Remove transmitter simulator and reconnect wire PT-266-(+) to terminal 37 and PT-266-(-) to terminal 36 of PLC 2-1-8.

LH 8.1.3 To simulate PIT-271, disconnect wires at PLC 2-1-9, terminals 2 and 3. Connect 4-20mA transmitter simulator, set at 55% to terminals 2(-) and 3(+) and reset any existing alarms. Then perform the following:

LH 8.1.3.1 Decrease simulated pressure to 0 psig (0%) and increase simulated pressure to 300 psig (100%) and verify that the range of the pressure (psi) indicator on screen (near valve WT-MOV-252, approximate center of screen) varies from 0 to 300 psi (0 to 100%).

LH 8.1.3.2 Remove transmitter simulator and reconnect wire PT-271-(+) to terminal 3 and PT-271-(-) to terminal 2 of PLC 2-1-9.

LH 8.1.4 To simulate PIT-452, disconnect wires at PLC 2-1-10, terminals 22 and 23. Connect 4-20mA transmitter simulator, set at 55% to terminals 22(-) and 23(+) and reset any existing alarms. Then perform the following:

LH 8.1.4.1 Decrease simulated pressure to 0 psig (0%) and increase simulated pressure to 200 psig (100%) and verify that the range of the pressure (psi) indicator on screen varies from 0 to 200 psi (0 to 100%).

LH 8.1.4.2 Remove transmitter simulator and reconnect wire PT-452-(+) to terminal 23 and PT-452-(-) to terminal 22 of PLC 2-1-10.

LH 8.1.5 To simulate PIT-123, disconnect wires at PLC 2-1-10, terminals 16 and 17. Connect 4-20mA transmitter simulator, set at 55% to terminals 16(-) and 17(+) and reset any existing alarms. Then perform the following:

LH 8.1.5.1 Decrease simulated pressure to 0 psig (0%) and increase simulated pressure to 300 psig (100%) and verify that the range of the pressure (psi) indicator on screen varies from 0 to 300 psi (0 to 100%).

LH 8.1.5.2 Remove transmitter simulator and reconnect wire PIT-123-(+) to terminal 17 and PIT-123-(-) to terminal 16 of PLC 2-1-10.

8.2 FLOW INDICATORS AND ALARMS

Refer to note 2 in paragraph 8.1 above.

LH 8.2.1 To simulate FIT-258, connect 4-20mA transmitter simulator, set at 50% to TB-6 terminals 1(+) and 2(-). Then perform the following:

LH 8.2.1.1 Disable PLC address 004575 and set to "1." Verify that transfer pump WT-P-002 is "on", (symbol is green).

LH 8.2.1.2 Decrease simulated flow to 60 gpm (30%) and verify that alarm FAL-258 "Transfer Pump WT-P-002 Low Discharge Flow" alarms.

LH 8.2.1.3 Increase simulated flow to 110 gpm (55%) and verify that alarm FAL-258 can be reset.

LH 8.2.1.4 Verify that the flow (gpm) indicator on screen (near tank 241-AP-102) varies from 0 to 200 gpm (0 to 100%).

LH 8.2.1.5 Set PLC address 004575 to "0", and enable address. Verify that the transfer pump is "off", (symbol is gray).

LH 8.2.1.6 Disconnect and remove transmitter simulator.

LH 8.2.2 To simulate FIT-264, connect 4-20mA transmitter simulator, set at 50% to TB-6 terminals 22(+) and 23(-). Then perform the following:

LH 8.2.2.1 Disable PLC address 004591 and set to "1." Verify that transfer pump WT-P-019 is "on", (symbol is green).

LH 8.2.2.2 Decrease simulated flow to <60 gpm (29.5%) and verify that alarm FAL-264 "Transfer Pump WT-P-019 Low Discharge Flow" alarms.

LH 8.2.2.3 Increase simulated flow to 110 gpm (55%) and verify that alarm FAL-264 can be reset.

LH 8.2.2.4 Verify that the flow (gpm) indicator on screen (near tank 241-AP-104) varies from 0 to 200 gpm (0 to 100%).

LH 8.2.2.5 Set PLC address 004591 to "0", and enable address. Verify that the transfer pump is "off", (symbol is gray).

LH 8.2.2.6 Disconnect and remove transmitter simulator.

LH 8.2.3 To simulate FIT-270, connect 4-20mA transmitter simulator, set at 50% to TB-6 terminals 28(+) and 29(-). Then perform the following:

LH 8.2.3.1 Vary the simulated flow from 0% to 100%, and verify that flow indicator FI-270 varies from 0 to 200 gpm.

LH 8.2.3.2 Set the flow to 0%

LH 8.2.3.3 Reset FQI-270 to 0 using Modsoft if necessary.

LH 8.2.3.4 Increase simulated flow to 200 gpm (100%) and verify that FQI-270 begins to accumulate gallons at a rate of 200 gpm on Modsoft. Run for 5 minutes and verify display on overview screen has accumulated 1000 gallons.

LH 8.2.3.5 Decrease simulated flow to 0 gpm (0%) and verify that FQI-270 stops accumulating, and remains constant.

LH 8.2.3.6 Disconnect and remove transmitter simulator.

LH 8.2.4 To simulate FIT-455, connect 4-20mA transmitter simulator, set at 50% to TB-6 terminals 55(+) and 56(-). Then perform the following:

LH 8.2.4.1 Vary the simulated flow from 0% to 100%, and verify that flow indicator FI-455 varies from 0 to 100% (0 to 200 gpm).

LH 8.2.4.2 Set the flow to 0%

LH 8.2.4.3 Reset FQI-455 to 0 using Modsoft.

LH 8.2.4.4 Increase simulated flow to 200 gpm (100%) and verify that FQI-455 begins to accumulate gallons at a rate of 200 gpm on Modsoft. Run for 5 minutes and verify display on overview screen has accumulated 1000 gallons.

LH 8.2.4.5 Decrease simulated flow to 0 gpm (0%) and verify that FQI-455 stops accumulating, and remains constant.

LH 8.2.4.6 Disconnect and remove transmitter simulator.

LH 8.2.5 To simulate FIT-122, connect 4-20mA transmitter simulator, set at 50% to TB-6 terminals 58(+) and 59(-). Then perform the following:

LH 8.2.5.1 Vary the simulated flow from 0% to 100%, and verify that flow indicator FI-122 varies from 0 to 100% (0 to 200 gpm).

LH 8.2.5.2 Set the flow to 0%

LH 8.2.5.3 Reset FQI-122 to 0 using Modsoft if necessary.

LH 8.2.5.4 Increase simulated flow to 200 gpm (100%) and verify that FQIC-122 begins to accumulate gallons at a rate of 200 gpm.

LH 8.2.5.5 Decrease simulated flow to 0 gpm (0%) and verify that FQIC-122 stops accumulating, and remains constant.

LH 8.2.5.6 Disconnect and remove transmitter simulator.

LH 8.2.6 To simulate FIT-456, connect 4-20mA transmitter simulator, set at 50% to TB-6 terminals 67(+) and 68(-). Then perform the following:

LH 8.2.6.1 Vary the simulated flow from 0% to 100%, and verify that flow indicator FI-456 varies from 0 to 100% (0 to 200gpm).

LH 8.2.6.2 Disconnect and remove transmitter simulator.

LH 8.2.7 To simulate FIT-129, connect 4-20mA transmitter simulator, set at 50% to TB-6 terminals 106(+) and 107(-). Then perform the following:

LH 8.2.7.1 Vary the simulated flow from 0% to 100%, and verify that flow indicator FI-129 varies from 0 to 100% (0 to 100 gpm).

LH 8.2.7.2 Disconnect and remove transmitter simulator.

8.3 TEMPERATURE INDICATORS AND ALARMS
Refer to note 2 in paragraph 8.1 above.

LH 8.3.1 To simulate TE-204, remove 110 Ω resistor, and connect RTD simulator, set at 32 °F, to TB-7 terminals 6 and 7. Then perform the following:

LH 8.3.1.1 Increase simulated temperature to >275 °F and verify that alarm TAH-204 "Mixer Pump AP-102 WST-P-001 Motor Winding High Temperature" alarms.

LH 8.3.1.2 Increase simulated temperature to >293 °F and verify that alarm TAHH-204 "Mixer Pump AP-102 WST-P-001 Motor Winding Hi-Hi Temperature" alarms.

NA 8.3.1.3 Removed

LH 8.3.1.4 Decrease simulated temperature to 200 °F and verify that alarms TAH-204 and TAHH-204 can be reset.

LH 8.3.1.5 Disconnect RTD simulator. Replace resistor at terminals 6 and 7.

LH 8.3.2 To simulate TE-203, remove 110 Ω resistor, and connect RTD simulator, set at 32 °F, to TB-7 terminals 2 and 3. Then perform the following:

LH 8.3.2.1 Increase simulated temperature to >185 °F and verify that alarm TAH-203 "Mixer Pump AP-102 WST-P-001 Upper Bearing High Temperature" alarms.

LH 8.3.2.2 Increase simulated temperature to >203 °F and verify that alarm TAHH-203 "Mixer Pump AP-102 WST-P-001 Upper Bearing Hi-Hi Temperature" alarms.

NA 8.3.2.3 Removed

LH 8.3.2.4 Decrease simulated temperature to 80 °F and verify that alarms TAH-203 and TAHH-203 can be reset.

LH 8.3.2.5 Remove RTD simulator and replace temporary resistor at terminals 2 and 3.

LH 8.3.3 To simulate TE-205, remove 110 Ω resistor, and connect RTD simulator, set at 32 °F, to TB-7 terminals 10 and 11. Then perform the following:

LH 8.3.3.1 Increase simulated temperature to >185 °F and verify that alarm TAH-205 "Mixer Pump AP-102 WST-P-001 Lower Bearing High Temperature" alarms.

LH 8.3.3.2 Increase simulated temperature to >203 °F and verify that alarm TAHH-205 "Mixer Pump AP-102 WST-P-001 Lower Bearing Hi-Hi Temperature" alarms.

NA 8.3.3.3 Removed

LH 8.3.3.4 Decrease simulated temperature to 80 °F and verify that alarms TAH-205 and TAHH-205 can be reset.

LH 8.3.3.5 Remove RTD simulator and replace temporary resistor at terminals 10 and 11.

LH 8.3.4 To simulate TE-216, remove 110 Ω resistor, and connect RTD simulator, set at 32 °F, to TB-7 terminals 23 and 24. Then perform the following:

LH 8.3.4.1 Increase simulated temperature to >275 °F and verify that alarm TAH-216 "Mixer Pump AP-104 WST-P-003 Motor Winding High Temperature" alarms.

LH 8.3.4.2 Increase simulated temperature to >293 °F and verify that alarm TAHH-216 "Mixer Pump AP-104 WST-P-003 Motor Winding Hi-Hi Temperature" alarms.

NA 8.3.4.3 Removed

LH 8.3.4.4 Decrease simulated temperature to 80 °F and verify that alarms TAH-216 and TAHH-216 can be reset.

LH 8.3.4.5 Remove RTD simulator and replace temporary resistor at terminals 23 and 24.

LH 8.3.5 To simulate TE-215, remove 110 Ω resistor and connect RTD simulator, set at 32 °F, to TB-7 terminals 19 and 20. Then perform the following:

LH 8.3.5.1 Increase simulated temperature to >185 °F and verify that alarm TAH-215 "Mixer Pump AP-104 WST-P-003 Upper Bearing High Temperature" alarms.

LH 8.3.5.2 Increase simulated temperature to >203 °F and verify that alarm TAHH-215 "Mixer Pump AP-104 WST-P-003 Upper Bearing Hi-Hi Temperature" alarms.

NA 8.3.5.3 Removed

LH 8.3.5.4 Decrease simulated temperature to 80 °F and verify that alarms TAH-215 and TAHH-215 are reset.

LH 8.3.5.5 Remove RTD simulator and replace temporary resistor at terminals 19 and 20.

LH 8.3.6 To simulate TE-217, remove 110 Ω resistor and connect RTD simulator, set at 32 °F, to TB-7 terminals 27 and 28. Then perform the following:

LH 8.3.6.1 Increase simulated temperature to >185 °F, and verify that alarm TAH-217 "Mixer Pump AP-104 WST-P-003 Lower Bearing High Temperature" alarms.

LH 8.3.6.2 Increase simulated temperature to >203 °F and verify that alarm TAHH-217 "Mixer Pump AP-104 WST-P-003 Lower Bearing Hi-Hi Temperature" alarms.

NA 8.3.6.3 Removed

LH 8.3.6.4 Decrease simulated temperature to 80 °F and verify that alarms TAH-217 and TAHH-217 are reset.

LH 8.3.6.5 Remove RTD simulator and replace temporary resistor at terminals 27 and 28.

LH 8.3.7 To simulate TE-277, remove 110 Ω resistor and connect RTD simulator, set at 32 °F, to TB-7 terminals 36 and 37. Then perform the following:

LH 8.3.7.1 Increase simulated temperature to >275 °F and verify that alarm TAH-277 "Transfer Pump AP-102 WT-P-002 Motor Winding High Temperature" alarms.

LH 8.3.7.2 Increase simulated temperature to >293 °F and verify that alarm TAHH-277 "Transfer Pump AP-102 WT-P-002 Motor Winding Hi-Hi Temperature" alarms.

LH 8.3.7.3 Verify "Transfer Pump Motor Winding Temp Hi-Hi" indicator is flashing on the Interlock screen.

LH 8.3.7.4 Decrease simulated temperature to 80 °F and verify that alarms TAH-277 and TAHH-277 can be reset.

LH 8.3.7.5 Remove RTD simulator and replace temporary resistor at terminals 36 and 37.

LH 8.3.8 To simulate TE-274, remove 110 Ω resistor and connect RTD simulator, set at 32 °F, to TB-7 terminals 40 and 41. Then perform the following:

LH 8.3.8.1 Increase simulated temperature to >275 °F and verify that alarm TAH-274 "Transfer Pump AP-104 WT-P-019 Motor Winding High Temperature" alarms.

LH 8.3.8.2 Increase simulated temperature to >293 °F and verify that alarm TAHH-274 "Transfer Pump AP-104 WT-P-019 Motor Winding Hi-Hi Temperature" alarms.

LH 8.3.8.3 Verify "Transfer Pump Motor Winding Temp Hi-Hi" indicator is flashing on the Interlock screen.

LH 8.3.8.4 Decrease simulated temperature to 80 °F and verify that alarms TAH-274 and TAHH-274 can be reset.

LH 8.3.8.5 Remove RTD simulator and replace temporary resistor at terminals 40 and 41.

LH 8.3.9 To simulate TIT-120, remove 2.4K Ω resistor between terminals 70 and 74 on TB-6, and connect 4-20mA transmitter simulator, set at 45%, to TB-6 terminals 73(-) and 74(+). Then perform the following:

LH 8.3.9.1 Vary the simulated temperature from 45% (140°F) to >50% (>150°F), and verify TAH-120 alarms.

LH 8.3.9.2 Vary the simulated temperature from 50% (150°F) to >55% (>160°F), and verify TAHH-120 alarms.

LH 8.3.9.3 Vary the simulated temperature from 55% (160°F) to <40% (<130°F), and verify TAL-120 alarms.

LH 8.3.9.4 Vary the simulated temperature from 40% (130°F) to <35% (<120°F), and verify TALL-120 alarms.

LH 8.3.9.5 Remove transmitter simulator, and reconnect resistor between terminals 70 and 74.

LH 8.3.10 To simulate TIT-124, remove 2.4K Ω resistor between terminals 76 and 80 on TB-6, and connect 4-20mA transmitter simulator, set at 45%, to TB-6 terminals 79(-) and 80(+). Then perform the following:

LH 8.3.10.1 Vary the simulated temperature from 45% (140°F)to >50% (>150°F), and verify TAH-124 alarms.

LH 8.3.10.2 Vary the simulated temperature from 50% (150°F) to >55% (>160°F), and verify TAHH-124 alarms.

LH 8.3.10.3 Vary the simulated temperature from 55% (160°F) to <40% (<130°F), and verify TAL-124 alarms.

LH 8.3.10.4 Vary the simulated temperature from 40% (130°F) to <35% (<120°F), and verify TALL-124 alarms.

LH 8.3.10.5 Remove transmitter simulator, and reconnect resistor between terminals 76 and 80.

LH 8.3.11 To simulate TIT-457, remove 2.4K Ω resistor between terminals 82 and 86 on TB-6, and connect 4-20mA transmitter simulator, set at 50%, to TB-6 terminals 85(-) and 86(+). Then perform the following:

LH 8.3.11.1 Vary the simulated temperature from 0% to 100%, and verify TI-457 varies from 50 to 250°F.

LH 8.3.11.2 Remove transmitter simulator, and reconnect resistor between terminals 82 and 86.

8.4 MOTOR VIBRATION INDICATORS AND ALARMS

NOTE: Switch to "TANK 241-AP-102 Overview" screen for this portion of the test.

LH 8.4.1 To simulate VT-206, connect transmitter simulator, set at 4 mA, to TB-6 terminals 16(+) and 17(-). Then perform the following:

LH 8.4.1.1 Increase simulated vibration to >2.5 mils (>8 mA) and verify that alarm VAH-206 "Mixer Pump WST-P-001 Upper Bearing High Vibration" alarms.

LH 8.4.1.2 Increase simulated vibration to >3 mils (>8.8 mA) and verify that alarm VAHH-206 "Mixer Pump WST-P-001 Upper Bearing Hi-Hi Vibration" alarms.

NA 8.4.1.3 Removed

LH 8.4.1.4 Vary the input simulation from 0 to 100% and verify that Mixer Pump WST-P-001: Motor Vibration: Upper indicator varies from 0 to 10 mils (4-20 mA). Disconnect transmitter simulator.

LH 8.4.2 To simulate VT-207, connect transmitter simulator, set at 4 mA, to TB-6 terminals 19(+) and 20(-). Then perform the following:

LH 8.4.2.1 Increase simulated vibration to >2.5 mils (>8 mA) and verify that alarm VAH-207 "Mixer Pump WST-P-001 Lower Bearing High Vibration" alarms.

LH 8.4.2.2 Increase simulated vibration to >3 mils (>8.8 mA) and verify that alarm VAHH-207 "Mixer Pump WST-P-001 Lower Bearing Hi-Hi Vibration" alarms.

NA 8.4.2.3 Removed

LH 8.4.2.4 Vary the input simulation from 0 to 100% and verify that Mixer Pump 001: Motor Vibration: Lower indicator varies from 0 to 10 mils (4-20 mA). Disconnect transmitter simulator.

NOTE: Switch to "Tank 241-AP-104 Overview" screen for this portion of the test.

LH 8.4.3 To simulate VT-218, connect simulator, set at 4 mA, to TB-6 terminals 49(+) and 50(-). Then perform the following:

LH 8.4.3.1 Increase simulated vibration to >2.5 mils (>8 mA) and verify that alarm VAH-218 "Mixer Pump WST-P-003 Upper Bearing High Vibration" alarms.

LH 8.4.3.2 Increase simulated vibration to >3 mils (>8.8 mA) and verify that alarm VAHH-218 "Mixer Pump WST-P-003 Upper Bearing Hi-Hi Vibration" alarms.

NA 8.4.3.3 Removed

LH 8.4.3.4 Vary the input simulation from 0 to 100% and verify that Mixer Pump WST-P-003: Motor Vibration: Upper indicator varies from 0 to 10 mils (4-20 mA). Disconnect transmitter simulator.

LH 8.4.4 To simulate VT-219, connect transmitter simulator, to TB-6 terminals 52(+) and 53(-). Then perform the following:

LH 8.4.4.1 Increase simulated vibration to >2.5 mils (>8 mA) and verify that alarm VAH-219 "Mixer Pump WST-P-003 Lower Bearing High Vibration" alarms.

LH 8.4.4.2 Increase simulated vibration to >3 mils (>8.8 mA) and verify that alarm VAHH-219 "Mixer Pump WST-P-003 Lower Bearing Hi-Hi Vibration" alarms.

NA 8.4.4.3 Removed

LH 8.4.4.4 Vary the input simulation from 0 to 100% and verify that Mixer Pump WST-P-003: Motor Vibration: Lower indicator varies from 0 to 10 mils (4-20 mA). Disconnect transmitter simulator.

8.5 LIQUID LEVEL and WINCH POSITION INSTRUMENTS

LH 8.5.1 To simulate LIT-126, connect 4-20mA transmitter simulator, set at 50%, to TB-6, terminals 100(+) and 101(-). Then perform the following:

LH 8.5.1.1 Verify LI-126 indicates 60 inches +/- 1 inch.

LH 8.5.1.2 Increase simulated level to >119" (100%) and verify that alarm LAH-126, "Diluent/Flush Tank HI Level" alarms.

LH 8.5.1.3 Decrease simulated level to 24" (20%) and verify hi level alarm can be reset and LAL-126 "Diluent/Flush Tank Low Level" alarms.

LH 8.5.1.4 Decrease simulated level to 16" (13%) and verify LALL-126 "Diluent/Flush Tank Lo-Lo Level" alarms.

LH 8.5.1.5 Vary simulator from 0% to 100%, and verify LI-126 varies from 0" to 120".

LH 8.5.1.6 Remove transmitter simulator.

8.6 ANALOG VOLTAGE INSTRUMENTS

LH 8.6.0.1 To simulate ZT-131, rotate the potentiometer located on the test set box, full CCW to full CW. Verify ZI-131 varies from 0% to 100% open.

NA 8.6.0.2 Removed

LH 8.6.0.3 Leave potentiometers at mid position.

LH 8.6.1 To simulate ZT-262, connect 4-20mA transmitter simulator, set at 50% to TB-6 terminals 13(+) and 14(-). Then perform the following:

LH 8.6.1.1 Vary the simulated elevation from 0% to 100%, and verify that position indicator ZT-262 on "Tank 241-AP-102 Overview" screen varies from 0" to 240".

LH 8.6.1.2 Disconnect and remove transmitter simulator.

LH 8.6.2 To simulate ZT-268, connect 4-20mA transmitter simulator, set at 50% to TB-6 terminals 46(+) and 47(-). Then perform the following:

LH 8.6.2.1 Vary the simulated elevation from 0% to 100%, and verify that position indicator ZI-268 on "Tank 241-AP-104 Overview" screen varies from 0" to 240".

LH 8.6.2.2 Disconnect and remove transmitter simulator.

8.7 DISCRETE INPUT SIMULATION

For each of the listed inputs, jumper the indicated terminals, verify the specified alarm, acknowledge the alarm, remove the jumper, and reset the alarm.

INITIALS	DEVICE	TB	TERMINALS	ALARM ACTION
ENCL-100				
___LH___	EDS-XA-101	2	1 & 21	LOSS OF POWER
___LH___	MPS-001	2	1 & 22	MPS SHUTDOWN
___LH___	RIAS-125A	2	1 & 23	RADIATION ALARM CHANNEL 125
___LH___	RXS-125A	2	1 & 24	RAD CHANNEL 125 FAILURE
___LH___	RIAS-126A	2	1 & 25	RADIATION ALARM CHANNEL 126
___LH___	RXS-126A	2	1 & 26	RAD CHANNEL 126 FAILURE
___LH___	RAIS-127A	2	1 & 27	RADIATION ALARM CHANNEL 127
___LH___	RXS-127A	2	1 & 28	RAD CHANNEL 127 FAILURE
___LH___	LDS-282	2	1 & 30	DILUENT ENCASEMENT LEAK
___LH___	LDS-284/285	2	1 & 31	DILUENT ENCASEMENT LEAK
___LH___	LDS-127	2	1 & 34	DILUENT FLUSH PIT LEAK
___LH___	LDS-281/283	2	1 & 29	TRANSFER LINE LEAK
___LH___	LDS-286	2	1 & 32	CAUSTIC PAD SUMP LEVEL
___LH___	LDS-287A/B	2	1 & 33	PUMP PIT 04D LEAK
ENCL-101				
___LH___	PSH-276	4	46 & 47	RUPTURE DISK FAILURE
___LH___	PSL-280	4	48 & 49	LOW NITROGEN PRESSURE
___LH___	FSH-260	4	50 & 51	HIGH NITROGEN FLOW
___LH___	PSH-275	4	110 & 111	RUPTURE DISK FAILURE
___LH___	PSL-281	4	112 & 113	LOW NITROGEN PRESSURE
___LH___	FSH-261	4	114 & 115	HIGH NITROGEN FLOW
___LH___	LSH-126	4	168 & 169	DILUENT TANK HI HI LEVEL

INITIALS	DEVICE	TB	TERMINALS	ALARM ACTION
___LH___	TSL-459	4	170 & 171	RAW WATER ENCLOSURE LOW TEMP
___LH___	PDISH-451	4	188 & 189	RAW WATER STRAINER HIGH DELTA P
___LH___	PSL-125	4	197 & 198	LOW SEAL WATER PRESSURE
___LH___	PSL-126	4	199 & 200	LOW SEAL WATER PRESSURE
___LH___	PDISH-454	4	201 & 202	75 mu FILTER HIGH DELTA P
___LH___	PDISH-456	4	203 & 204	50 mu FILTER HIGH DELTA P
___LH___	TSL-453	4	205 & 206	SERVICE WATER ENCLOSURE LOW TEMP
___LH___	TSL-273	NA	NO 1 & C	ENCLOSURE TEMP HI
___LH___	TSL-273	NA	NO 3 & C	ENCLOSURE TEMP LO

8.8 COMMAND OUTPUTS

___LH___ 8.8.1 Confirm no continuity between TB-4 terminals 192 & 193.

___LH___ 8.8.2 On the HMI screen, click CHEMB-P-002 START button.

___LH___ 8.8.3 Confirm continuity between TB-4, terminals 192 & 193, and no continuity between terminals 193 & 194.

___LH___ 8.8.4 On the HMI screen, click CHEMB-P-002 STOP button.

___LH___ 8.8.5 Confirm continuity between TB-4, terminals 193 & 194.

___LH___ 8.8.6 On the tank 241-AP-102 overview screen, click the WINCH POSITION UP arrow, and hold down.

___LH___ 8.8.7 Confirm 110-120 vac between TB-4, terminals 53 & 54.

___LH___ 8.8.8 On the tank 241-AP-102 overview screen, click the WINCH POSITION DOWN arrow, and hold down.

___LH___ 8.8.9 Confirm 110-120 vac between TB-4, terminals 52 & 54.

___LH___ 8.8.10 On the tank 241-AP-104 overview screen, click the WINCH POSITION UP arrow, and hold down.

___LH___ 8.8.11 Confirm 110-120 vac between TB-4, terminals 117 & 118.

___LH___ 8.8.12 On the tank 241-AP-104 overview, click the WINCH POSITION DOWN arrow and hold down.

___LH___ 8.8.13 Confirm 110-120 vac between TB-4, terminals 116 & 118.

___LH___ 8.8.14 On the SERVICE WATER SYSTEM overview screen, click the STRAINER MOTOR button.

___LH___ 8.8.15 Confirm 110-120 vac between TB-4, terminals 195 & 196.

___LH___ 8.8.16 Click the strainer motor button again, and confirm <15 vac at terminals 195 & 196.

9 VALVE MANUAL CONTROL IN READY MODE

Ready (RDY) is the default mode with no active modes selected. Equipment status including valve positions and current process parameters are displayed.

9.1 READY MODE VALVE MANUAL CONTROL TEST

Use the READY MODE VALVE CONTROL TEST table by proceeding through each step, shown in left hand column. Then proceed to the next position and then to the next listed valve.

Sign the READY MODE VALVE CONTROL TEST sheet when all of the valves listed have been tested.

READY MODE VALVE CONTROL TEST	MOV-132 POS A	MOV-132 POS B	MOV-132 POS C	MOV-242 POS A	MOV-242 POS B	MOV-242 POS C	MOV-243 POS A	MOV-243 POS B	MOV-243 POS C	MOV-244 POS A	MOV-244 POS B	MOV-244 POS C	MOV-245 POS A	MOV-245 POS B	MOV-245 POS C	MOV-246 POS A	MOV-246 POS B	MOV-246 POS C	MOV-247 POS A	MOV-247 POS B	MOV-247 POS C	MOV-248 POS A	MOV-248 POS B	MOV-248 POS C	MOV-249 POS A	MOV-249 POS B	MOV-249 POS C	MOV-250 POS A	MOV-250 POS B	MOV-250 POS C	MOV-251 POS A	MOV-251 POS B	MOV-251 POS C	MOV-252 CLOSE	MOV-252 OPEN	MOV-253 POS A	MOV-253 POS B	MOV-253 POS C	MOV-254 POS A	MOV-254 POS B	MOV-254 POS C	MOV-261 POS A	MOV-261 POS B	MOV-261 POS C	MOV-263 POS A	MOV-263 POS B	MOV-263 POS C	FCV-131 CLOSE	FCV-131 OPEN	LCV-430 CLOSE	LCV-430 OPEN	MOV-461 CLOSE	MOV-461 OPEN
STEP 1 - VERIFY THAT VALVE POSITION SWITCHES ON THE TEST SET ARE IN THE NEUTRAL POSITION. ON RETRIEVAL OVERVIEW SCREEN OR SERVICE WATER SCREEN, SELECT VALVE. NEXT SELECT MANUAL CONTROL FOR VALVE. OPEN/CLOSE OR A/B/C BUTTONS APPEAR.																																																								
STEP 2 - CLICK ON POSITION TO TEST. VERIFY THAT THE APPROPRIATE VALVE ACTIVATION LIGHT ON TEST SET IS LIT.																																																							
STEP 3 - VERIFY VALVE TURNS FIRST YELLOW, THEN FLASHING RED AND WHITE AFTER APPROXIMATELY 75 SECONDS FOR 3-WAY VALVES AND APPROXIMATELY 40 SECONDS FOR 2-WAY VALVES.																																																						
STEP 4 - VERIFY THAT VALVE FAIL ALARM IS ANNUNCIATED WITH THE CORRECT ALARM MESSAGE DISPLAYED ON ALARM SCREEN.																																																						
STEP 5 - ACKNOWLEDGE ALARM BY CLICKING ON THE ALARM MESSAGE. ALARM MESSAGE IS A STEADY COLOR.																																																					
STEP 6 - PLACE TEST SWITCH IN CORRECT POSITION. VALVE GOES FROM FLAHSING RED TO GREEN (OPEN) OR WHITE (CLOSED) PORTS.																																																					

Procedural Notes:

1. Place a checkmark if the step is done and if there is a problem leave it blank until it is fixed.
2. Sign this form at the end of the tests on this sheet.
3. Place sheet back in QTP binder at completion of sheet tests.

Witnessed by: Lanny R. Hall

Signature:

Representing: FDNW

9.2 FLOW CONTROL VALVES

LH 9.2.1 Set test set FCV-131 position dial to a value greater than 10%, and verify valve FCV-131 on the screen is green.

LH 9.2.1.1 Adjust the potentiometer on the test set from 0 to 100%. Verify the valve symbol is white below 5% open, and remains green between 5% and 100 % open.

LH 9.2.1.2 On the Test Set place the FCV-131 switch in the OPEN position. Verify the valve symbol remains green.

LH 9.2.1.3 Place the FCV-131 potentiometer on the test set to 0% and switch in the CLOSE position. Verify that the valve symbol turns white.

9.3 VERIFY AUTO CHECK FOR EACH MODE

LH 9.3.1 Place all valves in the AUTO mode. Refer to the following Table:

LH 9.3.2 When in the READY Mode, assure CSS_READY is on, select a valve identified in the left column, and place it in the MANUAL Mode. Bring up the MODE SELECT page. From the table, Select the related Mode from the right hand column and select it on the MODE SELECT menu. Verify that the following error message appears:

"Please put the following valves in AUTO and re-select the MODE."

(With the appropriate valve listed.)

LH 9.3.3 Return to the overview screen, place the appropriate valve in AUTO, return to the MODE SELECT page, and re-select the MODE. Verify no error messages. Place a check mark in the table and initial the entry.

LH 9.3.4 Click the MODE button to de-select the mode. Verify the blue outline disappears.

Repeat steps 9.3.2 through 9.3.4 for the remainder of the table.

VALVE NUMBER	MODE	ERROR MESSAGE & RECOVERY?	COMPLETED OK - INITIALS
MOV-250	(IN2) 241-A-B To AP-102		LH
MOV-244	(RTN2) AP-102 To 241-A-B		LH
MOV-243	(RTF2) AP-102 To 241-A-B Flush		LH
MOV-261	(DIL2) Add Diluent to AP-102		LH
MOV-253	(ITR2) AP-102 In Tank Recirculation		LH
MOV-132	(ITF2) AP-102 In Tank Flush		LH
MOV-242	(WT2) AP-102 To AP Valve Pit		LH
FCV-131	(PTF2) Flush AP-102 Valve Pit		LH
MOV-245	(ILD2) AP-102 In Line Dilution		LH
MOV-247	(IN4) 241-A-B To AP-104		LH
MOV-248	(RTN4) AP-104 To 241-A-B		LH
MOV-251	(RTF4) AP-104 To 241-A-B Flush		LH
MOV-263	(DIL4) Add Diluent to AP-104		LH
MOV-254	(ITR4) AP-104 In Tank Recirculation		LH
MOV-249	(ITF4) AP-104 In Tank Flush		LH
MOV-246	(WT4) AP-104 To AP Valve Pit		LH
FCV-131	(PTF4) Flush AP-104 Valve Pit		LH
MOV-249	(ILD4) AP-104 In Line Dilution		LH
MOV-252	(HVT) 241-A-B to VIT Facility		LH

10 MODE SWITCHING INTERLOCKS & MODE VALVE ALIGNMENT

10.1 INTERLOCK MATRIX

Using the MODE INTERLOCK MATRIX on the following page, verify for every combination of MODE, beginning in the upper left hand corner, that blank mode

intersections cannot be selected from the MODE SELECT screen. Verify that intersections with an "o", can be selected individually from the mode select screen.

10.2 DOCUMENTATION

___LH___ Mark each box in the matrix with a check as the test is successfully completed.

MODE INTERLOCK MATRIX

MODE	RDY	HVT	IN2	RTN2	RTF2	DIL2	ITR2	ITF2	WT2	PTF2	ILD2	IN4	RTN4	RTF4	DIL4	ITR4	ITF4	WT4	PTF4	ILD4	SSD
RDY	X																				
HVT		X				o	o	o	o	o	o				o	o	o	o	o	o	
IN2			X								o				o	o	o	o	o	o	
RTN2				X							o				o	o	o	o	o	o	
RTF2					X											o		o			
DIL2		o				X						o	o			o		o			
ITR2		o					X				o	o	o	o	o	o	o	o	o	o	
ITF2		o						X				o	o			o		o			
WT2		o							X		o	o	o	o	o	o	o			o	
PTF2		o								X		o	o			o					
ILD2		o	o	o			o		o		X	o	o			o		o			
IN4						o	o	o	o	o	o	X								o	
RTN4						o	o	o	o	o	o		X							o	
RTF4							o		o					X							
DIL4		o	o	o			o		o						X						
ITR4		o	o	o	o	o	o	o	o	o	o					X				o	
ITF4		o	o	o			o		o								X				
WT4		o	o	o	o	o	o	o			o							X		o	
PTF4		o	o	o			o												X		
ILD4		o	o	o			o		o			o	o			o		o		X	
SSD																					X

Blank: Not allow simultaneous Mode Activation
o : Allow Simultaneous Mode Activation.

10.3 VALVE ALIGNMENT

Using the MATRIX on the following page, start in the Ready Mode (RDY), and advance downward through the MODES. At any MATRIX intersection with a "■", verify that the valve is commanded to go to that position by observing the lights on the test set. A "■" indicates the desired valve position. Only those valve positions with a "■" need be verified.

10.3.1 Using the MATRIX, verify that the appropriate valve energization lights are lit. Then "move" valve (with test position switches) into the correct position as each valve is verified. Use a yellow marker to mark each cell with a "■" as the valve is verified.

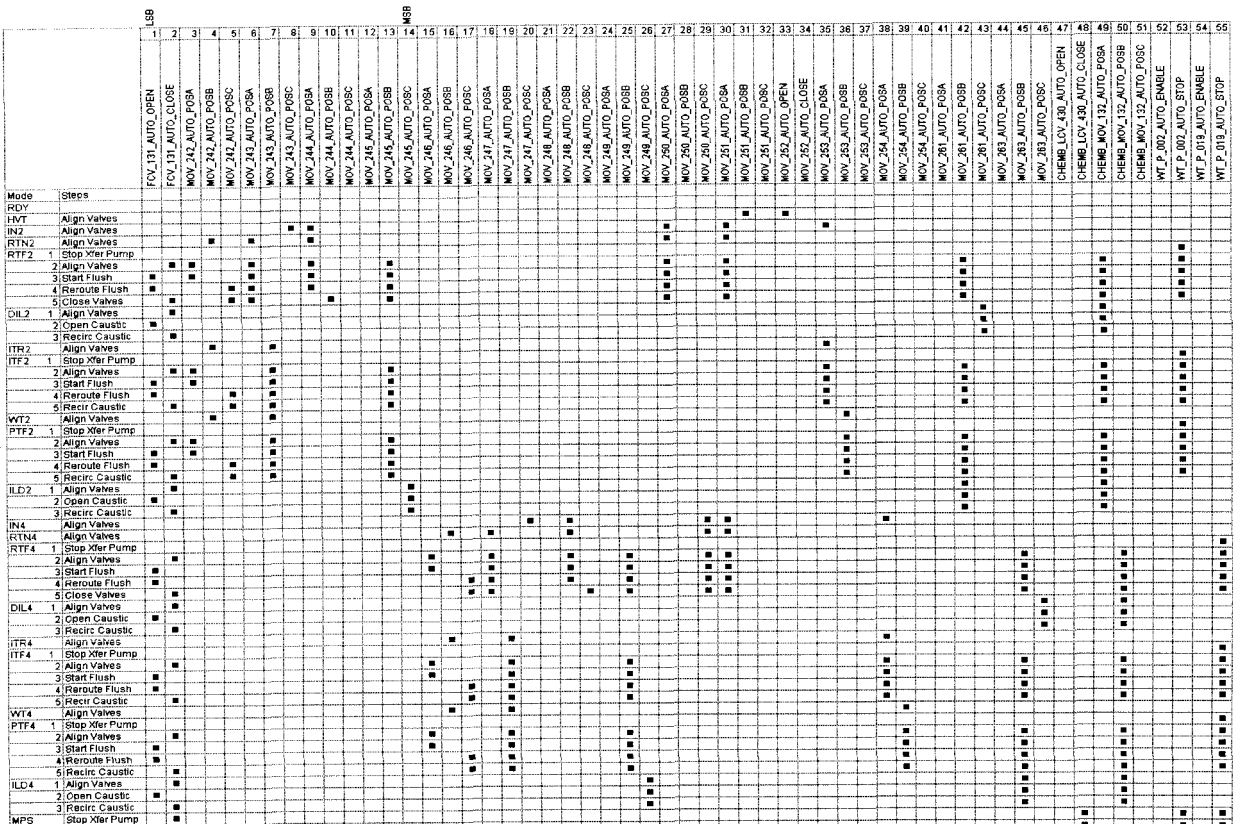
10.3.2 As each mode step is completed, verify that the appropriate step is checked off on the Mode Status window and proper valve energization lights are lit for the next step.

10.3.3 Verify the current mode button is outlined in blue. When finished with a MODE, click MODE button again to stop/exit MODE.

10.3.4 Repeat steps 10.1.1 - 10.1.3 for each of the remaining modes.

__LH__ 10.3.5 Verify all cells with a "■" have been marked as completed in the W-211 VALVE ALIGNMENT MATRIX.

The ■ symbol indicates required valve position for the related operating mode or step within that mode.



11 INTERLOCK BYPASSES

This section was removed due to no VFD devices available for testing. This section will be tested during the acceptance test procedure (ATP).

12 ENCLOSURE WT-ENCL-100 ANALOG DEVICES

Switch to "Process Overview", "Tank 241-AP-102 Overview", or "Tank 241-AP-104 Overview" screens for this portion of the test.

Acknowledge each alarm after it is verified.

12.1 PRESSURE AND LEVEL INDICATORS

NOTE: The input current is given as a percentage of 4-20mA current signal (0% = 4 mA and 100% = 20 mA).

___LH___ 12.1.1 To simulate WST-PT-102 (Tank 102 Dome Pressure), disconnect 2.4K resistor from TB-3 terminal 1.

___LH___ 12.1.2 Connect 4-20mA transmitter simulator (in mA out mode) set at 0% to terminals TB-3 terminals 1(+) and 2(-). Then perform the following:

___LH___ 12.1.3 Verify pressure indicated on screen for WST-PI-102 indicates -10 inches W.G.

___LH___ 12.1.4 Vary the input current from 0 to 100% and verify the range of the pressure indicator on screen varies from -10" to 5" W.G., and alarms occur as listed in DOO, App. B.

___LH___ 12.1.5 Remove simulator.

___LH___ 12.1.6 Reconnect 2.4K resistor.

___LH___ 12.1.7 To simulate WST-PT-104 (Tank 104 Dome Pressure), disconnect 2.4K resistor from terminal TB-3 terminal 4.

___LH___ 12.1.8 Connect a 4-20mA transmitter simulator (in mA out mode) set at 0% to terminals 4(+) and 5(-).Then perform the following:

___LH___ 12.1.9 Verify pressure indicated on screen for WST-PI-104 indicates -10 inches W.G.

LH 12.1.10 Vary the input current from 0 to 100% and verify the range of the pressure indicator on screen varies from -10" to 5" W.G., and alarms occur as listed in DOO, App. B.

LH 12.1.11 Remove simulator.

LH 12.1.12 Reconnect 2.4K resistor.

LH 12.1.13 To simulate WST-LIT-106 (Tank 106 Waste Level), disconnect 2.4K resistor from TB-3 terminal 11.

LH 12.1.14 Connect 4-20mA transmitter simulator (in mA out mode) set at 0% to terminals TB-3 terminals 11(+) and 10(-). Then perform the following:

LH 12.1.15 Verify level indicated on screen for WST-LI-106 indicates 0 inches.

LH 12.1.16 Vary the input current from 0 to 100% and verify the range of the level indicator on screen varies from 0 to 450 inches.

LH 12.1.17 Remove simulator.

LH 12.1.18 Reconnect 2.4K resistor

LH 12.1.19 To simulate WST-LIT-108 (Tank 108 Waste Level), disconnect 2.4K resistor from TB-3, terminal 17.

LH 12.1.20 Connect 4-20mA transmitter simulator (in mA out mode) set at 0% to terminals TB-3 terminals 17(+) and 16(-). Then perform the following:

LH 12.1.21 Verify level indicated on screen for WST-LI-108 indicates 0 inches.

LH 12.1.22 Vary the input current from 0 to 100% and verify the range of the level indicator on screen varies from 0 to 450 inches.

LH 12.1.23 Remove simulator.

LH 12.1.24 Reconnect 2.4K resistor.

LH 12.1.25 To simulate WST-LIT-222 (Tank 102 Waste Level), disconnect 2.4K resistor from TB-3, terminal 23.

LH 12.1.26 Connect 4-20mA transmitter simulator (in mA out mode) set at 0% to terminals TB-3 terminals 23(+) and 22(-). Then perform the following:

LH 12.1.27 Verify level indicated on screen for WST-LI-222 indicates 0 inches.

LH 12.1.28 Vary the input current from 0 to 100% and verify the range of the level indicator on screen varies from 0 to 450 inches.

LH 12.1.29 Remove simulator.

LH 12.1.30 Reconnect 2.4K resistor.

LH 12.1.31 To simulate WST-LIT-224 (Tank 104 Waste Level), disconnect 2.4K resistor from TB-3, terminal 29.

LH 12.1.32 Connect 4-20mA transmitter simulator (in mA out mode) set at 0% to terminals TB-3 terminals 29(+) and 28(-). Then perform the following:

LH 12.1.33 Verify level indicated on screen for WST-LI-224 indicates -0 inches.

LH 12.1.34 Vary the input current from 0 to 100% and verify the range of the level indicator on screen varies from 0 to 450 inches.

LH 12.1.35 Remove simulator.

LH 12.1.36 Reconnect 2.4K resistor.

13 TEST COMPLETION

13.0.1 Turn off all power.

13.0.2 Remove all simulation devices.

13.0.3 Open all fuse holders.

13.0.4 Have Electricians remove all power cables & cables to Test Set.

13.0.5 Remove two UPSs and deliver to Project Engineer. (Project Engineer will arrange to have UPSs connected to a suitable power source to maintain UPS internal batteries in a "float charge" condition.)

13.0.6 Save final RCS "as-built" software on removable electronic media (floppy disk or CD ROM).

13.0.7 Complete review and approvals of this QTP, and deliver final documentation to Test Director.

13.0.8 END

APPENDIX A - HMI SCREENS


Home Screen
Retrieval Control
Master Pump Shutdown
Tank Ventilation
Tank Waste Remediation Systems

Figure 1

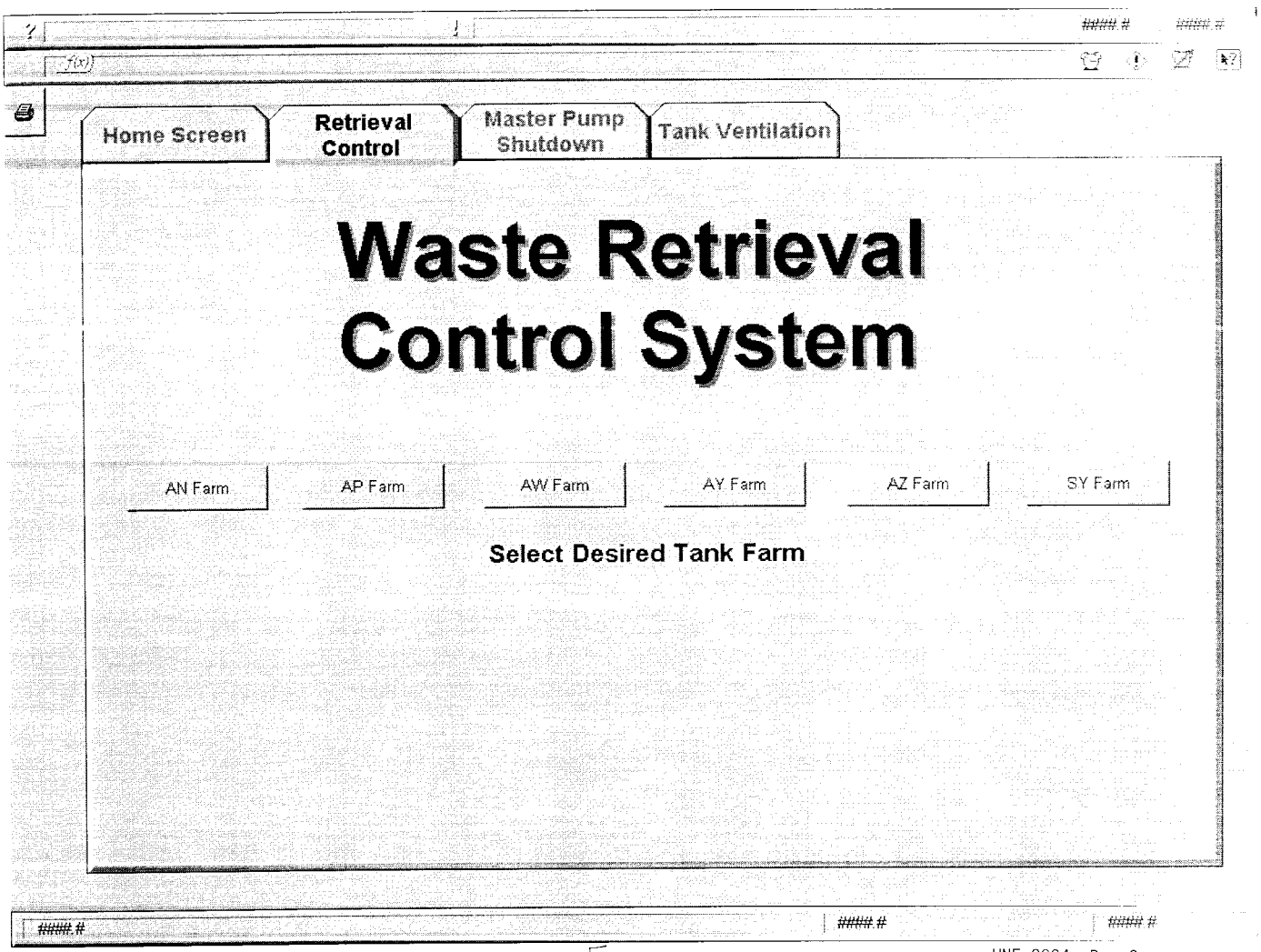

Home Screen
Retrieval Control
Master Pump Shutdown
Tank Ventilation
Waste Retrieval Control System
AN Farm
AP Farm
AW Farm
AY Farm
AZ Farm
SY Farm
Select Desired Tank Farm

Figure 2

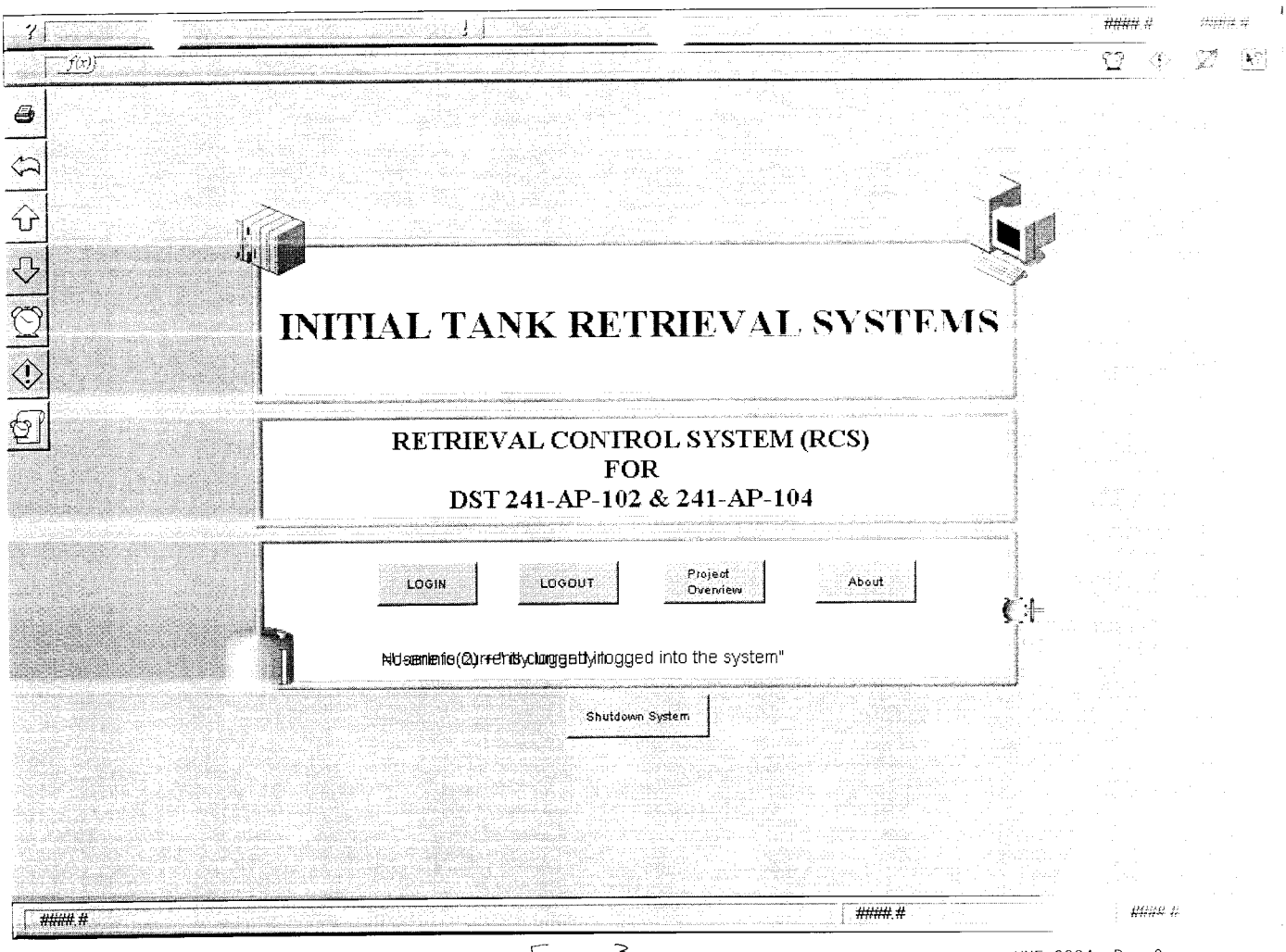

INITIAL TANK RETRIEVAL SYSTEMS
RETRIEVAL CONTROL SYSTEM (RCS)
FOR
DST 241-AP-102 & 241-AP-104
LOGIN
LOGOUT
Project Overview
About
Shutdown System

Figure 3

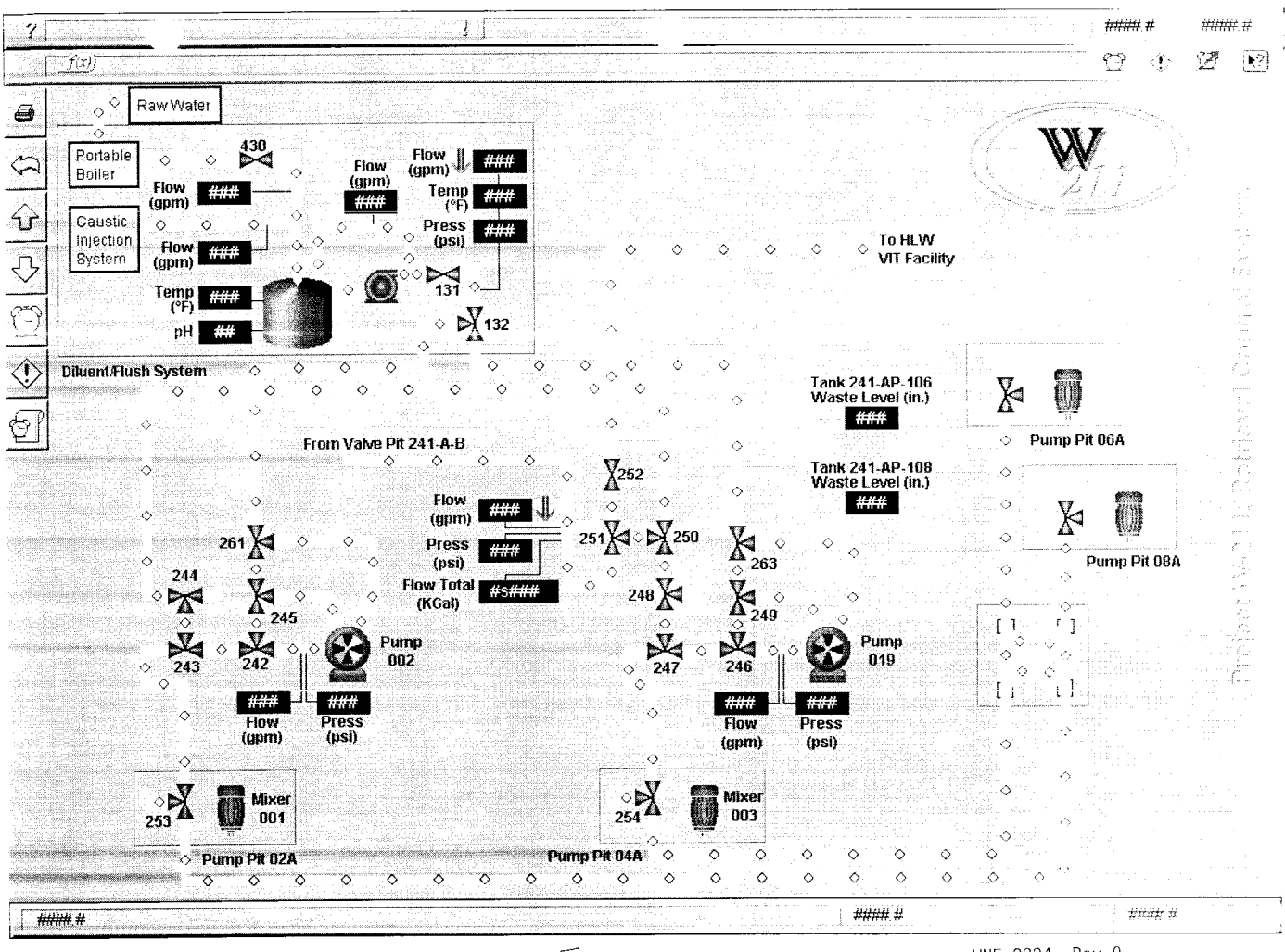

Raw Water
Portable Boiler
Caustic Injection System
430
Flow (gpm) ###
Flow (gpm) ###
Flow (gpm) ###
Temp (°F) ###
Press (psi) ###
Flow (gpm) ###
Temp (°F) ###
pH ##
131
132
Diluent/Flush System
To HLW VIT Facility
From Valve Pit 241-A-B
Tank 241-AP-106 Waste Level (in.) ###
Tank 241-AP-108 Waste Level (in.) ###
Pump Pit 06A
Pump Pit 08A
Flow (gpm) ###
Press (psi) ###
Flow Total (KGal) #s###
252
251
250
263
261
244
245
248
249
243
242
247
246
Pump 002
Pump 019
Flow (gpm)
Press (psi)
Flow (gpm)
Press (psi)
253
Mixer 001
Pump Pit 02A
254
Mixer 003
Pump Pit 04A

Figure 4

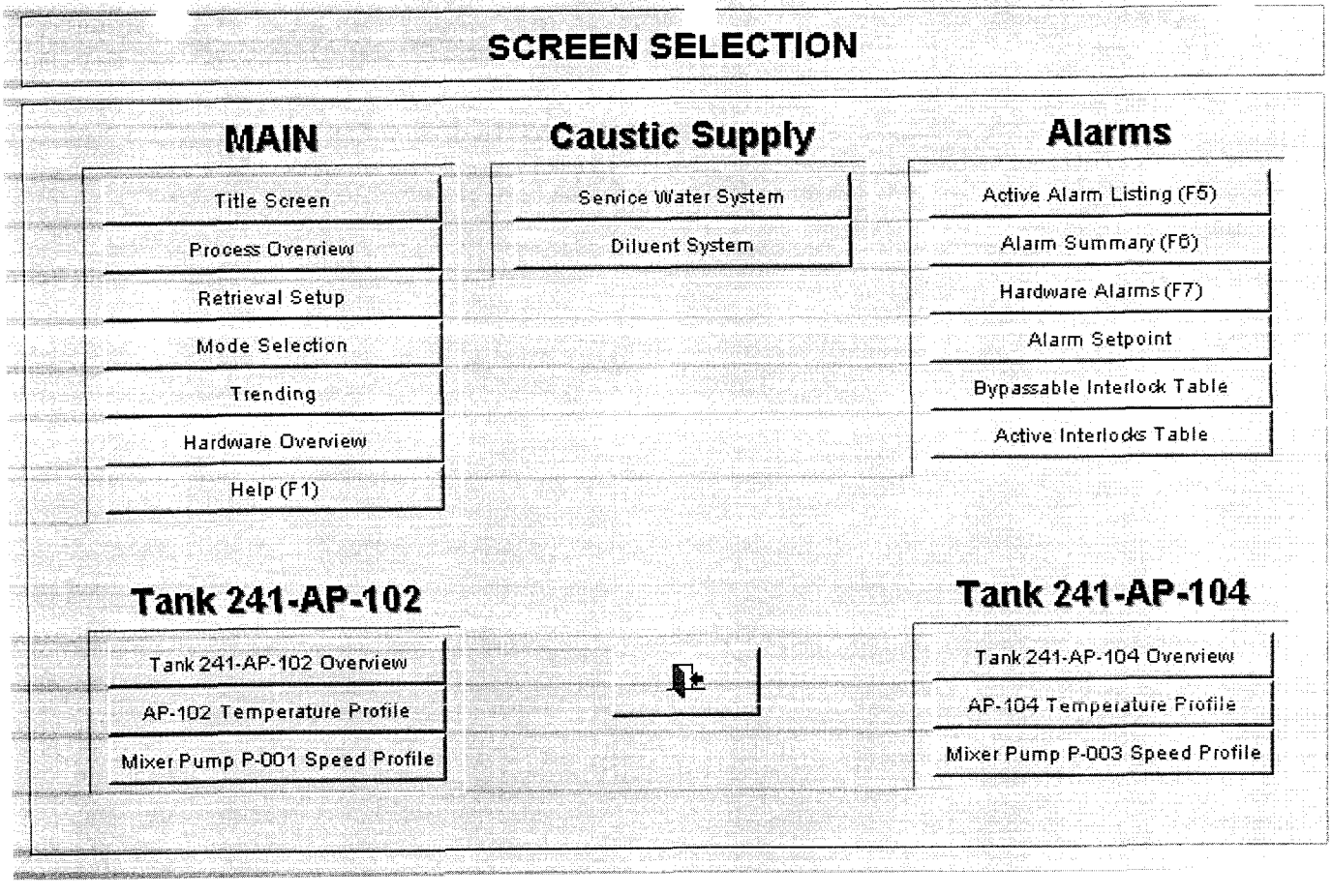

SCREEN SELECTION
MAIN
Title Screen
Process Overview
Retrieval Setup
Mode Selection
Trending
Hardware Overview
Help (F1)
Caustic Supply
Service Water System
Diluent System
Alarms
Active Alarm Listing (F5)
Alarm Summary (F6)
Hardware Alarms (F7)
Alarm Setpoint
Bypassable Interlock Table
Active Interlocks Table
Tank 241-AP-102
Tank 241-AP-102 Overview
AP-102 Temperature Profile
Mixer Pump P-001 Speed Profile
Tank 241-AP-104
Tank 241-AP-104 Overview
AP-104 Temperature Profile
Mixer Pump P-003 Speed Profile

Figure 5

RETRIEVAL SETUP

	AP-102	AP-104	
RTF: Flush to Transfer Pump	400	400	secs
RTF: Flush to Valve Pit AP-A-B	400	400	secs
DIL: Diluent Addition to Tank	0	0	gals
ITF: Flush to Transfer Pump	400	400	secs
ITF: Flush to Tank	400	400	secs
PTF: Flush to Transfer Pump	400	400	secs
PTF: Flush to Receiving Tank	400	400	secs

LH
8/4/98

Figure 6

MODES LIST

f(x)

READY

241-A-B To VIT Facility

Tank 241-AP-102	Tank 241-AP-104
241-A-B To AP-102	241-A-B To AP-104
AP-102 To 241-A-B	AP-104 To 241-A-B
AP-102 To 241-A-B Flush	AP-104 To 241-A-B Flush
Add Diluent To AP-102	Add Diluent To AP-104
AP-102 In-Tank Recirculation	AP-104 In-Tank Recirculation
AP-102 In Tank Flush	AP-104 In Tank Flush
AP-102 To AP Valve Pit	AP-104 To AP Valve Pit
Flush AP-102 Valve Pit	Flush AP-104 Valve Pit
AP-102 In-Line Dilution	AP-104 In-Line Dilution

EMERGENCY SHUTDOWN

Figure 7

BYPASSABLE PLC INTERLOCKS

AP-102	AP-104	Interlocks
Bypass	Bypass	Transfer Pump: Discharge Pressure Hi-Hi
Bypass	Bypass	Transfer Pump: Tank Waste Level Lo-Lo
Bypass	Bypass	Transfer Pump: Motor Current Hi-Hi
Bypass	Bypass	Transfer Pump: Rupture Disk Failure
Bypass	Bypass	Transfer Pump: Motor Winding Temp Hi-Hi
Bypass	Bypass	Transfer Pump: Ready Mode Is ON
Bypass	Bypass	Transfer Pump: Float Within 2' Of Waste
Bypass	Bypass	Mixer Pump: Tank Waste Level Lo-Lo
Bypass	Bypass	Mixer Pump: Motor Current Hi-Hi
Bypass	Bypass	Mixer Pump: Suction Float Not Up

Figure 8

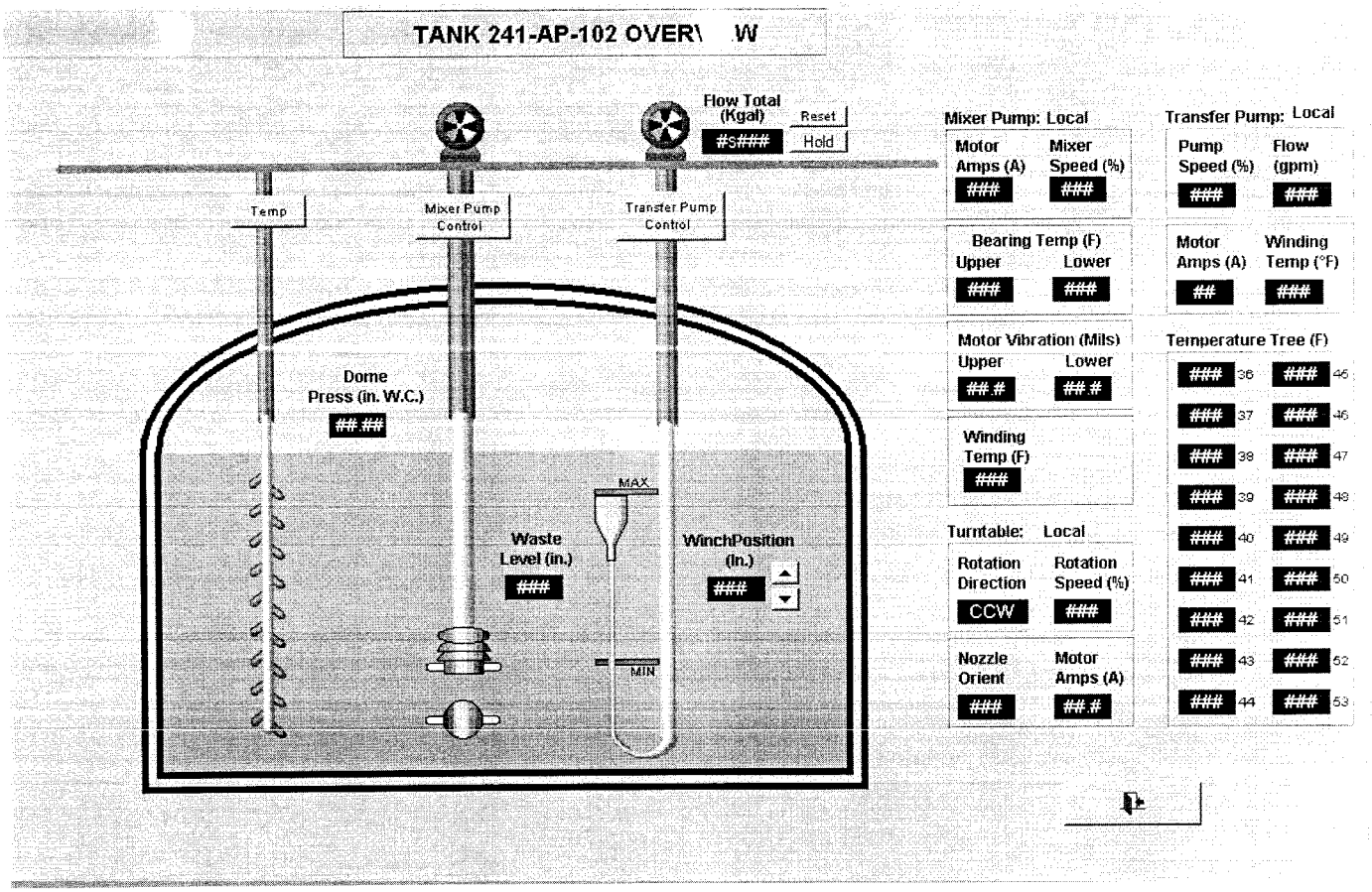

TANK 241-AP-102 OVER\ W
Flow Total (Kgal)
#s###
Reset
Hold
Temp
Mixer Pump Control
Transfer Pump Control
Dome Press (in. W.C.)
##.##
Waste Level (in.)
###
MAX
MIN
WinchPosition (In.)
###
Mixer Pump: Local
Motor Amps (A)
###
Mixer Speed (%)
###
Bearing Temp (F)
Upper
###
Lower
###
Motor Vibration (Mils)
Upper
##.#
Lower
##.#
Winding Temp (F)
###
Turntable: Local
Rotation Direction
CCW
Rotation Speed (%)
###
Nozzle Orient
###
Motor Amps (A)
##.#
Transfer Pump: Local
Pump Speed (%)
###
Flow (gpm)
###
Motor Amps (A)
##
Winding Temp (°F)
###
Temperature Tree (F)
36 ### 46
37 ### 46
38 ### 47
39 ### 48
40 ### 49
41 ### 50
42 ### 51
43 ### 52
44 ### 53

Figure 9

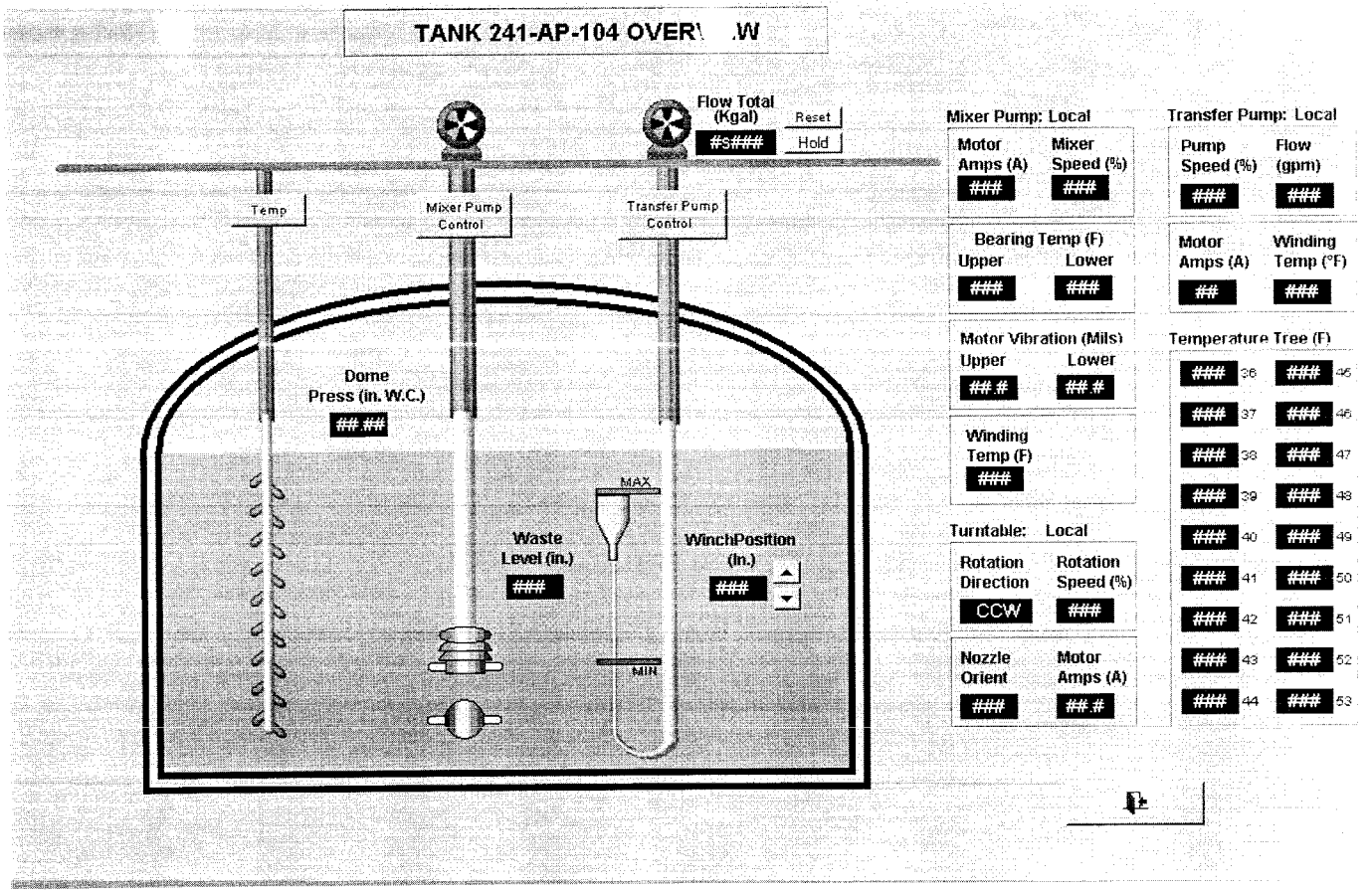

TANK 241-AP-104 OVER\ .W
Flow Total (Kgal)
#s###
Reset
Hold
Temp
Mixer Pump Control
Transfer Pump Control
Dome Press (in. W.C.)
##
Waste Level (in.)
###
MAX
MIN
WinchPosition (In.)
###
Mixer Pump: Local
Motor Amps (A)
###
Mixer Speed (%)
###
Bearing Temp (F)
Upper
###
Lower
###
Motor Vibration (Mils)
Upper
#
Lower
#
Winding Temp (F)
###
Turntable: Local
Rotation Direction
CCW
Rotation Speed (%)
###
Nozzle Orient
###
Motor Amps (A)
#
Transfer Pump: Local
Pump Speed (%)
###
Flow (gpm)
###
Motor Amps (A)
##
Winding Temp (°F)
###
Temperature Tree (F)
36 ### 45
37 ### 46
38 ### 47
39 ### 48
40 ### 49
41 ### 50
42 ### 51
43 ### 52
44 ### 53

Figure 10

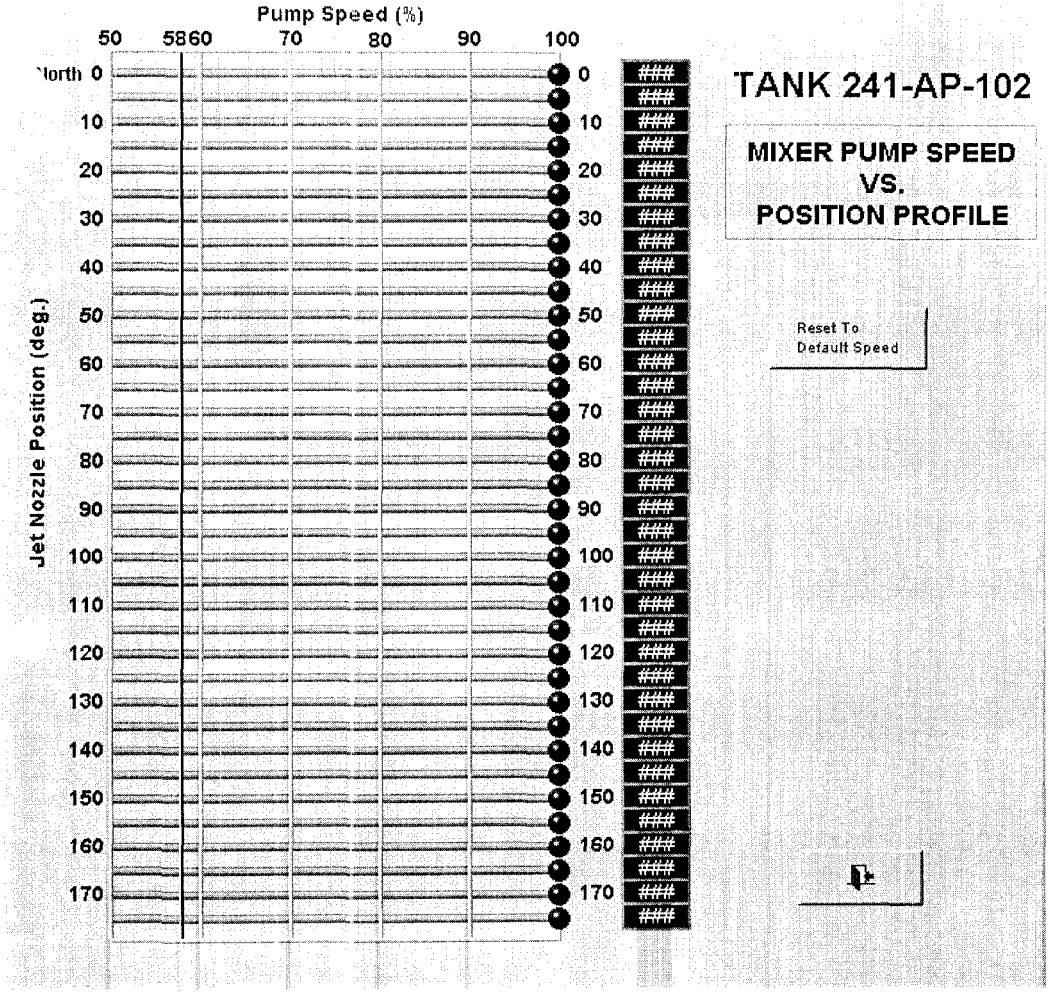

Pump Speed (%)
50
5860
70
80
90
100
North 0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
Jet Nozzle Position (deg.)
###
TANK 241-AP-102
MIXER PUMP SPEED
VS.
POSITION PROFILE
Reset To
Default Speed

Figure 11

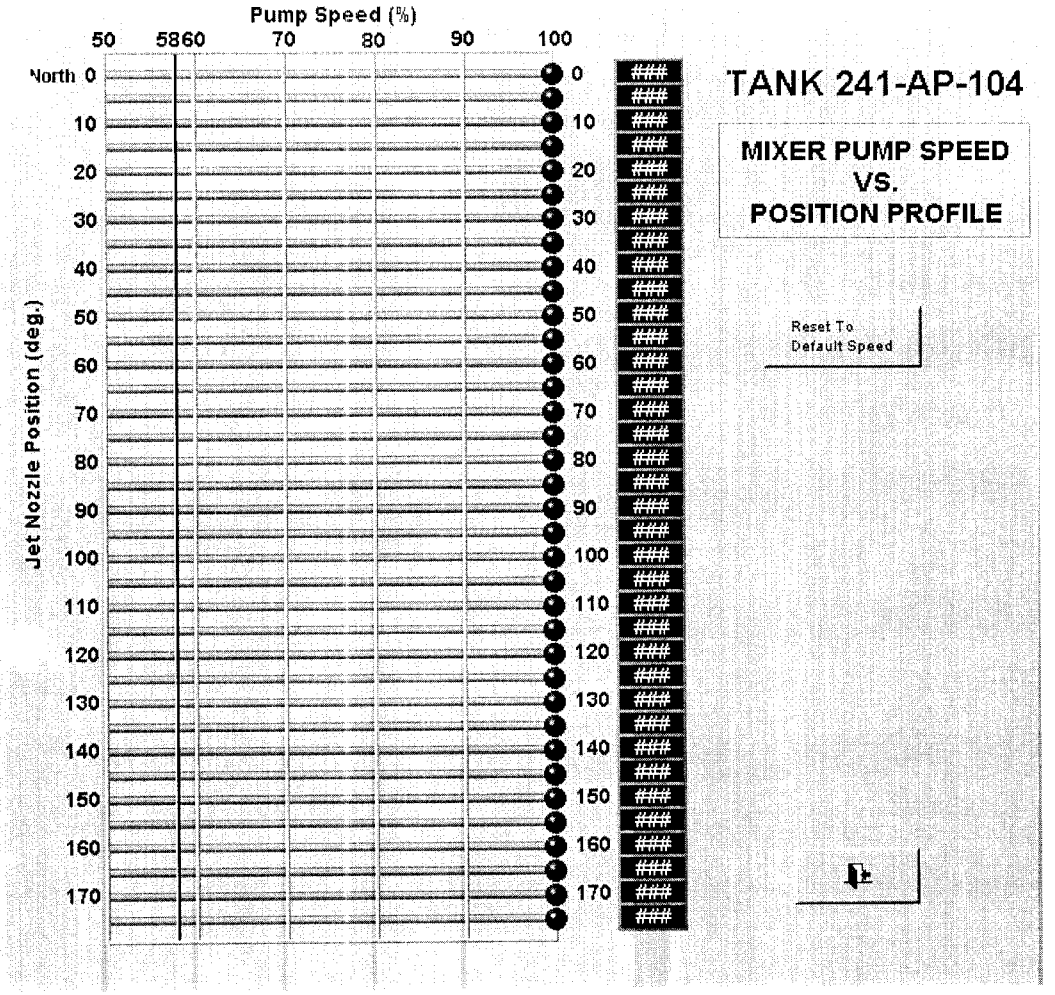

Pump Speed (%)
50
5860
70
80
90
100
North 0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
Jet Nozzle Position (deg.)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
###
TANK 241-AP-104
MIXER PUMP SPEED
VS.
POSITION PROFILE
Reset To
Default Speed

Figure 12

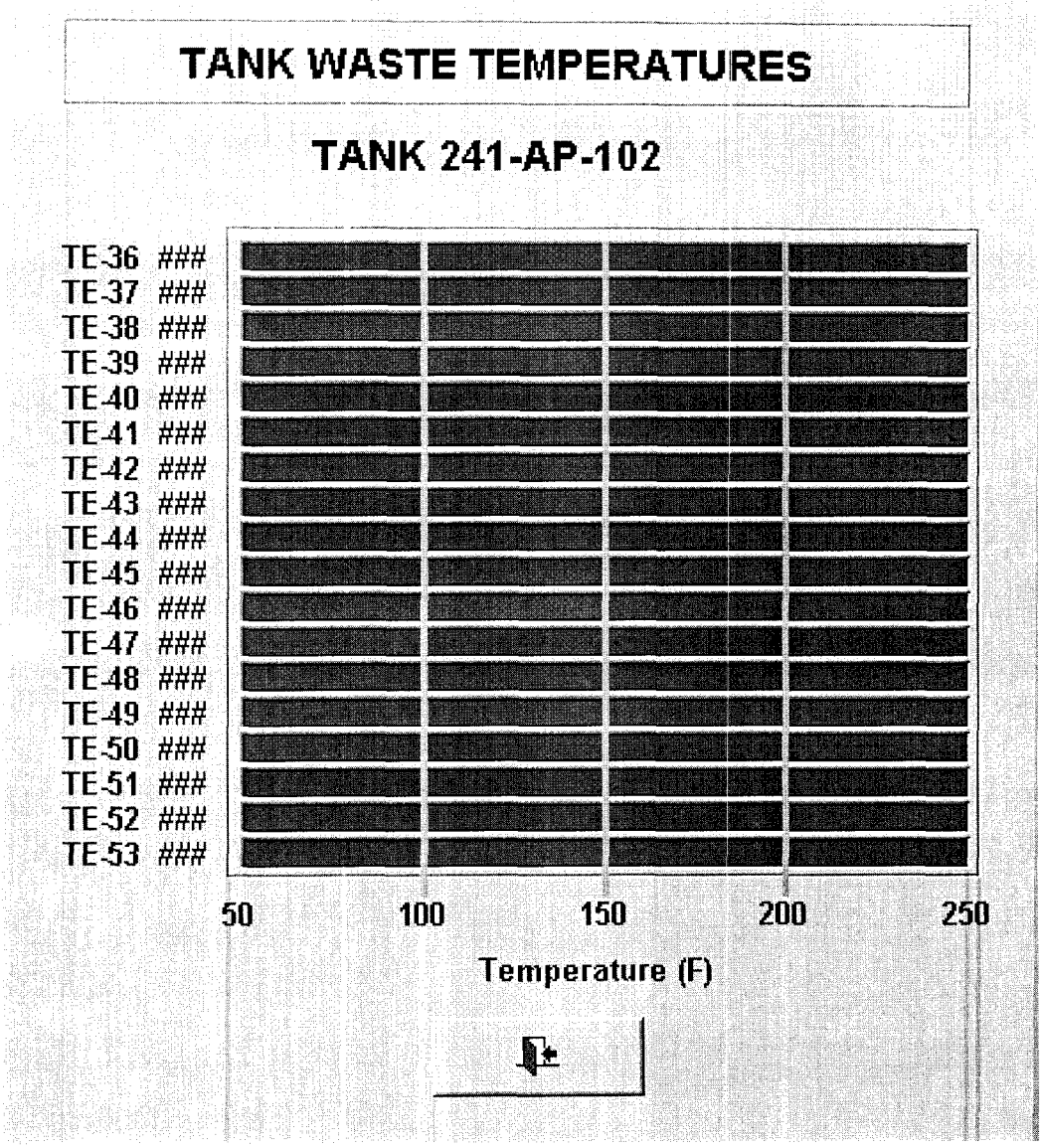
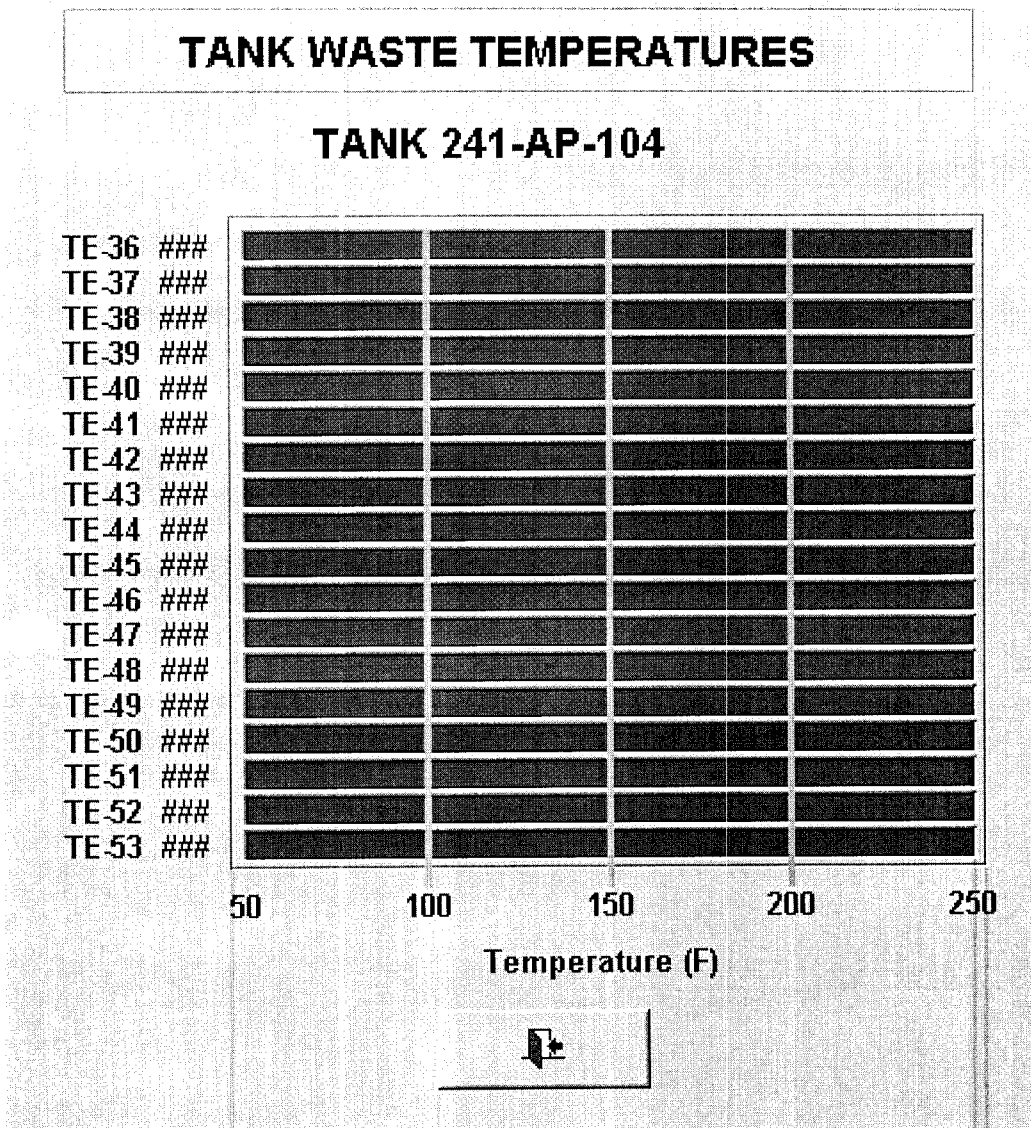

TANK WASTE TEMPERATURES
TANK 241-AP-102
TE-36 ###
TE-37 ###
TE-38 ###
TE-39 ###
TE-40 ###
TE-41 ###
TE-42 ###
TE-43 ###
TE-44 ###
TE-45 ###
TE-46 ###
TE-47 ###
TE-48 ###
TE-49 ###
TE-50 ###
TE-51 ###
TE-52 ###
TE-53 ###
50
100
150
200
250
Temperature (F)

figure 13


TANK WASTE TEMPERATURES
TANK 241-AP-104
TE-36 ###
TE-37 ###
TE-38 ###
TE-39 ###
TE-40 ###
TE-41 ###
TE-42 ###
TE-43 ###
TE-44 ###
TE-45 ###
TE-46 ###
TE-47 ###
TE-48 ###
TE-49 ###
TE-50 ###
TE-51 ###
TE-52 ###
TE-53 ###
50
100
150
200
250
Temperature (F)

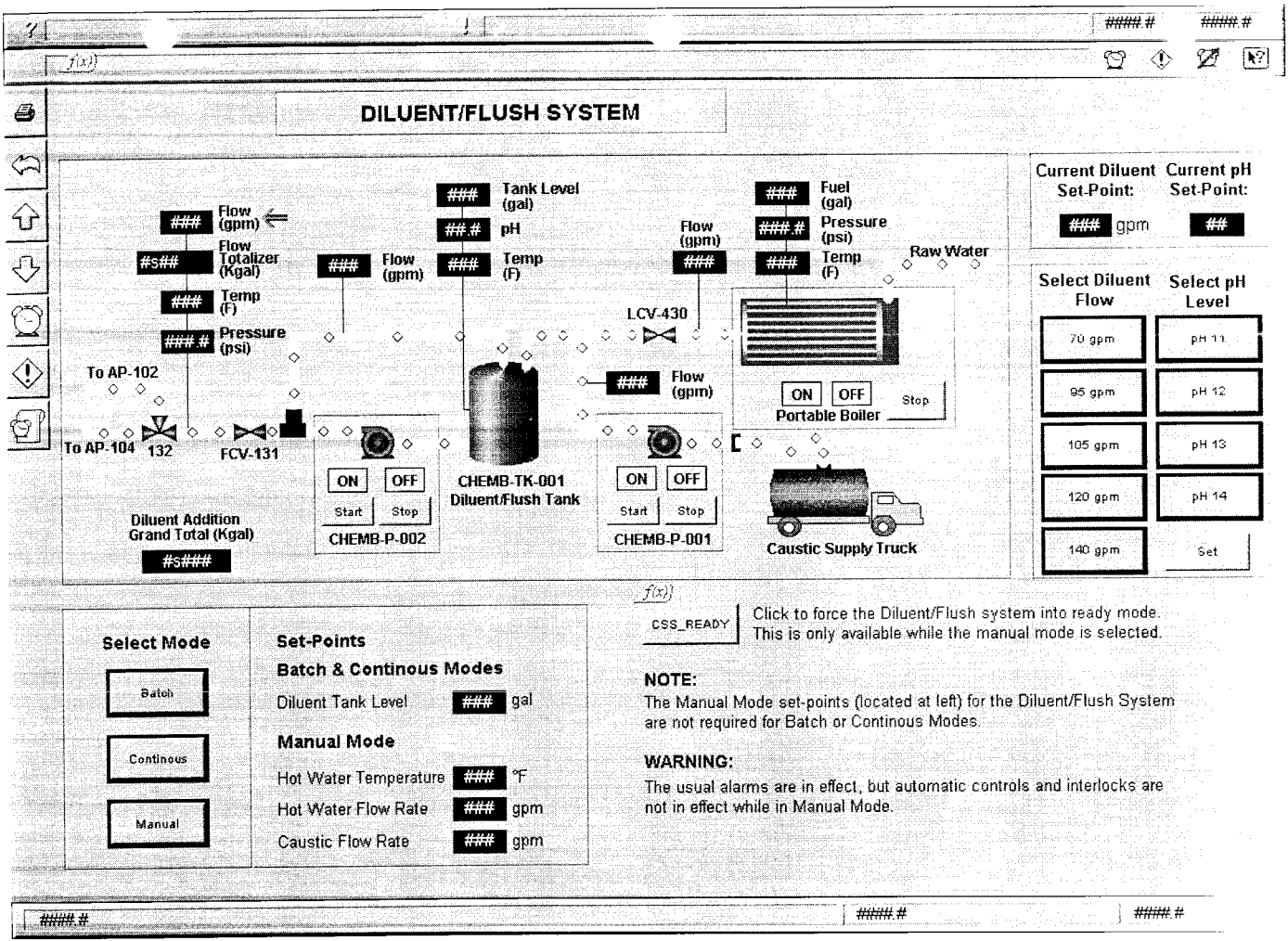

DILUENT/FLUSH SYSTEM
Flow (gpm)
#S## Flow Totalizer (Kgal)
Temp (F)
###.# Pressure (psi)
To AP-102
To AP-104
132
FCV-131
Diluent Addition Grand Total (Kgal)
#S###
Flow (gpm)
ON
OFF
Start
Stop
CHEMB-P-002
Tank Level (gal)
##.# pH
Temp (F)
CHEMB-TK-001 Diluent/Flush Tank
Flow (gpm) ###
LCV-430
Flow (gpm)
ON
OFF
Start
Stop
CHEMB-P-001
Fuel (gal)
###.# Pressure (psi)
Temp (F)
Raw Water
ON
OFF
Stop
Portable Boiler
Caustic Supply Truck
Current Diluent Set-Point:
gpm
Current pH Set-Point:
##
Select Diluent Flow
70 gpm
95 gpm
105 gpm
120 gpm
140 gpm
Select pH Level
pH 11
pH 12
pH 13
pH 14
Set
Select Mode
Batch
Continous
Manual
Set-Points
Batch & Continous Modes
Diluent Tank Level ### gal
Manual Mode
Hot Water Temperature ### °F
Hot Water Flow Rate ### gpm
Caustic Flow Rate ### gpm
f(x)
CSS_READY
Click to force the Diluent/Flush system into ready mode. This is only available while the manual mode is selected.
NOTE:
The Manual Mode set-points (located at left) for the Diluent/Flush System are not required for Batch or Continous Modes.
WARNING:
The usual alarms are in effect, but automatic controls and interlocks are not in effect while in Manual Mode.

Figure 15

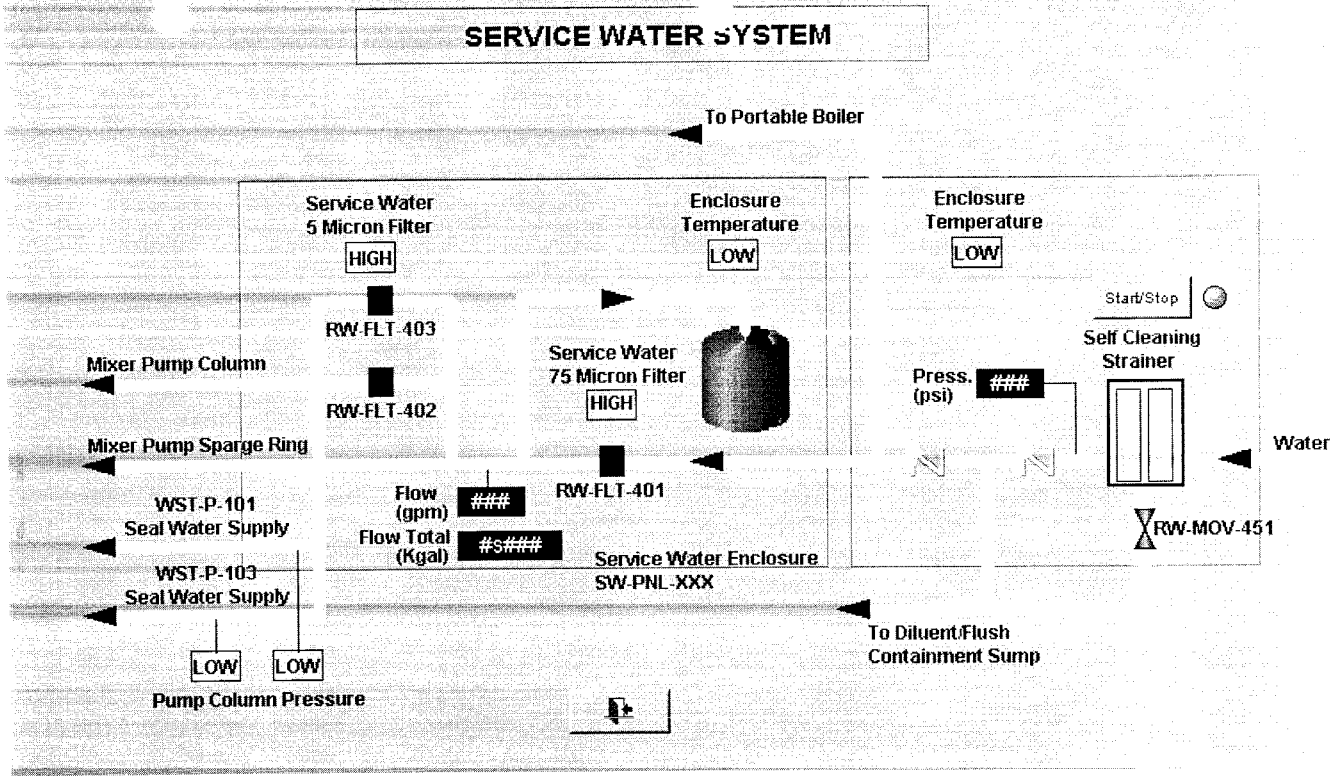

SERVICE WATER SYSTEM
To Portable Boiler
Service Water
5 Micron Filter
HIGH
RW-FLT-403
RW-FLT-402
Mixer Pump Column
Mixer Pump Sparge Ring
WST-P-101
Seal Water Supply
WST-P-103
Seal Water Supply
LOW
LOW
Pump Column Pressure
Enclosure
Temperature
LOW
Service Water
75 Micron Filter
HIGH
RW-FLT-401
Flow
(gpm)
###
Flow Total
(Kgal)
#s###
Service Water Enclosure
SW-PNL-XXX
Enclosure
Temperature
LOW
Start/Stop
Self Cleaning
Strainer
Press.
(psi)
###
Water
RW-MOV-451
To Diluent/Flush
Containment Sump

Figure 16

ALARM SETPOINTS

Tanks	241-AP-102				241-AP-104			
	HiHi	Hi	Lo	LoLo	HiHi	Hi	Lo	LoLo
Waste Level (in.)	###	###			###	###		
Temperature Probe Elem. (°F)	###	###			###	###		
Tank Dome Pressure (in. WC)			###	###			###	###

Mixer Pumps	WST-P-001				WST-P-003			
	HiHi	Hi	Lo	LoLo	HiHi	Hi	Lo	LoLo
Motor Current (Amp)	###	###			###	###		
Motor Upper Vibration (mils)	###	###			###	###		
Motor Lower Vibration (mils)	###	###			###	###		
Motor Upper Bearing Temp (F)	###	###			###	###		
Motor Lower Bearing Temp (F)	###	###			###	###		
Motor Winding Temp. (F)	###	###			###	###		
Turntable Motor Current (Amp)	###	###			###	###		
Tank Waste Level			###	###			###	###

Transfer Pumps	WT-P-002			WT-P-019		
	HiHi	Hi	Lo	HiHi	Hi	Lo
Motor Current (Amp)	###	###		###	###	
Motor Winding Temp. (°F)	###	###		###	###	
Flow Output (gpm)			###			###
Tank Waste Level			###	###		###

Diluent/Flush System	HiHi	Hi	Lo	LoLo
CHEMB-TK-001 Level (in.)		###	###	###
CHEMB-TK-001 Conductivity (µs)			###	###
CHEMB-TK-001 Temperature (°F)	###	###	###	###
Boiler Fuel Level (in.)			###	###

ALARM SET POINTS ON SCREEN AGREE WITH SECTION 5.4.3.1.2

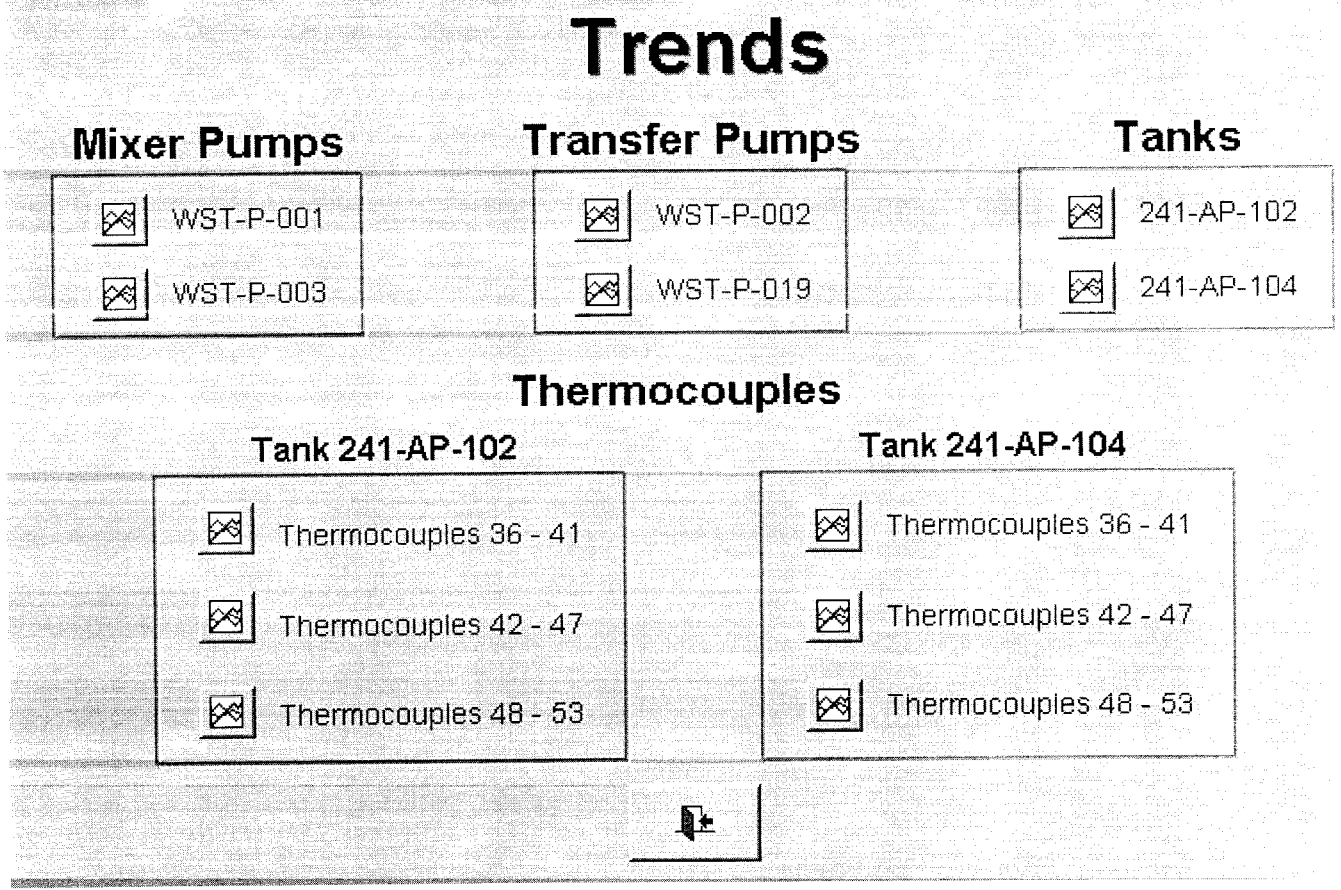

Trends
Mixer Pumps
WST-P-001
WST-P-003
Transfer Pumps
WST-P-002
WST-P-019
Tanks
241-AP-102
241-AP-104
Thermocouples
Tank 241-AP-102
Thermocouples 36 - 41
Thermocouples 42 - 47
Thermocouples 48 - 53
Tank 241-AP-104
Thermocouples 36 - 41
Thermocouples 42 - 47
Thermocouples 48 - 53

Figure 18

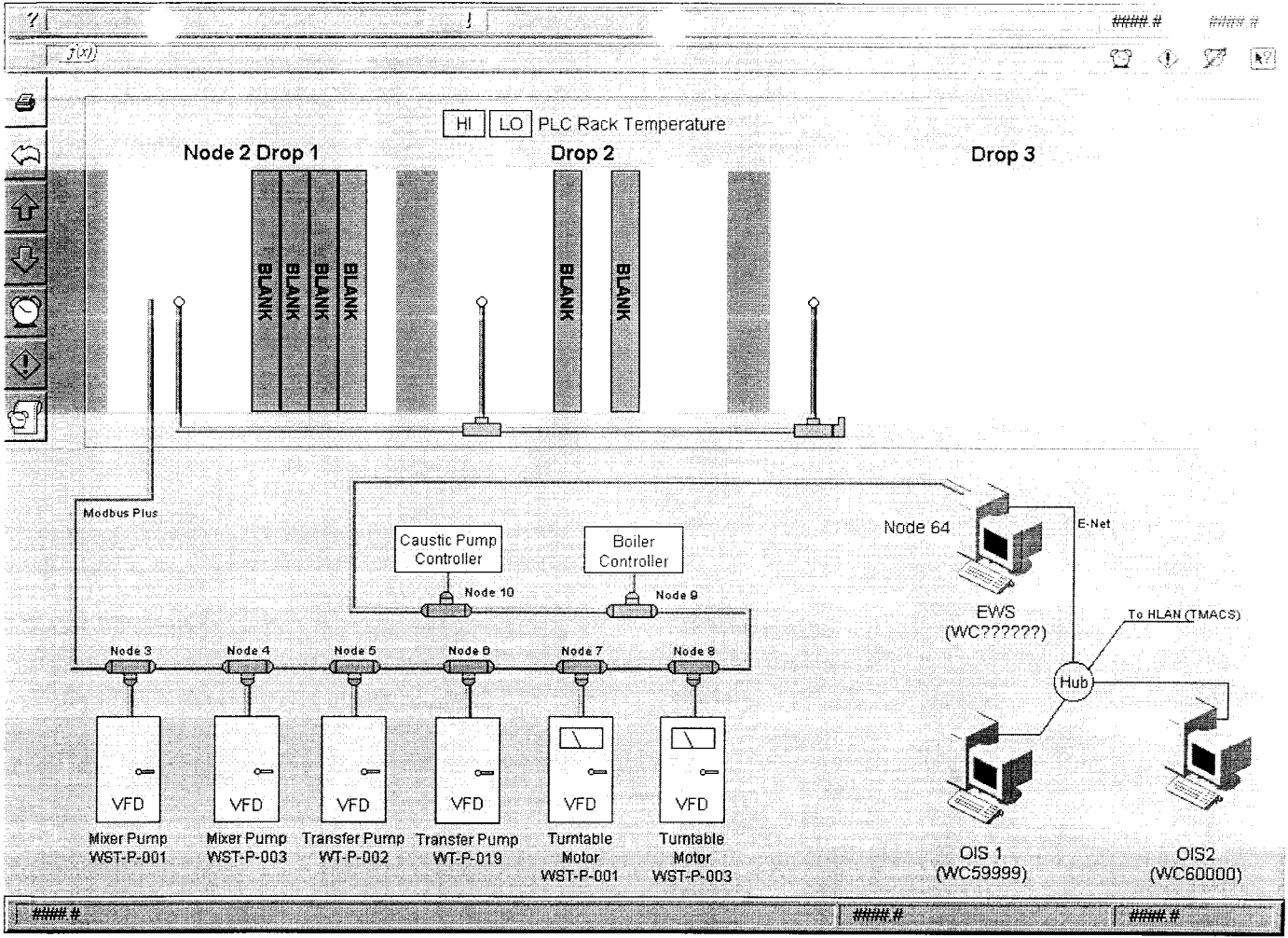

HI
LO
PLC Rack Temperature
Node 2 Drop 1
Drop 2
Drop 3
BLANK
BLANK
BLANK
BLANK
BLANK
BLANK
Modbus Plus
Caustic Pump Controller
Boiler Controller
Node 10
Node 9
Node 3
Node 4
Node 5
Node 6
Node 7
Node 8
VFD
VFD
VFD
VFD
VFD
VFD
Mixer Pump WST-P-001
Mixer Pump WST-P-003
Transfer Pump WT-P-002
Transfer Pump WT-P-019
Turntable Motor WST-P-001
Turntable Motor WST-P-003
Node 64
E-Net
EWS (WC??????)
To HLAN (TMACS)
Hub
OIS 1 (WC59999)
OIS2 (WC60000)

Figure 19

ACTIVE INTERLOCKS TABLE

Mixer Pump WST-P001	Mixer Pump WST-P003	Transfer Pump WT-P002	Transfer Pump WT-P019	Caustic Ready
SD_MOTORS	SD_MOTORS	SD_MOTORS	SD_MOTORS	Chem Tank Level out of SP Range
* WST001_LALL_222	* WST003_LALL_224	WT_MOV_242_ZSX	WT_MOV_246_ZSX	Chem Tank Temp. out of SP Range
* IAHH_201	* IAHH_213	PALL_102	PALL_104	NOT CHEMB_FCV_131_ZSC
RW_RAH_126A	RW_RAH_126A	TAHH_AP102	TAHH_AP104	NOT CHEMB_YL_550
RW_RXA_126A	RW_RXA_126A	WT_P_002_AUTO_STOP	WT_P_019_AUTO_STOP	Boiler Temp. < SP Range
VAHH_206	VAHH_218	* WT_PAH_276	* WT_PAH_275	No Mode Selected (Batch, Man, Cont)
VAHH_207	VAHH_219	* TAHH_277	* TAHH_274	WT_LDA_286
TAHH_203	TAHH_215	* WT_ZIA_262	* WT_ZIA_268	WT_LDA_282
TAHH_204	TAHH_216	* RDY_MODE_ON	* RDY_MODE_ON	
TAHH_205	TAHH_217	WT_HS_256A_STOP_CMD	WT_HS_264A_STOP_CMD	
PALL_102	PALL_104	* PAHH_259	* PAHH_266	
LAHH_222	LAHH_224	* WTP002_LALL_222	* WTP019_LALL_224	
TAHH_AP102	TAHH_AP104	* IAHH_258	* IAHH_264	
* WT_ZSU_262	* WT_ZSU_268	WT_YL_264C_ON	WT_YL_256C_ON	

* Bypassable, see Interlock Table

Figure 20