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ENGINEERING DATA TRANSMITTAL

Page 1 of 1  
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1	HNF-3611		0	Operational Test Report for 2706-T Complex Liquid Transfer System	Q	1	1	

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E, S, Q, D OR N/A (See WHC-CM-3-5, Sec. 12.7)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

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1		Design Authority N. K. Myers	<i>N. Myers</i>	4/10/99	T3-28	1		D. Levinskas	<i>D. Levinskas</i>	4/10/99	T3-28
1		Design Agent H. Benzel	<i>H. Benzel</i>	4/12/99	T3-14						
1		Cog. Eng. R. F. Boolean	<i>R. F. Boolean</i>	4/12/99	T3-28	3		Central Files			B1-07
1		Cog. Mgr. J. R. Rosser	<i>J. Rosser</i>	4/14/99	T4-03	3		DOE/RL Reading Room			H2-53
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18. <i>D. C. DeRosa</i> 4/14/99 D. C. DeRosa Signature of EDT Originator Date		19. <i>N. K. Myers</i> 4/14/99 N. K. Myers Authorized Representative for Receiving Organization Date		20. <i>N. K. Myers</i> 4/14/99 N. K. Myers Design Authority/Cognizant Manager Date		21. DOE APPROVAL (if required) Ctrl No. N/A <input type="radio"/> Approved <input type="radio"/> Approved w/comments <input type="radio"/> Disapproved w/comments	
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# Operational Test Report for 2706-T Complex Liquid Transfer System

H. R. Benzel

Waste Management Federal Services of Hanford, Inc, Richland, WA 99352  
Richland, WA 99352  
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### Abstract:

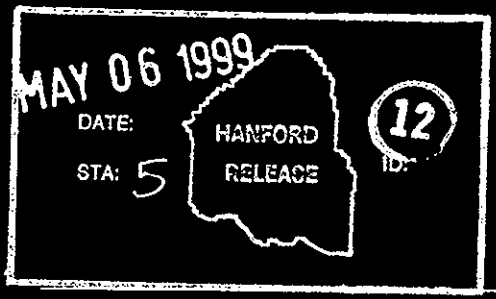
This document is the Operational Test Report (OTR). It enters the Record Copy of the W-259 Operational Test Procedure (HNF-3610) into the document retrieval system. Additionally, the OTR summarizes significant issues associated with testing the 2706-T waste liquid transfer and storage system.

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**Approved For Public Release**

**W-259 OPERATIONAL TEST REPORT**

**Document #HNF-3611, Rev. 0**

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## 1.0 PURPOSE

Operational Test Report (OTR) #HNF-3611, Rev. 0 is the mechanism for entering the signed-off Record Copy of the W-259 Operational Test Procedure (OTP) into the data retrieval system as a permanent record. In addition, the OTR provides a brief history of the OTP, and discusses many of the problems, delays, solutions, and lessons learned derived from the OTP performance activities.

## 2.0 DISCUSSION

### 2.1 OTP HISTORY

OTP #HNF-3610 tested the liquid waste collection and treatment/storage system located in the 2706-T complex in the 200 West Area of the Hanford Site. The testing was designed to demonstrate that the system components were functional, and that the system satisfied the process design criteria defined in the Project W-259 Functional Design Criteria. The test started on 12/10/98 and completed on 3/10/99. The three month interval was not due to the complexity of the system, but rather to design and installation deficiencies discovered during the testing. These are addressed in more detail in Attachment VI to this document.

Two principle deficiencies were responsible for the delay and warrant a brief discussion in the OTP history.

- FDNW did not calibrate the liquid level instruments in the system prior to Project turnover. This was particularly significant, when it was discovered that both the instruments and the system configuration were faulty.
- The software that controlled the pumps and valves were programmed in such a way that pumps could spontaneously start, and valves could inadvertently open.

Resolving the problem with the level detectors was a hardware issue. It was ultimately resolved by replacing the original instruments with new instruments of a different model, and modifying the piping in which the instrument was installed. The logistics of procuring, shipping and installing the instruments delayed the OTP for two months.

The software issue was resolved by modifying the software. A contract was placed with the vendor to make the necessary modifications. The logistics of placing the contract and modifying the software delayed the OTP for two weeks. The software modifications also forced a revision to the OTP to verify that the modifications were adequate and functional.

### 2.2 OTP LIMITATIONS

The OTP did not test two significant aspects of Project W-259.

- The OTP did not test any system components, if the test required simulated signals or conditions. For example, the OTP did not test the diaphragm failure alarms. Since it is inappropriate to perforate the diaphragm to demonstrate that the diaphragm leak detector is functional, it was necessary to immerse the leak detector's sensing element into a liquid container to simulate diaphragm failure. Since, this action was already performed in the Project W-259 Acceptance Test Procedure, there was no value added in repeating the test in the OTP.
- The OTP did not test the valve and pump controls on Instrument Panels I-XX-2706-001 and I-XX-2706-002. The controls on these two panels were designed to implement automatic valve line-ups based on a mode selector switch. However, the panels and automatic operating scheme were plagued by numerous design and logic errors. For example:
  - A low level in Tank 220 closes the Tank 220 fill valve.

- To operate a pump from Panel I-XX-2706-001 in the 2706-T Bay, it must first be selected at Panel I-XX-2706-002 in 2706-TA, and before the pump selection at -002 is made, the valve position mode must first be verified in the 2706-TA electrical room.
- The mode indicating lights do not include all of the relevant valves in a selected mode.

Note that these are just a few of the many problems associated with operating the system from Panels -001 and -002. WMH determined that the system could be operated more efficiently and safely from the computer control screen. Therefore, the OTP did not test Panels -001 and -002.

## 2.3 LESSONS LEARNED

This section presents some observations relative to system operation that are not readily apparent in the system design media. Whereas they could impact future operation, they are noted in this report.

### SYSTEM SIPHONS:

There is a perception that if the pumps are off no liquids move in the 2706-T Complex liquid handling/storage system. In reality, the system design allows liquids to siphon in certain configurations. For example, when transferring liquid from either Tank 220 or Tank 221 to the 2706-T Bay, liquid continues to flow even if the pump stops. The rate varies depending on how full the tank is, but is approximately 40 gallons per minute. The siphon can be broken by opening the vent valve, HV-07, or stopped by closing one or more of the transfer valves. However, closing the transfer valves is a temporary solution in that the siphon usually resumes when the transfer valves are reopened.

Liquid will also siphon through Valve HV-07 following a tank recirculation in either Tank 220 or 221. The liquid flows back to the 2706-TA sump at approximately 30 gallons a minute.

Consideration was given to whether the siphons are a hazard or a benefit, and what should actually be done about them. It was determined that the siphons are beneficial.

- The benefit provided by the siphon into the 2706-T Bay is the ability to finish a transfer if the pump fails.
- The benefit provided by the siphon into the 2706-TA Sump is the ability to test the high-high level alarm in that sump, without adding additional liquid to the sump. Because the high level alarm in the 2706-TA Sump shuts off the feed pumps, 203 and 204, it is not possible to test the 2706-TA Sump high-high level alarm without adding liquid from some source other than the Railroad Pit Sump. Before the OTP Test Director discovered the siphons, liquid was added with hoses. Once the siphon was discovered it was no longer necessary to add water to the system to test it. The siphons offer a viable waste minimization approach to system testing.

To ensure that the siphons would not be a hazard, a software command was added that automatically closes the system valves when the emergency stop is activated. The OTP was revised to include additional testing to verify that the emergency stop closes the system valves.

### SYSTEM LIMITATIONS:

The software controlling the 2706-T Complex liquid handling/storage system contains a number of interlocks that reduce the flexibility of the system. Perhaps the most significant of these limitations is the inability to recirculate liquids in the 2706-TA Sump through the filters without pumping the liquids into either Tank 220 or 221. Although, this function is not currently part of projected operations, it is very conceivable that the capability to recirculate 2706-TA Sump liquids might be beneficial to future operations.

In the absence of interlocks, the 2706-TA liquids can be recirculated by closing Valves HV-04, HV-05 and HV-06 and opening Valves HV-07 and HV-08. A likely scenario might be a case where the liquid is particularly dirty or contaminated, and recirculation through the filters a few times before the liquid is transferred to the tanks would reduce particulate build-up in the tanks. Alternatively, operations might like to transfer directly from the TA Sump to the transfer truck and bypass the tanks all together. The assumption in this case is that the material is inappropriate for storage in the tanks. In either case, 2706-TA Sump cannot be recirculated because Pumps 206 and 207 will not run if both tank fill valves, HV-04 and HV-05 are closed. (Note that recirculating the 2706-TA Sump through the filters would also allow Operations to sample liquids from the sump instead of only from the tanks).

Another limitation is the inability to recirculate tank liquids through the filters by way of the 2706-TA Sump. This action could be accomplished by opening either Valve HV-02 or HV-03 in combination with Valves HV-06 and HV-07, and closing Valve HV-08. However, this scenario is not workable, because when Valve HV-07 is open neither Pump 210 or 211 will run.

#### OPERATIONS RECOMMENDATIONS:

**TB Sump Pump 212:** The TB Sump Pump 212 is designed to run in automatic or manual mode. It has a regulatory function, in that it removes liquids from the secondary containment. If the pump is run in automatic, it is imperative that at least one of the tank fill valves, either HV-04 or HV-05 be open. If both fill valves are closed the TB Sump Pump 212 will not start.

**Remodel and upgrade the electrical room workstation:** The current station is not ergonomically designed. The mouse, a collection of buttons on a flat, vertical surface, is marginally functional. The workstation does not provide a workspace for setting relevant operating procedures and work documents. The computer itself is underpowered for the software it is running. Consequently, the valve and pump response to commands is very slow. In some cases a command would cancel a previous command because the previous command was not fully implemented. This situation was unpredictable, because the delays were varied and indications of completed actions were inconsistent. The operators learned to wait for comparatively extended periods between commands. However, a processor upgrade would resolve this concern.

**System Troubleshooting Guide:** A system troubleshooting guide should be developed and attached to the operating procedure. Because of the multitude of interlocks in the system, it is sometimes difficult to ascertain why a pump has failed to start, or a valve has failed to open. In many cases the circumstances that activate an interlock might be so rare, that an operator is likely to forget it exists. The troubleshooting guide would facilitate prompt problem diagnosis and ensure that interlocks are recorded. The guide should be in table form and should list possible causes in order of probable occurrence. For example:

Pump 203 fails to start automatically:

1. Verify that there is a high level in the Railroad Pit Sump.
2. Verify that it is not in manual mode.
3. Verify that there isn't a high-high level in the 2706-TA sump.
4. Verify that there isn't a Pump 203 diaphragm failure alarm.
5. Verify that there is air pressure in the system.
6. Verify that the air supply valves are open.
7. Verify that the pump isolation valves are not closed.
8. Call maintenance.

### 3.0 INTRODUCTION TO THE ATTACHMENTS

There are six attachments to the OTR. This section of the OTR introduces each of the attachments. The introduction explains the purpose of each attachment, and highlights significant issues, if any, associated with that attachment.

#### 3.1 Attachment I, HNF-3610, Rev. 1 Record Copy

Attachment I is the Record Copy of the OTP, #HNF-3610, Rev. 1. It contains the required signatures, and all pen and ink changes identified in the minor discrepancy list. Issues that require some explanation are:

- **Verification Dates:** Typically, the verification date on each procedure section is the date on which that section was successfully completed. In some cases the dates will differ from those shown in HNF-3610, Rev. 0. This difference is due to retesting as required to verify design changes implemented after Rev. 0 testing had been completed. In those sections where the verification dates are the same in both Rev. 0 and Rev. 1, that section did not require retesting. This explanation is provided only as clarification. Per Section 2.1.17 the dates do not need to coincide with procedure performance.
- **Gallon Readings:** A reviewer will note differences in the gallon readings between Rev. 0 and Rev. 1 of HNF-3610. These differences are not significant. The tolerances on the gallon readings are dependent on the accuracy of the instrument and the configuration of the installation. In all cases the readings were within the systems allowable tolerances. The purpose of the gallon readings was to provide data that the system engineers could use to determine pump rates, and evaluate the relative accuracy of the instruments. With this data, it can be seen that later gallon readings were much closer to the setpoints.
- **HNF 3610, Rev. 0 Minor Discrepancies:** HNF-3610, Rev. 1 incorporates most of the minor deficiencies identified in HNF-3610, Rev. 0. Those that were missed are repeated as minor deficiencies in Rev. 1.

#### 3.2 ATTACHMENT II, HNF-3610, Rev. 1 Minor Discrepancy List

Attachment II is the HNF-3610, Rev. 1 Minor Discrepancy List. The Minor Discrepancy List is a list of discrepancies that were classified as minor because they did not require a change in the system hardware, software or operating philosophy. They were implemented with pen and ink changes to the Record Copy of HNF-3610, Rev. 1 in accordance with Section 2.1.6 of HNF-3610, Rev. 1. Note that there is no significance to the order or numbering of the discrepancies. The items were noted during the OTP on the working copies of the OTP. When the OTP was completed the Minor Discrepancies List was compiled, and the pen and ink changes were entered into the OTP Record Copy. The pen and ink dates are the dates on which the minor discrepancies were discovered. Again there is no significance to the dates. They were not required. They were entered as a convenience to the Test Director.

#### 3.3 ATTACHMENT III, HNF-3610, Rev. 0 Major Discrepancy List

Attachment III is the HNF-3610, Rev. 0 Major Discrepancy List. The Major Discrepancy List is a list of discrepancies that required an ECN to the OTP to resolve the discrepancies. In summary, several software changes were required to ensure that the system could be operated safely. The OTP was revised as a result of these changes to provide additional testing to verify that the modifications were functional and effective.

#### 3.4 ATTACHMENT IV, HNF-3610, Rev. 0 Minor Discrepancy List



Attachment IV is the HNF-3610, Rev. 0 Minor Discrepancy List. The Minor Discrepancy List is a list of discrepancies that were classified as minor because their resolution did not require a change in the operating hardware, software or philosophy. They were implemented with pen and ink changes to the Record Copy of HNF-3610, Rev. 1 in accordance with Section 2.1.6 of HNF-3610, Rev. 1. Note that there is no significance to the order or numbering of the discrepancies. The items were noted during the OTP on the working copies of the OTP. When the OTP was completed the Minor Discrepancies List was compiled, and the pen and ink changes were entered into the OTP Record Copy. The pen and ink dates are the dates on which the minor discrepancies were discovered. Again there is no significance to the dates. They were not required. They were entered as a convenience to the Test Director.

### **3.5 ATTACHMENT V, HNF-3610, Rev. 0 Record Copy**

Attachment V is the Record Copy of OTP, #HNF-3610, Rev. 0. It contains the required signatures, and all pen and ink changes identified in the minor discrepancy list. Issues that require some explanation are:

- Verification Signatures: Note that not all OTP sections have verification signatures. Those OTP sections of Rev. 0 that were successfully completed have verification signatures. The remainder do not. The verification signature in Section 13.0 signifies that those OTP sections that have verification signatures were successfully completed in compliance with the OTP instructions.
- Verification Dates: Typically, the verification date on each procedure section is the date on which that section was successfully completed. In some cases the dates will differ from those shown in HNF-3610, Rev. 1. This difference is due to retesting as required to verify design changes implemented after Rev. 0 testing had been completed. In those sections where the verification dates are the same in both Rev. 0 and Rev. 1, that section did not require retesting. This explanation is provided only as clarification. Per Section 2.1.17 the dates do not need to coincide with the date the section was performed.
- Gallon Readings: A reviewer will note differences in the gallon readings between Rev. 0 and Rev. 1 of HNF-3610. These differences are not significant. The tolerances on the gallon readings are dependent on the accuracy of the instrument and the configuration of the installation. In all cases the readings were within the systems allowable tolerances. The purpose of the gallon readings was to provide data that the system engineers could use to determine pump rates, and evaluate the relative accuracy of the instruments. With this data, it can be seen that later gallon readings were much closer to the setpoints.

### **3.6 ATTACHMENT VI, Non-OTP Problems List**

Attachment VI is the Non-OTP Problems List. The Non-OTP Problems List is a list of the problems that were discovered during the course of the OTP. Many of the problems were not related to the liquid handling system, and as such did not prevent OTP performance. Others had to be resolved before the OTP could be performed. There is no significance to the order of the listing. Generally the problems are listed in the order in which they were discovered.

The problems are presented as an historical record. In many cases they are likely to recur and the record of resolution may assist in resolving future problems.

***RECORD COPY***

***OPERATIONAL TEST PROCEDURE***

***HNF-3610, Rev. 1***

<b>ENGINEERING CHANGE NOTICE</b>	Page 1 of <u>2</u>	1. ECN <b>640206</b>
		Proj. ECN

2. ECN Category (mark one) Supplemental <input type="checkbox"/> Direct Revision <input checked="" type="checkbox"/> Change ECN <input type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersedure <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. <b>DC DeRosa/32900/T4-56/376-7900</b>	4. USQ Required? <b>T-96-102</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5. Date <b>02/24/99</b>
6. Project Title/No./Work Order No. <b>2706-T Liquid Collection System</b>		7. Bldg./Sys./Fac. No. <b>2706-T/Treatment</b>	8. Approval Designator <b>ESQ</b>
9. Document Numbers Changed by this ECN (includes sheet no. and rev.) <b>HNF-3610 Rev. 0</b>		10. Related ECN No(s). <b>N/A</b>	11. Related PO No. <b>N/A</b>

12a. Modification Work <input type="checkbox"/> Yes (fill out Blk. 12b) <input checked="" type="checkbox"/> No (NA Blks. 12b, 12c, 12d)	12b. Work Package No. <b>N/A</b>	12c. Modification Work Complete <b>N/A</b>	12d. Restored to Original Condition (Temp. or Standby ECN only) <b>N/A</b>
		Design Authority/Cog. Engineer Signature & Date	Design Authority/Cog. Engineer Signature & Date

13a. Description of Change  
 This ECN is a complete revision to the document to reflect changes to the 2706-T effluent collection system software. These software changes were necessary to fully implement the required interlocks.

13b. Design Baseline Document?  Yes  No

14a. Justification (mark one)

Criteria Change <input type="checkbox"/>	Design Improvement <input checked="" type="checkbox"/>	Environmental <input type="checkbox"/>	Facility Deactivation <input type="checkbox"/>
As-Found <input type="checkbox"/>	Facilitate Const <input type="checkbox"/>	Const. Error/Omission <input type="checkbox"/>	Design Error/Omission <input type="checkbox"/>

14b. Justification Details  
 It was necessary to change the OTP so as to fully and accurately test the changes made to the software.

15. Distribution (include name, MSIN, and no. of copies)

R.F. Boolean T3-28	R.J. Nicklas T3-07
H.R. Benzy T3-28	A.S. Mortensen T3-28
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C.R. Haas T3-28	M.C. Teats S6-72

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**FEB 25 1999**

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ENGINEERING CHANGE NOTICE

16. Design Verification Required <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	17. Cost Impact		18. Schedule Impact (days)	
	ENGINEERING Additional <input type="checkbox"/> \$ Savings <input type="checkbox"/> \$N/A		CONSTRUCTION Additional <input type="checkbox"/> \$ Savings <input type="checkbox"/> \$N/A	
			Improvement <input type="checkbox"/> Delay <input type="checkbox"/> N/A	

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

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

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

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

21. Approvals

Signature	Date	Signature	Date
Design Authority N.K. Myers <i>N.K. Myers</i>	<u>2-25-99</u>	Design Agent H.J. Benzyl	
Cog. Eng. R.F. Boolean <i>R.F. Boolean</i>	<u>2/25/99</u>	PE	
Cog. Mgr. J.R. Rosser <i>J.R. Rosser</i>	<u>2/25/99</u>	QA	
QA C.A. McNaughton <i>Chuck A. McNaughton</i>	<u>2/25/99</u>	Safety	
Safety B.G. Baker <i>B.G. Baker</i>	<u>2-25-99</u>	Design	
Environ. C.R. Haas <i>Chris R. Haas</i>	<u>2-25-99</u>	Environ.	
Other		Other	

DEPARTMENT OF ENERGY

Signature or a Control Number that tracks the Approval Signature

ADDITIONAL

RECORD COPY

# Operational Test Procedure for 2706-T Complex Liquid Transfer System

H. R. Benzel

Waste Management Federal Services of Hanford, Inc, Richland, WA 99352  
U.S. Department of Energy Contract DE-AC06-96RL13200

EDT/ECN: 640206 UC: 2000  
Org Code: 32900 Charge Code: 101645  
B&R Code: EW3130020 Total Pages: 87

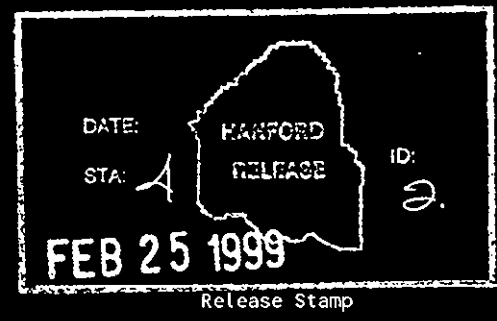
Key Words: 2706-T, Project W-259, OTP

Abstract: This document is the Operational Test Procedure for the Project W-259 modifications to the 2706-T facility. It tests the liquid transfer and storage system components.

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Release Approval 2/25/99  
Date



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RECORD OF REVISION

(1) Document Number

HNF-3610

Page 1

(2) Title

Operational Test Procedure for 2706-T Complex Liquid Transfer System

CHANGE CONTROL RECORD

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OPERATIONAL TEST PROCEDURE FOR 2706-T COMPLEX  
LIQUID TRANSFER SYSTEM

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## 1.0 PURPOSE AND SCOPE

### 1.1 PURPOSE

This Operational Test Procedure (OTP) tests the 2706-T liquid waste collection and treatment/storage system to demonstrate that the system components are functional, and that collectively they satisfy the process design criteria defined in the Project W-259 Functional Design Criteria.

### 1.2 SCOPE

This procedure is a complement to the W-259 Acceptance Test Procedure (ATP), HNF-1858. It tests the 2706-T liquid waste collection and treatment/storage system process components in their normal operating configuration. It demonstrates that the process:

- automatically moves liquids from the system sumps to either of two treatment/storage tanks;
- transfers liquids between the two tanks;
- and transfers liquids from each of the tanks through the system discharge valve.

Additionally the procedure demonstrates operation of the tank agitators, air compressor, chemical transfer pump, sump air spargers, safety showers, and filter room hoist.

The following are specifically outside the scope of this document, because they were adequately tested by Project W-259:

- Any component that requires a simulated signal to test. [e.g. sump liner leak detector; pump diaphragm failure, etc.] [Testing documented in ATP HNF-1858]
- The fire prevention system [Testing documented in ATP HNF-SD-W259-ATP-002].
- The ACT-II HVAC System [Testing documented in ATP HNF-1858]
- Facility infrastructure [e.g. light switches, electrical panels, heat pumps, thermostats, etc.]

## 2.0 INFORMATION

### 2.1 TERMS AND DEFINITIONS

- 2.1.1 **Activated Alarms/Indications** – The terms activated alarm and activated indications refer to the alarm display panel on the CMSS display screens. An activated alarm/indication is characterized by a change in text color and a flashing label. Acknowledging an alarm/indication stops the flashing, but the change in text color is maintained until the alarm/indication condition is cleared.
- 2.1.2 **CMSS** – Acronym for Computer Monitoring System Station. The CMSS is a graphical interface between the programmable logic controller and the operator. There are two CMSSes. CMSS 1 is located in the 2706-TA Electrical Room, and CMSS 2 is located in the Operations Manager Office in MO-433. Use of the term CMSS in this document refers only to CMSS 1, unless otherwise stated.
- 2.1.3 **Cognizant Engineer:** The representative from the Operations Support Engineering organization
- 2.1.4 **ENSURE** – Confirm that an activity or condition has occurred in conformance with specified requirements, or take action to make it so if the activity or condition is NOT found to be in conformance.

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- 2.1.5 **Major Discrepancy** – One of two types of OTP discrepancies. A major discrepancy requires an ECN to change the OTP before the OTP can be completed. The Test Director and the Cognizant Engineer jointly identify major discrepancies. Major discrepancies are sequentially numbered and compiled in a list. The list shall contain an explanation as to why a discrepancy was identified as major. The explanation shall include the number of the ECN that corrects the major discrepancy. The Test Director shall maintain the list. Following completion of the OTP, the list shall be signed and dated by the Test Director and the Cognizant Engineer and attached to the OTP Record Copy.
- 2.1.6 **Minor Discrepancy** – One of two types of OTP discrepancies. The Test Director and the Cognizant Engineer jointly identify minor discrepancies. Minor discrepancies are documented by Pen and Ink changes to the OTP. Minor discrepancies are sequentially numbered and compiled in a list. The list shall contain an explanation as to why a discrepancy was identified as minor. The Test Director shall maintain the list. Following completion of the OTP, the list shall be signed and dated by the Test Director and the Cognizant Engineer and attached to the OTP Record Copy.
- 2.1.7 **Operations Engineer** – The engineering representative from Treatment Facility Operations.
- 2.1.8 **Operator** – Bargaining unit personnel directed by WMH management to support performance of this procedure.
- 2.1.9 **OTP Acceptance/Completion** – The OTP is complete and accepted when the Test Director has signed all of the verification blocks, all discrepancies have been resolved, and the Test Director, Cognizant Engineer, and Operations Representative have signed in the Acceptance blocks in Section 13.0. Signatories shall legibly print or type their name, sign in the signature block and enter the date of signature. All signatures and the date shall be made in indelible ink.
- 2.1.10 **OTP Discrepancies** – Problems with the OTP either in step sequence or system preparation that prevent verification of an aspect of system process. There are two categories of OTP discrepancies, minor and major.
- 2.1.11 **OTP Record Copy** – The OTP Record Copy will be used by the Test Director to record verification signatures and pen and ink changes. Signatures shall be made in ~~blue ink~~ indelible ink. HQ B 4/7/99 #34
- 2.1.12 **OTP Working Copy** – An OTP copy that the Test Director uses in the field to record his observations and working notes. It is a reference to assist the Test Director in maintaining the OTP Record Copy. OTP working copies are not quality records, and there are no restrictions on the use of OTP working copies.
- 2.1.13 **Pen and Ink changes** – Changes made to the OTP Record Copy to correct minor discrepancies. Pen & Ink changes shall be dated and initialed by the Test Director. Both the date and initials shall be made with indelible ink.
- 2.1.14 **PLC** – Acronym for Programmable Logic Controller.
- 2.1.15 **Test Director** – Shall be interpreted to mean the Test Director or his designated representative. Designation can be given verbally and shall not require documentation. The Manager of Treatment Facility Operations appoints the Test Director.
- 2.1.16 **VERIFY** - Perform a comparison with stated requirements. No manipulation of equipment or other subsequent actions by the checker are involved. Initials or signature are required where verification signature blocks are provided.
- 2.1.17 **Verification Signatures** – A verification signature is made by the Test Director and is placed in the verification block following an OTP section. A verification signature signifies that the Test Director has confirmed that all procedural steps within that OTP section were performed, and that the steps requiring verification were completed successfully. Confirmation can be based on the Test Director's personal observation, consultation with other OTP participants, and/or logical deduction from related actions and results. Documentation of the basis for confirmation is not required.

A verification signature consists of three parts. First the Test Director must legibly print or type his name in the print name blank; second the Test Director signs or initials in the signature blank; third the Test Director enters the date in the date blank the day he/she signs in the signature blank. The date need not be the same day that the verification was performed. Indelible ink shall be used for all signatures and initials.

## 2.2 RESPONSIBILITIES

### 2.2.1 Test Director – The Test Director shall:

- direct the performance of the OTP;
- determine in what sequence sections and subsections of the OTP are performed;
- instruct the operators to perform required actions to prepare/implement OTP requirements;
- schedule support resources;
- function as the OTP data recorder;
- sign in the verification blocks following completion of associated verifications;
- sign in the OTP acceptance blank at the end of OTP;
- identify and resolve any discrepancies in the OTP;
- maintain a list of major discrepancies;
- maintain a list of minor discrepancies.

### 2.2.2 Treatment Facility Operations Supervision – Treatment Facility Operations Supervision shall:

- ensure that the liquid collection and treatment/storage system is operated by certified nuclear/chemical operators;
- direct the Nuclear/Chemical Operators in the performance of the OTP as required.

### 2.2.3 Nuclear/Chemical Operator (NCO) – The Operator shall manipulate the system components as directed by Operations Supervision, or Operations Engineer.

### 2.2.4 Cognizant Engineer – The Cognizant Engineer shall:

- review any OTP discrepancies and in tandem with the Test Director determine if a discrepancy is minor or major;
- sign the final minor discrepancy list at the conclusion of the OTP;
- sign the final major discrepancy list at the conclusion of the OTP;
- prepare engineering change notices to the OTP as required to resolve major discrepancies;
- sign in the OTP acceptance blank at the end of the OTP;
- direct the Nuclear/Chemical Operators in the performance of the OTP as required.

### 2.2.5 Operations Engineer – The operations engineer shall:

- schedule operator support;
- assist in performance of the OTP as requested by the Test Director;
- direct the Nuclear/Chemical Operators in the performance of the OTP as required;
- sign in the OTP acceptance blank at the end of the OTP;
- review and approve engineering change notices to the OTP.

### 2.2.6 Quality Systems personnel – The Quality Systems personnel shall:

- overview the OTP to ensure that it complies with applicable site procedures.

**2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP****2.3 References:**

## 2.3.1 Project Hanford Procedures:

- HNF-PRO-286, "Test Control"
- HNF-PRO-446, "Testing Requirements"
- HNF-PRO-572, "Project Acceptance and Closeout"

## 2.3.2 W-259 P&amp;ID Drawings:

- H-2-826550, Sht. 1, Sht. 2, Sht. 3, Sht. 4, Sht. 5 and Sht. 6
- H-2-826551, Sht 1 and Sht. 2

## 2.3.3 W-259 Instrumentation Binary Logic Diagrams:

- H-2-826574, Sht. 1, Sht. 3, Sht. 4, Sht. 5, Sht. 6, Sht. 7, Sht. 8, Sht. 9, Sht. 10, Sht. 11, Sht. 12, Sht. 13, Sht. 14, Sht. 15, Sht. 16, Sht. 17, Sht. 18, Sht. 19, Sht. 20, Sht. 21 and Sht. 22.

**2.4 General Information**

- 2.4.1 Although the W-259 emergency interlock system collectively consists of emergency stop buttons at the CMSSes, an emergency stop button at Panel I-XX-2706-001, and a flow switch on the fire sprinkler system, only the emergency stop button at CMSS 1 will be used to demonstrate operability of the emergency interlock system. This is permissible because all four signals activate a single coil. Since ATP HNF-1858 adequately tested signal activation of the coil, the OTP need only test that the coil will stop the system pumps, agitators and air spargers during actual liquid transfers.
- 2.4.2 There are two CMSSes. CMSS 1 is located in the 2706-TA Electrical Room, and CMSS 2 is located in the Operations Manager Office in MO-433. The OTP will test the system primarily from CMSS 1, because actions performed at CMSS 1 are mirrored on the CMSS 2. This operational link was adequately demonstrated by ATP HNF-1858.
- 2.4.3 The CMSS has six basic operating screens. Each screen contains a number of active icons, which when selected access subscreens. The subscreens are associated with individual process components. Double clicking on their associated icon wherever the icon appears on a basic screen accesses the subscreens. The basic screens and the methods of access are as follows:
- Overview screen. Accessed by pressing F2 on the keyboard or selecting the overview button on any one of the six basic screens.
  - Tank 220 screen. Accessed by pressing F6 on the keyboard, selecting the Tank 220 button on any one of the six basic screens, or double clicking on the Tank 220 icon on the Overview Screen.
  - Tank 221 screen. Accessed by pressing F7 on the keyboard, selecting the Tank 221 button on any one of the six basic screens, or double clicking on the Tank 221 icon on the Overview Screen.
  - 2706-T Railroad Pit Sump screen. Accessed by pressing F9 on the keyboard, selecting the 2706-T Railroad Pit Sump button on any one of the six basic screens, or double clicking on the 2706-T Railroad Pit Sump icon on the Overview screen.
  - 2706-TA Sump screen. Accessed by pressing F10 on the keyboard, selecting the 2706-TA Sump button on any one of the six basic screens, or double clicking on the 2706-TA Sump icon on the Overview screen.
  - HVAC Sump screen. Accessed by pressing F11 on the keyboard, selecting the HVAC Sump button on any one of the six basic screens, or double clicking on the HVAC Sump icon on the Overview screen.

The OTP only tests manual configuration of the motor operated valves. Although the PLC has the capability to provide automatic valve configuration, WMH has determined that manually configuring

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valves in accordance with approved procedures provides a higher level assurance that the valves will be correctly aligned. Accordingly, the OTP does not test automatic valve configuration.

- 2.4.4 The OTP is designed to be performed in Sections, and need not be performed sequentially. Each Section shall be considered a separate test procedure. Note that if an OTP section verifies an action that is equally applicable to other OTP sections, the Test Director can make verification signatures in those OTP sections without repeating the action in those procedures. Once an action is verified, it does not need to be repeated.
- 2.4.5 Data collected within this procedure is for information purposes only to assist engineering in quantifying system performance. Variations in the data do not effect the ability of the system to function in accordance with Functional Design Criteria.
- 2.4.6 This procedure contains a number of inferred steps that are not precisely defined. For example, a step that reads "ENSURE the CMSS "HIGH LEVEL IN TANK 220" indication is not activated" would require an operator to pump liquids out of Tank 220 if the indication was activated. The decision as to how to pump those liquids shall be made by the Test Director, and the operator will perform the necessary actions at the direction of a WMH representative with supervisory authority.
- 2.4.7 Because of the number of verifications and the relatively short time it takes to empty a sump, it may be necessary to repeat selected OTP steps to complete the verifications. The Test Director shall determine which steps must be repeated. Documenting the repeat steps is not required.

**2.5 Records -**

The final, approved OTP Record Copy will be the only quality record associated with this procedure. The major and minor discrepancy lists will be an attachment to the final approved OTP Record Copy.

**3.0 PRECAUTIONS AND LIMITATIONS**

There are no special precautions or limitations associated with this OTP.

**4.0 PREREQUISITES -**

- 4.1 All 2706-T Complex process systems are in operating configuration with no related lockouts or tag-outs.
- 4.2 System air compressor, #A-HP-2706-250, is started and operating in accordance with Operating Procedure #DO-021-040.
- 4.3 The following normally open air supply Valves are open: A-HP-2706-261, -262, -263, -264, -265, -266, -269, -272, -273, -274, -275, -276, -277, -278, -279, -281, -282, -283, -284, -285, -286, -291, -292, -299, -323, -325, -327, -328, -329, and -330.
- 4.4 The following normally closed air supply Valves are closed: A-HP-2706-26, -287, and -324.
- 4.5 The following process valves are open: T-XX-2706-223, -224, -225, -226, -228, -229, -230, -231, -232, -234, -246 and -247.
- 4.6 The following process valves are closed: T-XX-2706-233, -235, -236, -237, -238, -239, -242 and -243.
- 4.7 Tools/Equipment:
- 4.7.1 Stop Watch (Calibration is not required.)
- 4.7.2 Radios/phones as required when remote activities are required.
- 4.8 Prerequisites are listed at the beginning of applicable sections. However, any one prerequisite need not apply to all of the subsections. The Test Director will determine to what extent a prerequisite applies to any one subsection and ensure that the prerequisites are in place as needed.

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that require calibration

- 4.9 Instrument Calibration: All gauges/instruments used or referenced in this procedure shall be calibrated in accordance with an approved WMH calibration procedure. Where applicable each section shall contain a prerequisite section that identifies gauges/instruments used in that section. Both the number and calibration date shall be recorded.

## 5.0 SYSTEM TREATMENT WITH TRISODIUM PHOSPHATE

**NOTE:** To enhance corrosion resistance in the 2706-T Complex liquid collection and treatment/storage system, liquid containing trisodium phosphate (TSP) will be circulated through the pipes and tanks before any raw water is circulated. Accordingly this procedure will mix a batch of TSP and add it to Tanks 220 and 221 through the Chem Room chemical addition system. After the TSP has sat in the tanks overnight, the remainder of the OTP will be performed in a manner that ensures that the TSP solution has circulated through the selected portions of the system before any raw water is added to that portion.

**NOTE:** The TSP solution will be prepared in accordance with Procedure Number DO-020-055, "Caustic Soda Solution Preparation". The procedure requires Engineering to provide a volume of liquid and an amount of caustic. The volume of liquid shall be approximately 15 gallons, and the amount of TSP shall be approximately 6 pounds. The measures are gross approximations. The weight of TSP shall be measured by scale as stated in DO-020-055. The scale need not have a current calibration.

**NOTE:** The TSP solution will be added to Tanks 220 and 221 in accordance with Procedure Number DO-021-039, "Chemical Addition System Operation", with some exceptions. All references to tank recirculation shall be ignored. The liquids in the tanks cannot be recirculated until the TSP has been added. Also performance of Section 12.5 of this procedure negates the need to use Procedure DO-040-020, "Perform Daily Surveillances of 2706-T Complex" as a prerequisite to Procedure DO-021-039.

### 5.1 Prerequisites:

- 5.1.1 The following procedures are ready for validation:
- DO-020-055, "Caustic Soda Solution Preparation"
  - DO-021-039, "Chemical Addition System Operation"
  - DO-021-040, "2706-T Process Air System Operation"
- 5.1.2 Section 12.4 of this OTP has been performed.
- 5.1.3 Section 12.5 of this OTP has been performed.

**CAUTION:** The Chem Room Hose Bibb shall not be used for this procedure, unless it has been relocated from its position adjacent to the electrical disconnect on the northwest wall of the Chem Room.

### 5.2 Add TSP Solution to Tank 220

- 5.2.1 Add approximately 4 pounds of TSP to approximately 10 gallons of liquid in accordance with Procedure Number DO-020-055.



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5.2.2 Add the TSP solution prepared in Step 5.2.1 to Tank 220 in accordance with Procedure Number DO-021-039.

5.3 Add TSP Solution to Tank 221

5.3.1 Add approximately 2 pounds of TSP to approximately 5 gallons of liquid in accordance with Procedure Number DO-020-055.

5.3.2 Add the TSP solution prepared in Step 5.3.1 to Tank 221 in accordance with Procedure Number DO-021-039.

Verification Signature: HENRY R. BENZEL / H.R. Benzel / 12/10/98  
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**6.0 OVERVIEW CMSS SCREEN TEST**

**NOTE:** Sections 6.0 through 6.17 demonstrate that the overview screen icons are functional. Additionally it demonstrates that status indicators for the pumps and motor operated valves are functional.

**6.1 Test Screen Icons**

- 6.1.1 **SELECT** the HVAC Sump icon on the Overview screen.
- 6.1.2 **VERIFY** that the HVAC Sump screen is displayed on the CMSS monitor.
- 6.1.3 **RETURN** to the Overview screen, and **SELECT** 2706-T Railroad Pit Sump.
- 6.1.4 **VERIFY** that the 2706-T Railroad Pit Sump screen is displayed on the CMSS monitor.
- 6.1.5 **RETURN** to the Overview screen, and **SELECT** the 2706-TA Sump.
- 6.1.6 **VERIFY** that the 2706-TA Sump screen is displayed on the CMSS monitor.
- 6.1.7 **RETURN** to the Overview screen, and **SELECT** Tank 220.
- 6.1.8 **VERIFY** that Tank 220 screen is displayed on the CMSS monitor.
- 6.1.9 **RETURN** to the Overview screen, and **SELECT** Tank 221.
- 6.1.10 **VERIFY** that the Tank 221 screen is displayed on the CMSS monitor.

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**6.2 Test Pump 203 Subscreen Control**

- 6.2.1 **RETURN** to the Overview screen, and **SELECT** the Pump 203 icon.
- 6.2.2 **VERIFY** that the Pump 203 subscreen appears on the CMSS monitor.
- 6.2.3 **SELECT** "AUTO".
- 6.2.4 **VERIFY** that the word "AUTO" appears in the status box.
- 6.2.5 **SELECT** "MANUAL".
- 6.2.6 **VERIFY** that the word "MANUAL" appears in the status box.
- 6.2.7 **SELECT** "START".
- 6.2.8 **VERIFY** that the pump status indicator "ON" is white, and "OFF" is blue.
- 6.2.9 **SELECT** "STOP".
- 6.2.10 **VERIFY** that the pump status indicator "ON" is blue, and "OFF" is white.
- 6.2.11 **SELECT** "MANUAL".
- 6.2.12 **VERIFY** that the word "MANUAL" appears in the status box.
- 6.2.13 **SELECT** "START".
- 6.2.14 **VERIFY** that the pump status indicator "ON" is white, and "OFF" is blue.
- 6.2.15 **SELECT** "AUTO".
- 6.2.16 **VERIFY** that the word "AUTO" appears in the status box.

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- 6.2.17 SELECT "MANUAL".
- 6.2.18 VERIFY that the pump status indicator "ON" is blue, and "OFF" is white.
- 6.2.19 CLOSE the subscreen.

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**6.3 Test Pump 204 Subscreen Control**

- 6.3.1 SELECT the Pump 204 icon.
- 6.3.2 VERIFY that the Pump 204 subscreen appears on the CMSS monitor.
- 6.3.3 SELECT "AUTO".
- 6.3.4 VERIFY that the word "AUTO" appears in the status box.
- 6.3.5 SELECT "MANUAL".
- 6.3.6 VERIFY that the word "MANUAL" appears in the status box.
- 6.3.7 SELECT "START".
- 6.3.8 VERIFY that the pump status indicator "ON" is white, and "OFF" is blue.
- 6.3.9 SELECT "STOP".
- 6.3.10 VERIFY that the pump status indicator "ON" is blue, and "OFF" is white..
- 6.3.11 SELECT "MANUAL".
- 6.3.12 VERIFY that the word "MANUAL" appears in the status box.
- 6.3.13 SELECT "START".
- 6.3.14 VERIFY that the pump status indicator "ON" is white, and "OFF" is blue.
- 6.3.15 SELECT "AUTO".
- 6.3.16 VERIFY that the word "AUTO" appears in the status box.
- 6.3.17 SELECT "MANUAL".
- 6.3.18 VERIFY that the pump status indicator "ON" is blue, and "OFF" is white.
- 6.3.19 CLOSE the subscreen.

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**6.4 Test Pump 206 Subscreen Control**

- 6.4.1 SELECT the Pump 206 icon.
- 6.4.2 VERIFY that the Pump 206 subscreen appears on the CMSS monitor.
- 6.4.3 SELECT "AUTO".
- 6.4.4 VERIFY that the word "AUTO" appears in the status box.
- 6.4.5 SELECT "MANUAL".

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- 6.4.6 **VERIFY** that the word "MANUAL" appears in the status box.
- 6.4.7 **OPEN** Valve HV-05 in the manual mode.
- 6.4.8 **SELECT** "START".
- 6.4.9 **VERIFY** that the pump status indicator "ON" is white, and "OFF" is blue.
- 6.4.10 **SELECT** "STOP".
- 6.4.11 **VERIFY** that the pump status indicator "ON" is blue, and "OFF" is white.
- 6.4.12 **SELECT** "MANUAL".
- 6.4.13 **VERIFY** that the word "MANUAL" appears in the status box.
- 6.4.14 **SELECT** "START".
- 6.4.15 **VERIFY** that the pump status indicator "ON" is white, and "OFF" is blue.
- 6.4.16 **SELECT** "AUTO".
- 6.4.17 **VERIFY** that the word "AUTO" appears in the status box.
- 6.4.18 **SELECT** "MANUAL".
- 6.4.19 **VERIFY** that the pump status indicator "ON" is blue, and "OFF" is white.
- 6.4.20 **CLOSE** the subscreen.

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**6.5 Test Pump 207 Subscreen Control**

- 6.5.1 **SELECT** the Pump 207 icon.
- 6.5.2 **VERIFY** that the Pump 207 subscreen appears on the CMSS monitor.
- 6.5.3 **SELECT** "AUTO".
- 6.5.4 **VERIFY** that the word "AUTO" appears in the status box.
- 6.5.5 **SELECT** "MANUAL".
- 6.5.6 **VERIFY** that the word "MANUAL" appears in the status box.
- 6.5.7 **OPEN** Valve HV-05 in the manual mode.
- 6.5.8 **SELECT** "START".
- 6.5.9 **VERIFY** that the pump status indicator "ON" is white, and "OFF" is blue.
- 6.5.10 **SELECT** "STOP".
- 6.5.11 **VERIFY** that the pump status indicator "ON" is blue, and "OFF" is white.
- 6.5.12 **SELECT** "MANUAL".
- 6.5.13 **VERIFY** that the word "MANUAL" appears in the status box.
- 6.5.14 **SELECT** "START".
- 6.5.15 **VERIFY** that the pump status indicator "ON" is white, and "OFF" is blue.
- 6.5.16 **SELECT** "AUTO".
- 6.5.17 **VERIFY** that the word "AUTO" appears in the status box.

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6.5.18 **SELECT** "MANUAL".

6.5.19 **VERIFY** that the pump status indicator "ON" is blue, and "OFF" is white.

6.5.20 **CLOSE** the subscreen.

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**NOTE:** Multiple valve configuration interlocks prevent testing of Pump 210 operation in Section 6.6. Its function will be tested in later sections.

### 6.6 Test Pump 210 Subscreen Control

6.6.1 **SELECT** the Pump 210 icon.

6.6.2 **VERIFY** that the Pump 210 subscreen appears on the CMSS monitor.

6.6.3 **CLOSE** the subscreen.

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**NOTE:** Multiple valve configuration interlocks prevent testing of Pump 211 operation in Section 6.7. Its function will be tested in later sections.

### 6.7 Test Pump 211 Subscreen Control

6.7.1 **SELECT** the Pump 211 icon.

6.7.2 **VERIFY** that the Pump 211 subscreen appears on the CMSS monitor.

6.7.3 **CLOSE** the subscreen.

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### 6.8 Test Pump 216 Subscreen Control

6.8.1 **SELECT** the Pump 216 icon.

6.8.2 **ENSURE** that Pump 216 is unplugged.

6.8.3 **VERIFY** that the Pump 216 subscreen appears on the CMSS monitor.

6.8.4 **SELECT** "AUTO".

6.8.5 **VERIFY** that the word "AUTO" appears in the status box.

6.8.6 **SELECT** "MANUAL".

6.8.7 **VERIFY** that the word "MANUAL" appears in the status box.

6.8.8 **SELECT** "START".

6.8.9 **VERIFY** that the pump status indicator "ON" is white, and "OFF" is blue.

6.8.10 **SELECT** "STOP".

6.8.11 **VERIFY** that the pump status indicator "ON" is blue, and "OFF" is white.

6.8.12 **SELECT** "MANUAL".

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- 6.8.13 VERIFY that the word "MANUAL" appears in the status box.
- 6.8.14 SELECT "START".
- 6.8.15 VERIFY that the pump status indicator "ON" is white, and "OFF" is blue.
- 6.8.16 SELECT "AUTO".
- 6.8.17 VERIFY that the word "AUTO" appears in the status box.
- 6.8.17.1 VERIFY that the pump status indicator "ON" is white, and "OFF" is blue. *H.R.B. 3-6-99 #3*
- 6.8.18 SELECT "MANUAL".
- 6.8.19 VERIFY that the pump status indicator "ON" is blue, and "OFF" is white.
- 6.8.20 CLOSE the subscreen.

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**6.9 Test Valve HV-01 Subscreen Control**

- 6.9.1 SELECT the Valve HV-01 icon.
- 6.9.2 VERIFY that the Valve HV-01 subscreen appears on the CMSS monitor.
- 6.9.3 SELECT "OPEN".
- 6.9.4 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.9.5 SELECT "CLOSE".
- 6.9.6 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.
- 6.9.7 CLOSE the subscreen.

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**6.10 Test Valve HV-02 Subscreen Control**

- 6.10.1 SELECT the VALVE HV-02 icon.
- 6.10.2 VERIFY that the Valve HV-02 subscreen appears on the CMSS monitor.
- 6.10.3 SELECT "AUTO".
- 6.10.4 VERIFY that the word "AUTO" appears in the status box.
- 6.10.5 SELECT "MANUAL".
- 6.10.6 VERIFY that the word "MANUAL" appears in the status box.
- 6.10.7 SELECT "OPEN".
- 6.10.8 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.10.9 SELECT "CLOSE".
- 6.10.10 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.
- 6.10.11 SELECT "OPEN".
- 6.10.12 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.10.13 SELECT "AUTO".

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- 6.10.14 VERIFY that the word "AUTO" appears in the status box.
- 6.10.15 SELECT "MANUAL".
- 6.10.16 VERIFY that the word "MANUAL" appears in the status box.
- 6.10.17 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.
- 6.10.18 CLOSE the subscreen.

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**6.11 Test Valve HV-03 Subscreen Control**

- 6.11.1 SELECT the VALVE HV-03 icon.
- 6.11.2 VERIFY that the VALVE HV-03 subscreen appears on the CMSS monitor.
- 6.11.3 SELECT "AUTO".
- 6.11.4 VERIFY that the word "AUTO" appears in the status box.
- 6.11.5 SELECT "MANUAL".
- 6.11.6 VERIFY that the word "MANUAL" appears in the status box.
- 6.11.7 SELECT "OPEN".
- 6.11.8 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.11.9 SELECT "CLOSE".
- 6.11.10 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.
- 6.11.11 SELECT "OPEN".
- 6.11.12 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.11.13 SELECT "AUTO".
- 6.11.14 VERIFY that the word "AUTO" appears in the status box.
- 6.11.15 SELECT "MANUAL".
- 6.11.16 VERIFY that the word "MANUAL" appears in the status box.
- 6.11.17 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.
- 6.11.18 CLOSE the subscreen.

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**6.12 Test Valve HV-04 Subscreen Control**

- 6.12.1 SELECT the VALVE HV-04 icon.
- 6.12.2 VERIFY that the VALVE HV-04 subscreen appears on the CMSS monitor.
- 6.12.3 SELECT "AUTO".
- 6.12.4 VERIFY that the word "AUTO" appears in the status box.

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- 6.12.5 SELECT "MANUAL".
- 6.12.6 VERIFY that the word "MANUAL" appears in the status box.
- 6.12.7 SELECT "OPEN".
- 6.12.8 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.12.9 SELECT "CLOSE".
- 6.12.10 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.
- 6.12.11 SELECT "OPEN".
- 6.12.12 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.12.13 SELECT "AUTO".
- 6.12.14 VERIFY that the word "AUTO" appears in the status box.
- 6.12.15 SELECT "MANUAL".
- 6.12.16 VERIFY that the word "MANUAL" appears in the status box.
- 6.12.17 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.
- 6.12.18 CLOSE the subscreen.

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### 6.13 Test Valve HV-05 Subscreen Control

- 6.13.1 SELECT the VALVE HV-05 icon.
- 6.13.2 VERIFY that the VALVE HV-05 subscreen appears on the CMSS monitor.
- 6.13.3 SELECT "AUTO".
- 6.13.4 VERIFY that the word "AUTO" appears in the status box.
- 6.13.5 SELECT "MANUAL".
- 6.13.6 VERIFY that the word "MANUAL" appears in the status box.
- 6.13.7 SELECT "OPEN".
- 6.13.8 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.13.9 SELECT "CLOSE".
- 6.13.10 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.
- 6.13.11 SELECT "OPEN".
- 6.13.12 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.13.13 SELECT "AUTO".
- 6.13.14 VERIFY that the word "AUTO" appears in the status box.
- 6.13.15 SELECT "MANUAL".



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- 6.13.16 **VERIFY** that the word "MANUAL" appears in the status box.
- 6.13.17 **VERIFY** that the valve status indicator "OPEN" is blue, and "CLOSED" is white.
- 6.13.18 **CLOSE** the subscreen.

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**6.14 Test Valve HV-06 Subscreen Control**

- 6.14.1 **SELECT** the VALVE HV-06 icon.
- 6.14.2 **VERIFY** that the VALVE HV-06 subscreen appears on the CMSS monitor.
- 6.14.3 **SELECT** "AUTO".
- 6.14.4 **VERIFY** that the word "AUTO" appears in the status box.
- 6.14.5 **SELECT** "MANUAL".
- 6.14.6 **VERIFY** that the word "MANUAL" appears in the status box.
- 6.14.7 **SELECT** "OPEN".
- 6.14.8 **VERIFY** that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.14.9 **SELECT** "CLOSE".
- 6.14.10 **VERIFY** that the valve status indicator "OPEN" is blue, and "CLOSED" is white.
- 6.14.11 **SELECT** "OPEN".
- 6.14.12 **VERIFY** that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.14.13 **SELECT** "AUTO".
- 6.14.14 **VERIFY** that the word "AUTO" appears in the status box.
- 6.14.15 **SELECT** "MANUAL".
- 6.14.16 **VERIFY** that the word "MANUAL" appears in the status box.
- 6.14.17 **VERIFY** that the valve status indicator "OPEN" is blue, and "CLOSED" is white.
- 6.14.18 **CLOSE** the subscreen.

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**6.15 Test Valve HV-07 Subscreen Control**

- 6.15.1 **SELECT** the VALVE HV-07 icon.
- 6.15.2 **VERIFY** that the VALVE HV-07 subscreen appears on the CMSS monitor.
- 6.15.3 **SELECT** "AUTO".
- 6.15.4 **VERIFY** that the word "AUTO" appears in the status box.
- 6.15.5 **SELECT** "MANUAL".
- 6.15.6 **VERIFY** that the word "MANUAL" appears in the status box.
- 6.15.7 **SELECT** "OPEN".

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- 6.15.8 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.15.9 SELECT "CLOSE".
- 6.15.10 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.
- 6.15.11 SELECT "OPEN".
- 6.15.12 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.15.13 SELECT "AUTO".
- 6.15.14 VERIFY that the word "AUTO" appears in the status box.
- 6.15.15 SELECT "MANUAL".
- 6.15.16 VERIFY that the word "MANUAL" appears in the status box.
- 6.15.17 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.
- 6.15.18 CLOSE the subscreen.

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**6.16 Test Valve HV-08 Subscreen Control**

- 6.16.1 SELECT the VALVE HV-08 icon.
- 6.16.2 VERIFY that the VALVE HV-08 subscreen appears on the CMSS monitor.
- 6.16.3 SELECT "AUTO".
- 6.16.4 VERIFY that the word "AUTO" appears in the status box.
- 6.16.5 SELECT "MANUAL".
- 6.16.6 VERIFY that the word "MANUAL" appears in the status box.
- 6.16.7 SELECT "OPEN".
- 6.16.8 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.16.9 SELECT "CLOSE".
- 6.16.10 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.
- 6.16.11 SELECT "OPEN".
- 6.16.12 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.16.13 SELECT "AUTO".
- 6.16.14 VERIFY that the word "AUTO" appears in the status box.
- 6.16.15 SELECT "MANUAL".
- 6.16.16 VERIFY that the word "MANUAL" appears in the status box.
- 6.16.17 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.
- 6.16.18 CLOSE the subscreen..

~~6.16.19~~ CLOSE the subscreen. H.R.B. 2-26-99 #4

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**6.17 Test Valve HV-09 Subscreen Control**

- 6.17.1 **SELECT** the VALVE HV-09 icon.
- 6.17.2 **VERIFY** that the VALVE HV-09 subscreen appears on the CMSS monitor.
- 6.17.3 **SELECT** "AUTO".
- 6.17.4 **VERIFY** that the word "AUTO" appears in the status box.
- 6.17.5 **SELECT** "MANUAL".
- 6.17.6 **VERIFY** that the word "MANUAL" appears in the status box.
- 6.17.7 **SELECT** "OPEN".
- 6.17.8 **VERIFY** that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.17.9 **SELECT** "CLOSE".
- 6.17.10 **VERIFY** that the valve status indicator "OPEN" is blue, and "CLOSED" is white.
- 6.17.11 **SELECT** "OPEN".
- 6.17.12 **VERIFY** that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.17.13 **SELECT** "AUTO".
- 6.17.14 **VERIFY** that the word "AUTO" appears in the status box.
- 6.17.15 **SELECT** "MANUAL".
- 6.17.16 **VERIFY** that the word "MANUAL" appears in the status box.
- 6.17.17 **VERIFY** that the valve status indicator "OPEN" is blue, and "CLOSED" is white.
- 6.17.18 **CLOSE** the subscreen.

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## 7.0 HVAC SUMP CMSS SCREEN TEST

**NOTE:** The HVAC Sump CMSS Screen Test demonstrates that Pump 216 is functional in the automatic, manual, and local switch controlled modes. Additionally it demonstrates that the liquid level indications and emergency interlocks are functional.

### 7.1 Prerequisites:

7.1.1 Liquid Level Transmitter #I-XX-2706-LT-04 is calibrated: 1-19-99  
Calibration date

### 7.2 Test HVAC Sump Level Transmitter

- 7.2.1 ENSURE that the CMSS is displaying the 2706-TA HVAC Sump screen.
- 7.2.2 ENSURE that liquid level in the HVAC Sump is at or below the low liquid level cutoff.
- 7.2.3 VERIFY that the CMSS "LOW LEVEL IN SUMP" indication in the sump is activated.
- 7.2.4 ENSURE Pump 216 is in CMSS manual mode.
- 7.2.5 START filling the HVAC Sump with liquid.
- 7.2.6 VERIFY that the CMSS HVAC Sump icon shows a rising liquid level.
- 7.2.7 VERIFY that the CMSS "SUMP LEVEL" gallon indicator value increases with the rising liquid level.
- 7.2.8 RECORD the approximate liquid volume when the CMSS "LOW LEVEL IN SUMP" indicator is no longer activated: 6 gallons.
- 7.2.9 RECORD the approximate liquid volume when the CMSS "HIGH LEVEL IN SUMP" indicator is activated: 45 gallons.
- 7.2.10 STOP filling the HVAC Sump with liquid after the CMSS "HIGH-HIGH LEVEL IN SUMP" indicator is activated.
- 7.2.11 RECORD the approximate liquid volume when the CMSS "HIGH-HIGH LEVEL IN SUMP" alarm is activated: 60 gallons.
- 7.2.12 ADD approximately two tablespoons of Tri-Sodium Phosphate to the liquid in the sump.
- 7.2.13 WAIT approximately 10 minutes before pumping liquid out of the HVAC Sump.

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### 7.3 Test HVAC Sump Pump 216 in CMSS Manual Mode.

- 7.3.1 ENSURE that Pump 216 is plugged in.
- 7.3.2 VERIFY that the Pump 216 icon on the Overview screen is blue.
- 7.3.3 VERIFY that the Pump 216 icon on the 2706-TA HVAC Sump screen is blue.
- 7.3.4 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication is activated.

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- 7.3.5 ENSURE Pump 216 is in CMSS manual mode.
- 7.3.6 SELECT the manual "START" button on the Pump 216 pump control subscreen.
- 7.3.7 VERIFY that the Pump 216 icon on the CMSS Overview screen is white.
- 7.3.8 VERIFY that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is white.
- 7.3.9 VERIFY that the CMSS HVAC Sump icon shows a falling liquid level.
- 7.3.10 VERIFY that the CMSS "SUMP LEVEL" gallon indicator value decreases with the falling liquid level.

NOTE: Steps 7.3.11 and 7.3.13 demonstrate that the low liquid level interlock stops Pump 216 in the manual mode.

- 7.3.11 VERIFY that the Pump 216 icon on the CMSS Overview screen is blue, AFTER the CMSS "LOW LEVEL IN SUMP" indication is activated.
- 7.3.12 RECORD the approximate time lapse from when the "HIGH LEVEL IN SUMP" indication is deactivated and the "LOW LEVEL IN SUMP" is activated: 150 seconds.
- 7.3.13 VERIFY that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is blue, AFTER the CMSS "LOW LEVEL IN SUMP" indication is activated.

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#### 7.4 Test HVAC Sump Pump 216 in Local Manual Mode

- 7.4.1 ENSURE that Pump 216 is plugged in.
- 7.4.2 VERIFY that the Pump 216 icon on the CMSS Overview screen is blue.
- 7.4.3 VERIFY that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is blue.
- 7.4.4 ENSURE that the "LOW-LEVEL IN SUMP" indicator is not activated.

NOTE: The local manual mode is activated by pushing the button on the Pump 216 controller box located on the wall adjacent to the HVAC Sump. The push button bypasses the CMSS "LOW LEVEL IN SUMP" interlock. Since operating a centrifugal pump without liquid is hard on the pump, the pump should not be run if the CMSS "LOW LEVEL IN SUMP" indication is activated.

- 7.4.5 PUSH and HOLD the local manual start button on the side of the Pump 216 controller box.
- 7.4.6 Visually VERIFY that the HVAC Sump shows a falling liquid level.
- 7.4.7 RELEASE the local manual start button before the CMSS "LOW LEVEL IN SUMP" indication is activated.

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**7.5 Test HVAC Sump Pump 216 in CMSS Automatic Mode**

- 7.5.1 ENSURE that Pump 216 is plugged in.
- 7.5.2 VERIFY that the Pump 216 icon on the CMSS Overview screen is blue.
- 7.5.3 VERIFY that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is blue.
- 7.5.4 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indicator is not activated.
- 7.5.5 SELECT automatic mode on the Pump 216 subscreen.
- 7.5.6 START filling the sump with liquid.

**NOTE:** Steps 7.5.7 through 7.5.11 demonstrate that the high liquid level interlock starts Pump 216 in the automatic mode.

- 7.5.7 VERIFY that the Pump 216 icon on the CMSS Overview screen is white, AFTER the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 7.5.8 STOP filling the sump with liquid, AFTER the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 7.5.9 VERIFY that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is white, CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 7.5.10 VERIFY that the CMSS HVAC Sump icon shows a falling liquid level.
- 7.5.11 VERIFY that the CMSS "SUMP LEVEL" gallon indicator value decreases with the falling liquid level.

**NOTE:** Steps 7.5.12 and 7.5.13 demonstrate that the low liquid level interlock stops Pump 216 in the automatic mode.

- 7.5.12 VERIFY that the Pump 216 icon on the CMSS Overview screen is blue, AFTER the CMSS "LOW LEVEL IN SUMP" indication is activated.
- 7.5.13 VERIFY that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is blue, AFTER the CMSS "LOW LEVEL IN SUMP" indication is activated.

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**7.6 Test Emergency Interlocks on HVAC Sump Pump 216**

- 7.6.1 ENSURE that Pump 216 is plugged in.
- 7.6.2 ENSURE Pump 216 is in the manual mode.
- 7.6.3 FILL the sump with liquid, UNTIL the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 7.6.4 VERIFY that the Pump 216 icon on the CMSS Overview screen is blue.
- 7.6.5 VERIFY that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is blue.
- 7.6.6 SELECT the "EMERGENCY STOP" button on a CMSS screen.

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**NOTE:** Steps 7.6.7 through 7.6.10 demonstrate that Pump 216 will not start in manual mode when the emergency stop interlock is activated.

- 7.6.7 **START** Pump 216 in the manual mode.
- 7.6.8 **VERIFY** that the Pump 216 icon on the CMSS Overview screen is still blue.
- 7.6.9 **VERIFY** that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is still blue.
- 7.6.10 **VERIFY** that the "SUMP LEVEL" gallon indicator does not show a falling liquid level.

**NOTE:** Steps 7.6.11 through 7.6.15 demonstrate that Pump 216 will not start in automatic mode when the emergency stop interlock is activated.

- 7.6.11 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 7.6.12 **ENSURE** that Pump 216 is in the automatic mode.
- 7.6.13 **VERIFY** that the Pump 216 icon on the CMSS Overview screen is still blue.
- 7.6.14 **VERIFY** that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is still blue.
- 7.6.15 **VERIFY** that the CMSS "SUMP LEVEL" gallon indicator does not show a falling liquid level.

**NOTE:** the Emergency Stop Interlock does not effect The Pump 216 local control pushbutton. Also the CMSS will not reflect that the pump is operating. Steps 7.6.16 through 7.6.20 demonstrate this anomaly.

- 7.6.16 **PUSH** the Pump 216 local control pushbutton.
- 7.6.17 **VERIFY** that the Pump 216 icon on the CMSS Overview screen is still blue.
- 7.6.18 **VERIFY** that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is still blue.
- 7.6.19 **VERIFY** that the CMSS "SUMP LEVEL" gallon indicator shows a falling liquid level.
- 7.6.20 **RELEASE** Pump 216 local control pushbutton.
- 7.6.21 **SELECT** the (emergency stop) "RESET" button.

**NOTE:** Steps 7.6.22 through 7.6.32 demonstrate that the Emergency Stop Interlock will stop Pump 216 when it is running in the automatic mode.

- 7.6.22 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 7.6.23 **ENSURE** that Pump 216 is in automatic mode.
- 7.6.24 **VERIFY** that the Pump 216 icon on the CMSS Overview screen is white.
- 7.6.25 **VERIFY** that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is white.
- 7.6.26 **VERIFY** that the CMSS "SUMP LEVEL" gallon indicator shows a falling liquid level.
- 7.6.27 **SELECT** the "EMERGENCY STOP" button on a CMSS screen.
- 7.6.28 **VERIFY** that the Pump 216 icon on the CMSS Overview screen is blue.
- 7.6.29 **VERIFY** that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is blue.
- 7.6.30 **VERIFY** that the CMSS "SUMP LEVEL" gallon indicator does not show a falling liquid level.
- 7.6.31 **SELECT** the (emergency stop) "RESET" button.
- 7.6.32 **VERIFY** that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is still blue.

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## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

NOTE: Steps 7.6.33 through 7.6.46 demonstrate that the emergency stop interlock will stop Pump 216 when it is running in the manual mode.

- 7.6.33 ENSURE that the CMSS "LOW LEVEL IN SUMP" indication is not activated.
- 7.6.34 START Pump 216 in the manual mode.
- 7.6.35 VERIFY that the Pump 216 icon on the CMSS Overview screen is white.
- 7.6.36 VERIFY that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is white.
- 7.6.37 VERIFY that the "SUMP LEVEL" gallon indicator shows a falling liquid level.
- 7.6.38 SELECT the "EMERGENCY STOP" button on a CMSS screen.
- 7.6.39 VERIFY that the Pump 216 icon on the CMSS Overview screen is blue.
- 7.6.40 VERIFY that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is blue.
- 7.6.41 VERIFY that the "SUMP LEVEL" gallon indicator does not show a falling liquid level.
- 7.6.42 VERIFY that the Pump 216 icon is blue.
- 7.6.43 SELECT the (emergency stop) "RESET" button.
- 7.6.44 VERIFY that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is still blue.
- 7.6.45 START Pump 216 in the manual mode.
- 7.6.46 PLACE pump 216 in automatic mode, AFTER the CMSS "LOW LEVEL IN SUMP" indication is activated.

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## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

## 8.0 2706-T RAILROAD PIT SUMP CMSS SCREEN TEST

NOTE: The 2706-T Railroad Pit Sump Screen Test demonstrates that the system components, alarms, gauges and controls that are within the scope of the OTP and also appear on the CMSS 2706-T Railroad Pit Sump Screen are functional. Significant components include Pumps 203 and 204, an air sparger, and a liquid level transmitter. Each pump will be tested in the automatic, manual and duplex modes.

## 8.1 Prerequisites:

- 8.1.1 Liquid Level Transmitter #I-XX-2706-LT-02 is calibrated: 1-18-99  
Calibration date
- 8.1.2 Air Pressure Gauge #A-HP-2706-PDI-319 is functional (i.e. shows a pressure reading).
- 8.1.3 Air Pressure Gauge #A-HP-2706-PDI-320 is functional (i.e. shows a pressure reading).

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## 8.2 Test 2706-T Railroad Pit Sump Level Transmitter

- 8.2.1 ENSURE that liquid level in the 2706-T Railroad Pit Sump is at or below the low-low liquid level cutoff.
- 8.2.2 VERIFY that the CMSS "LOW-LOW LEVEL IN SUMP" indication is activated.
- 8.2.3 VERIFY that the CMSS "LOW LEVEL IN SUMP" indication is activated.
- 8.2.4 ENSURE Pump 203 is in the manual mode.
- 8.2.5 ENSURE Pump 204 is in the manual mode.
- 8.2.6 START filling the 2706-T Railroad Pit Sump with liquid.
- 8.2.7 VERIFY that the CMSS 2706-T Railroad Pit Sump icon shows a rising liquid level.
- 8.2.8 VERIFY that the CMSS "SUMP LEVEL" gallon indicator value increases with the rising liquid level.
- 8.2.9 RECORD the approximate liquid volume when the CMSS "LOW-LOW LEVEL IN SUMP" indication is no longer activated: 20 gallons.
- 8.2.10 RECORD the approximate liquid volume when the CMSS "LOW LEVEL IN SUMP" indication is no longer activated: 40 gallons.
- 8.2.11 RECORD the approximate liquid volume when the CMSS "HIGH LEVEL IN SUMP" indication is activated: 80 gallons.
- 8.2.12 STOP filling the 2706-T Railroad Pit Sump with liquid after the CMSS "HIGH-HIGH LEVEL IN SUMP" indication is activated.
- 8.2.13 RECORD the approximate liquid volume when the CMSS "HIGH-HIGH LEVEL IN SUMP" alarm is activated: 100 gallons.

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NOTE: Section 8.3 fills liquid filters T-XX-2706-208-FILTER A and -209-FILTER B with liquid in preparation for OTP activities that require pumping through the 2706-TA Sump. It necessary to slowly fill them through a partially open valve to avoid damaging the filter media.

### 8.3 Prepare Liquid Filters for Test

#### 8.3.1 Prerequisite:

8.3.1.1. Pressure Transmitter #I-XX-2706-PDI/PDSH-208 is calibrated: 1-12-99  
Calibration date

8.3.1.2. Pressure Transmitter #I-XX-2706-PDI/PDSH-209 is calibrated: 1-12-99  
Calibration date

8.3.2 **ENSURE** that the destination tank is not displaying a CMSS "HIGH LEVEL IN TANK" indication.

8.3.3 **ENSURE** that either Valve HV-04 or Valve HV-05 is open.

8.3.4 **ENSURE** that Valve HV-08 is closed.

8.3.5 **ENSURE** that the 2706-TA Sump "HIGH LEVEL IN SUMP" indication is activated.

8.3.6 **CLOSE** the Pump 206 manual isolation valve, T-XX-2706-229.

8.3.7 **START** Pump 206 in manual mode.

8.3.8 **OPEN** the Filter A vent valve, T-XX-2706-236.

8.3.9 Partially **OPEN** Valve T-XX-2706-229, **UNTIL** there is a steady flow into the filter.

8.3.10 **CONTINUE** to fill the filter, **UNTIL** a solid stream of liquid is discharged out of the Filter A vent valve, T-XX-2706-236.

8.3.11 **RECORD** the differential pressure reading on pressure gauge #I-XX-2706-PDI/PDSH-208: 1.5

8.3.12 **CLOSE** Valve T-XX-2706-229.

8.3.13 **CLOSE** the Filter A vent valve, T-XX-2706-236.

8.3.14 **STOP** Pump 206.

8.3.15 Slowly **OPEN** the balancing valve between Filter A and Filter B.

8.3.16 **WAIT** approximately two minutes and **CLOSE** the balancing valve.

NOTE: Switching from Filter A to Filter B is done by moving the mechanical actuator that simultaneously operates valves T-XX-2706-232, -233, -234 and -235.

8.3.17 **MOVE** the mechanical actuator so that valves T-XX-2706-232 and -234 close, and T-XX-2706-233 and -235 open.

8.3.18 **START** Pump 206 in manual mode.

8.3.19 **OPEN** the Filter B vent valve, T-XX-2706-238.

8.3.20 Partially **OPEN** Valve T-XX-2706-229, **UNTIL** there is a steady flow into the filter.

8.3.21 **CONTINUE** to fill the filter, **UNTIL** a solid stream of liquid is discharged out of the Filter B vent valve, T-XX-2706-238.

8.3.22 **RECORD** the differential pressure reading on pressure gauge #I-XX-2706-PDI/PDSH-209: 1.0

8.3.23 **CLOSE** Valve T-XX-2706-229.

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- 8.3.24 CLOSE the Filter B vent valve, T-XX-2706-238.
- 8.3.25 STOP Pump 206.
- 8.3.26 OPEN Valve T-XX-2706-229.

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NOTE: Section 8.4 demonstrates that Pump 203 is functional in the manual mode.

**8.4 Test Pump 203 in the manual mode:**

- 8.4.1 ENSURE Pump 203 is in the manual mode.
- 8.4.2 ENSURE Pump 204 is in the manual mode.

NOTE: A high liquid level in the 2706-TA Sump will prevent Pump 203 from starting.

- 8.4.3 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-TA Sump is not activated.
- 8.4.4 VERIFY that the Pump 203 icon on the CMSS Overview screen is blue.
- 8.4.5 VERIFY that the Pump 203 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.
- 8.4.6 VERIFY that the "on" pump status indicator on the Pump 203 control subscreen is blue.
- 8.4.7 VERIFY that the "off" pump status indicator on the Pump 203 control subscreen is white.
- 8.4.8 ENSURE that the 2706-T Railroad Pit Sump CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 8.4.9 SELECT the "START" button on the Pump 203 subscreen.

NOTE: Steps 8.4.10 through 8.4.13 demonstrate that the various Pump 203 on/off status indicators are functional. Where other OTP tests require verification of Pump 203 on/off status, only one of the indicators need to be verified to demonstrate the Pump 203 on/off status.

- 8.4.10 VERIFY that the Pump 203 icon on the CMSS Overview screen is white.
- 8.4.11 VERIFY that the Pump 203 icon on the CMSS 2706-T Railroad Pit Sump screen is white.
- 8.4.12 VERIFY that the "on" pump status indicator on the CMSS Pump 203 control subscreen is white.
- 8.4.13 VERIFY that the "off" pump status indicator on the CMSS Pump 203 control subscreen is blue.
- 8.4.14 VERIFY that the CMSS 2706-T Railroad Pit Sump icon shows a falling liquid level.
- 8.4.15 SELECT the "STOP" button on the CMSS Pump 203 subscreen, AFTER the 2706-T Railroad Pit Sump CMSS "LOW LEVEL IN SUMP" indication is activated.
- 8.4.16 RECORD the approximate time lapse from when the "HIGH LEVEL IN SUMP" indication is deactivated and the "LOW LEVEL IN SUMP" is activated: 53 seconds.
- 8.4.17 VERIFY that the Pump 203 icon on the CMSS Overview screen is blue.

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- 8.4.18 **VERIFY** that the Pump 203 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.
- 8.4.19 **VERIFY** that the "on" pump status indicator on the Pump 203 control subscreen is blue.
- 8.4.20 **VERIFY** that the "off" pump status indicator on the Pump 203 control subscreen is white.

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**8.5 Test Pump 204 in the manual mode:**

- 8.5.1 **ENSURE** Pump 203 is in the manual mode.
- 8.5.2 **ENSURE** Pump 204 is in the manual mode.

**NOTE:** A high liquid level in the 2706-TA Sump will prevent Pump 204 from starting.

- 8.5.3 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-TA Sump is not activated.
- 8.5.4 **VERIFY** that the Pump 204 icon on the CMSS Overview screen is blue.
- 8.5.5 **VERIFY** that the Pump 204 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.
- 8.5.6 **VERIFY** that the "on" pump status indicator on the CMSS Pump 204 control subscreen is blue.
- 8.5.7 **VERIFY** that the "off" pump status indicator on the CMSS Pump 204 control subscreen is white.
- 8.5.8 **ENSURE** that the 2706-T Railroad Pit Sump CMSS "LOW-LEVEL IN SUMP" indication is not activated.
- 8.5.9 **SELECT** the "START" button on the Pump 204 subscreen.

**NOTE:** Steps 8.5.10 through 8.5.13 demonstrate that the various Pump 204 on/off status indicators are functional. Where other OTP tests require verification of Pump 204 on/off status, only one of the indicators need to be verified to demonstrate the Pump 204 on/off status.

- 8.5.10 **VERIFY** that the Pump 204 icon on the CMSS Overview screen is white.
- 8.5.11 **VERIFY** that the Pump 204 icon on the CMSS 2706-T Railroad Pit Sump screen is white.
- 8.5.12 **VERIFY** that the "on" pump status indicator on the CMSS Pump 204 control subscreen is white.
- 8.5.13 **VERIFY** that the "off" pump status indicator on the CMSS Pump 204 control subscreen is blue.
- 8.5.14 **VERIFY** that the CMSS 2706-T Railroad Pit Sump shows a falling liquid level.
- 8.5.15 **SELECT** the "STOP" button on the CMSS Pump 204 subscreen.
- 8.5.16 **VERIFY** that the Pump 204 icon on the CMSS Overview screen is blue.
- 8.5.17 **VERIFY** that the Pump 204 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.
- 8.5.18 **VERIFY** that the "on" pump status indicator on the CMSS Pump 204 control subscreen is blue.
- 8.5.19 **VERIFY** that the "off" pump status indicator on the CMSS Pump 204 control subscreen is white.

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NOTE: Section 8.6 demonstrates that the Railroad Pit Sump Air Sparger is functional in the manual mode. Also demonstrates that switching to auto mode while the sparger is running will reset the manual start command to manual stop.

**8.6 Test the Railroad Pit Sump Air Sparger in the manual mode:**

8.6.1 ENSURE that the CMSS is displaying the 2706-T Railroad Pit Sump screen.

8.6.2 ENSURE the Railroad Pit Sump Air Sparger is in manual mode.

NOTE: Valve HY-02 operates the Railroad Pit Sump Air Sparger.

8.6.3 VERIFY the CMSS Valve HY-02 icon is blue.

8.6.4 SELECT the Railroad Pit Sump Air Sparger "START" on the CMSS 2706-T Railroad Pit Sump screen

8.6.5 VERIFY that the CMSS Valve HY-02 icon is white.

8.6.6 SELECT the Railroad Pit Sump Air Sparger "STOP" on the CMSS 2706-T Railroad Pit Sump screen.

8.6.7 VERIFY that the CMSS Valve HY-02 icon is blue.

8.6.8 SELECT the Railroad Pit Sump Air Sparger "START" on the CMSS 2706-T Railroad Pit Sump screen.

8.6.9 VERIFY that the CMSS Valve HY-02 icon is white.

8.6.10 ENSURE the Railroad Pit Sump Air Sparger is in auto mode.

8.6.11 ENSURE the Railroad Pit Sump Air Sparger is in manual mode.

8.6.12 VERIFY that the CMSS Valve HY-02 icon is blue.

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NOTE: Section 8.7 demonstrates that Pump 203 and the Railroad Pit Sump Air Sparger are functional in the automatic mode, and are controlled by the liquid level transmitter. The Railroad Pit Sump Air Sparger is controlled by Valve A-HP-2706-HY-02.

**8.7 Test Pump 203 and the Railroad Pit Sump Air Sparger in automatic mode:**

8.7.1 ENSURE that the CMSS is displaying the 2706-T Railroad Pit Sump Screen.

NOTE: A high liquid level in the 2706-TA Sump will prevent Pump 203 from starting.

8.7.2 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-TA Sump is not activated.

8.7.3 VERIFY that the Pump 203 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.

8.7.4 VERIFY that the Pump 204 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.

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- 8.7.5 **VERIFY** that the Valve HY-02 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.
- 8.7.6 **ENSURE** that the 2706-T Railroad Pit Sump CMSS "HIGH LEVEL IN SUMP" indication is not activated.
- 8.7.7 **SELECT** automatic mode on the CMSS Pump 203 subscreen.

NOTE: Pump 204 must be in manual mode or Pump 203 will not start in automatic mode.

- 8.7.8 **SELECT** manual mode on the CMSS Pump 204 subscreen.
- 8.7.9 **SELECT** the air sparger "AUTO" mode on the CMSS 2706-T Railroad Pit Sump screen.
- 8.7.10 **START** filling the 2706-T Railroad Pit Sump with liquid.
- 8.7.11 **STOP** filling the 2706-T Railroad Pit Sump with liquid, after the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 8.7.12 **VERIFY** that the Valve HY-02 icon on the CMSS 2706-T Railroad Pit Sump screen is white.
- 8.7.13 **VERIFY** that the Pump 203 icon on the CMSS 2706-T Railroad Pit Sump screen is white approximately 30 seconds, **AFTER** the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 8.7.14 **VERIFY** that the CMSS 2706-T Railroad Pit Sump icon shows a falling liquid level.
- 8.7.15 **VERIFY** that the Valve HY-02 icon is blue, **AFTER** the CMSS "LOW LEVEL IN SUMP" indication is activated.
- 8.7.16 **VERIFY** that the Pump 203 icon on the CMSS 2706-T Railroad Pit Sump screen turns blue approximately 30 seconds after the CMSS "LOW-LOW LEVEL IN SUMP" indication is activated.

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NOTE: Section 8.8 demonstrates that Pump 204 is functional in the automatic mode, and is controlled by the liquid level transmitter.

### 8.8 Test Pump 204 in automatic mode:

- 8.8.1 **ENSURE** that the CMSS is displaying the 2706-T Railroad Pit Sump Screen.

NOTE: A high liquid level in the 2706-TA Sump will prevent Pump 204 from starting.

- 8.8.2 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-TA Sump is not activated.
- 8.8.3 **VERIFY** that the Pump 204 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.
- 8.8.4 **VERIFY** that the Pump 203 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.
- 8.8.5 **ENSURE** that the 2706-T Railroad Pit Sump CMSS "HIGH LEVEL IN SUMP" indication is not activated.
- 8.8.6 **SELECT** automatic mode on the CMSS Pump 204 subscreen.

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NOTE: Pump 203 must be in manual mode or Pump 204 will not start in automatic mode.

- 8.8.7 **SELECT** manual mode on the CMSS Pump 203 subscreen.
- 8.8.8 **START** filling the 2706-T Railroad Pit Sump with liquid.
- 8.8.9 **VERIFY** that the CMSS 2706-T Railroad Pit Sump icon shows a rising liquid level.
- 8.8.10 **STOP** filling the 2706-T Railroad Pit Sump with liquid, after the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 8.8.11 **VERIFY** that the Pump 204 icon on the CMSS 2706-T Railroad Pit Sump screen is white.
- 8.8.12 **VERIFY** that the CMSS 2706-T Railroad Pit Sump icon shows a falling liquid level.
- 8.8.13 **VERIFY** that the Pump 204 icon on the CMSS 2706-T Railroad Pit Sump screen turns blue approximately 30 seconds after the CMSS "LOW-LOW LEVEL IN SUMP" indication is activated.

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NOTE: Section 8.9 demonstrates that Pumps 203 and 204 are functional in the duplex mode. Duplex mode means that the pumps alternate each time the liquid level transmitter indicates a high liquid level in the 2706-T Railroad Pit Sump. Duplex mode requires that both Pumps 203 and 204 be in the automatic mode.

### 8.9 Test Pumps 203 and 204 in duplex mode:

- 8.9.1 **ENSURE** at the CMSS is displaying the 2706-T Railroad Pit Sump Screen.
- 8.9.2 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication on the 2706-T Railroad Pit Sump is not activated.

NOTE: A high liquid level in the 2706-TA Sump will prevent Pump 203 from starting.

- 8.9.3 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-TA Sump is not activated.
- 8.9.4 **ENSURE** that Pump 203 is in automatic mode.
- 8.9.5 **ENSURE** that Pump 204 is in automatic mode.
- 8.9.6 **VERIFY** that the Pump 203 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.
- 8.9.7 **VERIFY** that the Pump 204 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.
- 8.9.8 **START** filling the 2706-T Railroad Pit Sump with liquid.
- 8.9.9 **VERIFY** that the CMSS 2706-T Railroad Pit Sump icon shows a rising liquid level.
- 8.9.10 **STOP** filling the 2706-T Railroad Pit Sump with liquid, **AFTER** the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 8.9.11 **VERIFY** that either the Pump 203 icon or the Pump 204 icon on the CMSS 2706-T Railroad Pit Sump screen is white.
- 8.9.12 **RECORD** the Pump whose CMSS icon turned white in Step 8.9.11.: Pump 204.

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- 8.9.13 **VERIFY** that the CMSS 2706-T Railroad Pit Sump icon shows a falling liquid level.
- 8.9.14 **VERIFY** that the icon for the Pump recorded in Step 8.9.12 turns blue on the CMSS 2706-T Railroad Pit Sump screen approximately 30 seconds, **AFTER** the CMSS "LOW-LOW LEVEL IN SUMP" indication is activated.
- 8.9.15 **START** filling the 2706-T Railroad Pit Sump with liquid.
- 8.9.16 **VERIFY** that the CMSS 2706-T Railroad Pit Sump icon shows a rising liquid level.
- 8.9.17 **STOP** filling the 2706-T Railroad Pit Sump with liquid, **AFTER** the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 8.9.18 **VERIFY** that the CMSS icon for the 2706-T Railroad Pit Sump pump not identified in Step 8.9.12 is white on the CMSS 2706-T Railroad Pit Sump screen.
- 8.9.19 **VERIFY** that the CMSS 2706-T Railroad Pit Sump icon shows a falling liquid level.
- 8.9.20 **VERIFY** that the CMSS icon for the 2706-T Railroad Pit Sump pump not identified in Step 8.9.12 is blue on the CMSS 2706-T Railroad Pit Sump screen approximately 30 seconds, **AFTER** the CMSS "LOW-LOW LEVEL IN SUMP" indication is activated.

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**NOTE:** Section 8.10 demonstrates that switching Pump 203 from manual to automatic mode while Pump 203 is running in manual will stop Pump 203. Also it demonstrates that the emergency stop interlocks will stop Pump 203 while it is running, and also prevent Pump 203 from starting. It demonstrates that the emergency stop "RESET" button is functional. Section 8.10 is to be performed sequentially.

**8.10 Test Pump 203 Interlocks in manual mode**

- 8.10.1 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication is not activated on the Railroad Pit Sump CMSS screen.
- 8.10.2 **START** Pump 203 in manual mode.
- 8.10.3 **VERIFY** that the CMSS Pump 203 icon is white.
- 8.10.4 **SELECT** automatic on the CMSS Pump 203 subscreen.
- 8.10.5 **VERIFY** that the CMSS Pump 203 icon is blue.
- 8.10.6 **START** Pump 203 in manual mode.
- 8.10.7 **VERIFY** that the CMSS Pump 203 icon is white.
- 8.10.8 **SELECT** "EMERGENCY STOP" button on a CMSS screen.
- 8.10.9 **VERIFY** that the CMSS Pump 203 icon is blue.
- 8.10.10 **START** Pump 203 in manual mode.
- 8.10.11 **VERIFY** that the CMSS Pump 203 icon is still blue.
- 8.10.12 **SELECT** (emergency stop) "RESET" button on a CMSS screen.
- 8.10.13 **VERIFY** that the CMSS Pump 203 icon is still blue.
- 8.10.14 **START** Pump 203 in manual mode.



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- 8.10.15 **VERIFY** that the CMSS Pump 203 icon is white.
- 8.10.16 **SELECT** the "STOP" button on the CMSS Pump 203 subscreen.

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NOTE: Section 8.11 demonstrates that switching Pump 204 from manual to automatic mode while Pump 203 is running in manual will stop Pump 204. Also it demonstrates that the emergency stop interlocks will stop Pump 204 while it is running, and also prevent Pump 203 from starting. It demonstrates that the emergency stop "RESET" button is functional. Section 8.11 is to be performed sequentially.

### 8.11 Test Pump 204 Interlocks in manual mode

- 8.11.1 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication is not activated on the Railroad Pit Sump CMSS screen.
- 8.11.2 **START** Pump 204 in manual mode.
- 8.11.3 **VERIFY** that the CMSS Pump 204 icon is white.
- 8.11.4 **SELECT** automatic on the CMSS Pump 204 subscreen.
- 8.11.5 **VERIFY** that the CMSS Pump 204 icon is blue.
- 8.11.6 **START** Pump 204 in manual mode.
- 8.11.7 **VERIFY** that the CMSS Pump 204 icon is white.
- 8.11.8 **SELECT** "EMERGENCY STOP" button on a CMSS screen.
- 8.11.9 **VERIFY** that the CMSS Pump 204 icon is blue.
- 8.11.10 **START** Pump 204 in manual mode.
- 8.11.11 **VERIFY** that the CMSS Pump 204 icon is still blue.
- 8.11.12 **SELECT** (emergency stop) "RESET" button on a CMSS screen.
- 8.11.13 **VERIFY** that the CMSS Pump 204 icon is still blue.
- 8.11.14 **START** Pump 204 in manual mode.
- 8.11.15 **VERIFY** that the CMSS Pump 204 icon is white.
- 8.11.16 **SELECT** the "STOP" button on the Pump 204 subscreen.

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NOTE: Section 8.12 demonstrates that the Automatic and Duplex Mode Interlocks are functional. Section 8.12 is designed to be performed sequentially.

### 8.12 Test Automatic/Duplex Mode Interlocks:

NOTE: Steps 8.12.1 through 8.12.12 demonstrate that Pumps 203 and 204 will not individually start in the automatic mode if the emergency stop interlock is activated. The activated emergency stop interlock will also prevent the pumps from starting in the duplex mode.

- 8.12.1 SELECT "EMERGENCY STOP" button on a CMSS screen.  
 SWITCH ORDER 4.0.6. 3-2-99 #5
- 8.12.2 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-T Railroad Pit Sump is activated.
- 8.12.3 ENSURE Pump 203 is in automatic mode.
- 8.12.4 ENSURE Pump 204 is in manual mode.
- 8.12.5 VERIFY that the CMSS Pump 203 icon is blue.
- 8.12.6 ENSURE Pump 204 is in automatic mode.
- 8.12.7 ENSURE Pump 203 is in manual mode.
- 8.12.8 VERIFY that the CMSS Pump 204 icon is blue.
- 8.12.9 ENSURE Pump 203 is in automatic mode.
- 8.12.10 ENSURE Pump 204 is in automatic mode.
- 8.12.11 VERIFY that the CMSS Pump 203 icon is blue.
- 8.12.12 VERIFY that the CMSS Pump 204 icon is blue.

NOTE: Steps 8.12.13 through 8.12.25 demonstrate that duplex mode will not start if Pump 204 is in manual mode. It also demonstrates that the pump emergency stop, reset the high level in sump start signal to Pump 203.

- 8.12.13 ENSURE Pump 204 is in manual.
- 8.12.14 SELECT (emergency stop) "RESET" button on a CMSS screen.
- 8.12.15 VERIFY that CMSS Pump 203 icon is white.
- 8.12.16 VERIFY that the CMSS Pump 204 icon is blue.
- 8.12.17 SELECT "EMERGENCY STOP" button on a CMSS screen, AFTER the CMSS "HIGH LEVEL IN SUMP" indication is no longer activated on the Railroad Pit Sump CMSS screen.
- 8.12.18 SELECT (emergency stop) "RESET" button on a CMSS screen.
- 8.12.19 VERIFY that the CMSS Pump 203 icon is blue.
- 8.12.20 VERIFY that the CMSS Pump 204 icon is blue.
- 8.12.21 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-T Railroad Pit Sump is activated.

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- 8.12.22 **VERIFY** that the CMSS Pump 203 icon is white.
- 8.12.23 **VERIFY** that the CMSS Pump 204 icon is blue.
- 8.12.24 **SELECT** "EMERGENCY STOP" button on a CMSS screen.
- 8.12.25 **SELECT** (emergency stop) "RESET" button on a CMSS screen.

**NOTE:** Steps 8.12.26 through 8.12.39 demonstrate that duplex mode will not start if Pump 203 is in manual mode. It also demonstrates that the pump emergency stop, reset the high-level-in-sump start signal to Pump 204.

- 8.12.26 **ENSURE** Pump 203 is in manual mode.
- 8.12.27 **ENSURE** Pump 204 is in automatic mode.
- 8.12.28 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-T Railroad Pit Sump is activated.
- 8.12.29 **VERIFY** that the CMSS Pump 204 icon is white.
- 8.12.30 **VERIFY** that the CMSS Pump 203 icon is blue.
- 8.12.31 **SELECT** "EMERGENCY STOP" button on a CMSS screen, **AFTER** the CMSS "HIGH LEVEL IN SUMP" indication is no longer activated on the Railroad Pit Sump CMSS screen.
- 8.12.32 **SELECT** (emergency stop) "RESET" button on a CMSS screen.
- 8.12.33 **VERIFY** that the CMSS Pump 204 icon is blue.
- 8.12.34 **VERIFY** that the CMSS Pump 203 icon is blue.
- 8.12.35 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-T Railroad Pit Sump is activated.
- 8.12.36 **VERIFY** that the CMSS Pump 204 icon is white.
- 8.12.37 **VERIFY** that the CMSS Pump 203 icon is blue.
- 8.12.38 **SELECT** "EMERGENCY STOP" button on a CMSS screen.
- 8.12.39 **SELECT** (emergency stop) "RESET" button on a CMSS screen.

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**NOTE:** Section 8.13 demonstrates that switching Railroad Pit Sump Air Sparger from manual to automatic mode while the air sparger is running in manual will stop the air sparger. Also it demonstrates that the emergency stop interlocks will stop the air sparger in manual mode while it is running, and also prevent the air sparger from starting.

**8.13 Test Railroad Pit Sump Air Sparger Interlocks in manual mode**

- 8.13.1 **ENSURE** that the "LOW LEVEL IN SUMP" indication is not activated on the CMSS 2706-T Railroad Pit Sump screen.
- 8.13.2 **START** the air sparger in manual mode.
- 8.13.3 **VERIFY** that the CMSS Valve HY-02 icon is white.
- 8.13.4 **SELECT** the air sparger automatic mode on the CMSS 2706-T Railroad Pit Sump screen.

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- 8.13.5 VERIFY that the CMSS Valve HY-02 icon is blue. ← 8.13.5.1 SELECT air sparger manual mode  
 8.13.6 START the air sparger in manual mode. ← 8.13.5.2 VERIFY that the CMSS Valve HY-02 icon is still blue.  
 8.13.7 VERIFY that the CMSS Valve HY-02 icon is white. H.R.B. 3-3-99  
 8.13.8 SELECT "EMERGENCY STOP" button on a CMSS screen. #6  
 8.13.9 VERIFY that the CMSS Valve HY-02 icon is blue.  
 8.13.10 START the air sparger in manual mode.  
 8.13.11 VERIFY that the CMSS Valve HY-02 icon is still blue.  
 8.13.12 SELECT (emergency stop) "RESET" button on a CMSS screen.  
 8.13.13 VERIFY that the CMSS Valve HY-02 icon is still blue.  
 8.13.14 START the air sparger in manual mode.  
 8.13.15 VERIFY that the CMSS Valve HY-02 icon is white.  
 8.13.16 SELECT the "STOP" button on the CMSS 2706-T Railroad Pit Sump screen.  
 8.13.17 VERIFY that the CMSS Valve HY-02 icon is blue.

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NOTE: Section 8.14 demonstrates that switching Railroad Pit Sump Air Sparger from automatic to manual mode while the air sparger is running in automatic will stop the air sparger. Also it demonstrates that the emergency stop interlocks will stop the air sparger in automatic mode while it is running, and also prevent the air sparger from starting.

### 8.14 Test Railroad Pit Sump Air Sparger Interlocks in automatic mode

- 8.14.1 ENSURE that the CMSS is displaying the 2706-T Railroad Pit Sump screen.  
 8.14.2 ENSURE that Pump 203 is in manual mode.  
 8.14.3 ENSURE that Pump 204 is in manual mode.  
 8.14.4 VERIFY that the CMSS Valve HY-02 icon is blue.  
 8.14.5 ENSURE that the Railroad Pit Sump CMSS "HIGH LEVEL IN SUMP" indication is activated.  
 8.14.6 ENSURE that the Railroad Pit Sump Air Sparger is in automatic mode.  
 8.14.6.1 VERIFY that the CMSS Valve HY-02 icon is blue. H.R.B. 3/5/99 #7  
 8.14.7 START Pump 203 in manual mode.  
 8.14.8 VERIFY that the CMSS Valve HY-02 icon is white.  
 8.14.9 SELECT the air sparger "MANUAL" button.  
 8.14.10 VERIFY that the CMSS Valve HY-02 icon is blue.  
 8.14.11 STOP Pump 203 in manual mode.  
 8.14.12 ENSURE that the Railroad Pit Sump CMSS "HIGH LEVEL IN SUMP" indication is activated.  
 8.14.13 ENSURE that the Railroad Pit Sump Air Sparger is in automatic mode.  
 8.14.14 START Pump 203 in manual mode.

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- 8.14.15 VERIFY that the CMSS Valve HY-02 icon is white.
- 8.14.16 SELECT "EMERGENCY STOP" button on a CMSS screen.
- 8.14.17 VERIFY that the CMSS Valve HY-02 icon is blue.
- 8.14.18 SELECT the CMSS (emergency stop) "RESET" button.
- 8.14.19 VERIFY that the CMSS Valve HY-02 icon is still blue.
- 8.14.20 VERIFY that the CMSS Pump 203 icon is blue.
- 8.14.21 ENSURE that the CMSS Railroad Pit Sump "HIGH LEVEL IN SUMP" indication is not activated.
- 8.14.22 VERIFY that the CMSS Valve HY-02 icon is blue.
- 8.14.23 SELECT "EMERGENCY STOP" button on a CMSS screen.
- 8.14.24 ENSURE that the CMSS Railroad Pit Sump "HIGH LEVEL IN SUMP" indication is activated.
- 8.14.25 START Pump 203 in manual mode.
- 8.14.26 VERIFY that the CMSS Valve HY-02 icon is still blue.
- 8.14.27 SELECT the CMSS (emergency stop) "RESET" button.
- 8.14.28 VERIFY that the CMSS Valve HY-02 icon is still blue.
- 8.14.29 VERIFY that the CMSS Pump 203 icon is blue.

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NOTE: The air sparger should not start or continue running if either Pump 203 or 204 are not running in either manual or automatic. Section 8.15 demonstrates that this logic is functional. Steps 8.15.1 through 8.15.17 demonstrate that relationship with respect to Pump 203 and Pump 204 in the manual mode.

### 8.15 Test Pump 203 and Pump 204 interlocks on the Air sparger

- 8.15.1 ENSURE that the CMSS is displaying the 2706-T Railroad Pit Sump screen.
- 8.15.2 ENSURE that Pump 203 is in manual mode.
- 8.15.3 ENSURE that Pump 204 is in manual mode.
- 8.15.4 CLOSE the Pump 203 Discharge Isolation Valve, #T-XX-2706-224 (manual valve).
- 8.15.5 CLOSE the Pump 204 Discharge Isolation Valve, #T-XX-2706-226 (manual valve).
- 8.15.6 VERIFY that the CMSS Valve HY-02 icon is blue.
- 8.15.7 ENSURE that the Railroad Pit Sump CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 8.15.8 ENSURE that the Railroad Pit Sump Air Sparger is in automatic mode.
- 8.15.8.1 VERIFY that the CMSS Valve HY-02 icon is blue. *H.R.B. 3/2/99 #8*
- 8.15.9 START Pump 203 in manual mode.
- 8.15.10 VERIFY that the CMSS Valve HY-02 icon is white.
- 8.15.11 STOP Pump 203 in manual mode.
- 8.15.12 VERIFY that the CMSS Valve HY-02 icon is blue.
- 8.15.13 START Pump 204 in manual mode.

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8.15.14 **VERIFY** that the CMSS Valve HY-02 icon is white.

8.15.15 **STOP** Pump 204 in manual mode.

~~8.15.16 STOP Pump 204 in manual mode.~~ H.R.B. 3/2/99 #10

8.15.17 **VERIFY** that the CMSS Valve HY-02 icon is blue.

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H.R.B. 3/2/99 #9

NOTE: Steps 8.15.18 through 8.15.38 demonstrate that stopping the pumps in automatic or duplex modes will stop the air sparger in automatic mode.

8.15.18 **SELECT** the Pump 204 manual mode.

8.15.19 **SELECT** the Pump 203 automatic mode.

8.15.20 **VERIFY** that the CMSS Valve HY-02 icon is white.

8.15.21 **ENSURE** that Pump 203 is in the manual mode.

8.15.22 **VERIFY** that the CMSS Valve HY-02 icon is blue.

8.15.23 **VERIFY** that CMSS Pump 203 icon is blue.

8.15.24 **SELECT** the Pump 203 manual mode.

8.15.25 **SELECT** the Pump 204 automatic mode.

8.15.26 **VERIFY** that the CMSS Valve HY-02 icon is white.

8.15.27 **ENSURE** that Pump 204 is in the manual mode.

8.15.28 **VERIFY** that the CMSS Valve HY-02 icon is blue.

8.15.29 **VERIFY** that CMSS Pump 204 icon is blue.

8.15.30 **PLACE** Pumps 203 and 204 in the automatic mode.

8.15.31 **VERIFY** that the CMSS Valve HY-02 icon is white.

8.15.32 **ENSURE** that Pump 203 is in the manual mode.

8.15.33 **ENSURE** that Pump 204 is in the manual mode.

8.15.34 **VERIFY** that the CMSS Valve HY-02 icon is blue.

8.15.35 **VERIFY** that CMSS Pump 203 icon is blue.

8.15.36 **VERIFY** that CMSS Pump 204 icon is blue.

8.15.37 **OPEN** the Pump 203 Discharge Isolation Valve, #T-XX-2706-224 (manual valve).

8.15.38 **OPEN** the Pump 204 Discharge Isolation Valve, #T-XX-2706-226 (manual valve).

NOTE: Section 8.16 demonstrates that a high liquid level in the 2706-TA Sump will prevent the Railroad Pit Sump pumps from running in the duplex, manual or automatic modes. Section 8.16 is designed to be performed sequentially.

### 8.16 Test 2706-TA High Level Interlock on the 2706-T Railroad Pit Sump

8.16.1 **ENSURE** that Pump 206 is in manual mode.

8.16.2 **ENSURE** that Pump 207 is in manual mode.

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- 8.16.3 **ENSURE** that the "HIGH LEVEL IN SUMP" indication is activated on the CMSS 2706-TA Sump screen.
- 8.16.4 **START** Pump 203 in manual mode.
- 8.16.5 **VERIFY** that the CMSS Pump 203 icon is blue.
- 8.16.6 **START** Pump 204 in manual mode.
- 8.16.7 **VERIFY** that the CMSS Pump 204 icon is blue.
- 8.16.8 **ENSURE** that the "HIGH LEVEL IN SUMP" indication is activated on the CMSS 2706-T Railroad Pit Sump screen.
- 8.16.9 **ENSURE** that Pump 203 is in automatic mode.
- 8.16.10 **VERIFY** that the CMSS Pump 203 icon is blue.
- 8.16.11 **ENSURE** that Pump 203 is in manual mode.
- 8.16.12 **ENSURE** that Pump 204 is in automatic mode.
- 8.16.13 **VERIFY** that the CMSS Pump 204 icon is blue.
- 8.16.14 **ENSURE** that Pump 203 is in automatic mode.
- 8.16.15 **ENSURE** that Pump 204 is in automatic mode.
- 8.16.16 **VERIFY** that the CMSS Pump 203 icon is blue.
- 8.16.17 **VERIFY** that the CMSS Pump 204 icon is blue.
- 8.16.18 **ENSURE** that the "HIGH LEVEL IN SUMP" indication is not activated on the CMSS 2706-TA Sump screen.
- 8.16.19 **VERIFY** that either the CMSS Pump 203 icon or the CMSS Pump 204 icon is white and the other is blue.
- 8.16.20 **VERIFY** that the Pump activated in Step 8.16.19 stops, **WHEN** the "HIGH LEVEL IN SUMP" indication is activated on the CMSS 2706-TA Sump screen.
- 8.16.21 **VERIFY** that the Railroad Pit Sump Pump not activated in Step 8.16.19 is also off.
- 8.16.22 **ENSURE** that Pump 203 is in automatic mode.
- 8.16.23 **VERIFY** that the CMSS Pump 203 icon is blue.
- 8.16.24 **ENSURE** that the "HIGH LEVEL IN SUMP" indication is not activated on the CMSS 2706-TA Sump screen.
- 8.16.25 **ENSURE** that the "HIGH LEVEL IN SUMP" indication is activated on the CMSS 2706-T Railroad Pit Sump screen.
- 8.16.26 **VERIFY** that the CMSS Pump 203 icon is white.
- 8.16.27 **VERIFY** that the CMSS Pump 203 icon is blue, **WHEN** the "HIGH LEVEL IN SUMP" indication is activated on the CMSS 2706-TA Sump screen.
- 8.16.28 **ENSURE** that Pump 203 is in manual mode.
- 8.16.29 **ENSURE** that Pump 204 is in automatic mode.
- 8.16.30 **VERIFY** that the CMSS Pump 204 icon is blue.
- 8.16.31 **ENSURE** that the "HIGH LEVEL IN SUMP" indication is not activated on the CMSS 2706-TA Sump screen.

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- 8.16.32 **ENSURE** that the "HIGH LEVEL IN SUMP" indication is activated on the CMSS 2706-T Railroad Pit Sump screen.
- 8.16.33 **VERIFY** that the CMSS Pump 204 icon is white.
- 8.16.34 **VERIFY** that the CMSS Pump 204 icon is blue, **WHEN** the "HIGH LEVEL IN SUMP" indication is activated on the CMSS 2706-TA Sump screen.
- 8.16.35 **ENSURE** that Pump 203 is in manual mode.
- 8.16.36 **ENSURE** that Pump 204 is in manual mode.
- 8.16.37 **ENSURE** that the "HIGH LEVEL IN SUMP" indication is not activated on the CMSS 2706-TA Sump screen.
- 8.16.38 **START** Pump 203 in manual mode.
- 8.16.39 **VERIFY** that the CMSS Pump 203 icon is white.
- 8.16.40 **VERIFY** that the CMSS Pump 203 icon is blue, **WHEN** the "HIGH LEVEL IN SUMP" indication is activated on the CMSS 2706-TA Sump screen.
- 8.16.41 **ENSURE** that the "HIGH LEVEL IN SUMP" indication is not activated on the CMSS 2706-TA Sump screen.
- 8.16.42 **VERIFY** that the CMSS Pump 203 icon is still blue.
- 8.16.43 **START** Pump 204 in manual mode.
- 8.16.44 **VERIFY** that the CMSS Pump 204 icon is white.
- 8.16.45 **VERIFY** that the CMSS Pump 204 icon is blue, **WHEN** the "HIGH LEVEL IN SUMP" indication is activated on the CMSS 2706-TA Sump screen.
- 8.16.46 **ENSURE** that the "HIGH LEVEL IN SUMP" indication is not activated on the CMSS 2706-TA Sump screen.
- 8.16.47 **VERIFY** that the CMSS Pump 204 icon is still blue.

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## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

**9.0 2706-TA SUMP CMSS SCREEN TEST**

**NOTE:** The 2706-TA Sump Screen Test demonstrates that the system components, alarms, gauges and controls appearing on the CMSS 2706-TA Sump Screen are functional. Significant components include Pumps 206 and 207, an air sparger, and a liquid level transmitter. Each pump will be tested in the automatic, manual and duplex modes.

**NOTE:** A high liquid level in Tank 220 when valve HV-05 is open will keep Pump 206 from starting. All 2706-TA tests will require that valve HV-05 be open, valves HV-04 and HV-08 be closed and the Tank 220 liquid level be below the "HIGH LEVEL IN TANK 220" setpoint.

**9.1 Prerequisites**

- 9.1.1 The destination tank does not have a CMSS "HIGH LEVEL IN TANK" indication
- 9.1.2 Either Valve HV-05 or HV-04 is open.
- 9.1.3 Valve HV-08 is closed.
- 9.1.4 Liquid Level Transmitter #I-XX-2706-LT-03 is calibrated: 1/20/99  
Calibration date
- 9.1.5 Air Pressure Gauge #A-HP-2706-PDI-321 is functional (i.e. shows a pressure reading).

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**9.2 Test 2706-TA Sump Level Transmitter**

- 9.2.1 **ENSURE** that liquid level in the 2706-TA Sump is at or below the low-low liquid level cutoff.
- 9.2.2 **VERIFY** that the CMSS "LOW-LOW LEVEL IN SUMP" indication is activated.
- 9.2.3 **VERIFY** that the CMSS "LOW LEVEL IN SUMP" indication is activated.
- 9.2.4 **ENSURE** Pump 206 is in the manual mode.
- 9.2.5 **ENSURE** Pump 207 is in the manual mode.
- 9.2.6 **START** filling the 2706-TA Sump with liquid.
- 9.2.7 **VERIFY** that the CMSS 2706-TA Sump icon shows a rising liquid level.
- 9.2.8 **VERIFY** that the "SUMP LEVEL" gallon indicator value increases with the rising liquid level.
- 9.2.9 **RECORD** the approximate liquid volume when the CMSS "LOW LOW LEVEL IN SUMP" indication is no longer activated: 18 gallons.
- 9.2.10 **RECORD** the approximate liquid volume when the CMSS "LOW LEVEL IN SUMP" indication is no longer activated: 65 gallons.
- 9.2.11 **RECORD** the approximate liquid volume when the CMSS "HIGH LEVEL IN SUMP" indication is activated: 414 gallons.

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**NOTE:** To reach the CMSS 2706-TA Sump "HIGH-HIGH LEVEL IN SUMP" indication, the sump can be filled by opening Valve HV-07 during a treatment/storage tank recirculation, or by running water through a hose placed in the pipe trench leading in the 2706-TA Sump.

- 9.2.12 **STOP** filling the 2706-TA Sump with liquid after the CMSS "HIGH-HIGH LEVEL IN SUMP" alarm is activated.
- 9.2.13 **RECORD** the approximate liquid volume when the CMSS "HIGH-HIGH LEVEL IN SUMP" alarm is activated: 491 gallons.

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**NOTE:** Section 9.3 demonstrates that Pump 206 is functional in the manual mode.

### 9.3 Test Pump 206 in the manual mode:

- 9.3.1 **ENSURE** Pump 206 is in the manual mode.
- 9.3.2 **ENSURE** Pump 207 is in the manual mode.
- 9.3.3 **VERIFY** that the Pump 206 icon on the CMSS Overview screen is blue.
- 9.3.4 **VERIFY** that the Pump 206 icon on the CMSS 2706-TA Sump screen is blue.
- 9.3.5 **VERIFY** that the "on" pump status indication on the CMSS Pump 206 control subscreen is blue.
- 9.3.6 **VERIFY** that the "off" pump status indication on the CMSS Pump 206 control subscreen is white.
- 9.3.7 **ENSURE** that the 2706-TA Sump CMSS "LOW LEVEL IN SUMP" indication is not activated.
- 9.3.8 **SELECT** the "START" button on the Pump 206 subscreen.

**NOTE:** Steps 9.3.9 through 9.3.12 demonstrate that the various Pump 206 on/off status indications are functional. Where other OTP tests require verification of Pump 206 on/off status, only one of the indications need to be verified to demonstrate the Pump 206 on/off status.

- 9.3.9 **VERIFY** that the Pump 206 icon on the CMSS Overview screen is white.
- 9.3.10 **VERIFY** that the Pump 206 icon on the CMSS 2706-TA Sump screen is white.
- 9.3.11 **VERIFY** that the "on" pump status indication on the CMSS Pump 206 control subscreen is white.
- 9.3.12 **VERIFY** that the "off" pump status indication on the CMSS Pump 206 control subscreen is blue.
- 9.3.13 **VERIFY** that the CMSS 2706-TA Sump icon shows a falling liquid level.
- 9.3.14 **SELECT** the "STOP" button on the CMSS Pump 206 subscreen, **AFTER** the 2706-TA Sump CMSS "LOW LEVEL IN SUMP" indication is activated.
- 9.3.15 **RECORD** the approximate time lapse from when the "HIGH LEVEL IN SUMP" indication is deactivated and the "LOW LEVEL IN SUMP" is activated: 360 seconds.
- 9.3.16 **VERIFY** that the Pump 206 icon on the CMSS Overview screen is blue.

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- 9.3.17 VERIFY that the Pump 206 icon on the CMSS 2706-TA Sump screen is blue. <sup>206 H.R.B. 2-3-99 #37</sup>
- 9.3.18 VERIFY that the "on" pump status indicator on the CMSS Pump ~~204~~ <sup>206</sup> control subscreen is blue.
- 9.3.19 VERIFY that the "off" pump status indicator on the CMSS Pump ~~204~~ <sup>206</sup> control subscreen is white.

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**9.4 Test Pump 207 in the manual mode:**

- 9.4.1 ENSURE Pump 206 is in the manual mode.
- 9.4.2 ENSURE Pump 207 is in the manual mode.
- 9.4.3 VERIFY that the Pump 207 icon on the CMSS Overview screen is blue.
- 9.4.4 VERIFY that the Pump 207 icon on the CMSS 2706-TA Sump screen is blue.
- 9.4.5 VERIFY that the "on" pump status indication on the CMSS Pump 207 control subscreen is blue.
- 9.4.6 VERIFY that the "off" pump status indication on the CMSS Pump 207 control subscreen is white.
- 9.4.7 ENSURE that the 2706-TA Sump CMSS "LOW LEVEL IN SUMP" indication is not activated.
- 9.4.8 SELECT the "START" button on the Pump 207 subscreen.

NOTE: Steps 9.4.9 through 9.4.12 demonstrate that the various Pump 207 on/off status indications are functional. Where other OTP tests require verification of Pump 207 on/off status, only one of the indications need to be verified to demonstrate the Pump 207 on/off status.

- 9.4.9 VERIFY that the Pump 207 icon on the CMSS Overview screen is white.
- 9.4.10 VERIFY that the Pump 207 icon on the CMSS 2706-T 2706-TA Sump screen is white.
- 9.4.11 VERIFY that the "on" pump status indication on the CMSS Pump 207 control subscreen is white.
- 9.4.12 VERIFY that the "off" pump status indication on the CMSS Pump 207 control subscreen is blue.
- 9.4.13 VERIFY that the CMSS 2706-TA Sump icon shows a falling liquid level.
- 9.4.14 SELECT the "STOP" button on the CMSS Pump 207 subscreen.
- 9.4.15 VERIFY that the Pump 207 icon on the CMSS Overview screen is blue.
- 9.4.16 VERIFY that the Pump 207 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.
- 9.4.17 VERIFY that the "on" pump status indicator on the CMSS Pump 207 control subscreen is blue.
- 9.4.18 VERIFY that the "off" pump status indicator on the CMSS Pump 207 control subscreen is white.

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## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

NOTE: Section 9.5 demonstrates that the 2706-TA Sump Air Sparger is functional in the manual mode. Also demonstrates that switching to auto mode while the sparger is running will reset the manual start command to manual stop.

### 9.5 Test the 2706-TA Sump Air Sparger in the Manual Mode

- 9.5.1 ENSURE that the CMSS is displaying the 2706-TA Sump screen.  
 9.5.2 ENSURE that the 2706-TA Sump Air Sparger is in manual mode.

NOTE: Valve HY-03 operates the 2706-TA Sump Air Sparger.

- 9.5.3 VERIFY that the CMSS Valve HY-03 icon is blue.  
 9.5.4 SELECT the 2706-TA Sump Air Sparger "START" on the CMSS 2706-TA Sump screen.  
 9.5.5 VERIFY that the CMSS Valve HY-03 icon is white.  
 9.5.6 SELECT the 2706-TA Sump Air Sparger "STOP" on the CMSS 2706-TA Sump screen.  
 9.5.7 VERIFY that the CMSS Valve HY-03 icon is blue.  
 9.5.8 SELECT the 2706-TA Sump Air Sparger "START" on the CMSS 2706-T Railroad Pit Sump screen.  
 9.5.9 VERIFY that the CMSS Valve HY-03 icon is white.  
 9.5.10 ENSURE the 2706-TA Sump Air Sparger is in auto mode.  
 9.5.11 ENSURE the 2706-TA Sump Air Sparger is in manual mode.  
 9.5.12 VERIFY that the CMSS Valve HY-03 icon is blue.

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NOTE: Section 9.6 demonstrates that Pump 206 and the 2706-TA Sump Air Sparger are functional in the automatic mode, and are controlled by the liquid level transmitter.

### 9.6 Test Pump 206 and the 2706-TA Sump Air Sparger in automatic mode:

- 9.6.1 ENSURE that the CMSS is displaying the 2706-TA Sump Screen.  
 9.6.2 VERIFY that the Pump 206 icon on the CMSS 2706-TA Sump screen is blue.  
 9.6.3 VERIFY that the Pump 207 icon on the CMSS 2706-TA Sump screen is blue.  
 9.6.4 VERIFY that the Valve HY-03 on the CMSS 2706-TA Sump screen is blue.  
 9.6.5 ENSURE that the 2706-TA Sump CMSS "HIGH LEVEL IN SUMP" indication is not activated.  
 9.6.6 SELECT automatic mode on the Pump 206 subscreen.

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**NOTE:** Pump 207 must be in the manual mode or Pump 206 will not start in the automatic mode.

- 9.6.7 **SELECT** manual mode on the Pump 207 subscreen.
- 9.6.8 **SELECT** the air sparger "AUTO" mode on the CMSS 2706-TA Sump screen.
- 9.6.9 **START** filling the 2706-TA Sump with liquid.
- 9.6.10 **STOP** filling the 2706-T 2706-TA Sump with liquid, after the "HIGH LEVEL IN SUMP" indication is activated.
- 9.6.11 **VERIFY** that the Valve HY-03 icon on the CMSS 2706-TA Sump screen is white.
- 9.6.12 **VERIFY** that the Pump 206 icon on the CMSS 2706-TA Sump screen is white approximately 30 seconds, **AFTER** the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 9.6.13 **VERIFY** that the 2706-TA Sump icon shows a falling liquid level.
- 9.6.14 **VERIFY** that the Valve HY-03 icon is blue, **AFTER** the "LOW LEVEL IN SUMP" indication is activated.
- 9.6.15 **VERIFY** that the Pump 206 icon on the CMSS 2706-TA Sump screen is blue approximately 30 seconds, **AFTER** the "LOW-LOW LEVEL IN SUMP" indication is activated. H.R.B. 3-6-99 # 11

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**NOTE:** Section 9.7 demonstrates that Pump 207 is functional in the automatic mode, and is controlled by the liquid level transmitter.

**9.7 Test Pump 207 in automatic mode:**

- 9.7.1 **ENSURE** that the CMSS is displaying the 2706-TA Sump Screen.
- 9.7.2 **VERIFY** that the Pump 207 icon on the CMSS 2706-TA Sump screen is blue.
- 9.7.3 **VERIFY** that the Pump 206 icon on the CMSS 2706-TA Sump screen is blue.
- 9.7.4 **SELECT** automatic mode on the Pump 207 subscreen.

**NOTE:** Pump 206 must be in the manual mode or Pump 207 will not start in the automatic mode.

- 9.7.5 **SELECT** manual mode on the Pump 206 subscreen.
- 9.7.6 **START** filling the 2706-TA Sump with liquid.
- 9.7.7 **VERIFY** that the CMSS 2706-TA Sump icon shows a rising liquid level.
- 9.7.8 **STOP** filling the 2706-TA Sump with liquid, after the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 9.7.9 **VERIFY** that the Pump 207 icon on the CMSS 2706-TA Sump screen is white approximately 30 seconds, **AFTER** the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 9.7.10 **VERIFY** that the 2706-TA Sump icon shows a falling liquid level.

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9.7.11 VERIFY that the Pump 207 icon on the CMSS 2706-TA Sump screen is blue approximately 30 seconds, AFTER the CMSS "LOW-LOW LEVEL IN SUMP" indication is activated.

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9.8 Test Pumps 206 and 207 in duplex mode:

- 9.8.1 ENSURE that the CMSS is displaying the 2706-TA Sump Screen.
- 9.8.2 ENSURE that Pump 206 is in automatic mode.
- 9.8.3 ENSURE that Pump 207 is in automatic mode.
- 9.8.4 VERIFY that the Pump 206 icon on the CMSS 2706-TA Sump screen is blue.
- 9.8.5 VERIFY that the Pump 207 icon on the CMSS 2706-TA Sump screen is blue.
- 9.8.6 START filling the 2706-TA Sump with liquid.
- 9.8.7 VERIFY that the CMSS 2706-TA Sump icon shows a rising liquid level.
- 9.8.8 STOP filling the 2706-TA Sump with liquid, AFTER the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 9.8.9 VERIFY that either the Pump 206 icon or the Pump 207 icon on the CMSS 2706-T 2706-TA Sump screen turns white after approximately 30 seconds.
- 9.8.10 RECORD the Pump whose icon turned white in Step 9.8.9. Pump 206.
- 9.8.11 VERIFY that the CMSS 2706-TA Sump icon shows a falling liquid level.
- 9.8.12 VERIFY that the icon for the Pump recorded in Step 9.8.10 turns blue on the CMSS 2706-TA Sump screen approximately 30 seconds, AFTER the CMSS "LOW-LOW LEVEL IN SUMP" indication is activated. AQB. 3-6-99 #13
- 9.8.13 START filling the 2706-TA Sump with liquid.
- 9.8.14 VERIFY that the CMSS 2706-TA Sump icon shows a rising liquid level.
- 9.8.15 STOP filling the 2706-TA Sump with liquid, AFTER the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 9.8.16 VERIFY that the icon for the 2706-TA Sump pump not identified in Step 9.8.10 is white, approximately 30 seconds, AFTER the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 9.8.17 VERIFY that the 2706-TA Sump icon shows a falling liquid level.
- 9.8.18 VERIFY that the icon for the 2706-TA Sump pump not identified in Step 9.8.10 is blue approximately 30 seconds, AFTER the CMSS "LOW-LOW LEVEL IN SUMP" indication is activated. AQB. 3-6-99 #13

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NOTE: Section 9.9 demonstrates that switching Pump 206 from manual to automatic mode while Pump 206 is running in manual will stop Pump 206. Also it demonstrates that the emergency stop interlocks will stop Pump 206 while it is running, and also prevent Pump 206 from starting. It demonstrates that the emergency stop "RESET" button is functional.

**9.9 Test Pump 206 Interlocks in manual mode:**

- 9.9.1 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication is not activated on the 2706-TA Sump CMSS screen.
- 9.9.2 START Pump 206 in manual mode.
- 9.9.3 VERIFY that the CMSS Pump 206 icon is white.
- 9.9.4 SELECT automatic on the Pump 206 subscreen.
- 9.9.5 VERIFY that the CMSS Pump 206 icon is blue.
- 9.9.6 START Pump 206 in manual mode.
- 9.9.7 VERIFY that the CMSS Pump 206 icon is white.
- 9.9.8 SELECT the "EMERGENCY STOP" button on a CMSS screen.
- 9.9.9 VERIFY that the CMSS Pump 206 icon is blue.
- 9.9.10 START Pump 206 in manual mode.
- 9.9.11 VERIFY that the CMSS Pump 206 icon is still blue.
- 9.9.12 SELECT (emergency stop) "RESET" button on a CMSS screen.
- 9.9.12.1 ENSURE that Valve HV-05 is open in the manual mode. AQR 3-6-99 # 14
- 9.9.13 VERIFY that the CMSS Pump 206 icon is still blue.
- 9.9.14 START Pump 206 in manual mode.
- 9.9.15 VERIFY that the CMSS Pump 206 icon is white.
- 9.9.16 SELECT the "STOP" button on the Pump 206 subscreen.
- 9.9.17 VERIFY that the CMSS Pump 206 icon is blue.

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NOTE: Section 9.10 demonstrates that switching Pump 207 from manual to automatic mode while Pump 206 is running in manual will stop Pump 207. Also it demonstrates that the emergency stop interlocks will stop Pump 207 while it is running, and also prevent Pump 206 from starting. It demonstrates that the emergency stop "RESET" button is functional.

**9.10 Test Pump 207 Interlocks in manual mode:**

- 9.10.1 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication is not activated on the 2706-TA Sump CMSS screen.
- 9.10.2 START Pump 207 in manual mode.
- 9.10.3 VERIFY that the Pump 207 icon is white.

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- 9.10.4 SELECT automatic on the Pump 207 subscreen.
- 9.10.5 VERIFY that the Pump 207 icon is blue.
- 9.10.6 START Pump 207 in manual mode.
- 9.10.7 VERIFY that the Pump 207 icon is white.
- 9.10.8 SELECT the "EMERGENCY STOP" button on a CMSS screen.
- 9.10.9 VERIFY that the CMSS Pump 207 icon is blue.
- 9.10.10 START Pump 207 in manual mode.
- 9.10.11 VERIFY that the CMSS Pump 207 icon is still blue.
- 9.10.12 SELECT (emergency stop) "RESET" button on a CMSS screen.
- 9.10.13 VERIFY that the CMSS Pump 207 icon is still blue.
- 9.10.14 START Pump 207 in manual mode.
- 9.10.15 VERIFY that the CMSS Pump 207 icon is white.
- 9.10.16 SELECT the "STOP" button on the CMSS Pump 207 subscreen.
- 9.10.17 VERIFY that the CMSS Pump 207 icon is blue.

9.10.2.1 ENSURE that Valve HV-05 is open in the manual mode. H.R.B. 3-6-99 #15

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NOTE: Section 9.11 demonstrates that the Automatic and Duplex Mode Interlocks are functional. Section 9.11 is designed to be performed sequentially.

9.11 Test Automatic/Duplex Mode Interlocks:

NOTE: Steps 9.11.1 through 9.11.12 demonstrate that Pumps 206 and 207 will not individually start in the automatic mode if the emergency stop interlock is activated. The activated emergency stop interlock will also prevent the pumps from starting in the duplex mode.

- 9.11.1 SELECT the "EMERGENCY STOP" button on a CMSS screen.
- 9.11.2 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-TA Sump is activated.
- 9.11.3 ENSURE Pump 206 is in automatic mode.
- 9.11.4 ENSURE Pump 207 is in manual mode.
- 9.11.5 VERIFY that the CMSS Pump 206 icon is blue.
- 9.11.6 ENSURE Pump 207 is in automatic mode.
- 9.11.7 ENSURE Pump 206 is in manual mode.
- 9.11.8 VERIFY that the CMSS Pump 207 icon is blue.
- 9.11.9 ENSURE Pump 206 is in automatic mode.
- 9.11.10 ENSURE Pump 207 is in automatic mode.
- 9.11.11 VERIFY that the CMSS Pump 206 icon is blue.

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9.11.12 **VERIFY** that the CMSS Pump 207 icon is blue.

**NOTE:** Steps 9.11.13 through 9.11.25 demonstrate that duplex mode will not start if Pump 207 is in manual mode. It also demonstrates that the pump emergency stop, reset the high-level-in-sump start signal to Pump 206.

9.11.13 **ENSURE** Pump 207 is in manual mode.

9.11.14 **SELECT** the emergency stop "RESET" button on a CMSS screen.

9.11.14.1 **ENSURE** that Valve HV-05 is open in the manual mode. *A.R.B. 3-6-99 #16*

9.11.15 **VERIFY** that CMSS Pump 206 icon is white.

9.11.16 **VERIFY** that the CMSS Pump 207 icon is blue.

9.11.17 **SELECT** the "EMERGENCY STOP" button on a CMSS screen, **AFTER** the CMSS "HIGH LEVEL IN SUMP" indication is no longer activated on the 2706-TA Sump CMSS screen.

9.11.18 **SELECT** (emergency stop) "RESET" button on a CMSS screen.

9.11.18.1 **ENSURE** that Valve HV-05 is open in the manual mode. *A.R.B. 3-6-99 #16*

9.11.19 **VERIFY** that CMSS Pump 206 icon is blue.

9.11.20 **VERIFY** that the CMSS Pump 207 icon is blue.

9.11.21 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-TA Sump is activated.

9.11.22 **VERIFY** that the CMSS Pump 206 icon is white.

9.11.23 **VERIFY** that the CMSS Pump 207 icon is blue.

9.11.24 **SELECT** the "EMERGENCY STOP" button on a CMSS screen.

9.11.25 **SELECT** the (emergency stop) "RESET" button on a CMSS screen.

**NOTE:** Steps 9.11.26 through 9.11.46 demonstrate that duplex mode will not start if Pump 206 is in manual mode. It also demonstrates that the pump emergency stop, reset the high-level-in-sump start signal to Pump 207.

9.11.26 **ENSURE** Pump 206 is in manual mode.

9.11.27 **ENSURE** Pump 207 is in automatic mode.

9.11.28 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indicator in the 2706-TA Sump is activated.

9.11.29 **VERIFY** that the CMSS Pump 207 icon is white.

9.11.30 **VERIFY** that the CMSS Pump 206 icon is blue.

9.11.31 **SELECT** the "EMERGENCY STOP" button on a CMSS screen, **AFTER** the CMSS "HIGH LEVEL IN SUMP" indication is no longer activated on the 2706-TA Sump CMSS screen..

9.11.32 **SELECT** (emergency stop) "RESET" button on a CMSS screen.

9.11.33 **VERIFY** that the CMSS Pump 207 icon is blue.

9.11.34 **VERIFY** that the CMSS Pump 206 icon is blue.

9.11.35 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-TA Sump is activated.

9.11.36 **VERIFY** that the CMSS Pump 207 icon is white.

9.11.37 **VERIFY** that the CMSS Pump 206 icon is blue.

9.11.38 **SELECT** "EMERGENCY STOP" button on a CMSS screen.

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- 9.11.39 **SELECT** (emergency stop) "RESET" button on a CMSS screen.
- 9.11.39.1 **ENSURE** that Valve HV-05 is open in the manual mode *H.R.B. 3-6-99 #16*
- 9.11.40 **VERIFY** that the CMSS Pump 206 icon is blue.
- 9.11.41 **VERIFY** that the CMSS Pump 207 icon is blue.
- 9.11.42 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-TA Sump is activated.
- 9.11.43 **VERIFY** that the CMSS Pump 207 icon is white.
- 9.11.44 **VERIFY** that the CMSS Pump 206 icon is blue.
- 9.11.45 **SELECT** "EMERGENCY STOP" button on a CMSS screen.
- 9.11.46 **SELECT** (emergency stop) "RESET" button on a CMSS screen.

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NOTE: Section 9.12 demonstrates that switching 2706-TA Air Sparger from manual to automatic mode while the air sparger is running in manual will stop the air sparger. Also it demonstrates that the emergency stop interlocks will stop the air sparger in manual mode while it is running, and also prevent the air sparger from starting.

### 9.12 Test 2706-TA Sump Air Sparger Interlocks in manual mode

- 9.12.1 **ENSURE** that the "LOW LEVEL IN SUMP" indication is not activated on the CMSS 2706-TA Sump screen.
- 9.12.2 **START** the air sparger in manual mode.
- 9.12.3 **VERIFY** that the CMSS Valve HY-03 icon is white.
- 9.12.4 **SELECT** automatic mode on the CMSS 2706-TA Sump screen.
- 9.12.5 **VERIFY** that the CMSS Valve HY-03 icon is blue.
- 9.12.6 **START** the air sparger in manual mode.
- 9.12.7 **VERIFY** that the CMSS Valve HY-03 icon is white.
- 9.12.8 **SELECT** "EMERGENCY STOP" button on a CMSS screen.
- 9.12.9 **VERIFY** that the CMSS Valve HY-03 icon is blue.
- 9.12.10 **START** the air sparger in manual mode.
- 9.12.11 **VERIFY** that the CMSS Valve HY-03 icon is still blue.
- 9.12.12 **SELECT** (emergency stop) "RESET" button on a CMSS screen.
- 9.12.13 **VERIFY** that the CMSS Valve HY-03 icon is still blue.
- 9.12.14 **START** the air sparger in manual mode.
- 9.12.15 **VERIFY** that the CMSS Valve HY-03 icon is white.
- 9.12.16 **SELECT** the "STOP" button on the CMSS 2706-TA Sump screen.
- 9.12.17 **VERIFY** that the CMSS Valve HY-02 icon is blue.

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## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

**NOTE:** Section 9.13 demonstrates that switching 2706-TA Sump Air Sparger from automatic to manual mode while the air sparger is running in automatic will stop the air sparger. Also it demonstrates that the emergency stop interlocks will stop the air sparger in automatic mode while it is running, and also prevent the air sparger from starting.

**9.13 Test 2706-TA Sump Air Sparger Interlocks in automatic mode**

- 9.13.1 ENSURE that the CMSS is displaying the 2706-TA Sump screen.
- 9.13.2 ENSURE that Pump 206 is in manual mode.
- 9.13.3 ENSURE that Pump 207 is in manual mode.
- 9.13.4 VERIFY that the CMSS Valve HY-03 icon is blue.
- 9.13.5 ENSURE that the 2706-TA Sump CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 9.13.6 ENSURE that the 2706-TA Sump Air Sparger is in automatic mode.
- 9.13.7 START Pump 206 in manual mode.
- 9.13.8 VERIFY that the CMSS Valve HY-03 icon is white.
- 9.13.9 SELECT the air sparger "MANUAL" button.
- 9.13.10 VERIFY that the CMSS Valve HY-03 icon is blue.
- 9.13.11 STOP Pump 206 in manual mode.
- 9.13.12 ENSURE that the 2706-TA Sump CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 9.13.13 ENSURE that the 2706-TA Sump Air Sparger is in automatic mode.
- 9.13.14 START Pump 206 in manual mode.
- 9.13.15 VERIFY that the CMSS Valve HY-03 icon is white.
- 9.13.16 SELECT "EMERGENCY STOP" button on a CMSS screen.
- 9.13.17 VERIFY that the CMSS Valve HY-03 icon is blue.
- 9.13.18 SELECT the CMSS (emergency stop) "RESET" button.
- 9.13.19 VERIFY that the CMSS Valve HY-03 icon is still blue.
- 9.13.20 VERIFY that the CMSS Pump 206 icon is blue.
- 9.13.21 ENSURE that the CMSS 2706-TA Sump "HIGH LEVEL IN SUMP" indication is not activated.
- 9.13.22 VERIFY that the CMSS Valve HY-03 icon is blue.
- 9.13.23 SELECT "EMERGENCY STOP" button on a CMSS screen.
- 9.13.24 ENSURE that the CMSS 2706-TA Sump "HIGH LEVEL IN SUMP" indication is activated.
- 9.13.25 START Pump 206 in manual mode.
- 9.13.26 VERIFY that the CMSS Valve HY-02 icon is still blue.

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- 9.13.27 SELECT the CMSS (emergency stop) "RESET" button.
- 9.13.28 VERIFY that the CMSS Valve HY-02 icon is still blue.
- 9.13.29 VERIFY that the CMSS Pump 206 icon is blue.

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**9.14 Test Pump 206 and Pump 207 interlocks on the Air sparger**

- 9.14.1 ENSURE that the CMSS is displaying the 2706-TA Railroad Pit Sump screen. #17 3-6-99
- 9.14.2 ENSURE that Pump 206 is in manual mode.
- 9.14.3 ENSURE that Pump 207 is in manual mode.
- 9.14.4 CLOSE the Pump 206 Discharge Isolation Valve, #T-XX-2706-229 (manual valve).
- 9.14.5 CLOSE the Pump 207 Discharge Isolation Valve, #T-XX-2706-231 (manual valve).
- 9.14.6 VERIFY that the CMSS Valve HY-03 icon is blue.
- 9.14.7 ENSURE that the Railroad Pit Sump CMSS "HIGH LEVEL IN SUMP" indication is activated. 2706-TA H.R.B. 3-6-99 #17
- 9.14.8 ENSURE that the Railroad Pit Sump Air Sparger is in automatic mode. 2706-TA H.R.B. 3-6-99 #17
- 9.14.9 START Pump 206 in manual mode.
- 9.14.10 VERIFY that the CMSS Valve HY-03 icon is white.
- 9.14.11 STOP Pump 206 in manual mode.
- 9.14.12 VERIFY that the CMSS Valve HY-03 icon is blue.
- 9.14.13 START Pump 207 in manual mode.
- 9.14.14 VERIFY that the CMSS Valve HY-03 icon is white.
- 9.14.15 STOP Pump 207 in manual mode.
- ~~9.14.16 STOP Pump 207 in manual mode.~~ H.R.B. #18
- 9.14.17 VERIFY that the CMSS Valve HY-03 icon is blue.

NOTE: Steps 8.15.18 through 8.15.38 demonstrate that stopping the pumps in automatic or duplex modes will stop the air sparger in automatic mode.

- 9.14.18 SELECT the Pump 207 manual mode.
- 9.14.19 SELECT the Pump 206 automatic mode.
- 9.14.20 VERIFY that the CMSS Valve HY-03 icon is white.
- 9.14.21 ENSURE that Pump 206 is in the manual mode.
- 9.14.22 VERIFY that the CMSS Valve HY-03 icon is blue.
- 9.14.23 VERIFY that CMSS Pump 206 icon is blue.
- 9.14.24 SELECT the Pump 206 manual mode.
- 9.14.25 SELECT the Pump 207 automatic mode.

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- 9.14.26 VERIFY that the CMSS Valve HY-03 icon is white.
- 9.14.27 ENSURE that Pump 207 is in the manual mode.
- 9.14.28 VERIFY that the CMSS Valve HY-03 icon is blue.
- 9.14.29 VERIFY that CMSS Pump 207 icon is blue.
- 9.14.30 PLACE Pumps 206 and 207 in the automatic mode.
- 9.14.31 VERIFY that the CMSS Valve HY-03 icon is white.
- 9.14.32 ENSURE that Pump 206 is in the manual mode.
- 9.14.33 ENSURE that Pump 207 is in the manual mode.
- 9.14.34 VERIFY that the CMSS Valve HY-03 icon is blue.
- 9.14.35 VERIFY that CMSS Pump 206 icon is blue.
- 9.14.36 VERIFY that CMSS Pump 207 icon is blue.
- 9.14.37 OPEN the Pump 206 Discharge Isolation Valve, #T-XX-2706-229 (manual valve).
- 9.14.38 OPEN the Pump 207 Discharge Isolation Valve, #T-XX-2706-231 (manual valve).

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## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

## 10.0 TANK 2706-220 CMSS SCREEN TEST

NOTE: The Tank 2706-220 CMSS Screen Test demonstrates that

- Pump 212
- 2706-TB liquid level transmitter
- Pump 210
- Tank 220 liquid level transmitter and associated screen indications are functional.

The Tank Agitator is tested in a separate section of the OTP.

NOTE: The 2706-T Railroad Pit Sump Screen Test demonstrates that the system components, alarms, gauges and controls that are within the scope of the OTP and also appear on the CMSS 2706-T Railroad Pit Sump Screen are functional. Significant components include Pumps 203 and 204, an air sparger, and a liquid level transmitter. Each pump will be tested in the automatic, manual and duplex modes.

## 10.1 Prerequisites:

- 10.1.1 pH Analyzer #I-XX-2706-AIT-01: 12-30-98  
Calibration date
- 10.1.2 Liquid Level Transmitter #I-XX-2706-LT-220 is calibrated: 2-10-99  
Calibration date
- 10.1.3 Air Pressure Gauge #A-HP-2706-PDI-322 is functional (i.e. shows a pressure reading).

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## 10.2 Test Tank 2706-220 Level Transmitter.

- 10.2.1 ENSURE that Tank 220 is nominally empty.
- 10.2.2 ENSURE that valve HV-05 is open.
- 10.2.3 ENSURE that the CMSS displays the Tank 2706-220 screen.
- 10.2.4 VERIFY that the CMSS "LOW LEVEL IN TANK 220" indication is activated.
- 10.2.5 START filling Tank 220 with liquid.
- 10.2.6 VERIFY that the CMSS Tank 220 icon shows a rising liquid level.
- 10.2.7 VERIFY that the CMSS "LEVEL" gallon indication value increases with the rising liquid level.
- 10.2.8 RECORD the approximate liquid volume when the CMSS "LOW LEVEL IN TANK 220" indication is no longer activated: 2518 gallons.
- 10.2.9 RECORD the approximate liquid volume when the CMSS "HIGH LEVEL IN TANK 220" indication is activated: 13,042 gallons.
- 10.2.10 RECORD the approximate liquid volume when the CMSS "HIGH-HIGH LEVEL IN TANK 220" is activated: 14,045 gallons.

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212 H.Q.B. 3-6-99 # 20

10.3 Pump 212 Test Prerequisites:

10.3.1 ENSURE that Pump 212 is plugged in.

NOTE: With the exception of the local control pushbutton, Pump 212 is controlled only from the CMSS Tank 2706-220 screen. Therefore, the CMSS Tank 2706-220 screen must be displayed to test the pump.

10.3.2 ENSURE the CMSS is displaying the Tank 2706-220 screen.

NOTE: An interlock prevents Pump 212 from starting in the CMSS manual or automatic modes if the Tank 220 and 221 fill valves are both closed.

10.3.3 ENSURE that either valve HV-05 or valve HV-04 is open in manual mode.

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10.4 Test Sump Pump 212 in CMSS Manual Mode

10.4.1 VERIFY that the CMSS Pump 212 icon is blue.

10.4.2 ADD approximately two tablespoons of Tri-Sodium Phosphate to the liquid.



10.4.3 FILL the 2706-TB sump with liquid.

10.4.4 ENSURE that the CMSS "HIGH SUMP LEVEL" indication is activated.

10.4.5 SELECT manual mode on the Pump 212 subscreen.

10.4.6 SELECT the manual "START" button on the CMSS Pump 212 subscreen.

10.4.7 VERIFY that the CMSS Pump 212 icon is white.

10.4.8 VERIFY that the CMSS Pump 212 icon is blue, AFTER the CMSS "LOW SUMP LEVEL" indication is deactivated.

10.4.9 RECORD the approximate time lapse from when the "HIGH SUMP LEVEL" indication is deactivated and the "LOW SUMP LEVEL" is deactivated: 70 seconds.

10.4.10 ENSURE that the CMSS "LOW SUMP LEVEL" indication is not activated.

10.4.11 START Pump 212 in the manual mode.

10.4.12 VERIFY that the CMSS Pump 212 icon is white.

10.4.13 SELECT automatic mode on the Pump 212 subscreen.

10.4.13.1 VERIFY that the CMSS Pump 212 icon is blue.

10.4.14 SELECT manual mode on the Pump 212 subscreen.

10.4.15 VERIFY that the CMSS Pump 212 icon is blue.

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**10.5 Test Sump Pump 212 in Local manual Mode**

10.5.1 VERIFY that the Pump 212 icon is blue.

NOTE: The local manual mode is activated by pushing the button on the Pump 212 controller box located on the wall adjacent to the 2706-TB Sump. The push button bypasses the CMSS "LOW SUMP LEVEL" interlock. Since operating a centrifugal pump without liquid is hard on the pump, the pump should not be run if the CMSS "LOW SUMP LEVEL" indication is activated

10.5.2 ENSURE that the CMSS "LOW SUMP LEVEL" indication is ~~not~~ <sup>A.Q.B. 3-8-99 #25</sup> activated.

10.5.3 PUSH and HOLD the local manual start button on the side of the Pump 212 controller box.

10.5.4 Visually VERIFY that Pump 212 is draining the 2706-TB Sump.

10.5.5 VERIFY that the CMSS Pump 212 icon is still blue.

10.5.6 RELEASE the local manual start button.

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**10.6 Test Sump Pump 212 in CMSS Automatic Mode**

10.6.1 VERIFY that the CMSS Pump 212 icon is blue.

10.6.2 ENSURE that the CMSS "HIGH SUMP LEVEL" indication is not activated.

10.6.3 SELECT automatic mode on the Pump 212 subscreen.

10.6.4 START filling the sump with liquid.

10.6.5 VERIFY that the CMSS Pump 212 icon is white, AFTER the CMSS "HIGH SUMP LEVEL" indication is activated.

10.6.6 VERIFY that the CMSS Pump 212 icon is blue, AFTER the CMSS "LOW SUMP LEVEL" indication is activated.

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**10.7 Test Emergency Interlocks on 2706-TB Sump Pump 212**

10.7.1 ENSURE Pump 212 is in the manual mode.

10.7.2 FILL the sump with liquid, UNTIL the CMSS "HIGH SUMP LEVEL" indication is activated.

10.7.3 VERIFY that the CMSS Pump 212 icon is blue.

NOTE: Steps 10.7.4 through 10.7.6 demonstrate that Pump 212 will not start in manual mode when the emergency interlock is activated.

10.7.4 SELECT the CMSS "EMERGENCY STOP" button.

10.7.5 START Pump 212 in the manual mode.

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10.7.6 **VERIFY** that the CMSS Pump 212 icon is still blue.

**NOTE:** Steps 10.7.7 through 10.7.9 demonstrate that Pump 212 will not start in manual mode when the emergency interlock is activated.

10.7.7 **ENSURE** that the CMSS "HIGH SUMP LEVEL" indication is activated.

10.7.8 **ENSURE** that Pump 212 is in the automatic mode.

10.7.9 **VERIFY** that the CMSS Pump 212 icon is still blue.

**NOTE:** the Emergency Stop Interlock does not effect The Pump 212 local control pushbutton. Also the CMSS will not reflect that the pump is operating. Steps 10.7.10 through 10.7.13 demonstrate this anomaly.

10.7.10 **PUSH** the Pump 212 local control pushbutton.

10.7.11 **VERIFY** that the CMSS Pump 212 icon is still blue.

10.7.12 Visually **VERIFY** that the liquid level in the 2706-TB Sump is falling.

10.7.13 **RELEASE** the Pump 212 local control pushbutton.

**NOTE:** Steps 10.7.14 through 10.7.20 demonstrate that Pump 212 will stop in the manual mode when the CMSS "EMERGENCY STOP" button is selected

10.7.14 **SELECT** the CMSS (emergency stop) "RESET" button.

10.7.14.1 **ENSURE** that Valve HV-05 is open in the manual mode. *H.Q.B. 3-9-99 #26*

10.7.15 **VERIFY** that the CMSS Pump 212 icon is blue.

10.7.16 **ENSURE** that the CMSS "HIGH SUMP LEVEL" indication is activated.

10.7.17 **START** Pump 212 in the manual mode.

10.7.18 **VERIFY** that the CMSS Pump 212 icon is white.

10.7.19 **SELECT** the CMSS "EMERGENCY STOP" button.

10.7.20 **VERIFY** that the CMSS Pump 212 icon is blue.

**NOTE:** Steps 10.7.21 through 10.7.30 demonstrate that Pump 212 will stop in the automatic mode when the CMSS "EMERGENCY STOP" button is selected.

10.7.21 **SELECT** the CMSS (emergency stop) "RESET" button.

10.7.21.1 **ENSURE** that Valve HV-05 is open in the manual mode. *H.Q.B. 3-9-99 #26*

10.7.22 **VERIFY** that the CMSS Pump 212 icon is blue.

10.7.23 **ENSURE** that Pump 212 is in automatic mode.

10.7.24 **ENSURE** that the CMSS "HIGH SUMP LEVEL" indication is activated.

10.7.25 **VERIFY** that the CMSS Pump 212 icon is white.

10.7.26 **SELECT** the CMSS "EMERGENCY STOP" button.

10.7.27 **VERIFY** that the CMSS Pump 212 icon is blue.

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- 10.7.28 SELECT the CMSS (emergency stop) "RESET" button.
- 10.7.28.1 ENSURE that Valve HV-05 is open in the manual mode. *H.R.B. 3-9-99 #26*
- 10.7.29 VERIFY that the CMSS Pump 212 icon is blue.
- 10.7.30 DRAIN the 2706-TB Sump, and MOP UP any residual liquid.

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**10.9 Test Transfer Pump 210 in Transfer from Tank 220 to Truck Mode**

- 10.9.1 ENSURE the CMSS "LOW LEVEL IN TANK 220" indication is not activated.
- 10.9.2 ENSURE Valve HV-03 is open in manual mode.
- 10.9.3 ENSURE Valve HV-09 is open in manual mode.
- 10.9.4 ENSURE Valve 227 is open.
- 10.9.5 ENSURE Valve HV-02 is closed in manual mode.
- 10.9.6 ENSURE Valve HV-06 is closed in manual mode.
- 10.9.7 VERIFY that the CMSS Pump 210 icon is blue.
- 10.9.8 START Pump 210.
- 10.9.9 VERIFY that the CMSS Pump 210 icon is white.
- 10.9.10 VERIFY that the CMSS "LEVEL" in gallons indicator value is decreasing.
- 10.9.11 STOP Pump 210
- 10.9.12 VERIFY that the CMSS Pump 210 icon is blue.
- 10.9.13 START Pump 210.
- 10.9.14 VERIFY that the CMSS Pump 210 icon is white.
- 10.9.15 SELECT the CMSS "EMERGENCY STOP" button.
- 10.9.16 VERIFY that the CMSS Pump 210 icon is blue.
- 10.9.17 START Pump 210
- 10.9.18 VERIFY that the CMSS Pump 210 icon is still blue.
- 10.9.19 SELECT the CMSS (emergency stop) "RESET" button.
- 10.9.19.1 ENSURE that Valve HV-05 is open in the manual mode. *H.R.B. 3-3-99 #27*
- 10.9.20 VERIFY that the Pump 210 icon is still blue.

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**10.10 Test Transfer Pump 210 in Transfer from Tank 220 to Tank 221**

- 10.10.1 ENSURE the CMSS "LOW LEVEL IN TANK 220" indication is not activated.
- 10.10.2 ENSURE that the CMSS "HIGH LEVEL IN TANK 221" indication is not activated on the Tank 2706-221 CMSS screen.

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- 10.10.3 ENSURE Valve HV-03 is open in manual mode.
- 10.10.4 ENSURE Valve HV-06 is open in manual mode.
- 10.10.5 ENSURE Valve HV-08 is open in manual mode.
- 10.10.6 ENSURE Valve HV-04 is open in manual mode.
- 10.10.7 ENSURE Valve HV-02 is closed in manual mode.
- 10.10.8 ENSURE Valve HV-05 is closed in manual mode.
- 10.10.9 ENSURE Valve HV-07 is closed in manual mode.
- 10.10.10 ENSURE Valve HV-09 is closed in manual mode.
- 10.10.11 VERIFY that the CMSS Pump 210 icon is blue.
- 10.10.12 START Pump 210.
- 10.10.13 VERIFY that the CMSS Pump 210 icon is white.
- 10.10.14 VERIFY that the CMSS "LEVEL" in gallons indicator value is decreasing.
- 10.10.15 VERIFY that the CMSS "LEVEL" in gallons indicator on the Tank 2706-221 screen is increasing.
- 10.10.16 STOP Pump 210.
- 10.10.17 VERIFY that the CMSS Pump 210 icon is blue.
- 10.10.18 START Pump 210.
- 10.10.19 VERIFY that the CMSS Pump 210 icon is white.
- 10.10.20 SELECT the CMSS "EMERGENCY STOP" button.
- 10.10.21 VERIFY that the CMSS Pump 210 icon is blue.
- 10.10.22 START Pump 210.
- 10.10.23 VERIFY that the CMSS Pump 210 icon is still blue.
- 10.10.24 SELECT the CMSS (emergency stop) "RESET" button.
- 10.10.24.1 ENSURE that Valve HV-03 is open in the manual mode. *A.R.B 3-5-99 #27*
- 10.10.25 VERIFY that the CMSS Pump 210 icon is still blue.

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**10.11 Test Transfer Pump 210 in Recirculate Tank 220 Mode**

- 10.11.1 ENSURE the CMSS "LOW LEVEL IN TANK 220" indication is not activated.
- 10.11.2 ENSURE Valve HV-03 is open in manual mode.
- 10.11.3 ENSURE Valve HV-06 is open in manual mode.
- 10.11.4 ENSURE Valve HV-08 is open in manual mode.
- 10.11.5 ENSURE Valve HV-05 is open in manual mode.
- 10.11.6 ENSURE Valve HV-02 is closed in manual mode.
- 10.11.7 ENSURE Valve HV-04 is closed in manual mode.
- 10.11.8 ENSURE Valve HV-07 is closed in manual mode.

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- 10.11.9 ENSURE Valve HV-09 is closed in manual mode.
- 10.11.10 VERIFY that the CMSS Pump 210 icon is blue.
- 10.11.11 START Pump 210.
- 10.11.12 VERIFY that the CMSS Pump 210 icon is white.
- 10.11.13 STOP Pump 210.
- 10.11.14 VERIFY that the CMSS Pump 210 icon is blue.
- 10.11.15 START Pump 210.
- 10.11.16 VERIFY that the CMSS Pump 210 icon is white.
- 10.11.17 SELECT the CMSS "EMERGENCY STOP" button.
- 10.11.18 VERIFY that the CMSS Pump 210 icon is blue.
- 10.11.19 START Pump 210.
- 10.11.20 VERIFY that the CMSS Pump 210 icon is still blue.
- 10.11.21 SELECT the CMSS (emergency stop) "RESET" button.
- 10.11.21.1 ENSURE that Valve HV-03 is open in the manual mode. *H.R.B. 3-5-99 #27*
- 10.11.22 VERIFY that the CMSS Pump 210 icon is still blue.

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**10.12 Test Tank 220 in Sample Mode**

- 10.12.1 ENSURE Tank 220 is recirculated.
- 10.12.2 ENSURE that Pump 210 is off.
- 10.12.3 ENSURE that Pump 211 is off.
- 10.12.4 ENSURE Valve HV-06 is closed and in the manual mode.
- 10.12.5 ENSURE Valve HV-08 is closed and in the manual mode.
- 10.12.6 ENSURE Valve HV-07 is open in manual mode.
- 10.12.7 OPEN manual valve T-XX-2706-243.
- 10.12.8 OPEN manual valve T-XX-2706-242.
- 10.12.9 VERIFY that liquid drains out of the sample line.
- 10.12.10 CLOSE manual valve T-XX-2706-243.
- 10.12.11 CLOSE manual valve T-XX-2706-242.
- 10.12.12 RECORD the pH reading on Panel -002 in 2706-TA: 8.12.
- 10.12.13 RECORD the pH reading on the CMSS Overview screen: 8.1.

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## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

NOTE: Tank 220 has overfill protection. If Valve HV-05 is open and there is a CMSS "HIGH TANK LEVEL IN TANK 220" indication, Pumps 206 and 207 will not start or run. If Valve HV-01 is open and there is a CMSS "HIGH TANK LEVEL IN TANK 220" indication, Pump 211 will not start or run.

**10.13 Test Tank 220 Overfill Interlocks**

NOTE: Steps 10.13.1 through 10.13.10 demonstrate that the Overfill interlock shuts off Pumps 206 and 207 when they are in the automatic mode.

- 10.13.1 ENSURE that the CMSS "HIGH LEVEL IN TANK 220" indication is not activated.
- 10.13.2 ENSURE that Valve HV-05 is open in manual mode.
- 10.13.3 ENSURE that Valve HV-04 is closed in manual mode.
- 10.13.4 ENSURE that Valve HV-08 is closed in manual mode.
- 10.13.5 ENSURE that Pump 206 is in automatic mode.
- 10.13.6 ENSURE that Pump 207 is in automatic mode.
- 10.13.7 FILL the 2706-TA Sump, UNTIL the CMSS "HIGH LEVEL IN TANK 220" indication is activated.
- 10.13.8 ENSURE that the 2706-TA Sump "HIGH LEVEL IN SUMP" indication is activated on the 2706-TA Sump CMSS screen.
- 10.13.9 VERIFY that the CMSS Pump 206 icon is blue.
- 10.13.10 VERIFY that the CMSS Pump 207 icon is blue.

NOTE: Steps 10.13.11 through 10.13.18 demonstrate that the Overfill interlock keeps Pumps 206 and 207 from starting in the automatic mode

- 10.13.11 ENSURE that the 2706-TA Sump "HIGH LEVEL IN SUMP" indication is activated on the 2706-TA Sump CMSS screen.
- 10.13.12 ENSURE the CMSS "HIGH LEVEL IN TANK 220" indication is activated.
- 10.13.13 ENSURE Pump 206 is in the manual mode.
- 10.13.14 SELECT Pump 207 automatic mode.
- 10.13.15 VERIFY that the CMSS Pump 207 icon is blue.
- 10.13.16 ENSURE Pump 207 is in the manual mode.
- 10.13.17 SELECT Pump 206 automatic mode.
- 10.13.18 VERIFY that the CMSS Pump 206 icon is blue.

NOTE: Steps 10.13.19 through 10.13.22 demonstrate that the Overfill interlock keeps Pumps 206 and 207 from starting in the duplex mode.

- 10.13.19 SELECT Pump 206 automatic mode.

- 10.13.20 **SELECT** Pump 207 automatic mode.
- 10.13.21 **VERIFY** that the CMSS Pump 206 icon is blue.
- 10.13.22 **VERIFY** that the CMSS Pump 207 icon is blue.

**NOTE:** Steps 10.13.23 through 10.13.28 demonstrate that the Overfill interlock can be bypassed by Pump 207 in the manual mode. Additionally it demonstrates that the CMSS "HIGH-HIGH LEVEL IN TANK 220" interlock will close Valve HV-05, and that with both Valves HV-04 and HV-05 closed, Pump 207 will shut-off.

- 10.13.23 **ENSURE** Pump 207 is in the manual mode.
- 10.13.24 **SELECT** the "START" button on the Pump 207 subscreen.
- 10.13.25 **VERIFY** that the CMSS Pump 207 icon is white.
- 10.13.26 **ENSURE** that the CMSS "HIGH-HIGH LEVEL IN TANK 220" indication is activated
- 10.13.27 **VERIFY** that the CMSS Valve HV-05 icon is blue.
- 10.13.28 **VERIFY** that the CMSS Pump 207 icon is blue.

**NOTE:** Steps 10.13.29 through 10.13.38 demonstrate that the Overfill interlock can be bypassed by Pump 206 in the manual mode. Additionally it demonstrates that the CMSS "HIGH-HIGH LEVEL IN TANK 220" interlock will close Valve HV-05, and that with both Valves HV-04 and HV-05 closed, Pump 206 will shut-off.

- 10.13.29 **ENSURE** that the CMSS "HIGH-HIGH LEVEL IN TANK 220" indication is not activated.
- 10.13.30 **ENSURE** that the CMSS "HIGH LEVEL IN TANK 220" indication is activated.
- 10.13.31 **ENSURE** that Valve HV-05 is open in the manual mode.
- 10.13.32 **VERIFY** that the CMSS Pump 206 icon is blue.
- 10.13.33 **ENSURE** Pump 206 is in the manual mode
- 10.13.34 **SELECT** the "START" button on the Pump 206 subscreen.
- 10.13.35 **VERIFY** that the CMSS Pump 206 icon is white.
- 10.13.36 **ENSURE** that the CMSS "HIGH-HIGH LEVEL IN TANK 220" indication is activated.
- 10.13.37 **VERIFY** that the CMSS Valve HV-05 icon is blue.
- 10.13.38 **VERIFY** that the CMSS Pump 206 icon is blue.

**NOTE:** Steps 10.13.39 through 10.13.41 demonstrate that the CMSS "HIGH-HIGH LEVEL IN TANK 220" does not allow Valve HV-01 to open

- 10.13.39 **ENSURE** that the CMSS "HIGH-HIGH LEVEL IN TANK 220" is activated.
- 10.13.40 **SELECT** Valve HV-01 manual open.
- 10.13.41 **VERIFY** that the CMSS Valve HV-01 icon is blue.

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**NOTE:** Steps 10.13.42 through 10.13.63 demonstrate that the Tank 220 Overfill interlock will stop Pumps 206 and 207 when they are running in the duplex mode

- 10.13.42 **ENSURE** that the CMSS "HIGH LEVEL IN TANK 220" indication is not activated.
- 10.13.43 **ENSURE** that Valve HV-05 is open in the manual mode.
- 10.13.44 **ENSURE** that Pump 206 is in the automatic mode.
- 10.13.45 **ENSURE** that Pump 207 is in the automatic mode.
- 10.13.46 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication is activated in the 2706-TA Sump.
- 10.13.47 **VERIFY** that either the CMSS Pump 206 or CMSS Pump 207 icon is white.
- 10.13.48 **ALLOW** the activated pump to run, **UNTIL** the CMSS "HIGH LEVEL IN TANK 220" indication is activated.
- 10.13.49 **VERIFY** that the CMSS Pump 206 icon is blue.
- 10.13.50 **VERIFY** that the CMSS Pump 207 icon is blue.
- 10.13.51 **ENSURE** that the CMSS "HIGH LEVEL IN TANK 220" indication is not activated.
- 10.13.52 **VERIFY** that the CMSS Pump 206 icon is still blue.
- 10.13.53 **VERIFY** that the CMSS Pump 207 icon is still blue.
- 10.13.54 **ENSURE** that Pump 206 is in the automatic mode.
- 10.13.55 **ENSURE** that Pump 207 is in the automatic mode.
- 10.13.56 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication is activated in the 2706-TA Sump.
- 10.13.57 **VERIFY** that either the CMSS Pump 206 or CMSS Pump 207 icon is white.
- 10.13.58 **ALLOW** the activated pump to run, **UNTIL** the CMSS "HIGH LEVEL IN TANK 220" indication is activated.
- 10.13.59 **VERIFY** that the CMSS Pump 206 icon is blue.
- 10.13.60 **VERIFY** that the CMSS Pump 207 icon is blue.
- 10.13.61 **ENSURE** that the CMSS "HIGH LEVEL IN TANK 220" indication is not activated.
- 10.13.62 **VERIFY** that the CMSS Pump 206 icon is still blue.
- 10.13.63 **VERIFY** that the CMSS Pump 207 icon is still blue.

**NOTE:** Steps 10.13.64 through 10.13.88 demonstrate that the Tank 220 Overfill interlock prevents Pump 211 from starting or running if Valve HV-01 is open and there is a CMSS "HIGH LEVEL IN TANK 220" indication.

- 10.13.64 **ENSURE** that Pump 206 is off and in the manual mode
- 10.13.65 **VERIFY** that the CMSS Pump 206 icon is blue.
- 10.13.66 **ENSURE** that Pump 207 is off and in the manual mode.
- 10.13.67 **VERIFY** that the CMSS Pump 207 icon is blue.
- 10.13.68 **ENSURE** that Valve HV-01 is open and in the manual mode.
- 10.13.69 **VERIFY** that the CMSS Valve HV-01 icon is white.

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- 10.13.70 ENSURE that Valve HV-02 is closed and in the manual mode.
- 10.13.71 VERIFY that the CMSS Valve HV-02 icon is blue.
- 10.13.72 ENSURE that the CMSS "LOW LEVEL IN TANK 221" indication is not activated on the Tank 2706-221 CMSS screen.
- 10.13.73 ENSURE that the CMSS "HIGH LEVEL IN TANK 220" indication is not activated.
- 10.13.74 RUN Pump 211 UNTIL the CMSS "HIGH LEVEL IN TANK 220" indication is activated.
- 10.13.75 VERIFY that the CMSS Pump 211 icon is blue.
- 10.13.76 SELECT Valve HV-01 manual close.
- 10.13.77 SELECT Valve HV-02 manual open.
- 10.13.78 SELECT Valve HV-06 manual open.
- 10.13.79 SELECT Valve HV-08 manual open.
- 10.13.80 SELECT Valve HV-04 manual open.
- 10.13.81 SELECT Pump 211 start.
- 10.13.82 VERIFY that the CMSS Pump 211 icon is white.
- 10.13.83 SELECT Pump 211 manual stop.
- 10.13.84 SELECT Valve HV-01 manual open.
- 10.13.85 SELECT Valve HV-02 manual close.
- 10.13.86 SELECT Pump 211 manual start.
- 10.13.87 VERIFY that the CMSS Pump 211 icon is blue.
- 10.13.88 SELECT Pump 211 manual stop.

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### 11.0 TANK 2706-221 CMSS SCREEN TEST

NOTE: The Tank 2706-221 CMSS Screen Test demonstrates that:

- 2706-TB liquid level transmitter
- Pump 211
- Tank 221 liquid level transmitter and associated screen indications are functional.

The Tank 221 Agitator 214 is tested in a separate section of the OTP.

#### 11.1 Prerequisites:

11.1.1 Liquid Level Transmitter #I-XX-2706-LT-221 is calibrated: 2-10-99  
Calibration date

11.1.2 Air Pressure Gauge #A-HP-2706-PDI-322 is functional (i.e. shows a pressure reading).

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#### 11.2 Test Tank 2706-221 Level Transmitter

- 11.2.1 ENSURE that Tank 221 is nominally empty.
- 11.2.2 ENSURE that valve HV-04 is open.
- 11.2.3 ENSURE that the CMSS displays the Tank 2706-221 screen.
- 11.2.4 VERIFY that the CMSS "LOW LEVEL IN TANK 221" indication is activated.
- 11.2.5 START filling Tank 221 with liquid.
- 11.2.6 VERIFY that the CMSS Tank 221 icon shows a rising liquid level.
- 11.2.7 VERIFY that the CMSS "LEVEL" gallon indication value increases with the rising liquid level.
- 11.2.8 RECORD the approximate liquid volume when the CMSS "LOW LEVEL IN TANK 221" indication is no longer activated: 1800 gallons.
- 11.2.9 RECORD the approximate liquid volume when the CMSS "HIGH LEVEL IN TANK 221" indication is activated: 5007 gallons.
- 11.2.10 RECORD the approximate liquid volume when the CMSS "HIGH-HIGH LEVEL IN TANK 221" is activated: 5404 gallons.

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**11.3 Test Transfer Pump 211 in Transfer from Tank 221 to Truck Mode**

- 11.3.1 ENSURE the CMSS "LOW LEVEL IN TANK 221" indication is not activated.
- 11.3.2 ENSURE Valve HV-02 is open in manual mode.
- 11.3.3 ENSURE Valve HV-09 is open in manual mode.
- 11.3.4 ENSURE Valve 227 is open.
- 11.3.5 ENSURE Valve HV-01 is closed in manual mode.
- 11.3.6 ENSURE Valve HV-03 is closed in manual mode.
- 11.3.7 ENSURE Valve HV-06 is closed in manual mode.
- 11.3.8 VERIFY that the CMSS Pump 211 icon is blue.
- 11.3.9 START Pump 211.
- 11.3.10 VERIFY that the CMSS Pump 211 icon is white.
- 11.3.11 VERIFY that the CMSS "LEVEL" in gallons indicator value is decreasing.
- 11.3.12 STOP Pump 211.
- 11.3.13 VERIFY that the CMSS Pump 211 icon is blue.
- 11.3.14 START Pump 211.
- 11.3.15 VERIFY that the CMSS Pump 211 icon is white.
- 11.3.16 SELECT the CMSS "EMERGENCY STOP" button.
- 11.3.17 VERIFY that the CMSS Pump 211 icon is blue.
- 11.3.18 START Pump 211.
- 11.3.19 VERIFY that the CMSS Pump 211 icon is still blue.
- 11.3.20 SELECT the CMSS (emergency stop) "RESET" button.
- 11.3.20.1 ENSURE that Valve HV-02 is open in the manual mode. *H.R.B. 3-2-99 #28*
- 11.3.21 VERIFY that the Pump 211 icon is still blue.

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**11.4 Test Transfer Pump 211 in Transfer from Tank 221 to Tank 220**

- 11.4.1 ENSURE the CMSS "LOW LEVEL IN TANK 221" indication is not activated.
- 11.4.2 ENSURE that the CMSS "HIGH LEVEL IN TANK 220" indication is not activated on the Tank 2706-220 CMSS screen.
- 11.4.3 ENSURE Valve HV-01 is open in manual mode.
- 11.4.4 ENSURE Valve HV-02 is closed in manual mode.
- 11.4.5 VERIFY that the CMSS Pump 211 icon is blue.
- 11.4.6 START Pump 211.
- 11.4.7 VERIFY that the CMSS Pump 211 icon is white.

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- 11.4.8 VERIFY that the CMSS "LEVEL" in gallons indicator value is decreasing.
- 11.4.9 VERIFY that the CMSS "LEVEL" in gallons indicator on the Tank 2706-220 screen is increasing.
- 11.4.10 STOP Pump 211.
- 11.4.11 VERIFY that the CMSS Pump 211 icon is blue.
- 11.4.12 START Pump 211.
- 11.4.13 VERIFY that the CMSS Pump 211 icon is white.
- 11.4.14 SELECT the CMSS "EMERGENCY STOP" button.
- 11.4.15 VERIFY that the CMSS Pump 211 icon is blue.
- 11.4.16 START Pump 211.
- 11.4.17 VERIFY that the CMSS Pump 211 icon is still blue.
- 11.4.18 SELECT the CMSS (emergency stop) "RESET" button.
- 11.4.18.1 ENSURE that Valve HV-01 is open in the manual mode. H.R.B. 3-2-99 #29
- 11.4.19 VERIFY that the CMSS Pump 211 icon is still blue.

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**11.5 Test Transfer Pump 211 in Recirculate Tank 221 Mode**

- 11.5.1 ENSURE the CMSS "LOW LEVEL IN TANK 221" indication is not activated.
- 11.5.2 ENSURE Valve HV-02 is open in manual mode.
- 11.5.3 ENSURE Valve HV-06 is open in manual mode.
- 11.5.4 ENSURE Valve HV-08 is open in manual mode.
- 11.5.5 ENSURE Valve HV-04 is open in manual mode.
- 11.5.6 ENSURE Valve HV-01 is closed in manual mode.
- 11.5.7 ENSURE Valve HV-03 is closed in manual mode.
- 11.5.8 ENSURE Valve HV-05 is closed in manual mode.
- 11.5.9 ENSURE Valve HV-07 is closed in manual mode.
- 11.5.10 ENSURE Valve HV-09 is closed in manual mode.
- 11.5.11 VERIFY that the CMSS Pump 211 icon is blue.
- 11.5.12 START Pump 211.
- 11.5.13 VERIFY that the CMSS Pump 211 icon is white.
- 11.5.14 STOP Pump 211.
- 11.5.15 VERIFY that the CMSS Pump 211 icon is blue.
- 11.5.16 START Pump 211.
- 11.5.17 VERIFY that the CMSS Pump 211 icon is white.
- 11.5.18 SELECT the CMSS "EMERGENCY STOP" button.
- 11.5.19 VERIFY that the CMSS Pump 211 icon is blue.

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11.5.20 START Pump 211.

11.5.21 VERIFY that the CMSS Pump 211 icon is still blue.

11.5.22 SELECT the CMSS (emergency stop) "RESET" button.

11.5.22.1 ENSURE that Valve HV-02 is open in the manual mode. *H.R.B. 3-2-99 # 30*

11.5.23 VERIFY that the CMSS Pump 211 icon is still blue.

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11.6 Test Tank 221 in Sample Mode

11.6.1 ENSURE Tank 221 is recirculated.

11.6.2 ENSURE that Pump 210 is off.

11.6.3 ENSURE that Pump 211 is off.

11.6.4 ENSURE Valve HV-06 is closed and in the manual mode.

11.6.5 ENSURE Valve HV-08 is closed and in the manual mode.

11.6.6 ENSURE Valve HV-07 is open and in the manual mode.

11.6.7 OPEN manual valve T-XX-2706-243.

11.6.8 OPEN manual valve T-XX-2706-242.

11.6.9 VERIFY that liquid drains out of the sample line.

11.6.10 CLOSE manual valve T-XX-2706-243.

11.6.11 CLOSE manual valve T-XX-2706-242.

11.6.12 RECORD the pH reading on Panel -002 in 2706-TA: 8.61

11.6.13 RECORD the pH reading on the CMSS Overview screen: 8.6

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NOTE: Tank 221 has overflow protection. If Valve HV-04 is open and there is a CMSS "HIGH TANK LEVEL IN TANK 221" indication, Pumps 206, 207 and 210 will not start or run.

11.7 Test Tank 221 Overflow Interlocks

NOTE: Steps 11.7.1 through 11.7.10 demonstrate that the Overflow interlock shuts off Pumps 206 and 207 when they are in the automatic mode.

11.7.1 ENSURE that the CMSS "HIGH LEVEL IN TANK 221" indication is not activated.

11.7.2 ENSURE that Valve HV-04 is open in manual mode.

11.7.3 ENSURE that Valve HV-05 is closed in manual mode.

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- 11.7.4 **ENSURE** that Valve HV-08 is closed in manual mode.
- 11.7.5 **ENSURE** that Pump 206 is in automatic mode.
- 11.7.6 **ENSURE** that Pump 207 is in automatic mode.
- 11.7.7 **FILL** the 2706-TA Sump, **UNTIL** the CMSS "HIGH LEVEL IN TANK 221" indication is activated.
- 11.7.8 **ENSURE** that the 2706-TA Sump "HIGH LEVEL IN SUMP" indication is activated on the 2706-TA Sump CMSS screen.
- 11.7.9 **VERIFY** that the CMSS Pump 206 icon is blue.
- 11.7.10 **VERIFY** that the CMSS Pump 207 icon is blue.

**NOTE:** Steps 11.7.11 through 11.7.18 demonstrate that the Overfill interlock keeps Pumps 206 and 207 from starting in the automatic mode

- 11.7.11 **ENSURE** that the 2706-TA Sump "HIGH LEVEL IN SUMP" indication is activated on the 2706-TA Sump CMSS screen.
- 11.7.12 **ENSURE** the CMSS "HIGH LEVEL IN TANK 221" indication is activated
- 11.7.13 **ENSURE** Pump 206 is in the manual mode.
- 11.7.14 **SELECT** Pump 207 automatic mode.
- 11.7.15 **VERIFY** that the CMSS Pump 207 icon is blue.
- 11.7.16 **ENSURE** Pump 207 is in the manual mode.
- 11.7.17 **SELECT** Pump 206 automatic mode.
- 11.7.18 **VERIFY** that the CMSS Pump 206 icon is blue.

**NOTE:** Steps 11.7.19 through 11.7.22 demonstrate that the Overfill interlock keeps Pumps 206 and 207 from starting in the duplex mode.

- 11.7.19 **SELECT** Pump 206 automatic mode.
- 11.7.20 **SELECT** Pump 207 automatic mode.
- 11.7.21 **VERIFY** that the CMSS Pump 206 icon is blue.
- 11.7.22 **VERIFY** that the CMSS Pump 207 icon is blue.

**NOTE:** Steps 11.7.23 through 11.7.26 demonstrate that the Overfill interlock can be bypassed by Pump 206 in the manual mode.

- 11.7.23 **ENSURE** Pump 206 is in the manual mode
- 11.7.24 **SELECT** the "START" button on the Pump 206 subscreen.
- 11.7.25 **VERIFY** that the CMSS Pump 206 icon is white.
- 11.7.26 **SELECT** Pump 206 manual stop.

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NOTE: Steps 11.7.27 through 11.7.32 demonstrate that the Overfill interlock can be bypassed by Pump 207 in the manual mode. Additionally it demonstrates that the CMSS "HIGH-HIGH LEVEL IN TANK 221" interlock will close Valve HV-04, and that with both Valves HV-04 and HV-05 closed, Pump 207 will shut-off.

- 11.7.27 ENSURE Pump 207 is in the manual mode
- 11.7.28 SELECT the "START" button on the Pump 207 subscreen.
- 11.7.29 VERIFY that the CMSS Pump 207 icon is white.
- 11.7.30 ENSURE that the CMSS "HIGH-HIGH LEVEL IN TANK 221" indication is activated.
- 11.7.31 VERIFY that the CMSS Valve HV-04 icon is blue.
- 11.7.32 VERIFY that the CMSS Pump 207 icon is blue.

NOTE: Steps 11.7.33 through 11.7.43 demonstrate that the Overfill interlock can be bypassed by Pump 206 in the manual mode. Additionally it demonstrates that CMSS "HIGH-HIGH LEVEL IN TANK 221" interlock will close Valve HV-04, and that with both Valves HV-04 and HV-05 closed, Pump 206 will shut-off.

- 11.7.33 ENSURE that the CMSS "HIGH-HIGH LEVEL IN TANK 221" indication is not activated.
- 11.7.34 VERIFY that the CMSS Valve HV-04 icon is still blue.
- 11.7.35 VERIFY that the CMSS Pump 207 icon is blue.
- 11.7.36 ENSURE that the CMSS "HIGH LEVEL IN TANK 221" indication is activated.
- 11.7.37 ENSURE that Valve HV-04 is open in the manual mode.
- 11.7.38 VERIFY that the CMSS Pump 206 icon is blue
- 11.7.39 SELECT Pump 206 manual start.
- 11.7.40 VERIFY that the CMSS Pump 206 icon is white.
- 11.7.41 ENSURE that the CMSS "HIGH-HIGH LEVEL IN TANK 221" indication is activated.
- 11.7.42 VERIFY that the CMSS Valve HV-04 icon is blue.
- 11.7.43 VERIFY that the CMSS Pump 206 icon is blue.

NOTE: Steps 11.7.44 through 11.7.67 demonstrate that the Tank 221 Overfill interlock will stop Pumps 206 and 207 when they are running in the duplex mode

- 11.7.44 ENSURE that the CMSS "HIGH LEVEL IN TANK 221" indication is not activated.
- 11.7.45 VERIFY that the CMSS Valve HV-04 icon is blue.
- 11.7.46 VERIFY that the CMSS Pump 206 icon is blue.
- 11.7.47 ENSURE that Valve HV-04 is open in the manual mode. <sup>04 A.O.B. 3-5-99 #31</sup>
- 11.7.48 ENSURE that Pump 206 is in the automatic mode.
- 11.7.49 ENSURE that Pump 207 is in the automatic mode.
- 11.7.50 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication is activated in the 2706-TA Sump.
- 11.7.51 VERIFY that either the CMSS Pump 206 or CMSS Pump 207 icon is white.

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- 11.7.52 **ALLOW** the activated pump to run, **UNTIL** the CMSS "HIGH LEVEL IN TANK 221" indication is activated.
- 11.7.53 **VERIFY** that the CMSS Pump 206 icon is blue.
- 11.7.54 **VERIFY** that the CMSS Pump 207 icon is blue.
- 11.7.55 **ENSURE** that the CMSS "HIGH LEVEL IN TANK 221" indication is not activated.
- 11.7.56 **VERIFY** that the CMSS Pump 206 icon is still blue.
- 11.7.57 **VERIFY** that the CMSS Pump 207 icon is still blue.
- 11.7.58 **ENSURE** that Pump 206 is in the automatic mode.
- 11.7.59 **ENSURE** that Pump 207 is in the automatic mode.
- 11.7.60 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication is activated in the 2706-TA Sump.
- 11.7.61 **VERIFY** that either the CMSS Pump 206 or CMSS Pump 207 icon is white.
- 11.7.62 **ALLOW** the activated pump to run, **UNTIL** the CMSS "HIGH LEVEL IN TANK 221" indication is activated.
- 11.7.63 **VERIFY** that the CMSS Pump 206 icon is blue.
- 11.7.64 **VERIFY** that the CMSS Pump 207 icon is blue.
- 11.7.65 **ENSURE** that the CMSS "HIGH LEVEL IN TANK ~~220~~<sup>221</sup>" indication is not activated. *H.Q.B. 3-10-99 #32*
- 11.7.66 **VERIFY** that the CMSS Pump 206 icon is still blue.
- 11.7.67 **VERIFY** that the CMSS Pump 207 icon is still blue.

**NOTE:** Steps 11.7.68 through 11.7.101 demonstrate that the Tank 221 Overfill interlock prevents Pump 210 from starting or running, if Valve HV-04 is open and there is a CMSS "HIGH LEVEL IN TANK 221" indication. Also demonstrates that a pump stoppage resets the pump start command.

- 11.7.68 **ENSURE** that Pump 206 is off and in the manual mode
- 11.7.69 **VERIFY** that the CMSS Pump 206 icon is blue.
- 11.7.70 **ENSURE** that Pump 207 is off and in the manual mode.
- 11.7.71 **VERIFY** that the CMSS Pump 207 icon is blue.
- 11.7.72 **ENSURE** that Valve HV-04 is open and in the manual mode.
- 11.7.73 **VERIFY** that the CMSS Valve HV-04 icon is white.
- 11.7.74 **ENSURE** that Valve HV-03 is open and in the manual mode.
- 11.7.75 **VERIFY** that the CMSS Valve HV-03 icon is white.
- 11.7.76 **ENSURE** that Valve HV-06 is open and in the manual mode.
- 11.7.77 **VERIFY** that the CMSS Valve HV-06 icon is white.
- 11.7.78 **ENSURE** that Valve HV-08 is open and in the manual mode.
- 11.7.79 **VERIFY** that the CMSS Valve HV-08 icon is white.
- 11.7.80 **ENSURE** that Valve HV-02 is closed and in the manual mode.
- 11.7.81 **VERIFY** that the CMSS Valve HV-02 icon is blue.

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- 11.7.82 ENSURE that Valve HV-05 is closed and in the manual mode.
- 11.7.83 VERIFY that the CMSS Valve HV-05 icon is blue.
- 11.7.84 ENSURE that Valve HV-07 is closed and in the manual mode.
- 11.7.85 VERIFY that the CMSS Valve HV-07 icon is blue.
- 11.7.86 ENSURE that Valve HV-09 is closed and in the manual mode.
- 11.7.87 VERIFY that the CMSS Valve HV-09 icon is blue.
- 11.7.88 ENSURE that the CMSS "HIGH LEVEL IN TANK 221" indication is not activated.
- 11.7.89 RUN Pump 210 UNTIL the CMSS "HIGH LEVEL IN TANK 221" indication is activated.
- 11.7.90 VERIFY that the CMSS Pump 210 icon is blue.
- 11.7.91 SELECT Valve HV-05 manual open.
- 11.7.92 SELECT Valve HV-04 manual close.
- 11.7.93 VERIFY that the CMSS Pump 210 icon is still blue.
- 11.7.94 SELECT Pump 210 start.
- 11.7.95 VERIFY that the CMSS Pump 210 icon is white.
- 11.7.96 SELECT Pump 210 manual stop.
- 11.7.96.1 ENSURE that Valve HV-05 is closed in the manual mode. *A.R.B. 3-10-99 #33*
- 11.7.97 SELECT Valve HV-04 manual open.
- 11.7.98 SELECT Pump 210 manual start.
- 11.7.99 VERIFY that the CMSS Pump 210 icon is blue.
- 11.7.100 SELECT Valve HV-04 manual close.
- 11.7.101 VERIFY that the CMSS Pump 210 icon is still blue.

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## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

**12.0 MISCELLANEOUS EQUIPMENT**

NOTE: This section of the OTP demonstrates that the following equipment is functional:

- Tank 220 Agitator 213
- Tank 221 Agitator 214
- Safety Showers
- Chemical Transfer Pump
- Filter Room Hoist

**12.1 Prerequisites:**

- 12.1.1 Liquid Level Transmitter #I-XX-2706-LT-220 is calibrated: 2-10-99  
Calibration date
- 12.1.2 Liquid Level Transmitter #I-XX-2706-LT-221 is calibrated: 2-10-99  
Calibration date

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NOTE: This OTP tests the agitator from three locations:

- the CMSS
- 2706-TB Motor Controller for Agitator 213.
- and 2706-TB Chem Room Panel -004

**12.2 Test Tank 220 Agitator 213**

- 12.2.1 ENSURE that the Tank 220 "LOW LEVEL IN TANK 220" indication is not activated.
- 12.2.2 SELECT the Agitator "START" button on the CMSS Tank 2706-220 screen.
- 12.2.3 VERIFY that the CMSS Agitator "on" button is white.
- 12.2.4 VERIFY that the CMSS Agitator "off" button is blue.
- 12.2.5 VERIFY on Panel -004 that the red indicating light for Agitator 213 is illuminated.
- 12.2.6 VERIFY on the 2706-TB motor controller that the red indicating light for Agitator 213 is illuminated.
- 12.2.7 SELECT the Agitator "STOP" button on the CMSS Tank 2706-220 screen.
- 12.2.8 VERIFY that the CMSS Agitator "on" button is blue.
- 12.2.9 VERIFY that the CMSS Agitator "off" button is white.
- 12.2.10 VERIFY on Panel -004 that the green indicating light for Agitator 213 is illuminated.
- 12.2.11 VERIFY on the 2706-TB motor controller that the green indicating light for Agitator 213 is illuminated.
- 12.2.12 SELECT the Agitator "START" button on the CMSS Tank 2706-220 screen.
- 12.2.13 VERIFY that the CMSS Agitator "on" button is white.
- 12.2.14 PUSH the agitator stop button on Panel -004.
- 12.2.15 VERIFY that the CMSS Agitator "off" button is white.

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- 12.2.16 **PUSH** the agitator start button on Panel -004.
- 12.2.17 **VERIFY** that the CMSS Agitator "on" button is white.
- 12.2.18 **SELECT** the Agitator "STOP" button on the CMSS Tank 2706-220 screen.
- 12.2.19 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.2.20 **PUSH** the agitator start button on Panel -004.
- 12.2.21 **VERIFY** that the CMSS Agitator "on" button is white.
- 12.2.22 **PUSH** the agitator stop button on Panel -004.
- 12.2.23 **SELECT** the Agitator "START" button on the CMSS Tank 2706-220 screen.

**NOTE:** Steps 12.2.24 through 12.2.28 demonstrate that the emergency stop interlock stops the agitator when it is running.

- 12.2.24 **SELECT** the CMSS "EMERGENCY STOP" button.
- 12.2.25 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.2.26 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.2.27 **VERIFY** on Panel -004 that the green indicating light for Agitator 213 is illuminated.
- 12.2.28 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 213 is illuminated.

**NOTE:** Steps 12.2.29 through 12.2.33 demonstrate that emergency stop prevents Agitator 213 from starting.

- 12.2.29 **SELECT** the Agitator "START" button on the CMSS Tank 2706-220 screen.
- 12.2.30 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.2.31 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.2.32 **VERIFY** on Panel -004 that the green indicating light for Agitator 213 is illuminated.
- 12.2.33 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 213 is illuminated.

**NOTE:** Steps 12.2.34 through 12.2.38 demonstrate that the emergency stop interlock disables the agitator start instruction. So when emergency stop reset is pushed the agitator will not start automatically.

- 12.2.34 **SELECT** the CMSS (emergency stop) "RESET" button.
- 12.2.35 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.2.36 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.2.37 **VERIFY** on Panel -004 that the green indicating light for Agitator 213 is illuminated.
- 12.2.38 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 213 is illuminated.

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## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

**NOTE:** Steps 12.2.39 through 12.2.44 demonstrate that the "LOW LEVEL IN TANK 220" interlock stops the agitator from running

- 12.2.39 **SELECT** the Agitator "START" button on the CMSS Tank 2706-220 screen.
- 12.2.40 **ENSURE** that the CMSS "LOW LEVEL IN TANK 220" indication is activated.
- 12.2.41 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.2.42 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.2.43 **VERIFY** on Panel -004 that the green indicating light for Agitator 213 is illuminated.
- 12.2.44 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 213 is illuminated.

**NOTE:** Steps 12.2.45 through 12.2.50 demonstrate that the "LOW LEVEL IN TANK 220" interlock stops the agitator from starting.

- 12.2.45 **ENSURE** that the CMSS "LOW LEVEL IN TANK 220" indication is activated.
- 12.2.46 **SELECT** the Agitator "START" button on the CMSS Tank 2706-220 screen.
- 12.2.47 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.2.48 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.2.49 **VERIFY** on Panel -004 that the green indicating light for Agitator 213 is illuminated.
- 12.2.50 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 213 is illuminated.

**NOTE:** Steps 12.2.51 through 12.2.61 demonstrate that the Panel -004 Agitator 213 control buttons are functional

- 12.2.51 **ENSURE** that the CMSS "LOW LEVEL IN TANK 220" indication is not activated.
- 12.2.52 **PUSH** the Panel -004 Agitator 213 start button.
- 12.2.53 **VERIFY** that the CMSS Agitator "on" button is white.
- 12.2.54 **VERIFY** that the CMSS Agitator "off" button is blue.
- 12.2.55 **VERIFY** on Panel -004 that the red indicating light for Agitator 213 is illuminated.
- 12.2.56 **VERIFY** on the 2706-TB motor controller that the red indicating light for Agitator 213 is illuminated.
- 12.2.57 **PUSH** the Panel -004 Agitator 213 stop button.
- 12.2.58 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.2.59 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.2.60 **VERIFY** on Panel -004 that the green indicating light for Agitator 213 is illuminated.
- 12.2.61 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 213 is illuminated.

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NOTE: Steps 12.2.62 through 12.2.71 demonstrate that the 2706-TB Agitator 213 motor controller pushbuttons are functional.

- 12.2.62 **PUSH** the 2706-TB Agitator 213 motor controller start button.
- 12.2.63 **VERIFY** that the CMSS Agitator "on" button is white.
- 12.2.64 **VERIFY** that the CMSS Agitator "off" button is blue.
- 12.2.65 **VERIFY** on Panel -004 that the red indicating light for Agitator 213 is illuminated.
- 12.2.66 **VERIFY** on the 2706-TB motor controller that the red indicating light for Agitator 213 is illuminated.
- 12.2.67 **PUSH** the 2706-TB Agitator 213 motor controller stop button.
- 12.2.68 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.2.69 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.2.70 **VERIFY** on Panel -004 that the green indicating light for Agitator 213 is illuminated.
- 12.2.71 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 213 is illuminated.

NOTE: Steps 12.2.72 through 12.2.77 demonstrate that the 2706-TB Agitator 213 can be started from the computer and stopped from a remote location.

- 12.2.72 **SELECT** the Agitator "START" button on the CMSS Tank 2706-220 screen.
- 12.2.73 **VERIFY** that the CMSS Agitator "on" button is white.
- 12.2.74 **PUSH** the Panel -004 Agitator 213 stop button.
- 12.2.75 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.2.76 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.2.77 **VERIFY** on Panel -004 that the green indicating light for Agitator 213 is illuminated.

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NOTE: This OTP tests the agitator from three locations:

- the CMSS
- 2706-TB Motor Controller for Agitator 214.
- and 2706-TB Chem Room Panel -004

### 12.3 Test Tank 221 Agitator 214

- 12.3.1 **ENSURE** that the Tank 221 "LOW LEVEL IN TANK 221" indication is not activated.
- 12.3.2 **SELECT** the Agitator "START" button on the CMSS Tank 2706-221 screen.
- 12.3.3 **VERIFY** that the CMSS Agitator "on" button is white.
- 12.3.4 **VERIFY** that the CMSS Agitator "off" button is blue.
- 12.3.5 **VERIFY** on Panel -004 that the red indicating light for Agitator 214 is illuminated.

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- 12.3.6 **VERIFY** on the 2706-TB motor controller that the red indicating light for Agitator 214 is illuminated.
- 12.3.7 **SELECT** the Agitator "STOP" button on the CMSS Tank 2706-221 screen.
- 12.3.8 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.3.9 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.3.10 **VERIFY** on Panel -004 that the green indicating light for Agitator 214 is illuminated.
- 12.3.11 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 214 is illuminated.
- 12.3.12 **SELECT** the Agitator "START" button on the CMSS Tank 2706-221 screen.
- 12.3.13 **VERIFY** that the CMSS Agitator "on" button is white.
- 12.3.14 **PUSH** the agitator stop button on Panel -004.
- 12.3.15 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.3.16 **PUSH** the agitator start button on Panel -004.
- 12.3.17 **VERIFY** that the CMSS Agitator "on" button is white.
- 12.3.18 **SELECT** the Agitator "STOP" button on the CMSS Tank 2706-221 screen.
- 12.3.19 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.3.20 **PUSH** the agitator start button on Panel -004.
- 12.3.21 **VERIFY** that the CMSS Agitator "on" button is white.
- 12.3.22 **PUSH** the agitator stop button on Panel -004.
- 12.3.23 **SELECT** the Agitator "START" button on the CMSS Tank 2706-221 screen.

**NOTE:** Steps 12.3.24 through 12.3.28 demonstrate that the emergency stop interlock stops the agitator when it is running.

- 12.3.24 **SELECT** the CMSS "EMERGENCY STOP" button.
- 12.3.25 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.3.26 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.3.27 **VERIFY** on Panel -004 that the green indicating light for Agitator 214 is illuminated.
- 12.3.28 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 214 is illuminated.

**NOTE:** Steps 12.3.29 through 12.3.33 demonstrate that emergency stop prevents Agitator 214 from starting.

- 12.3.29 **SELECT** the Agitator "START" button on the CMSS Tank 2706-221 screen.
- 12.3.30 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.3.31 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.3.32 **VERIFY** on Panel -004 that the green indicating light for Agitator 214 is illuminated.
- 12.3.33 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 214 is illuminated.

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## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

**NOTE:** Steps 12.3.34 through 12.3.38 demonstrate that the emergency stop interlock disables the agitator start instruction. So when emergency stop reset is pushed the agitator will not start automatically.

- 12.3.34 **SELECT** the CMSS (emergency stop) "RESET" button.
- 12.3.35 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.3.36 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.3.37 **VERIFY** on Panel -004 that the green indicating light for Agitator 214 is illuminated.
- 12.3.38 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 214 is illuminated.

**NOTE:** Steps 12.3.39 through 12.3.44 demonstrate that the "LOW LEVEL IN TANK 221" interlock stops the agitator from running

- 12.3.39 **SELECT** the Agitator "START" button on the CMSS Tank 2706-221 screen.
- 12.3.40 **ENSURE** that the CMSS "LOW LEVEL IN TANK 221" indication is activated.
- 12.3.41 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.3.42 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.3.43 **VERIFY** on Panel -004 that the green indicating light for Agitator 214 is illuminated.
- 12.3.44 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 214 is illuminated.

**NOTE:** Steps 12.3.45 through 12.3.50 demonstrate that the "LOW LEVEL IN TANK 221" interlock stops the agitator from starting.

- 12.3.45 **ENSURE** that the CMSS "LOW LEVEL IN TANK 221" indication is activated.
- 12.3.46 **SELECT** the Agitator "START" button on the CMSS Tank 2706-221 screen.
- 12.3.47 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.3.48 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.3.49 **VERIFY** on Panel -004 that the green indicating light for Agitator 214 is illuminated.
- 12.3.50 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 214 is illuminated.

**NOTE:** Steps 12.3.51 through 12.3.61 demonstrate that the Panel -004 Agitator 214 control buttons are functional

- 12.3.51 **ENSURE** that the CMSS "LOW LEVEL IN TANK 221" indication is not activated.
- 12.3.52 **PUSH** the Panel -004 Agitator 214 start button.
- 12.3.53 **VERIFY** that the CMSS Agitator "on" button is white.

## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

- 12.3.54 **VERIFY** that the CMSS Agitator "off" button is blue.
- 12.3.55 **VERIFY** on Panel -004 that the red indicating light for Agitator 214 is illuminated.
- 12.3.56 **VERIFY** on the 2706-TB motor controller that the red indicating light for Agitator 214 is illuminated.
- 12.3.57 **PUSH** the Panel -004 Agitator 214 stop button.
- 12.3.58 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.3.59 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.3.60 **VERIFY** on Panel -004 that the green indicating light for Agitator 214 is illuminated.
- 12.3.61 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 214 is illuminated.

**NOTE:** Steps 12.2.62 through 12.3.71 demonstrate that the 2706-TB Agitator 214 motor controller pushbuttons are functional.

- 12.3.62 **PUSH** the 2706-TB Agitator 214 motor controller start button.
- 12.3.63 **VERIFY** that the CMSS Agitator "on" button is white.
- 12.3.64 **VERIFY** that the CMSS Agitator "off" button is blue.
- 12.3.65 **VERIFY** on Panel -004 that the red indicating light for Agitator 214 is illuminated.
- 12.3.66 **VERIFY** on the 2706-TB motor controller that the red indicating light for Agitator 214 is illuminated.
- 12.3.67 **PUSH** the 2706-TB Agitator 214 motor controller stop button.
- 12.3.68 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.3.69 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.3.70 **VERIFY** on Panel -004 that the green indicating light for Agitator 214 is illuminated.
- 12.3.71 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 214 is illuminated.

**NOTE:** Steps 12.3.72 through 12.3.77 demonstrate that the 2706-TB Agitator 214 can be started from the computer and stopped from a remote location.

- 12.3.72 **SELECT** the Agitator "START" button on the CMSS Tank 2706-221 screen.
- 12.3.73 **VERIFY** that the CMSS Agitator "on" button is white.
- 12.3.74 **PUSH** the Panel -004 Agitator 214 stop button.
- 12.3.75 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.3.76 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.3.77 **VERIFY** on Panel -004 that the green indicating light for Agitator 214 is illuminated.

Verification Signature: HENRY R. BENZEL / H. R. Benzel / 12-12-99  
PRINT NAME SIGNATURE/INITIALS DATE

RECORD COPY

## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

**12.4 Test the Chemical Transfer Pump T-XX-2706-215**

**NOTE:** Pump 215 is an air-actuated pump. Valve A-HP-2706-288 supplies the control air. Valve T-XX-2706-248 opens the path to Tank 220, and Valve T-XX-2706-249 opens the path to Tank 221.

**CAUTION:** The Chem Room Hose Bibb shall not be used for this procedure, unless it has been relocated from its position adjacent to the electrical disconnect on the northwest wall of the Chem Room.

**NOTE:** Steps 12.4.1 through 12.4.9 demonstrate that the chemical pump transfers liquids to Tank 220.

- 12.4.1 **ENSURE** that the Pump 215 suction line is connected to a 55-gallon drum that is nominally full of liquid.
- 12.4.2 **ENSURE** that the CMSS "LOW LEVEL IN TANK 220" is not activated.
- 12.4.3 **RECORD** the number of gallons registered in the "LEVEL" block on the CMSS Tank 2706-220 screen: 2934 gallons.
- 12.4.4 Slowly **OPEN** Valve T-XX-2706-248.
- 12.4.5 Slowly **OPEN** Valve A-HP-2706-288.
- 12.4.6 **RUN** Pump 215, **UNTIL** it is no longer sucking liquid, **OR** the CMSS Tank 2706-220 "LEVEL" block shows an approximate 30 gallon increase to the volume recorded in Step 12.4.3.
- 12.4.7 **CLOSE** Valve A-HP-2706-288.
- 12.4.8 **CLOSE** Valve T-XX-2706-248.
- 12.4.9 **RECORD** the number of gallons registered in the "LEVEL" block on the CMSS Tank 2706-221 screen: 3025 gallons.

**NOTE:** Steps 12.4.10 through 12.4.18 demonstrate that the chemical pump transfers liquids to Tank 221.

- 12.4.10 **ENSURE** that the Pump 215 suction line is connected to a 55-gallon drum that is nominally full of liquid.
- 12.4.11 **ENSURE** that the CMSS "LOW LEVEL IN TANK 221" is not activated.
- 12.4.12 **RECORD** the number of gallons registered in the "LEVEL" block on the CMSS Tank 2706-221 screen: 1480 gallons.
- 12.4.13 Slowly **OPEN** Valve T-XX-2706-249.
- 12.4.14 Slowly **OPEN** Valve A-HP-2706-288.
- 12.4.15 **RUN** Pump 215, **UNTIL** it is no longer sucking liquid, **OR** the CMSS Tank 2706-221 "LEVEL" block shows an approximate 30 gallon increase to the volume recorded in Step 12.4.12.
- 12.4.16 **CLOSE** Valve A-HP-2706-288.
- 12.4.17 **CLOSE** Valve T-XX-2706-249.
- 12.4.18 **RECORD** the number of gallons registered in the "LEVEL" block on the CMSS Tank 2706-221 screen: 1910 gallons.

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## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

**NOTE:** Section 12.5 tests three safety showers. Two are located in 2706-TA and the other is located in the 2706-TB Chem Room. A flow switch is connected to each of the showers. When the flow switches sense a flow, they send an alarm signal to the CMSS. The alarm registers on the CMSS "HVAC SYSTEM" screen.

### 12.5 Test the 2706-TA and 2706-TB Chem Room Safety Showers.

**CAUTION:** Activating the eyewash could splash water on the floor. Water on the floor is a slipping hazard.

- 12.5.1 **ACTIVATE** the eyewash in the North corner of 2706-TA.
- 12.5.2 **VERIFY** that the CMSS "FAH-01 HIGH FLOW SHOWER/EYEWASH" alarm indication is activated.
- 12.5.3 **DEACTIVATE** the eyewash in the North corner of 2706-TA.
- 12.5.4 **VERIFY** that the CMSS "FAH-01 HIGH FLOW SHOWER/EYEWASH" alarm indication is deactivated.
- 12.5.5 **MOP-UP** any spilled liquids.
- 12.5.6 **ACTIVATE** the eyewash in the South corner of 2706-TA.
- 12.5.7 **VERIFY** that the CMSS "FAH-02 HIGH FLOW SHOWER/EYEWASH" alarm indication is activated.
- 12.5.8 **DEACTIVATE** the eyewash in the South corner of 2706-TA.
- 12.5.9 **VERIFY** that the CMSS "FAH-02 HIGH FLOW SHOWER/EYEWASH" alarm indication is deactivated.
- 12.5.10 **MOP-UP** any spilled liquids.
- 12.5.11 **ACTIVATE** the eyewash in the 2706-TB Chem Room.
- 12.5.12 **VERIFY** that the CMSS "FAH-03 HIGH FLOW SHOWER/EYEWASH" alarm indication is activated.
- 12.5.13 **DEACTIVATE** the eyewash in the 2706-TB Chem Room.
- 12.5.14 **VERIFY** that the CMSS "FAH-03 HIGH FLOW SHOWER/EYEWASH" alarm indication is activated.
- 12.5.15 **MOP-UP** any spilled liquids.

Verification Signature: HENRY R. BENZEL / H. R. Benzel / 12-10-98  
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## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

**12.6 Test the Filter Room Hoist and Trolley**

**NOTE:** The Filter Room Hoist and Trolley is located in 2706-TA. Its function is to enable the replacement of filter cartridges in the process filters. It is electrically actuated, and controlled by four buttons on a suspended wand. The buttons are sequentially labeled "HOIST UP", "HOIST DOWN", "TROLLEY LEFT" and "TROLLEY RIGHT".

**NOTE:** The Hoist has three limits. Pushing the "HOIST UP" and "HOIST DOWN" buttons simultaneously results in no motion. The "HOIST UP" travel is limited to prevent running the hook into the block. The "HOIST DOWN" is limited to prevent the chain from unraveling off the drum.

**NOTE:** The Trolley has one limit: Pushing the "TROLLEY LEFT" and "TROLLEY RIGHT" buttons simultaneously results in no motion.

- 12.6.1 **ENSURE** that the Hoist and Trolley are plugged in.
- 12.6.2 **PUSH** and **HOLD** the "HOIST UP" and "HOIST DOWN" buttons simultaneously.
- 12.6.3 **VERIFY** that the Hoist does not move while both buttons are depressed.
- 12.6.4 **PUSH** and **HOLD** the "HOIST DOWN" button, UNTIL the limit switch cuts the power.
- 12.6.5 **RECORD** the approximate distance from the base of hook to the floor to the nearest inch:  
4 inches.
- 12.6.6 **PUSH** and **HOLD** the "HOIST UP" button, UNTIL the limit switch cuts the power.
- 12.6.7 **PUSH** and **HOLD** the "TROLLEY LEFT" and "TROLLEY RIGHT" buttons simultaneously.
- 12.6.8 **VERIFY** that the trolley does not move while both buttons are depressed.
- 12.6.9 **PUSH** and **HOLD** the "TROLLEY LEFT" button until it is within approximately 18" of the building structure.
- 12.6.10 **PUSH** and **HOLD** the "TROLLEY RIGHT" button until it is within approximately 18" of the cable coil.

Verification Signature:

HENRI BENZEL

PRINT NAME

H. B. Benzel 13-10-99

SIGNATURE/INITIALS

DATE

RECORD COPY

13.0 FINAL OPERATION TEST PROCEDURE APPROVAL SIGNATURES

13.1 TEST DIRECTOR:

Verification Signature: HENRY R. BENZEL / H.R. Benzel / 3-16-99  
PRINT NAME SIGNATURE/INITIALS DATE

13.2 COGNIZANT ENGINEER:

Verification Signature: R.F. Boden / R.F. Boden / 3/23/99  
PRINT NAME SIGNATURE/INITIALS DATE

13.3 OPERATIONS REPRESENTATIVE:

Verification Signature: D.C. DeRosa / D.C. DeRosa / 3/23/99  
PRINT NAME SIGNATURE/INITIALS DATE

**MINOR DISCREPANCY LIST**  
**FOR OTP HNF-3610, Rev. 1**

OTP Test Director:

HENRY R. BENZEL | Henry R. Benzel | 4-12-99  
Print Name | Signature | Date

Cognizant Engineer:

R.F. Booher | R.F. Booher | 4/12/99  
Print Name | Signature | Date

## *W-259 OTP Minor Discrepancy List*

*For OTP HNF-3610, Rev. 1*

**Item #:**  **Section #:**  **Step(s):**

**Description:** The Section Title incorrectly refers to Pump 216. It should refer to Pump 212.

**Discussion:** This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP changing the reference to Pump 212.

**Item #:**  **Section #:**  **Step(s):**

**Description:** Section 5 is missing the verification signature block.

**Discussion:** This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP adding a signature verification block to Section 5.0.

**Item #:**  **Section #:**  **Step(s):**

**Description:** A step is needed to verify that when Pump 216 is running in manual mode, switching to auto mode shuts off the pump.

**Discussion:** This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP adding Step 6.8.17.1. Step 6.8.17.1 reads, "VERIFY that the pump status indicator "ON" is blue, and "OFF" is white.

---

**Item #:**  **Section #:**  **Step(s):**

**Description:** Step 6.16.19 is redundant to Step 6.16.18.

**Discussion:** This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP that deleted Step 6.16.19.

---

**Item #:**  **Section #:**  **Step(s):**

**Description:** Steps 8.12.1 and 8.12.2 need to be switched to allow the 2706-T Railroad Pit Sump to be filled before the Emergency Stop is activated.

**Discussion:** This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP to switch the order of Steps 8.12.1 and 8.12.2.

---

**Item #:**  **Section #:**  **Step(s):**

**Description:** Verification steps are required to demonstrate that switching the air sparger from the automatic mode back to manual will not start the air sparger.

**Discussion:** In the original programming, when the air sparger was running in manual, switching to automatic stop the air sparger, but switching back to manual restarted it. When this was discovered, PLCs Plus was requested to revise the software so that the air sparger would not restart. Steps 8.13.5.1 and 8.13.5.2 were added to verify that the change was made and is functional.

This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP to add Steps 8.13.5.1 and 8.13.5.2. Step 8.13.5.1 reads "SELECT air sparger manual mode.". Step 8.13.5.2 reads "VERIFY that the CMSS Valve HY-02 icon is still blue."

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Item #: **7** Section #: **8.14** Step(s): **8.14.6.1**

**Description:** A step is needed to verify that a "HIGH LEVEL IN SUMP" indication will not start the air sparger.

**Discussion:** In the original design an air sparger started on a sump high level and shut off on a low sump level. There was the potential that the sump pump would shut-off before the sump liquid level dropped below the low sump level setpoint. If this happened the air sparger would not shut-off. The software was changed so that the air sparger won't start or run unless a sump pump is running. A verification step is needed to demonstrate that the air sparger is no longer controlled by a high level in the sump.

This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP to add Step 8.14.6.1. The Step reads, "VERIFY that the CMSS Valve HY-02 is blue."

---

Item #: **8** Section #: **8.15** Step(s): **8.15.8.1**

**Description:** A step is needed to verify that a "HIGH LEVEL IN SUMP" indication will not start the air sparger.

**Discussion:** In the original design an air sparger started on a sump high level and shut off on a low sump level. There was the potential that the sump pump would shut-off before the sump liquid level dropped below the low sump level setpoint. If this happened the air sparger would not shut-off. The software was changed so that the air sparger won't start or run unless a sump pump is running. A verification step is needed to demonstrate that the air sparger is no longer controlled by a high level in the sump.

This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP to add Step 8.15.8.1. The Step reads, "VERIFY that the CMSS Valve HY-02 is blue."

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**Item #:**  **Section #:**  **Step(s):**

**Description:** Section 8.15 is missing the verification signature block.

**Discussion:** This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP adding a signature verification block to Section 8.15.

---

**Item #:**  **Section #:**  **Step(s):**

**Description:** Step 8.15.16 is redundant to Step 8.15.15.

**Discussion:** This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP that deletes Step 8.15.16.

---

**Item #:**  **Section #:**  **Step(s):**

**Description:** Step 9.6.15 implies that the pump shuts-off 30 seconds after the "LOW-LOW LEVEL IN SUMP" indication is activated. This is no longer true.

**Discussion:** The original design had the pump shut-off 30 seconds after the "LOW-LOW LEVEL IN SUMP" indication was activated. After the OTP was written it was determined that the 30 second delay served no purpose and it was deleted.

This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP that deleted the reference to the 30 second delay.

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**Item #:**  **Section #:**  **Step(s):**

**Description:** Step 9.7.11 implies that the pump shuts-off 30 seconds after the "LOW-LOW LEVEL IN SUMP" indication is activated. This is no longer true.

**Discussion:** The original design had the pump shut-off 30 seconds after the "LOW-LOW LEVEL IN SUMP" indication was activated. After the OTP was written it was determined that the 30 second delay served no purpose and it was deleted.

This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP that deleted the reference to the 30 second delay.

---

**Item #:**  **Section #:**  **Step(s):**

**Description:** Steps 9.8.12 and 9.8.18 imply that the pump shuts-off 30 seconds after the "LOW-LOW LEVEL IN SUMP" indication is activated. This is no longer true.

**Discussion:** The original design had the pump shut-off 30 seconds after the "LOW-LOW LEVEL IN SUMP" indication was activated. After the OTP was written it was determined that the 30 second delay served no purpose and it was deleted.

This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP that deleted the reference to the 30 second delay.

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**Item #:** 14    **Section #:** 9.9    **Step(s):** 9.9.12.1

**Description:** Steps 9.9.13 through 9.9.17 cannot be completed unless Valve HV-05 is open. Since the emergency stop closed Valve HV-05, HV-05 must be opened again after the emergency stop is reset.

**Discussion:** In the original design the emergency stop did not shut the valves. However after the OTP was issued, it was determined that siphons in the system made it necessary to shut the valves with the emergency stop. The change was made, and collateral impacts to the OTP were remedied by pen and ink changes.

This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP that added Step 9.9.12.1. Step 9.9.12.1 reads, "ENSURE that Valve HV-05 is open in the manual mode."

---

**Item #:** 15    **Section #:** 9.10    **Step(s):** 9.10.12.1

**Description:** Steps 9.10.13 through 9.10.17 cannot be completed unless Valve HV-05 is open. Since the emergency stop closed Valve HV-05, HV-05 must be opened again after the emergency stop is reset.

**Discussion:** In the original design the emergency stop did not shut the valves. However after the OTP was issued, it was determined that siphons in the system made it necessary to shut the valves with the emergency stop. The change was made, and collateral impacts to the OTP were remedied by pen and ink changes.

This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP that added Step 9.10.12.1. Step 9.10.12.1 reads, "ENSURE that Valve HV-05 is open in the manual mode."

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**Item #:** 16 **Section #:** 9.11 **Step(s):** 9.11.14.1, 9.11.18.1 and 9.11.39.1

**Description:** Section 9.11 cannot be completed unless Valve HV-05 is open when the emergency stop is deactivated. Since the emergency stop closes Valve HV-05, HV-05 must be opened again after the emergency stop is reset.

**Discussion:** In the original design the emergency stop did not shut the valves. However after the OTP was issued, it was determined that siphons in the system made it necessary to shut the valves with the emergency stop. The change was made, and collateral impacts to the OTP were remedied by pen and ink changes.

This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP that added Steps 9.11.14.1, 9.11.18.1 and 9.11.39.1. Steps 9.11.14.1, 9.11.18.1 and 9.11.39.1 all read, "ENSURE that Valve HV-05 is open in the manual mode."

**Item #:** 17 **Section #:** 9.14 **Step(s):** 9.14.1, 9.14.7 and 9.14.8

**Description:** Steps 9.14.1, 9.14.7 and 9.14.8 all refer to the Railroad Pit Sump. They should refer to the 2706-TA Sump.

**Discussion:** This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP that replaced the words "Railroad Pit" with "2706-TA" in the referenced steps.

**Item #:** 18 **Section #:** 9.14 **Step(s):** 9.14.16

**Description:** Step 9.14.16 is redundant to 9.14.15

**Discussion:** This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP that deleted Step 9.14.16.

**Item #:** 19 **Section #:** 9.14 **Step(s):**

**Description:** Section 9.14 is missing the verification signature block.

**Discussion:** This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP adding a signature verification block to Section 9.14.

**Item #:** 20 **Section #:** 10.3 **Step(s):**

**Description:** The Section Title incorrectly refers to Pump 216. It should refer to Pump 212.

**Discussion:** This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP that replaced 216 with 212.

**Item #:** 21 **Section #:** 10.4 **Step(s):** 10.4.2 and 10.4.3

**Description:** Steps 10.4.2 and 10.4.3 are switched.

**Discussion:** It is not possible to put the TSP into the liquid before the liquid is added to the TB Sump.

This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP that switches the order of Steps 10.4.2 and 10.4.3.

---

**Item #:** 22    **Section #:** 10.4    **Step(s):** 10.4.5

**Description:** Step 10.4.5 needs to precede the step adding liquid to the sump to ensure that the pump does not automatically start.

**Discussion:** If the pump is in automatic mode the high sump level indication will start the pump.

This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP that directs that Step 10.4.5 precede the step that adds liquid to the sump.

---

**Item #:** 23    **Section #:** 10.4    **Step(s):** 10.4.8, 10.4.9 and 10.4.10

**Description:** References to the activation state of the CMSS "LOW SUMP LEVEL" indication are incorrect.

**Discussion:** The activated state of the CMSS "LOW SUMP LEVEL" indication differs from the other sumps. Unlike the other sumps where a high level indication is the alarm condition, the alarm condition in the TB Sump is the low level indication. This difference is reflected in the behavior of the CMSS alarm indication. In the other sumps the CMSS low level indication is activated when the liquid level is BELOW the setpoint. In the TB Sump the CMSS low level indication is activated when the liquid level is ABOVE the setpoint.

This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP that changed the activation states of the CMSS "LOW SUMP LEVEL" indication to be consistent with the design.

---

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**Item #:** 24    **Section #:** 10.4    **Step(s):** 10.4.13.1

**Description:**    A step is needed to demonstrate that switching to automatic mode when the pump is running in manual mode will stop the pump.

**Discussion:**    This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:**    A pen and ink change was made to the OTP that added Step 10.4.13.1. Step 10.4.13.1 reads, "VERIFY that the CMSS Pump 212 icon is blue."

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**Item #:** 25    **Section #:** 10.5    **Step(s):** 10.5.2

**Description:**    The reference to the activation state of the CMSS "LOW SUMP LEVEL" indication is incorrect.

**Discussion:**    The activated state of the CMSS "LOW SUMP LEVEL" indication differs from the other sumps. Unlike the other sumps where a high level indication is the alarm condition, the alarm condition in the TB Sump is the low level indication. This difference is reflected in the behavior of the CMSS alarm indication. In the other sumps the CMSS low level indication is activated when the liquid level is BELOW the setpoint. In the TB Sump the CMSS low level indication is activated when the liquid level is ABOVE the setpoint.

This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:**    A pen and ink change was made to the OTP that changed the activation state of the CMSS "LOW SUMP LEVEL" indication to be consistent with the design.

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**Item #:** 26    **Section #:** 10.7    **Step(s):** 10.7.14.1, 10.7.21.1 and 10.7.28.1

**Description:** Section 10.7 cannot be completed unless Valve HV-05 is re-opened after each emergency stop reset, because the emergency stop shut Valve HV-05.

**Discussion:** In the original design the emergency stop did not shut the valves. However after the OTP was issued, it was determined that siphons in the system made it necessary to shut the valves with the emergency stop. The change was made, and collateral impacts to the OTP were remedied by pen and ink changes.

This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP that added Steps 10.7.14.1, 10.7.21.1 and 10.7.28.1. Each of the new steps reads, "ENSURE that Valve HV-05 is open in the manual mode."

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**Item #:** 27    **Section #:** 10.9, 10.10 and 10.11    **Step(s):** 0.9.19.1, 10.10.24.1 and 10.11.21.1

**Description:** Valve HV-03 must be open to demonstrate that Pump 210 will not automatically start after an Emergency Stop Reset. Since the Emergency Stop closed the valve, the valve must be reopened.

**Discussion:** When the OTP was written the Emergency Stop did not close the valves. This feature was added later to prevent siphons in the system during an emergency stop. Since Pump 210 is interlocked so that it will not operate if Valve HV-03 is closed, it must be reopened after the Emergency Stop Reset is activated to ensure that Pump 210 will not automatically start.

This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP that added Steps 10.9.19.1, 10.10.24.1 and 10.11.21.1. Each of the new steps reads, "ENSURE that Valve HV-03 is open in the manual mode."

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**Item #:** 28    **Section #:** 11.3    **Step(s):** 11.3.20.1

**Description:**    Either Valve HV-02 or HV-01 must be open to demonstrate that Pump 211 will not automatically start after an Emergency Stop Reset. Since the Emergency Stop closed the valve, the valve must be reopened.

**Discussion:**    When the OTP was written the Emergency Stop did not close the valves. This feature was added later to prevent siphons in the system during an emergency stop. Since Pump 211 is interlocked so that it will not operate if both Valves HV-01 and HV-02 are closed, one of the valves must be reopened after the Emergency Stop Reset is activated, to ensure that Pump 211 will not automatically start.

This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:**    A pen and ink change was made to the OTP that added Step 11.3.20.1. The new steps reads, "ENSURE that Valve HV-02 is open in the manual mode."

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**Item #:** 29    **Section #:** 11.4    **Step(s):** 11.4.18.1

**Description:**    Either Valve HV-02 or HV-01 must be open to demonstrate that Pump 211 will not automatically start after an Emergency Stop Reset. Since the Emergency Stop closed the valve, the valve must be reopened.

**Discussion:**    When the OTP was written the Emergency Stop did not close the valves. This feature was added later to prevent siphons in the system during an emergency stop. Since Pump 211 is interlocked so that it will not operate if both Valves HV-01 and HV-02 are closed, one of the valves must be reopened after the Emergency Stop Reset is activated, to ensure that Pump 211 will not automatically start.

This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:**    A pen and ink change was made to the OTP that added Step 11.4.18.1. The new steps reads, "ENSURE that Valve HV-01 is open in the manual mode."

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**Item #:** 30    **Section #:** 11.5    **Step(s):** 11.5.22.1

**Description:**        Either Valve HV-02 or HV-01 must be open to demonstrate that Pump 211 will not automatically start after an Emergency Stop Reset. Since the Emergency Stop closed the valve, the valve must be reopened.

**Discussion:**        When the OTP was written the Emergency Stop did not close the valves. This feature was added later to prevent siphons in the system during an emergency stop. Since Pump 211 is interlocked so that it will not operate if both Valves HV-01 and HV-02 are closed, one of the valves must be reopened after the Emergency Stop Reset is activated, to ensure that Pump 211 will not automatically start.

This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:**        A pen and ink change was made to the OTP that added Step 11.5.22.1. The new step reads, "ENSURE that Valve HV-02 is open in the manual mode."

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**Item #:** 31    **Section #:** 11.7    **Step(s):** 11.7.47

**Description:**        Step 11.7.47 incorrectly references Valve HV-05. It should refer to Valve HV-04.

**Discussion:**        This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:**        A pen and ink change was made to the OTP that changed Valve HV-05 to HV-04.

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**Item #:** 32    **Section #:** 11.7    **Step(s):** 11.7.65

**Description:**        Step 11.7.65 incorrectly references Tank 220. It should refer to Tank 221.

**Discussion:**        This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:**        A pen and ink change was made to the OTP that changed Tank 220 to Tank 221.

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**Item #:** 33    **Section #:** 11.7    **Step(s):** 11.7.96.1

**Description:** Valve HV-05 must be closed to perform Steps 11.7.97 through 11.7.101.

**Discussion:** There is an interlock that prevents Pump 210 from starting if both Valves HV-05 and HV-04 are open. Note that Section 11.7 demonstrates that the interlock stops Pump 210 when it is running and also prevents it from starting, and that it doesn't interfere with Tank 220 recirculation. Opening Valve 5 with Valve 4 closed demonstrated recirculation. Steps 11.7.97 through 11.7.101 demonstrates that the interlock prevents Pumps 210 from starting. It is important that the interlock related to both Valves 4 and 5 being closed does not interfere with this test. Therefore, it is necessary to close Valve HV-05.

This was classified as a minor change because it was consistent with the intent of the OTP and did not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP that added Step 11.7.96.1. Step 11.7.96.1 reads, "ENSURE that Valve HV-05 is closed in the manual mode."

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**Item #:** 34    **Section #:** 2.1.11    **Step(s):**

**Description:** Section 2.1.11 contains a requirement to make verification signatures in blue ink.

**Discussion:** Before the advent of color copiers, it was not unusual to require that verification signatures be done in blue ink to distinguish between originals and copies. This requirement is no longer relevant. It is more meaningful to require signatures in indelible ink.

**Resolution:** Do a pen and ink change to Section 2.1.11 that requires signatures to be made in indelible ink.

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**Item #:** 35 **Section #:** 4.6 **Step(s):**

**Description:** Process Valves T-XX-2706-242 and T-XX-2706-243 are not listed.

**Discussion:** Valves T-XX-2706-242 and -243 are the manual valves on the sample collection system. These process valves need to be closed during all portions of the OTP except when the OTP specifically directs that they be opened. Accordingly they should be listed in Section 4.6. This is classified as a minor change because it is consistent with the intent of the OTP and does not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP Record Copy. The change added Valves T-XX-2706-242 and T-XX-2706-243 to Section 4.6.

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**Item #:** 36 **Section #:** 4.9 **Step(s):**

**Description:** Section 4.9 can be interpreted to mean that instruments/gauges that do not require calibration must be calibrated.

**Discussion:** OTP Section 4.9 conflicts with the Scope statement in OTP Section 1.2. Section 1.2 requires the OTP to test system components in "their normal operating configuration". Section 4.9 can be interpreted to require calibration of gauges that are not calibrated in their "normal operating configuration". Clearly Section 4.9 must be clarified so that it cannot be interpreted to require calibration of instruments, that are not calibrated in "their normal operating configuration". Note that the actual testing was done with the instruments in "their normal operating configuration". Specifically the gauges were not calibrated by WMH personnel. This change was classified a minor discrepancy, because it did not require a change to the normal operating condition of a system component.

**Resolution:** Do a pen and ink change to Section 4.9 to clarify that only instruments that require calibration in accordance with WMH procedures need to be calibrated for the performance of the OTP.

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**Item #:**  **Section #:**  **Step(s):**

**Description:** Steps 9.3.18 and 9.3.19 refer to Pump 204. They should refer to Pump 206.

**Discussion:** This change was classified as a minor discrepancy because it does not require a change in the operating hardware, software or philosophy.

**Resolution:** A pen and ink change was made to the OTP changing the pump number from 204 to 206.

---

**MAJOR DISCREPANCY LIST**  
**FOR OTP HNF-3610, Rev.0**

OTP Test Director:

HENRY R. BENZEL      H. R. Benzel      13-16-99  
Print Name    Signature    Date

Cognizant Engineer:

R.F. Boden    R.F. Boden    13/17/99  
Print Name    Signature    Date

## ***W-259 OTP Major Discrepancy List***

*For OTP HNF-3610, Rev. 0*

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**Item #:**

**Description:** The computer software contained logic strings that allowed the system pumps to start without either pressing the start pump, or enabling the automatic permissives.

**Discussion:** A number of operating sequences existed in the software control logic that allowed a pump to start spontaneously. Examples included:

If a pump was running and the emergency stop was pushed, the pump stopped. However, when the emergency stop reset button was pushed the pump started running again, without the operator pushing any buttons or creating automatic permissives.

If a pump was running in manual, switching the pump to automatic mode stopped the pump. However, when the operator switched back to manual the pump automatically started again, without the operator pushing any other buttons.

The potential for pumps to automatically start without the operator selecting start permissives is not consistent with good operating practice, and it was determined that the software needed to be changed to ensure that the system pumps would not spontaneously operate. Testing these changes required a revision to the OTP. By definition a revision is a major discrepancy.

**Resolution:** WMH decided to hire PLCS Plus to modify the software to eliminate spontaneous pump starts. WMH documented these changes in an ECN that modified the system logic diagrams contained in Drawing H-2-826574. Additionally, WMH revised the OTP to test the changes.

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Item #:

**Description:** The computer software contained logic strings that allowed valves to spontaneously open without operator control.

**Discussion:** A number of operating sequences existed in the software control logic that allowed a valve to spontaneously open without operator control. Examples included:

If a valve was open and the emergency stop was pushed, the valve closed. However, when the emergency stop reset button was pushed the valve opened again, without the operator purposely opening the valve.

If a valve was open in manual, switching the valve to automatic mode closed the valve. However, when the operator switched back to manual, the valve automatically opened again, without the operator pushing any other buttons.

The potential for valves to automatically open without the operator selecting the open command was not consistent with good operating practice, and it was determined that the software needed to be changed to ensure that the system valves would not spontaneously operate. Testing these changes required a revision to the OTP. By definition a revision is a major discrepancy.

**Resolution:** WMH decided to hire PLCS Plus to modify the software to eliminate spontaneous pump starts. WMH documented these changes in an ECN that modified the system logic diagrams contained in Drawing H-2-826574. Additionally, WMH revised the OTP to test the changes.

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***MINOR DISCREPANCY LIST***  
***FOR OTP HNF-3610, Rev. 0***

OTP Test Director:

HENRY R. BENZEL | H. D. Benzel | 14-12-99  
Print Name Signature Date

Cognizant Engineer:

R.F. Boston | R.F. Boston | 4/12/99  
Print Name Signature Date



## *W-259 OTP Minor Discrepancy List*

*For OTP HNF-3610, Rev. 0*

**Item #:**       **Section #:**       **Step(s):**

**Description:** Tank 221 is incorrectly described as Tank 220.

**Discussion:** This is classified as a minor change because it is consistent with the intent of the OTP and does not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change shall be made to the OTP record copy that changes Section 5.3.2 to read, "Add...to Tank 221,, in accordance with Procedure Number DO-021-039."

**Item #:**       **Section #:**       **Step(s):**

**Description:** Steps 6.1.3 and 6.1.4 refers to a CMSS screen titled, the "2706-T Railroad Pit Sump A". The correct title is "2706-T Railroad Pit Sump".

**Discussion:** This is classified as a minor change because it is consistent with the intent of the OTP and does not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP record copy. The change deleted "A" from the screen title.

**Item #:**       **Section #:**       **Step(s):**

**Description:** Process Valves T-XX-2706-242 and T-XX-2706-243 are not listed.

**Discussion:** Valves T-XX-2706-242 and -243 are the manual valves on the sample collection system. These process valves need to be closed during all portions of the OTP except when the OTP specifically directs that they be opened. Accordingly they should be listed in Section 4.6. This is classified as a minor change because it is consistent with the intent of the OTP and does not require a significant modification either to the OTP or to the operating systems.

**Resolution:** A pen and ink change was made to the OTP Record Copy. The change added Valves T-XX-2706-242 and T-XX-2706-243 to Section 4.6.

Item #: 4 Section #: 11.3 Step(s): 11.3.4.1

**Description:** Section 11.3 does not include a step to ensure that Valve HV-01 is closed.

**Discussion:** Section 11.3 transfers liquid from Tank 221 to Truck Mode. If Valve HV-01 is not closed, liquid will be inappropriately diverted to Tank 220. Valve HV-01 must be closed for this test. This item is considered a minor change because it does not alter the operating hardware, software or philosophy.

**Resolution:** A pen and ink change shall be made to the OTP Record Copy. The change shall add step 11.3.4.1. Step 11.3.4.1 shall read, "ENSURE that Valve HV-01 is closed in the manual mode."

Item #: 5 Section #: 11.5 Step(s): 11.5.5.1

**Description:** Section 11.5 does not include a step to ensure that Valve HV-01 is closed.

**Discussion:** Section 11.5 recirculates liquids in Tank 221. If Valve HV-01 is not closed, liquid will be inappropriately diverted to Tank 220. Valve HV-01 must be closed for this test. This item is considered a minor change because it does not alter the operating hardware, software or philosophy.

**Resolution:** A pen and ink change shall be made to the OTP Record Copy. The change shall add step 11.5.5.1. Step 11.5.5.1 shall read, "ENSURE that Valve HV-01 is closed in the manual mode."

Item #: 6 Section #: 7.3 Step(s): 7.3.11

**Description:** The note just prior to Step 7.3.11 reads, "NOTE: Steps 0 and 7.3.13 demonstrate...". It should read "NOTE: Steps 7.3.11 and 7.3.13 demonstrate...".

**Discussion:** This change is considered minor because there is no change to operating hardware or controlling software. It is purely editorial.

**Resolution:** A pen and ink change was made to the OTP record copy.

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**Item #:**       **Section #:**       **Step(s):**

**Description:** Steps 8.1.4 and 8.1.5 could not be completed because of the required instrument settings were changed after the OTP was approved.

**Discussion:** Steps 8.1.4 and 8.1.5 specified air pressure settings for the air pressure gauges to the railroad pit sump pumps and the pump control valves. In consultations with the pump vendor it was determined that the specified settings were inappropriate, and that a number of variables dictate the optimum speed. Engineering determined that a note in the drawing specifying that the air pressure would be set in the field is more appropriate than specifying a value that is subject to change. This change was made via ECN #W259-148.

**Resolution:** A pen and ink change was made to the OTP deleting steps 8.1.4 and 8.1.5.

---

**Item #:**       **Section #:**       **Step(s):**

**Description:** Step 8.7.1 refers to "2706-T Railroad Pit Sump A Screen." It should refer to "2706-T Railroad Pit Sump Screen".

**Discussion:** This change is considered minor because there is no change to operating hardware or controlling software. It is purely editorial.

**Resolution:** A pen and ink change was made to the OTP to show the correct wording.

---

**Item #:**       **Section #:**       **Step(s):**

**Description:** The second sentence of the first note in Section 8.12 refers to Duplex Pump Reset buttons. These buttons were deleted after the OTP was approved, but prior to performance, and this portion of the note is no longer applicable.

**Discussion:** This change is a minor discrepancy because it does not alter the operating hardware, software or philosophy.

**Resolution:** A pen and ink change was made that deleted the second sentence of the note.

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**Item #:** 10      **Section #:** 8.13      **Step(s):** 8.13.12.1

**Description:** An additional step was required to verify that the emergency stop reset would not allow the air sparger to start without pushing the air sparger start button.

**Discussion:** This change is a minor discrepancy because it does not alter the operating hardware, software or philosophy.

**Resolution:** A pen and ink change was made to the OTP adding step 8.13.12.1. The step reads, "VERIFY Valve HY-02 icon is still blue."

**Item #:** 11      **Section #:** 9.1      **Step(s):** 9.1.1 and 9.1.2

**Description:** Steps 9.1.1 and 9.1.2 require that the speed controllers for Pumps 206 and 207 be set at mid-range. However, the pump vendor determined during a site visit that the mid-range settings are too fast.

**Discussion:** Steps 9.1.1 and 9.1.2 were deleted because they specified a condition that did not meet operating requirements. This change was classified as a minor discrepancy because it does not require a change in the operating hardware, software or philosophy.

**Resolution:** A pen and ink change was made to delete Steps 9.1.1 and 9.1.2.

**Item #:** 12      **Section #:** 9.1      **Step(s):** 9.1.9

**Description:** Step 9.1.9 could not be completed because the required instrument settings were changed after the OTP was approved.

**Discussion:** Step 9.1.9 specified the air pressure setting for the air pressure gauge that controls the speed of the TA Sump pumps. In consultations with the pump vendor it was determined that the specified setting was inappropriate, and that a number of variables dictate the optimum speed. Engineering determined that a note in the drawing specifying that the air pressure would be set in the field is more appropriate than specifying a value that is subject to change. This change was made via ECN #W259-148.

This change was classified as a minor discrepancy because it does not require a change in the operating hardware, software or philosophy.

**Resolution:** A pen and ink change was made to the OTP that deleted Step 9.1.9

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**Item #:** 13      **Section #:** 9.3      **Step(s):** 9.3.18 and 9.3.19

**Description:** Steps 9.3.18 and 9.3.19 refer to Pump 204. They should refer to Pump 206.

**Discussion:** This change was classified as a minor discrepancy because it does not require a change in the operating hardware, software or philosophy.

**Resolution:** A pen and ink change was made to the OTP changing the pump number from 204 to 206.

---

**Item #:** 14      **Section #:** 12.2      **Step(s):** 12.2.50.1

**Description:** Steps 12.2.51 through 12.2.60 cannot be performed unless the tank liquid level is higher than the low level setpoint. The OTP does not specify this requirement.

**Discussion:** This change was classified as a minor discrepancy because it does not require a change in the operating hardware, software or philosophy.

**Resolution:** Added Step 12.2.50.1a to the OTP. The step reads, "ENSURE that the CMSS "LOW LEVEL IN TANK 220" indication is not activated."

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**Item #:** 15      **Section #:** 12.3      **Step(s):** 12.3.50.1

**Description:** Steps 12.2.51 through 12.2.60 cannot be performed unless the tank liquid level is higher than the low level setpoint. The OTP does not specify this requirement.

**Discussion:** This change was classified as a minor discrepancy because it does not require a change in the operating hardware, software or philosophy.

**Resolution:** Added Step 12.3.50.1 to the OTP. The step reads, "ENSURE that the CMSS "LOW LEVEL IN TANK 221" indication is not activated."

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**Item #:** 16      **Section #:** 5.0      **Step(s):**

**Description:** Section 5 is missing the verification signature block.

**Discussion:** This change was classified as a minor discrepancy because it does not require a change in the operating hardware, software or philosophy.

**Resolution:** A pen and ink change was done to add the verification signature block.

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**Item #:** 17      **Section #:** 9.6      **Step(s):** 9.6.1

**Description:** The 2706-TA Sump Screen is inaccurately referred to as the "2706-TA Sump A Screen".

**Discussion:** This change was classified as a minor discrepancy because it does not require a change in the operating hardware, software or philosophy.

**Resolution:** A pen and ink change was made to the document deleting the letter "A".

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**Item #:** 18      **Section #:** 10.1      **Step(s):** 10.1.4

**Description:** Step 10.1.4 could not be completed because the required instrument settings were changed after the OTP was approved.

**Discussion:** Step 10.1.4 specified the air pressure setting for the air pressure gauge that controls the speed of Pump 210. In consultations with the pump vendor it was determined that the specified setting was inappropriate, and that a number of variables dictate the optimum speed. Engineering determined that a note in the drawing specifying that the air pressure would be set in the field is more appropriate than specifying a value that is subject to change. This change was made via ECN #W259-148.

This change was classified as a minor discrepancy because it does not require a change in the operating hardware, software or philosophy.

**Resolution:** A pen and ink change was made to the OTP that deleted Step 10.1.4.

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*Item #:* 19      *Section #:* 11.1      *Step(s):* 11.1.3

*Description:* Step 11.1.3 could not be completed because the required instrument settings were changed after the OTP was approved.

*Discussion:* Step 11.1.3 specified the air pressure setting for the air pressure gauge that controls the speed of Pump 211. In consultations with the pump vendor it was determined that the specified setting was inappropriate, and that a number of variables dictate the optimum speed. Engineering determined that a note in the drawing specifying that the air pressure would be set in the field is more appropriate than specifying a value that is subject to change. This change was made via ECN #W259-148.

This change was classified as a minor discrepancy because it does not require a change in the operating hardware, software or philosophy.

*Resolution:* A pen and ink change was made to the OTP that deleted Step 11.1.3.

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*Item #:* 20      *Section #:* 2.1.11      *Step(s):*

*Description:* Section 2.1.11 contains a requirement to make verification signatures in blue ink.

*Discussion:* Before the advent of color copiers, it was not unusual to require that verification signatures be done in blue ink to distinguish between originals and copies. This requirement is no longer relevant. It is more meaningful to require signatures in indelible ink.

*Resolution:* Do a pen and ink change to Section 2.1.11 that requires signatures to be made in indelible ink.

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***HNF-3610, Rev. 0***



ENGINEERING DATA TRANSMITTAL

DEC 09 1998

2. To: (Receiving Organization) DISTRIBUTION		3. From: (Originating Organization) Treatment Facility Operations/32A00		4. Related EDT No.: 620567	
5. Proj./Prog./Dept./Div.: W-259		6. Design Authority/ Design Agent/Cog. Engr.: D.C. DeRosa		7. Purchase Order No.: N/A	
8. Originator Remarks: This EDT is for approval.				9. Equip./Component No.: N/A	
				10. System/Bldg./Facility: N/A	
11. Receiver Remarks:				12. Major Assm. Dwg. No.: H-2-826574	
11A. Design Baseline Document? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				13. Permit/Permit Application No.: N/A	
				14. Required Response Date: N/A	

15. DATA TRANSMITTED				(F)	(G)	(H)	(I)	
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Designator	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	HNF-3610	N/A	0	Operational Test Procedure for 2706-T Complex Liquid Transfer System	ESQ	1	1	

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D or N/A (see WHG-CM-3-5, Sec. 12.7)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION  
(See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
1	1	Design Authority	R.F. Boolean	12/2/98	T3-28	3		R.J. Nicklas			T3-07
1	1	Design Agent	H.R. Benzel	12/3/98	T3-28	3		A.S. Mortensen			T3-28
1	1	Cog. Eng.	D.C. DeRosa	12/3/98	T3-28	3		S.M. Addleman			T3-28
1	1	Cog. Mgr.	D. Levinskas	12/3/98	T3-28	3		O.D. Berglund			T3-20
1	1	QA	C.A. McNaughton	12/3/98	T3-28	3		S.D. Wolfe			T3-28
1	1	Safety	B.G. Baker	12/3/98	T3-28	3		W.J. Geuther			T3-30
1	1	Env.	C.R. Haas	12/3/98	T3-28	3		C.R. McCollum			T4-55

18. <i>David C. DeRosa</i> Signature of EDT Originator Date		19. N/A Authorized Representative Date for Receiving Organization		20. <i>D. Levinskas</i> Design Authority Cognizant Manager Date		21. DOE APPROVAL (if required) Ctrl. No. N/A <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/comments <input type="checkbox"/> Disapproved w/comments	
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# Operational Test Procedure for 2706-T Complex Liquid Transfer System

**David C. DeRosa**

Waste Management Hanford, Richland, WA 99352  
U.S. Department of Energy Contract DE-AC06-96RL13200

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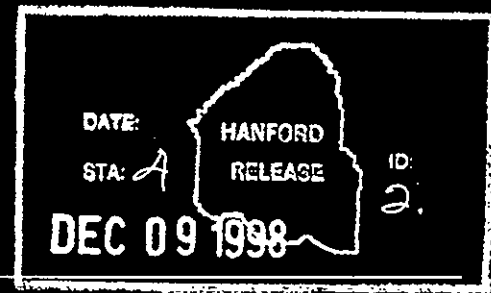
**Key Words:** T Plant, Treatment Facility, 2706-T, Operational Test Procedure, Liquid Transfer System, Instrumentation and Control, System Operation, Interlocks, programmable logic controller

**Abstract:** This Operational Test Procedure is developed to demonstrate that the liquid transfer system installed under Project W-259 function and operate within the bounds of the safety basis, interlocks are activated and perform designed function, and all components within the liquid waste transfer system function as an operable program.

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Date



**Approved for Public Release**

**OPERATIONAL TEST PROCEDURE FOR 2706-T COMPLEX  
LIQUID TRANSFER SYSTEM**

**PRINTED: DECEMBER 8, 1998**

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**2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP****1.0 PURPOSE AND SCOPE****1.1 PURPOSE**

This Operational Test Procedure (OTP) tests the 2706-T liquid waste collection and treatment/storage system to demonstrate that the system components are functional, and that collectively they satisfy the process design criteria defined in the Project W-259 Functional Design Criteria.

**1.2 SCOPE**

This procedure is a complement to the W-259 Acceptance Test Procedure (ATP), HNF-1858. It tests the 2706-T liquid waste collection and treatment/storage system process components in their normal operating configuration. It demonstrates that the process:

- automatically moves liquids from the system sumps to either of two treatment/storage tanks;
- transfers liquids between the two tanks;
- and transfers liquids from each of the tanks through the system discharge valve.

Additionally the procedure demonstrates operation of the tank agitators, air compressor, chemical transfer pump, sump air spargers, safety showers, and filter room hoist.

The following are specifically outside the scope of this document, because they were adequately tested by Project W-259:

- Any component that requires a simulated signal to test. [e.g. sump liner leak detector; pump diaphragm failure, etc.] [Testing documented in ATP HNF-1858]
- The fire prevention system [Testing documented in ATP HNF-SD-W259-ATP-002].
- The ACT-II HVAC System [Testing documented in ATP HNF-1858]
- Facility infrastructure [e.g. light switches, electrical panels, heat pumps, thermostats, etc.]

**2.0 INFORMATION****2.1 TERMS AND DEFINITIONS**

- 2.1.1 **Activated Alarms/Indications** – The terms activated alarm and activated indications refer to the alarm display panel on the CMSS display screens. An activated alarm/indication is characterized by a change in text color and a flashing label. Acknowledging an alarm/indication stops the flashing, but the change in text color is maintained until the alarm/indication condition is cleared.
- 2.1.2 **CMSS** – Acronym for Computer Monitoring System Station. The CMSS is a graphical interface between the programmable logic controller and the operator. There are two CMSSes. CMSS 1 is located in the 2706-TA Electrical Room, and CMSS 2 is located in the Operations Manager Office in MO-433. Use of the term CMSS in this document refers only to CMSS 1, unless otherwise stated.
- 2.1.3 **Cognizant Engineer:** The representative from the Operations Support Engineering organization
- 2.1.4 **ENSURE** – Confirm that an activity or condition has occurred in conformance with specified requirements, or take action to make it so if the activity or condition is NOT found to be in conformance.

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- 2.1.5 **Major Discrepancy** – One of two types of OTP discrepancies. A major discrepancy requires an ECN to change the OTP before the OTP can be completed. The Test Director and the Cognizant Engineer jointly identify major discrepancies. Major discrepancies are sequentially numbered and compiled in a list. The list shall contain an explanation as to why a discrepancy was identified as major. The explanation shall include the number of the ECN that corrects the major discrepancy. The Test Director shall maintain the list. Following completion of the OTP, the list shall be signed and dated by the Test Director and the Cognizant Engineer and attached to the OTP Record Copy.
- 2.1.6 **Minor Discrepancy** – One of two types of OTP discrepancies. The Test Director and the Cognizant Engineer jointly identify minor discrepancies. Minor discrepancies are documented by Pen and Ink changes to the OTP. Minor discrepancies are sequentially numbered and compiled in a list. The list shall contain an explanation as to why a discrepancy was identified as minor. The Test Director shall maintain the list. Following completion of the OTP, the list shall be signed and dated by the Test Director and the Cognizant Engineer and attached to the OTP Record Copy.
- 2.1.7 **Operations Engineer** – The engineering representative from Treatment Facility Operations.
- 2.1.8 **Operator** – Bargaining unit personnel directed by WMH management to support performance of this procedure.
- 2.1.9 **OTP Acceptance/Completion** – The OTP is complete and accepted when the Test Director has signed all of the verification blocks, all discrepancies have been resolved, and the Test Director, Cognizant Engineer, and Operations Representative have signed in the Acceptance blocks in Section 13.0. Signatories shall legibly print or type their name, sign in the signature block and enter the date of signature. All signatures and the date shall be made in indelible ink.
- 2.1.10 **OTP Discrepancies** – Problems with the OTP either in step sequence or system preparation that prevent verification of an aspect of system process. There are two categories of OTP discrepancies, minor and major.
- 2.1.11 **OTP Record Copy** – The OTP Record Copy will be used by the Test Director to record verification signatures and pen and ink changes. ~~Signatures shall be made in blue ink.~~ *4 Q.B. 4/7/99 # 20*  
SIGNATURES SHALL BE MADE IN INDELIBLE INK.
- 2.1.12 **OTP Working Copy** – An OTP copy that the Test Director uses in the field to record his observations and working notes. It is a reference to assist the Test Director in maintaining the OTP Record Copy. OTP working copies are not quality records, and there are no restrictions on the use of OTP working copies.
- 2.1.13 **Pen and Ink changes** – Changes made to the OTP Record Copy to correct minor discrepancies. Pen & Ink changes shall be dated and initiated by the Test Director. Both the date and initials shall be made with indelible ink.
- 2.1.14 **PLC** – Acronym for Programmable Logic Controller.
- 2.1.15 **Test Director** – Shall be interpreted to mean the Test Director or his designated representative. Designation can be given verbally and shall not require documentation. The Manager of Treatment Facility Operations appoints the Test Director.
- 2.1.16 **VERIFY** - Perform a comparison with stated requirements. No manipulation of equipment or other subsequent actions by the checker are involved. Initials or signature are required where verification signature blocks are provided.
- 2.1.17 **Verification Signatures** – A verification signature is made by the Test Director and is placed in the verification block following an OTP section. A verification signature signifies that the Test Director has confirmed that all procedural steps within that OTP section were performed, and that the steps requiring verification were completed successfully. Confirmation can be based on the Test Director's personal observation, consultation with other OTP participants, and/or logical deduction from related actions and results. Documentation of the basis for confirmation is not required.



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A verification signature consists of three parts. First the Test Director must legibly print or type his name in the print name blank; second the Test Director signs or initials in the signature blank; third the Test Director enters the date in the date blank the day he/she signs in the signature blank. The date need not be the same day that the verification was performed. Indelible ink shall be used for all signatures and initials.

**2.2 RESPONSIBILITIES****2.2.1 Test Director – The Test Director shall:**

- direct the performance of the OTP;
- determine in what sequence sections and subsections of the OTP are performed;
- instruct the operators to perform required actions to prepare/implement OTP requirements;
- schedule support resources;
- function as the OTP data recorder;
- sign in the verification blocks following completion of associated verifications;
- sign in the OTP acceptance blank at the end of OTP;
- identify and resolve any discrepancies in the OTP;
- maintain a list of major discrepancies;
- maintain a list of minor discrepancies.

**2.2.2 Treatment Facility Operations Supervision – Treatment Facility Operations Supervision shall:**

- ensure that the liquid collection and treatment/storage system is operated by certified nuclear/chemical operators;
- direct the Nuclear/Chemical Operators in the performance of the OTP as required.

**2.2.3 Nuclear/Chemical Operator (NCO) – The Operator shall manipulate the system components as directed by Operations Supervision, or Operations Engineer.****2.2.4 Cognizant Engineer – The Cognizant Engineer shall:**

- review any OTP discrepancies and in tandem with the Test Director determine if a discrepancy is minor or major;
- sign the final minor discrepancy list at the conclusion of the OTP;
- sign the final major discrepancy list at the conclusion of the OTP;
- prepare engineering change notices to the OTP as required to resolve major discrepancies;
- sign in the OTP acceptance blank at the end of the OTP;
- direct the Nuclear/Chemical Operators in the performance of the OTP as required.

**2.2.5 Operations Engineer – The operations engineer shall:**

- schedule operator support;
- assist in performance of the OTP as requested by the Test Director;
- direct the Nuclear/Chemical Operators in the performance of the OTP as required;
- sign in the OTP acceptance blank at the end of the OTP;
- review and approve engineering change notices to the OTP.

**2.2.6 Quality Systems personnel – The Quality Systems personnel shall:**

- overview the OTP to ensure that it complies with applicable site procedures.

**2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP****2.3 References:**

- 2.3.1 Project Hanford Procedures:
- HNF-PRO-286, "Test Control"
  - HNF-PRO-446, "Testing Requirements"
  - HNF-PRO-572, "Project Acceptance and Closeout"
- 2.3.2 W-259 P&ID Drawings:
- H-2-826550, Sht. 1, Sht. 2, Sht. 3, Sht. 4, Sht. 5 and Sht. 6
  - H-2-826551, Sht 1 and Sht. 2
- 2.3.3 W-259 Instrumentation Binary Logic Diagrams:
- H-2-826574, Sht. 1, Sht. 3, Sht. 4, Sht. 5, Sht. 6, Sht. 7, Sht. 8, Sht. 9, Sht. 10, Sht. 11, Sht. 12, Sht. 13, Sht. 14, Sht. 15, Sht. 16, Sht. 17, Sht. 18, Sht. 19, Sht. 20, Sht. 21 and Sht. 22.

**2.4 General Information**

- 2.4.1 Although the W-259 emergency interlock system collectively consists of emergency stop buttons at the CMSSes, an emergency stop button at Panel I-XX-2706-001, and a flow switch on the fire sprinkler system, only the emergency stop button at CMSS 1 will be used to demonstrate operability of the emergency interlock system. This is permissible because all four signals activate a single coil. Since ATP HNF-1858 adequately tested signal activation of the coil, the OTP need only test that the coil will stop the system pumps, agitators and air spargers during actual liquid transfers.
- 2.4.2 There are two CMSSes. CMSS 1 is located in the 2706-TA Electrical Room, and CMSS 2 is located in the Operations Manager Office in MO-433. The OTP will test the system primarily from CMSS 1, because actions performed at CMSS 1 are mirrored on the CMSS 2. This operational link was adequately demonstrated by ATP HNF-1858.
- 2.4.3 The CMSS has six basic operating screens. Each screen contains a number of active icons, which when selected access subscreens. The subscreens are associated with individual process components. Double clicking on their associated icon wherever the icon appears on a basic screen accesses the subscreens. The basic screens and the methods of access are as follows:
- Overview screen. Accessed by pressing F2 on the keyboard or selecting the overview button on any one of the six basic screens.
  - Tank 220 screen. Accessed by pressing F6 on the keyboard, selecting the Tank 220 button on any one of the six basic screens, or double clicking on the Tank 220 icon on the Overview Screen.
  - Tank 221 screen. Accessed by pressing F7 on the keyboard, selecting the Tank 221 button on any one of the six basic screens, or double clicking on the Tank 221 icon on the Overview Screen.
  - 2706-T railroad Pit Sump A screen. Accessed by pressing F9 on the keyboard, selecting the 2706-T railroad Pit Sump A button on any one of the six basic screens, or double clicking on the 2706-T railroad Pit Sump A icon on the Overview screen.
  - 2706-TA Sump screen. Accessed by pressing F10 on the keyboard, selecting the 2706-TA Sump button on any one of the six basic screens, or double clicking on the 2706-TA Sump icon on the Overview screen.
  - HVAC Sump screen. Accessed by pressing F11 on the keyboard, selecting the HVAC Sump button on any one of the six basic screens, or double clicking on the HVAC Sump icon on the Overview screen.

The OTP only tests manual configuration of the motor operated valves. Although the PLC has the capability to provide automatic valve configuration, WMH has determined that manually configuring

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valves in accordance with approved procedures provides a higher level assurance that the valves will be correctly aligned. Accordingly, the OTP does not test automatic valve configuration.

- 2.4.4 The OTP is designed to be performed in Sections, and need not be performed sequentially. Each Section shall be considered a separate test procedure. Note that if an OTP section verifies an action that is equally applicable to other OTP sections, the Test Director can make verification signatures in those OTP sections without repeating the action in those procedures. Once an action is verified, it does not need to be repeated.
- 2.4.5 Data collected within this procedure is for information purposes only to assist engineering in quantifying system performance. Variations in the data do not effect the ability of the system to function in accordance with Functional Design Criteria.
- 2.4.6 This procedure contains a number of inferred steps that are not precisely defined. For example, a step that reads "ENSURE the CMSS "HIGH LEVEL IN TANK 220" indication is not activated" would require an operator to pump liquids out of Tank 220 if the indication was activated. The decision as to how to pump those liquids shall be made by the Test Director, and the operator will perform the necessary actions at the direction of a WMH representative with supervisory authority.
- 2.4.7 Because of the number of verifications and the relatively short time it takes to empty a sump, it may be necessary to repeat selected OTP steps to complete the verifications. The Test Director shall determine which steps must be repeated. Documenting the repeat steps is not required.

**2.5 Records -**

The final, approved OTP Record Copy will be the only quality record associated with this procedure. The major and minor discrepancy lists will be an attachment to the final approved OTP Record Copy.

**3.0 PRECAUTIONS AND LIMITATIONS**

There are no special precautions or limitations associated with this OTP.

**4.0 PREREQUISITES --**

- 4.1 All 2706-T Complex process systems are in operating configuration with no related lockouts or tag-outs.
- 4.2 System air compressor, #A-HP-2706-250, is started and operating in accordance with Operating Procedure #DO-021-040.
- 4.3 The following normally open air supply Valves are open: A-HP-2706-261, -262, -263, -264, -265, -266, -269, -272, -273, -274, -275, -276, -277, -278, -279, -281, -282, -283, -284, -285, -286, -291, -292, -299, -323, -325, -327, -328, -329, and -330.
- 4.4 The following normally closed air supply Valves are closed: A-HP-2706-26, -287, and -324.
- 4.5 The following process valves are open: T-XX-2706-223, -224, -225, -226, -228, -229, -230, -231, -232, -234, -246 and -247.
- 4.6 The following process valves are closed: T-XX-2706-233, -235, -236, -237, -238, -239, <sup>-242 and -243</sup> *4 QB 12/10/98 #3*
- 4.7 Tools/Equipment:
- 4.7.1 Stop Watch (Calibration is not required.)
- 4.7.2 Radios/phones as required when remote activities are required.
- 4.8 Instrument Calibration: All gauges/instruments used or referenced in this procedure shall be calibrated in accordance with an approved WMH calibration procedure. Where applicable each section shall contain a prerequisite section that identifies gauges/instruments used in that section. Both the number and calibration date shall be recorded.

## 5.0 SYSTEM TREATMENT WITH TRISODIUM PHOSPHATE

**NOTE:** To enhance corrosion resistance in the 2706-T Complex liquid collection and treatment/storage system, liquid containing trisodium phosphate (TSP) will be circulated through the pipes and tanks before any raw water is circulated. Accordingly this procedure will mix a batch of TSP and add it to Tanks 220 and 221 through the Chem Room chemical addition system. After the TSP has sat in the tanks overnight, the remainder of the OTP will be performed in a manner that ensures that the TSP solution has circulated through the selected portions of the system before any raw water is added to that portion.

**NOTE:** The TSP solution will be prepared in accordance with Procedure Number DO-020-055, "Caustic Soda Solution Preparation". The procedure requires Engineering to provide a volume of liquid and an amount of caustic. The volume of liquid shall be approximately 15 gallons, and the amount of TSP shall be approximately 6 pounds. The measures are gross approximations. The weight of TSP shall be measured by scale as stated in DO-020-055. The scale need not have a current calibration.

**NOTE:** The TSP solution will be added to Tanks 220 and 221 in accordance with Procedure Number DO-021-039, "Chemical Addition System Operation", with some exceptions. All references to tank recirculation shall be ignored. The liquids in the tanks cannot be recirculated until the TSP has been added. Also performance of Section 12.5 of this procedure negates the need to use Procedure DO-040-020, "Perform Daily Surveillances of 2706-T Complex" as a prerequisite to Procedure DO-021-039.

### 5.1 Prerequisites:

- 5.1.1 The following procedures are ready for validation:
- DO-020-055, "Caustic Soda Solution Preparation"
  - DO-021-039, "Chemical Addition System Operation"
  - DO-021-040, "2706-T Process Air System Operation"
- 5.1.2 Section 12.4 of this OTP has been performed.
- 5.1.3 Section 12.5 of this OTP has been performed.

**CAUTION:** The Chem Room Hose Bibb shall not be used for this procedure, unless it has been relocated from its position adjacent to the electrical disconnect on the northwest wall of the Chem Room.

### 5.2 Add TSP Solution to Tank 220

- 5.2.1 Add approximately 4 pounds of TSP to approximately 10 gallons of liquid in accordance with Procedure Number DO-020-055.
- 5.2.2 Add the TSP solution prepared in Step 5.2.1 to Tank 220 in accordance with Procedure Number DO-021-039.

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5.3 Add TSP Solution to Tank 221

- 5.3.1 Add approximately 2 pounds of TSP to approximately 5 gallons of liquid in accordance with Procedure Number DO-020-055.
- 5.3.2 Add the TSP solution prepared in Step 5.3.1 to Tank <sup>220</sup>221 in accordance with Procedure Number DO-021-039.

AQB 12/10/98 #1

Verification signature HENRY R. BENZEL / A. R. Benzel / 12/10/98 # 16  
PRINT NAME SIGNATURE/INITIALS DATE

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## 6.0 OVERVIEW CMSS SCREEN TEST

**NOTE:** Sections 6.0 through 6.17 demonstrate that the overview screen icons are functional. Additionally it demonstrates that status indicators for the pumps and motor operated valves are functional.

### 6.1 Test Screen Icons

- 6.1.1 SELECT the HVAC Sump icon on the Overview screen.
- 6.1.2 VERIFY that the HVAC Sump screen is displayed on the CMSS monitor. *4QB, 12/14/98 #2*
- 6.1.3 RETURN to the Overview screen, and SELECT 2706-T Railroad Pit Sump ~~X~~.
- 6.1.4 VERIFY that the 2706-T Railroad Pit Sump ~~X~~ screen is displayed on the CMSS monitor. *#QB 12/14/98*
- 6.1.5 RETURN to the Overview screen, and SELECT the 2706-TA Sump.
- 6.1.6 VERIFY that the 2706-TA Sump screen is displayed on the CMSS monitor.
- 6.1.7 RETURN to the Overview screen, and SELECT Tank 220.
- 6.1.8 VERIFY that Tank 220 screen is displayed on the CMSS monitor.
- 6.1.9 RETURN to the Overview screen, and SELECT Tank 221.
- 6.1.10 VERIFY that the Tank 221 screen is displayed on the CMSS monitor.

Verification Signature: HENRY R. BENZEL / *H. R. Benzel* / 12/14/98  
PRINT NAME SIGNATURE/INITIALS DATE

### 6.2 Test Pump 203 Subscreen Control

- 6.2.1 RETURN to the Overview screen, and SELECT the Pump 203 icon.
- 6.2.2 VERIFY that the Pump 203 subscreen appears on the CMSS monitor.
- 6.2.3 SELECT "AUTO".
- 6.2.4 VERIFY that the word "AUTO" appears in the status box.
- 6.2.5 SELECT "MANUAL".
- 6.2.6 VERIFY that the word "MANUAL" appears in the status box.
- 6.2.7 SELECT "START".
- 6.2.8 VERIFY that the pump status indicator "ON" is white, and "OFF" is blue.
- 6.2.9 SELECT "STOP".
- 6.2.10 VERIFY that the pump status indicator "ON" is blue, and "OFF" is white.

Verification Signature: HENRY R. BENZEL / *H. R. Benzel* / 12/14/98  
PRINT NAME SIGNATURE/INITIALS DATE

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**6.3 Test Pump 204 Subscreen Control**

- 6.3.1 CLOSE the subscreen, and SELECT the Pump 204 icon.
- 6.3.2 VERIFY that the Pump 204 subscreen appears on the CMSS monitor.
- 6.3.3 SELECT "AUTO".
- 6.3.4 VERIFY that the word "AUTO" appears in the status box.
- 6.3.5 SELECT "MANUAL".
- 6.3.6 VERIFY that the word "MANUAL" appears in the status box.
- 6.3.7 SELECT "START".
- 6.3.8 VERIFY that the pump status indicator "ON" is white, and "OFF" is blue.
- 6.3.9 SELECT "STOP".

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PRINT NAME SIGNATURE/INITIALS DATE

**6.4 Test Pump 206 Subscreen Control**

- 6.4.1 CLOSE the subscreen, and SELECT the Pump 206 icon.
- 6.4.2 VERIFY that the Pump 206 subscreen appears on the CMSS monitor.
- 6.4.3 SELECT "AUTO".
- 6.4.4 VERIFY that the word "AUTO" appears in the status box.
- 6.4.5 SELECT "MANUAL".
- 6.4.6 VERIFY that the word "MANUAL" appears in the status box.
- 6.4.7 OPEN Valve HV-05 in the manual mode.
- 6.4.8 SELECT "START".
- 6.4.9 VERIFY that the pump status indicator "ON" is white, and "OFF" is blue.
- 6.4.10 SELECT "STOP".
- 6.4.11 VERIFY that the pump status indicator "ON" is blue, and "OFF" is white.

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**6.5 Test Pump 207 Subscreen Control**

- 6.5.1 CLOSE the subscreen, and SELECT the Pump 207 icon.
- 6.5.2 VERIFY that the Pump 207 subscreen appears on the CMSS monitor.
- 6.5.3 SELECT "AUTO".
- 6.5.4 VERIFY that the word "AUTO" appears in the status box.
- 6.5.5 SELECT "MANUAL".

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- 6.5.6 VERIFY that the word "MANUAL" appears in the status box.
- 6.5.7 OPEN Valve HV-05 in the manual mode.
- 6.5.8 SELECT "START".
- 6.5.9 VERIFY that the pump status indicator "ON" is white, and "OFF" is blue.
- 6.5.10 SELECT "STOP".
- 6.5.11 VERIFY that the pump status indicator "ON" is blue, and "OFF" is white.

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**NOTE:** Multiple valve configuration interlocks prevent testing of Pump 210 operation in Section 6.6. Its function will be tested in later sections.

**6.6 Test Pump 210 Subscreen Control**

- 6.6.1 CLOSE the subscreen, and SELECT the Pump 210 icon.
- 6.6.2 VERIFY that the Pump 210 subscreen appears on the CMSS monitor.

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**NOTE:** Multiple valve configuration interlocks prevent testing of Pump 211 operation in Section 6.7. Its function will be tested in later sections.

**6.7 Test Pump 211 Subscreen Control**

- 6.7.1 CLOSE the subscreen, and SELECT the Pump 211 icon.
- 6.7.2 VERIFY that the Pump 211 subscreen appears on the CMSS monitor.

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**6.8 Test Pump 216 Subscreen Control**

- 6.8.1 CLOSE the subscreen, and SELECT the Pump 216 icon.
- 6.8.2 ENSURE that Pump 216 is unplugged.
- 6.8.3 VERIFY that the Pump 216 subscreen appears on the CMSS monitor.
- 6.8.4 SELECT "AUTO".
- 6.8.5 VERIFY that the word "AUTO" appears in the status box.
- 6.8.6 SELECT "MANUAL".
- 6.8.7 VERIFY that the word "MANUAL" appears in the status box.
- 6.8.8 SELECT "START".
- 6.8.9 VERIFY that the pump status indicator "ON" is white, and "OFF" is blue.



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6.8.10 SELECT "STOP".

6.8.11 VERIFY that the pump status indicator "ON" is blue, and "OFF" is white.

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### 6.9 Test Valve HV-01 Subscreen Control

6.9.1 CLOSE the subscreen, and SELECT the Valve HV-01 icon.

6.9.2 VERIFY that the Valve HV-01 subscreen appears on the CMSS monitor.

6.9.3 SELECT "OPEN".

6.9.4 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.

6.9.5 SELECT "CLOSE".

6.9.6 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.

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### 6.10 Test Valve HV-02 Subscreen Control

6.10.1 CLOSE the subscreen, and SELECT the VALVE HV-02 icon.

6.10.2 VERIFY that the Valve HV-02 subscreen appears on the CMSS monitor.

6.10.3 SELECT "AUTO".

6.10.4 VERIFY that the word "AUTO" appears in the status box.

6.10.5 SELECT "MANUAL".

6.10.6 VERIFY that the word "MANUAL" appears in the status box.

6.10.7 SELECT "OPEN".

6.10.8 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.

6.10.9 SELECT "CLOSE".

6.10.10 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.

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### 6.11 Test Valve HV-03 Subscreen Control

6.11.1 CLOSE the subscreen, and SELECT the VALVE HV-03 icon.

6.11.2 VERIFY that the VALVE HV-03 subscreen appears on the CMSS monitor.

6.11.3 SELECT "AUTO".

6.11.4 VERIFY that the word "AUTO" appears in the status box.

6.11.5 SELECT "MANUAL".

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- 6.11.6 VERIFY that the word "MANUAL" appears in the status box.
- 6.11.7 SELECT "OPEN".
- 6.11.8 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.11.9 SELECT "CLOSE".
- 6.11.10 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.

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**6.12 Test Valve HV-04 Subscreen Control**

- 6.12.1 CLOSE the subscreen, and SELECT the VALVE HV-04 icon.
- 6.12.2 VERIFY that the VALVE HV-04 subscreen appears on the CMSS monitor.
- 6.12.3 SELECT "AUTO".
- 6.12.4 VERIFY that the word "AUTO" appears in the status box.
- 6.12.5 SELECT "MANUAL".
- 6.12.6 VERIFY that the word "MANUAL" appears in the status box.
- 6.12.7 SELECT "OPEN".
- 6.12.8 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.12.9 SELECT "CLOSE".
- 6.12.10 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.

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**6.13 Test Valve HV-05 Subscreen Control**

- 6.13.1 CLOSE the subscreen, and SELECT the VALVE HV-05 icon.
- 6.13.2 VERIFY that the VALVE HV-05 subscreen appears on the CMSS monitor.
- 6.13.3 SELECT "AUTO".
- 6.13.4 VERIFY that the word "AUTO" appears in the status box.
- 6.13.5 SELECT "MANUAL".
- 6.13.6 VERIFY that the word "MANUAL" appears in the status box.
- 6.13.7 SELECT "OPEN".
- 6.13.8 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.13.9 SELECT "CLOSE".
- 6.13.10 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.

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**6.14 Test Valve HV-06 Subscreen Control**

- 6.14.1 CLOSE the subscreen, and SELECT the VALVE HV-06 icon.
- 6.14.2 VERIFY that the VALVE HV-06 subscreen appears on the CMSS monitor.
- 6.14.3 SELECT "AUTO".
- 6.14.4 VERIFY that the word "AUTO" appears in the status box.
- 6.14.5 SELECT "MANUAL".
- 6.14.6 VERIFY that the word "MANUAL" appears in the status box.
- 6.14.7 SELECT "OPEN".
- 6.14.8 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.14.9 SELECT "CLOSE".
- 6.14.10 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.

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**6.15 Test Valve HV-07 Subscreen Control**

- 6.15.1 CLOSE the subscreen, and SELECT the VALVE HV-07 icon.
- 6.15.2 VERIFY that the VALVE HV-07 subscreen appears on the CMSS monitor.
- 6.15.3 SELECT "AUTO".
- 6.15.4 VERIFY that the word "AUTO" appears in the status box.
- 6.15.5 SELECT "MANUAL".
- 6.15.6 VERIFY that the word "MANUAL" appears in the status box.
- 6.15.7 SELECT "OPEN".
- 6.15.8 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.
- 6.15.9 SELECT "CLOSE".
- 6.15.10 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.

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**6.16 Test Valve HV-08 Subscreen Control**

- 6.16.1 CLOSE the subscreen, and SELECT the VALVE HV-08 icon.
- 6.16.2 VERIFY that the VALVE HV-08 subscreen appears on the CMSS monitor.
- 6.16.3 SELECT "AUTO".
- 6.16.4 VERIFY that the word "AUTO" appears in the status box.
- 6.16.5 SELECT "MANUAL".
- 6.16.6 VERIFY that the word "MANUAL" appears in the status box.
- 6.16.7 SELECT "OPEN".

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6.16.8 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.

6.16.9 SELECT "CLOSE".

6.16.10 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.

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### 6.17 Test Valve HV-09 Subscreen Control

6.17.1 CLOSE the subscreen, and SELECT the VALVE HV-09 icon.

6.17.2 VERIFY that the VALVE HV-09 subscreen appears on the CMSS monitor.

6.17.3 SELECT "AUTO".

6.17.4 VERIFY that the word "AUTO" appears in the status box.

6.17.5 SELECT "MANUAL".

6.17.6 VERIFY that the word "MANUAL" appears in the status box.

6.17.7 SELECT "OPEN".

6.17.8 VERIFY that the valve status indicator "OPEN" is white, and "CLOSED" is blue.

6.17.9 SELECT "CLOSE".

6.17.10 VERIFY that the valve status indicator "OPEN" is blue, and "CLOSED" is white.

6.17.11 CLOSE the subscreen.

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## 7.0 HVAC SUMP CMSS SCREEN TEST

**NOTE:** The HVAC Sump CMSS Screen Test demonstrates that Pump 216 is functional in the automatic, manual, and local switch controlled modes. Additionally it demonstrates that the liquid level indications and emergency interlocks are functional.

### 7.1 Prerequisites:

7.1.1 Liquid Level Transmitter #I-XX-2706-LT-04 is calibrated: 1-19-99  
Calibration date

### 7.2 Test HVAC Sump Level Transmitter

- 7.2.1 ENSURE that the CMSS is displaying the 2706-TA HVAC Sump screen
- 7.2.2 ENSURE that liquid level in the HVAC Sump is at or below the low liquid level cutoff.
- 7.2.3 VERIFY that the CMSS "LOW LEVEL IN SUMP" indication in the sump is activated.
- 7.2.4 ENSURE Pump 216 is in CMSS manual mode.
- 7.2.5 START filling the HVAC Sump with liquid.
- 7.2.6 VERIFY that the CMSS HVAC Sump icon shows a rising liquid level.
- 7.2.7 VERIFY that the CMSS "SUMP LEVEL" gallon indicator value increases with the rising liquid level.
- 7.2.8 RECORD the approximate liquid volume when the CMSS "LOW LEVEL IN SUMP" indicator is no longer activated: 10 gallons.
- 7.2.9 RECORD the approximate liquid volume when the CMSS "HIGH LEVEL IN SUMP" indicator is activated: 50 gallons.
- 7.2.10 STOP filling the HVAC Sump with liquid after the CMSS "HIGH-HIGH LEVEL IN SUMP" indicator is activated.
- 7.2.11 RECORD the approximate liquid volume when the CMSS "HIGH-HIGH LEVEL IN SUMP" alarm is activated: 64 gallons.
- 7.2.12 ADD approximately two tablespoons of Tri-Sodium Phosphate to the liquid in the sump.
- 7.2.13 WAIT approximately 10 minutes before pumping liquid out of the HVAC Sump.

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### 7.3 Test HVAC Sump Pump 216 in CMSS Manual Mode.

- 7.3.1 ENSURE that Pump 216 is plugged in.
- 7.3.2 VERIFY that the Pump 216 icon on the Overview screen is blue.
- 7.3.3 VERIFY that the Pump 216 icon on the 2706-TA HVAC Sump screen is blue.
- 7.3.4 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication is activated.

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- 7.3.5 ENSURE Pump 216 is in CMSS manual mode.
- 7.3.6 SELECT the manual "START" button on the Pump 216 pump control subscreen.
- 7.3.7 VERIFY that the Pump 216 icon on the CMSS Overview screen is white.
- 7.3.8 VERIFY that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is white.
- 7.3.9 VERIFY that the CMSS HVAC Sump icon shows a falling liquid level.
- 7.3.10 VERIFY that the CMSS "SUMP LEVEL" gallon indicator value decreases with the falling liquid level.

**NOTE:** Steps 7.3.11 and 7.3.13 demonstrate that the low liquid level interlock stops Pump 216 in the manual mode.

- 7.3.11 <sup>7.3.11 A.R.B. 1/25/99 #6</sup> VERIFY that the Pump 216 icon on the CMSS Overview screen is blue, AFTER the CMSS "LOW LEVEL IN SUMP" indication is activated.
- 7.3.12 RECORD the approximate time lapse from when the "HIGH LEVEL IN SUMP" indication is deactivated and the "LOW LEVEL IN SUMP" is activated: 150 seconds.
- 7.3.13 VERIFY that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is blue, AFTER the CMSS "LOW LEVEL IN SUMP" indication is activated.

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**7.4 Test HVAC Sump Pump 216 in Local Manual Mode**

- 7.4.1 ENSURE that Pump 216 is plugged in.
- 7.4.2 VERIFY that the Pump 216 icon on the CMSS Overview screen is blue.
- 7.4.3 VERIFY that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is blue.
- 7.4.4 ENSURE that the "LOW-LEVEL IN SUMP" indicator is not activated.

**NOTE:** The local manual mode is activated by pushing the button on the Pump 216 controller box located on the wall adjacent to the HVAC Sump. The push button bypasses the CMSS "LOW LEVEL IN SUMP" interlock. Since operating a centrifugal pump without liquid is hard on the pump, the pump should not be run if the CMSS "LOW LEVEL IN SUMP" indication is activated.

- 7.4.5 PUSH and HOLD the local manual start button on the side of the Pump 216 controller box.
- 7.4.6 Visually VERIFY that the HVAC Sump shows a falling liquid level.
- 7.4.7 RELEASE the local manual start button before the CMSS "LOW LEVEL IN SUMP" indication is activated.

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**7.5 Test HVAC Sump Pump 216 in CMSS Automatic Mode**

- 7.5.1 ENSURE that Pump 216 is plugged in.
- 7.5.2 VERIFY that the Pump 216 icon on the CMSS Overview screen is blue.
- 7.5.3 VERIFY that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is blue.
- 7.5.4 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indicator is not activated.
- 7.5.5 SELECT automatic mode on the Pump 216 subscreen.
- 7.5.6 START filling the sump with liquid.

**NOTE:** Steps 7.5.7 and 7.5.9 demonstrate that the high liquid level interlock starts Pump 216 in the automatic mode.

- 7.5.7 VERIFY that the Pump 216 icon on the CMSS Overview screen is white, AFTER the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 7.5.8 STOP filling the sump with liquid, AFTER the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 7.5.9 VERIFY that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is white, CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 7.5.10 VERIFY that the CMSS HVAC Sump icon shows a falling liquid level.
- 7.5.11 VERIFY that the CMSS "SUMP LEVEL" gallon indicator value decreases with the falling liquid level.

**NOTE:** Steps 7.5.12 and 7.5.13 demonstrate that the low liquid level interlock stops Pump 216 in the automatic mode.

- 7.5.12 VERIFY that the Pump 216 icon on the CMSS Overview screen is blue, AFTER the CMSS "LOW LEVEL IN SUMP" indication is activated.
- 7.5.13 VERIFY that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is blue, AFTER the CMSS "LOW LEVEL IN SUMP" indication is activated.

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**7.6 Test Emergency Interlocks on HVAC Sump Pump 216**

- 7.6.1 ENSURE that Pump 216 is plugged in.
- 7.6.2 ENSURE Pump 216 is in the manual mode.
- 7.6.3 FILL the sump with liquid, UNTIL the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 7.6.4 VERIFY that the Pump 216 icon on the CMSS Overview screen is blue.
- 7.6.5 VERIFY that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is blue.
- 7.6.6 SELECT the "EMERGENCY STOP" button on a CMSS screen.

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**NOTE:** Steps 7.6.7 through 7.6.10 demonstrate that Pump 216 will not start in manual mode when the emergency stop interlock is activated.

- 7.6.7 **START** Pump 216 in the manual mode.
- 7.6.8 **VERIFY** that the Pump 216 icon on the CMSS Overview screen is still blue.
- 7.6.9 **VERIFY** that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is still blue.
- 7.6.10 **VERIFY** that the "SUMP LEVEL" gallon indicator does not show a falling liquid level.

**NOTE:** Steps 7.6.11 through 7.6.15 demonstrate that Pump 216 will not start in automatic mode when the emergency stop interlock is activated.

- 7.6.11 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 7.6.12 **ENSURE** that Pump 216 is in the automatic mode.
- 7.6.13 **VERIFY** that the Pump 216 icon on the CMSS Overview screen is still blue.
- 7.6.14 **VERIFY** that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is still blue.
- 7.6.15 **VERIFY** that the CMSS "SUMP LEVEL" gallon indicator does not show a falling liquid level.

**NOTE:** the Emergency Stop Interlock does not effect The Pump 216 local control pushbutton. Also the CMSS will not reflect that the pump is operating. Steps 7.6.16 through 7.6.20 demonstrate this anomaly.

- 7.6.16 **PUSH** the Pump 216 local control pushbutton.
- 7.6.17 **VERIFY** that the Pump 216 icon on the CMSS Overview screen is still blue.
- 7.6.18 **VERIFY** that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is still blue.
- 7.6.19 **VERIFY** that the CMSS "SUMP LEVEL" gallon indicator shows a falling liquid level.
- 7.6.20 **RELEASE** Pump 216 local control pushbutton.
- 7.6.21 **SELECT** the (emergency stop) "RESET" button.

**NOTE:** Steps 7.6.22 through 7.6.32 demonstrate that the Emergency Stop Interlock will stop Pump 216 when it is running in the automatic mode.

- 7.6.22 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 7.6.23 **ENSURE** that Pump 216 is in automatic mode.
- 7.6.24 **VERIFY** that the Pump 216 icon on the CMSS Overview screen is white.
- 7.6.25 **VERIFY** that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is white.
- 7.6.26 **VERIFY** that the CMSS "SUMP LEVEL" gallon indicator shows a falling liquid level.
- 7.6.27 **SELECT** the "EMERGENCY STOP" button on a CMSS screen.
- 7.6.28 **VERIFY** that the Pump 216 icon on the CMSS Overview screen is blue.
- 7.6.29 **VERIFY** that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is blue.
- 7.6.30 **VERIFY** that the CMSS "SUMP LEVEL" gallon indicator does not show a falling liquid level.
- 7.6.31 **SELECT** the (emergency stop) "RESET" button.
- 7.6.32 **VERIFY** that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is still blue.



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**NOTE:** Steps 7.6.33 through 7.6.44 demonstrate that the emergency stop interlock will stop Pump 216 when it is running in the manual mode.

- 7.6.33 ENSURE that the CMSS "LOW LEVEL IN SUMP" indication is not activated.
- 7.6.34 START Pump 216 in the manual mode.
- 7.6.35 VERIFY that the Pump 216 icon on the CMSS Overview screen is white.
- 7.6.36 VERIFY that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is white.
- 7.6.37 VERIFY that the "SUMP LEVEL" gallon indicator shows a falling liquid level.
- 7.6.38 SELECT the "EMERGENCY STOP" button on a CMSS screen.
- 7.6.39 VERIFY that the Pump 216 icon on the CMSS Overview screen is blue.
- 7.6.40 VERIFY that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is blue.
- 7.6.41 VERIFY that the "SUMP LEVEL" gallon indicator does not show a falling liquid level.
- 7.6.42 VERIFY that the Pump 216 icon is blue.
- 7.6.43 SELECT the (emergency stop) "RESET" button.
- 7.6.44 VERIFY that the Pump 216 icon on the CMSS 2706-TA HVAC Sump screen is still blue.
- 7.6.45 START Pump 216 in the manual mode.
- 7.6.46 PLACE pump 216 in automatic mode, AFTER the CMSS "LOW LEVEL IN SUMP" indication is activated.

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**8.0 2706-T RAILROAD PIT SUMP CMSS SCREEN TEST**

NOTE: The 2706-T Railroad Pit Sump Screen Test demonstrates that the system components, alarms, gauges and controls that are within the scope of the OTP and also appear on the CMSS 2706-T Railroad Pit Sump Screen are functional. Significant components include Pumps 203 and 204, an air sparger, and a liquid level transmitter. Each pump will be tested in the automatic, manual and duplex modes.

**8.1 Prerequisites:**

8.1.1 Liquid Level Transmitter #1-XX-2706-LT-02 is calibrated: 1-18-99  
Calibration date

8.1.2 Air Pressure Gauge #A-HP-2706-PDI-319 is calibrated: FACTORY  
Calibration date

8.1.3 Air Pressure Gauge #A-HP-2706-PDI-320 is calibrated: FACTORY  
Calibration date

8.1.4 Air Pressure Gauge #A-HP-2706-PDI-319 reads approximately 50 psi. *A.Q.B. 2/1/99 #7*

8.1.5 Air Pressure Gauge #A-HP-2706-PDI-320 reads approximately 40 psi.

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**8.2 Test 2706-T Railroad Pit Sump Level Transmitter**

- 8.2.1 ENSURE that liquid level in the 2706-T Railroad Pit Sump is at or below the low-low liquid level cutoff.
- 8.2.2 VERIFY that the CMSS "LOW-LOW LEVEL IN SUMP" indication is activated.
- 8.2.3 VERIFY that the CMSS "LOW LEVEL IN SUMP" indication is activated.
- 8.2.4 ENSURE Pump 203 is in the manual mode.
- 8.2.5 ENSURE Pump 204 is in the manual mode.
- 8.2.6 START filling the 2706-T Railroad Pit Sump with liquid.
- 8.2.7 VERIFY that the CMSS 2706-T Railroad Pit Sump icon shows a rising liquid level.
- 8.2.8 VERIFY that the CMSS "SUMP LEVEL" gallon indicator value increases with the rising liquid level.
- 8.2.9 RECORD the approximate liquid volume when the CMSS "LOW-LOW LEVEL IN SUMP" indication is no longer activated: 26 gallons.
- 8.2.10 RECORD the approximate liquid volume when the CMSS "LOW LEVEL IN SUMP" indication is no longer activated: 38 gallons.
- 8.2.11 RECORD the approximate liquid volume when the CMSS "HIGH LEVEL IN SUMP" indication is activated: 80 gallons.
- 8.2.12 STOP filling the 2706-T Railroad Pit Sump with liquid after the CMSS "HIGH-HIGH LEVEL IN SUMP" indication is activated.
- 8.2.13 RECORD the approximate liquid volume when the CMSS "HIGH-HIGH LEVEL IN SUMP" alarm is activated: 105 gallons.

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NOTE: Section 8.3 fills liquid filters T-XX-2706-208-FILTER A and -209-FILTER B with liquid in preparation for OTP activities that require pumping through the 2706-TA Sump. It necessary to slowly fill them through a partially open valve to avoid damaging the filter media.

8.3 Prepare Liquid Filters for Test

8.3.1 Prerequisite:

8.3.1.1. Pressure Transmitter #I-XX-2706-PDI/PDSH-208 is calibrated: \_\_\_\_\_ Calibration date

8.3.1.2. Pressure Transmitter #I-XX-2706-PDI/PDSH-209 is calibrated: \_\_\_\_\_ Calibration date

8.3.2 ENSURE that the CMSS "HIGH LEVEL IN TANK 220" indication is not activated.

8.3.3 ENSURE that Valve HV-05 is open.

8.3.4 ENSURE that Valve HV-04 is closed.

8.3.5 ENSURE that Valve HV-08 is closed

8.3.6 ENSURE that the 2706-TA Sump "HIGH LEVEL IN SUMP" indication is activated.

8.3.7 CLOSE Valve T-XX-2706-229.

8.3.8 START Pump 206 in manual mode.

8.3.9 Partially OPEN Valve T-XX-2706-229, UNTIL there is a steady flow into the filter.

8.3.10 CONTINUE to fill the filter, UNTIL the Tank 220 volume gauge begins to record an increase in volume.

8.3.11 RECORD the differential pressure reading on pressure gauge #I-XX-2706-PDI/PDSH-208: \_\_\_\_\_

8.3.12 STOP Pump 206.

8.3.13 CLOSE Valve T-XX-2706-229

8.3.14 Slowly OPEN the balancing valve between Filter A and Filter B.

8.3.15 WAIT approximately two minutes and CLOSE the balancing valve.

NOTE: Switching from Filter A to Filter B is done by moving the mechanical actuator that simultaneously operates valves T-XX-2706-232, -233, -234 and -235.

8.3.16 MOVE the mechanical actuator so that valves T-XX-2706-232 and -234 close, and T-XX-2706-233 and -235 open.

8.3.17 START Pump 206 in manual mode.

8.3.18 Partially OPEN Valve T-XX-2706-229, UNTIL there is a steady flow into the filter.

8.3.19 CONTINUE to fill the filter, UNTIL the Tank 220 volume gauge begins to record an increase in volume.

8.3.20 RECORD the differential pressure reading on pressure gauge #I-XX-2706-PDI/PDSH-209: \_\_\_\_\_

8.3.21 STOP Pump 206.

8.3.22 OPEN Valve T-XX-2706-229.

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## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

NOTE: Section 8.4 demonstrates that Pump 203 is functional in the manual mode.

**8.4 Test Pump 203 in the manual mode:**

- 8.4.1 ENSURE Pump 203 is in the manual mode.
- 8.4.2 ENSURE Pump 204 is in the manual mode.

NOTE: A high liquid level in the 2706-TA Sump will prevent Pump 203 from starting.

- 8.4.3 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-TA Sump is not activated.
- 8.4.4 VERIFY that the Pump 203 icon on the CMSS Overview screen is blue.
- 8.4.5 VERIFY that the Pump 203 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.
- 8.4.6 VERIFY that the "on" pump status indicator on the Pump 203 control subscreen is blue.
- 8.4.7 VERIFY that the "off" pump status indicator on the Pump 203 control subscreen is white.
- 8.4.8 ENSURE that the 2706-T Railroad Pit Sump CMSS "HIGH LEVEL IN SUMP" indication is activated
- 8.4.9 SELECT the "START" button on the Pump 203 subscreen.

NOTE: Steps 8.4.10 through 8.4.13 demonstrate that the various Pump 203 on/off status indicators are functional. Where other OTP tests require verification of Pump 203 on/off status, only one of the indicators need to be verified to demonstrate the Pump 203 on/off status.

- 8.4.10 VERIFY that the Pump 203 icon on the CMSS Overview screen is white.
- 8.4.11 VERIFY that the Pump 203 icon on the CMSS 2706-T Railroad Pit Sump screen is white.
- 8.4.12 VERIFY that the "on" pump status indicator on the CMSS Pump 203 control subscreen is white.
- 8.4.13 VERIFY that the "off" pump status indicator on the CMSS Pump 203 control subscreen is blue.
- 8.4.14 VERIFY that the CMSS 2706-T Railroad Pit Sump icon shows a falling liquid level.
- 8.4.15 SELECT the "STOP" button on the CMSS Pump 203 subscreen, AFTER the 2706-T Railroad Pit Sump CMSS "LOW LEVEL IN SUMP" indication is activated.
- 8.4.16 RECORD the approximate time lapse from when the "HIGH LEVEL IN SUMP" indication is deactivated and the "LOW LEVEL IN SUMP" is activated: 50.94 seconds.
- 8.4.17 VERIFY that the Pump 203 icon on the CMSS Overview screen is blue.
- 8.4.18 VERIFY that the Pump 203 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.
- 8.4.19 VERIFY that the "on" pump status indicator on the Pump 203 control subscreen is blue.
- 8.4.20 VERIFY that the "off" pump status indicator on the Pump 203 control subscreen is white.

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**8.5 Test Pump 204 in the manual mode:**

- 8.5.1 ENSURE Pump 203 is in the manual mode.
- 8.5.2 ENSURE Pump 204 is in the manual mode.

**NOTE:** A high liquid level in the 2706-TA Sump will prevent Pump 204 from starting.

- 8.5.3 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-TA Sump is not activated.
- 8.5.4 VERIFY that the Pump-204 icon on the CMSS Overview screen is blue.
- 8.5.5 VERIFY that the Pump 204 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.
- 8.5.6 VERIFY that the "on" pump status indicator on the CMSS Pump 204 control subscreen is blue.
- 8.5.7 VERIFY that the "off" pump status indicator on the CMSS Pump 204 control subscreen is white.
- 8.5.8 ENSURE that the 2706-T Railroad Pit Sump CMSS "LOW-LEVEL IN SUMP" indication is not activated
- 8.5.9 SELECT the "START" button on the Pump 204 subscreen.

**NOTE:** Steps 8.5.10 through 8.5.13 demonstrate that the various Pump 204 on/off status indicators are functional. Where other OTP tests require verification of Pump 204 on/off status, only one of the indicators need to be verified to demonstrate the Pump 204 on/off status.

- 8.5.10 VERIFY that the Pump 204 icon on the CMSS Overview screen is white.
- 8.5.11 VERIFY that the Pump 204 icon on the CMSS 2706-T Railroad Pit Sump screen is white.
- 8.5.12 VERIFY that the "on" pump status indicator on the CMSS Pump 204 control subscreen is white.
- 8.5.13 VERIFY that the "off" pump status indicator on the CMSS Pump 204 control subscreen is blue.
- 8.5.14 VERIFY that the CMSS 2706-T Railroad Pit Sump shows a falling liquid level.
- 8.5.15 SELECT the "STOP" button on the CMSS Pump 204 subscreen.
- 8.5.16 VERIFY that the Pump 204 icon on the CMSS Overview screen is blue.
- 8.5.17 VERIFY that the Pump 204 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.
- 8.5.18 VERIFY that the "on" pump status indicator on the CMSS Pump 204 control subscreen is blue.
- 8.5.19 VERIFY that the "off" pump status indicator on the CMSS Pump 204 control subscreen is white.

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## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

**NOTE:** Section 8.6 demonstrates that the Railroad Pit Sump Air Sparger is functional in the manual mode.

### 8.6 Test the Railroad Pit Sump Air Sparger in the manual mode:

- 8.6.1 ENSURE that the CMSS is displaying the 2706-T Railroad Pit Sump screen.  
8.6.2 ENSURE the Railroad Pit Sump Air Sparger is in manual mode.

**NOTE:** Valve HY-02 operates the Railroad Pit Sump Air Sparger.

- 8.6.3 VERIFY the CMSS Valve HY-02 icon is blue.  
8.6.4 SELECT "START" on the CMSS 2706-T Railroad Pit Sump screen  
8.6.5 VERIFY that the CMSS Valve HY-02 icon is white.  
8.6.6 SELECT "STOP" on the CMSS 2706-T Railroad Pit Sump screen.  
8.6.7 VERIFY that the CMSS Valve HY-02 icon is blue.

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**NOTE:** Section 8.7 demonstrates that Pump 203 and the Railroad Pit Sump Air Sparger are functional in the automatic mode, and are controlled by the liquid level transmitter. The Railroad Pit Sump Air Sparger is controlled by Valve A-HP-2706-HY-02.

### 8.7 Test Pump 203 and the Railroad Pit Sump Air Sparger in automatic mode:

- 8.7.1 ENSURE that the CMSS is displaying the 2706-T Railroad Pit Sump ~~X~~ Screen.

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**NOTE:** A high liquid level in the 2706-TA Sump will prevent Pump 203 from starting.

- 8.7.2 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-TA Sump is not activated.  
8.7.3 VERIFY that the Pump 203 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.  
8.7.4 VERIFY that the Pump 204 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.  
8.7.5 VERIFY that the Valve HY-02 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.  
8.7.6 ENSURE that the 2706-T Railroad Pit Sump CMSS "HIGH LEVEL IN SUMP" indication is not activated.  
8.7.7 SELECT automatic mode on the CMSS Pump 203 subscreen.

**NOTE:** Pump 204 must be in manual mode or Pump 203 will not start in automatic mode.

- 8.7.8 SELECT manual mode on the CMSS Pump 204 subscreen.

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- 8.7.9 **SELECT** the air sparger "AUTO" mode on the CMSS 2706-T Railroad Pit Sump screen.
- 8.7.10 **START** filling the 2706-T Railroad Pit Sump with liquid.
- 8.7.11 **STOP** filling the 2706-T Railroad Pit Sump with liquid, after the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 8.7.12 **VERIFY** that the Valve HY-02 icon on the CMSS 2706-T Railroad Pit Sump screen is white.
- 8.7.13 **VERIFY** that the Pump 203 icon on the CMSS 2706-T Railroad Pit Sump screen is white approximately 30 seconds, **AFTER** the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 8.7.14 **VERIFY** that the CMSS 2706-T Railroad Pit Sump icon shows a falling liquid level.
- 8.7.15 **VERIFY** that the Valve HY-02 icon is blue, **AFTER** the CMSS "LOW LEVEL IN SUMP" indication is activated.
- 8.7.16 **VERIFY** that the Pump 203 icon on the CMSS 2706-T Railroad Pit Sump screen turns blue approximately 30 seconds after the CMSS "LOW-LOW LEVEL IN SUMP" indication is activated.

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**NOTE:** Section 8.8 demonstrates that Pump 204 is functional in the automatic mode, and is controlled by the liquid level transmitter.

**8.8 Test Pump 204 in automatic mode:**

- 8.8.1 **ENSURE** that the CMSS is displaying the 2706-T Railroad Pit Sump ~~X~~ Screen.

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**NOTE:** A high liquid level in the 2706-TA Sump will prevent Pump 204 from starting.

- 8.8.2 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-TA Sump is not activated.
- 8.8.3 **VERIFY** that the Pump 204 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.
- 8.8.4 **VERIFY** that the Pump 203 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.
- 8.8.5 **ENSURE** that the 2706-T Railroad Pit Sump CMSS "HIGH LEVEL IN SUMP" indication is not activated.
- 8.8.6 **SELECT** automatic mode on the CMSS Pump 204 subscreen.

**NOTE:** Pump 203 must be in manual mode or Pump 204 will not start in automatic mode.

- 8.8.7 **SELECT** manual mode on the CMSS Pump 203 subscreen.
- 8.8.8 **START** filling the 2706-T Railroad Pit Sump with liquid.
- 8.8.9 **VERIFY** that the CMSS 2706-T Railroad Pit Sump icon shows a rising liquid level.
- 8.8.10 **STOP** filling the 2706-T Railroad Pit Sump with liquid, after the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 8.8.11 **VERIFY** that the Pump 204 icon on the CMSS 2706-T Railroad Pit Sump screen is white.
- 8.8.12 **VERIFY** that the CMSS 2706-T Railroad Pit Sump icon shows a falling liquid level.

## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

- 8.8.13 **VERIFY** that the Pump 204 icon on the CMSS 2706-T Railroad Pit Sump screen turns blue approximately 30 seconds after the CMSS "LOW-LOW LEVEL IN SUMP" indication is activated.

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**NOTE:** Section 8.9 demonstrates that Pumps 203 and 204 are functional in the duplex mode. Duplex mode means that the pumps alternate each time the liquid level transmitter indicates a high liquid level in the 2706-T Railroad Pit Sump. Duplex mode requires that both Pumps 203 and 204 be in the automatic mode.

### 8.9 Test Pumps 203 and 204 in duplex mode:

- 8.9.1 **ENSURE** at the CMSS is displaying the 2706-T Railroad Pit Sump ~~Screen~~ <sup>4128 2/1/99 #8</sup> Screen.
- 8.9.2 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication on the 2706-T Railroad Pit Sump is not activated.

**NOTE:** A high liquid level in the 2706-TA Sump will prevent Pump 203 from starting.

- 8.9.3 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-TA Sump is not activated.
- 8.9.4 **ENSURE** that Pump 203 is in automatic mode.
- 8.9.5 **ENSURE** that Pump 204 is in automatic mode.
- 8.9.6 **VERIFY** that the Pump 203 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.
- 8.9.7 **VERIFY** that the Pump 204 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.
- 8.9.8 **START** filling the 2706-T Railroad Pit Sump with liquid.
- 8.9.9 **VERIFY** that the CMSS 2706-T Railroad Pit Sump icon shows a rising liquid level.
- 8.9.10 **STOP** filling the 2706-T Railroad Pit Sump with liquid, **AFTER** the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 8.9.11 **VERIFY** that either the Pump 203 icon or the Pump 204 icon on the CMSS 2706-T Railroad Pit Sump screen is white.
- 8.9.12 **RECORD** the Pump whose CMSS icon turned white in Step 8.9.11.: Pump \_\_\_\_\_.
- 8.9.13 **VERIFY** that the CMSS 2706-T Railroad Pit Sump icon shows a falling liquid level.
- 8.9.14 **VERIFY** that the icon for the Pump recorded in Step 8.9.12 turns blue on the CMSS 2706-T Railroad Pit Sump screen approximately 30 seconds, **AFTER** the CMSS "LOW-LOW LEVEL IN SUMP" indication is activated.
- 8.9.15 **START** filling the 2706-T Railroad Pit Sump with liquid.
- 8.9.16 **VERIFY** that the CMSS 2706-T Railroad Pit Sump icon shows a rising liquid level.
- 8.9.17 **STOP** filling the 2706-T Railroad Pit Sump with liquid, **AFTER** the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 8.9.18 **VERIFY** that the CMSS icon for the 2706-T Railroad Pit Sump pump not identified in Step 8.9.12 is white on the CMSS 2706-T Railroad Pit Sump screen.
- 8.9.19 **VERIFY** that the CMSS 2706-T Railroad Pit Sump icon shows a falling liquid level.



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- 8.9.20 **VERIFY** that the CMSS icon for the 2706-T Railroad Pit Sump pump not identified in Step 8.9.12 is blue on the CMSS 2706-T Railroad Pit Sump screen approximately 30 seconds, **AFTER** the CMSS "LOW-LOW LEVEL IN SUMP" indication is activated.

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**NOTE:** Section 8.10 demonstrates that switching Pump 203 from manual to automatic mode while Pump 203 is running in manual will stop Pump 203. Also it demonstrates that the emergency stop interlocks will stop Pump 203 while it is running, and also prevent Pump 203 from starting. It demonstrates that the emergency stop "RESET" button is functional. Section 8.10 is to be performed sequentially.

### 8.10 Test Pump 203 Interlocks in manual mode

- 8.10.1 **START** Pump 203 in manual mode.
- 8.10.2 **VERIFY** that the CMSS Pump 203 icon is white.
- 8.10.3 **SELECT** automatic on the CMSS Pump 203 subscreen.
- 8.10.4 **VERIFY** that the CMSS Pump 203 icon is blue.
- 8.10.5 **START** Pump 203 in manual mode.
- 8.10.6 **VERIFY** that the CMSS Pump 203 icon is white.
- 8.10.7 **SELECT** "EMERGENCY STOP" button on a CMSS screen
- 8.10.8 **VERIFY** that the CMSS Pump 203 icon is blue.
- 8.10.9 **START** Pump 203 in manual mode.
- 8.10.10 **VERIFY** that the CMSS Pump 203 icon is still blue.
- 8.10.11 **SELECT** (emergency stop) "RESET" button on a CMSS screen.
- 8.10.12 **VERIFY** that the CMSS Pump 203 icon is still blue.
- 8.10.13 **START** Pump 203 in manual mode.
- 8.10.14 **VERIFY** that the CMSS Pump 203 icon is white.
- 8.10.15 **SELECT** the "STOP" button on the CMSS Pump 203 subscreen.

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**NOTE:** Section 8.11 demonstrates that switching Pump 204 from manual to automatic mode while Pump 203 is running in manual will stop Pump 204. Also it demonstrates that the emergency stop interlocks will stop Pump 204 while it is running, and also prevent Pump 203 from starting. It demonstrates that the emergency stop "RESET" button is functional. Section 8.11 is to be performed sequentially.

### 8.11 Test Pump 204 Interlocks in manual mode

- 8.11.1 START Pump 204 in manual mode.
- 8.11.2 VERIFY that the CMSS Pump 204 icon is white.
- 8.11.3 SELECT automatic on the CMSS Pump 204 subscreen.
- 8.11.4 VERIFY that the CMSS Pump 204 icon is blue.
- 8.11.5 START Pump 204 in manual mode.
- 8.11.6 VERIFY that the CMSS Pump 204 icon is white.
- 8.11.7 SELECT "EMERGENCY STOP" button on a CMSS screen
- 8.11.8 VERIFY that the CMSS Pump 204 icon is blue.
- 8.11.9 START Pump 204 in manual mode.
- 8.11.10 VERIFY that the CMSS Pump 204 icon is still blue.
- 8.11.11 SELECT (emergency stop) "RESET" button on a CMSS screen.
- 8.11.12 VERIFY that the CMSS Pump 204 icon is still blue.
- 8.11.13 START Pump 204 in manual mode.
- 8.11.14 VERIFY that the CMSS Pump 204 icon is white.
- 8.11.15 SELECT the "STOP" button on the Pump 204 subscreen.

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NOTE: Section 8.12 demonstrates that the Automatic and Duplex Mode Interlocks are functional. Section 8.12 is designed to be performed sequentially.

### 8.12 Test Automatic/Duplex Mode Interlocks:

NOTE: Steps 8.12.1 through 8.12.12 demonstrate that Pumps 203 and 204 will not automatically start if the emergency stop interlock is activated. Selecting the Duplex Pump Reset button ensures that the pumps are not in duplex mode when testing the automatic mode interlocks. *42B, 2/1/99 #9*

- 8.12.1 SELECT "EMERGENCY STOP" button on a CMSS screen.
- 8.12.2 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-T Railroad Pit Sump is activated.
- 8.12.3 ENSURE Pump 203 is in automatic mode.
- 8.12.4 ENSURE Pump 204 is in manual mode
- 8.12.5 VERIFY that the CMSS Pump 203 icon is blue.
- 8.12.6 ENSURE Pump 204 is in automatic mode.
- 8.12.7 ENSURE Pump 203 is in manual mode
- 8.12.8 VERIFY that the CMSS Pump 204 icon is blue.
- 8.12.9 ENSURE Pump 203 is in automatic mode.
- 8.12.10 ENSURE Pump 204 is in automatic mode
- 8.12.11 VERIFY that the CMSS Pump 203 icon is blue.
- 8.12.12 VERIFY that the CMSS Pump 204 icon is blue.

NOTE: Steps 8.12.13 through 8.12.23 demonstrate that duplex mode will not start if Pump 204 is in manual mode.

- 8.12.13 ENSURE Pump 204 is in manual.
- 8.12.14 SELECT (emergency stop) "RESET" button on a CMSS screen.
- 8.12.15 VERIFY that CMSS Pump 203 icon is white.
- 8.12.16 VERIFY that the CMSS Pump 204 icon is blue.
- 8.12.17 SELECT "EMERGENCY STOP" button on a CMSS screen.
- 8.12.18 SELECT (emergency stop) "RESET" button on a CMSS screen.
- 8.12.19 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-T Railroad Pit Sump is activated.
- 8.12.20 VERIFY that the CMSS Pump 203 icon is white.
- 8.12.21 VERIFY that the CMSS Pump 204 icon is blue.



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NOTE: Section 8.13 demonstrates that switching Railroad Pit Sump Air Sparger from manual to automatic mode while the air sparger is running in manual will stop the air sparger. Also it demonstrates that the emergency stop interlocks will stop the air sparger in manual mode while it is running, and also prevent the air sparger from starting.

**8.13 Test Railroad Pit Sump Air Sparger Interlocks in manual mode**

- 8.13.1 ENSURE that the "LOW LEVEL IN SUMP" indication is not activated on the CMSS 2706-T Railroad Pit Sump screen.
- 8.13.2 START the air sparger in manual mode.
- 8.13.3 VERIFY that the CMSS Valve HY-02 icon is white.
- 8.13.4 SELECT automatic mode on the CMSS 2706-T Railroad Pit Sump screen.
- 8.13.5 VERIFY that the CMSS Valve HY-02 icon is blue.
- 8.13.6 START the air sparger in manual mode.
- 8.13.7 VERIFY that the CMSS Valve HY-02 icon is white.
- 8.13.8 SELECT "EMERGENCY STOP" button on a CMSS screen.
- 8.13.9 VERIFY that the CMSS Valve HY-02 icon is blue.
- 8.13.10 START the air sparger in manual mode.
- 8.13.11 VERIFY that the CMSS Valve HY-02 icon is still blue.
- 8.13.12 SELECT (emergency stop) "RESET" button on a CMSS screen.
- 8.13.12.1 VERIFY Valve HY-02 icon is still blue. *H.R.B. 2/1/99 #10*
- 8.13.13 START the air sparger in manual mode.
- 8.13.14 VERIFY that the CMSS Valve HY-02 icon is white.
- 8.13.15 SELECT the "STOP" button on the CMSS 2706-T Railroad Pit Sump screen
- 8.13.16 VERIFY that the CMSS Valve HY-02 icon is blue.

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NOTE: Section 8.14 demonstrates that switching Railroad Pit Sump Air Sparger from automatic to manual mode while the air sparger is running in automatic will stop the air sparger. Also it demonstrates that the emergency stop interlocks will stop the air sparger in automatic mode while it is running, and also prevent the air sparger from starting.

**8.14 Test Railroad Pit Sump Air Sparger Interlocks in automatic mode**

- 8.14.1 ENSURE that the CMSS is displaying the 2706-T Railroad Pit Sump screen.
- 8.14.2 ENSURE that Pump 203 is in manual mode.
- 8.14.3 ENSURE that Pump 204 is in manual mode.
- 8.14.4 VERIFY that the CMSS Valve HY-02 icon is blue.
- 8.14.5 ENSURE that the Railroad Pit Sump CMSS "HIGH LEVEL IN SUMP" indication is activated.

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- 8.14.6 ENSURE that the Railroad Pit Sump Air Sparger is in automatic mode
- 8.14.7 VERIFY that the CMSS Valve HY-02 icon is white.
- 8.14.8 SELECT the air sparger "MANUAL" button
- 8.14.9 VERIFY that the CMSS Valve HY-02 icon is blue.
- 8.14.10 ENSURE that the Railroad Pit Sump Air Sparger is in automatic mode
- 8.14.11 VERIFY that the CMSS Valve HY-02 icon is white.
- 8.14.12 SELECT "EMERGENCY STOP" button on a CMSS screen.
- 8.14.13 VERIFY that the CMSS Valve HY-02 icon is blue.
- 8.14.14 SELECT the CMSS (emergency stop) "RESET" button.
- 8.14.15 VERIFY that the CMSS Valve HY-02 icon is white.
- 8.14.16 ENSURE that the CMSS Railroad Pit Sump "HIGH LEVEL IN SUMP" indication is not activated.
- 8.14.17 VERIFY that the CMSS Valve HY-02 icon is blue.
- 8.14.18 SELECT "EMERGENCY STOP" button on a CMSS screen.
- 8.14.19 ENSURE that the CMSS Railroad Pit Sump "HIGH LEVEL IN SUMP" indication is activated.
- 8.14.20 VERIFY that the CMSS Valve HY-02 icon is still blue.

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**NOTE:** Section 8.15 demonstrates that a high liquid level in the 2706-TA Sump will prevent the Railroad Pit Sump pumps from running in the duplex, manual or automatic modes. Section 8.15 is designed to be performed sequentially.

### 8.15 Test 2706-TA High Level Interlock on the 2706-T Railroad Pit Sump

- 8.15.1 ENSURE that Pump 206 is in manual mode.
- 8.15.2 ENSURE that Pump 207 is in manual mode.
- 8.15.3 ENSURE that Pump 203 is in manual mode.
- 8.15.4 ENSURE that Pump 204 is in manual mode.
- 8.15.5 ENSURE that the "HIGH LEVEL IN SUMP" indication is activated on the CMSS 2706-TA Sump screen
- 8.15.6 START Pump 203 in manual mode.
- 8.15.7 START Pump 204 in manual mode.
- 8.15.8 VERIFY that the CMSS Pump 204 icon is blue.
- 8.15.9 ENSURE that the "HIGH LEVEL IN SUMP" indication is activated on the CMSS 2706-T Railroad Pit Sump screen.
- 8.15.10 ENSURE that Pump 203 is in automatic mode.
- 8.15.11 VERIFY that the CMSS Pump 203 icon is blue.
- 8.15.12 ENSURE that Pump 203 is in manual mode.

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- 8.15.13 ENSURE that Pump 204 is in automatic mode.
- 8.15.14 VERIFY that the CMSS Pump 204 icon is blue.
- 8.15.15 ENSURE that Pump 203 is in automatic mode.
- 8.15.16 ENSURE that Pump 204 is in automatic mode.
- 8.15.17 VERIFY that the CMSS Pump 203 icon is blue.
- 8.15.18 VERIFY that the CMSS Pump 204 icon is blue.
- 8.15.19 ENSURE that the "HIGH LEVEL IN SUMP" indication is not activated on the CMSS 2706-TA Sump screen
- 8.15.20 VERIFY that either the CMSS Pump 203 icon or the CMSS Pump 204 icon is white and the other is blue.
- 8.15.21 SELECT "EMERGENCY STOP" button on a CMSS screen.
- 8.15.22 SELECT (emergency stop) "RESET" button on a CMSS screen.

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## 9.0 2706-TA SUMP CMSS SCREEN TEST

NOTE: The 2706-TA Sump Screen Test demonstrates that the system components, alarms, gauges and controls appearing on the CMSS 2706-TA Sump Screen are functional. Significant components include Pumps 206 and 207, an air sparger, and a liquid level transmitter. Each pump will be tested in the automatic, manual and duplex modes.

NOTE: A high liquid level in Tank 220 when valve HV-05 is open will keep Pump 206 from starting. All 2706-TA tests will require that valve HV-05 be open, valves HV-04 and HV-08 be closed and the Tank 220 liquid level be below the "HIGH LEVEL IN TANK 220" setpoint.

### 9.1 Prerequisites

- 9.1.1 Pump 206 speed controller, #A-HP-2706-206 is set at mid-range. *H.R.B. 2-3-99 #11*
- 9.1.2 Pump 207 speed controller, #A-HP-2706-207 is set at mid-range.
- 9.1.3 The CMSS "HIGH LEVEL IN TANK 220" indication is not activated.
- 9.1.4 Valve HV-05 is open.
- 9.1.5 Valve HV-04 is closed.
- 9.1.6 Valve HV-08 is closed.
- 9.1.7 Liquid Level Transmitter #I-XX-2706-LT-03 is calibrated: 1/20/99  
Calibration date
- 9.1.8 Air Pressure Gauge #A-HP-2706-PDI-321 is calibrated: FACTORY  
Calibration date
- 9.1.9 Air Pressure Gauge #A-HP-2706-PDI-321 reads approximately 40 psia. *H.R.B. 2-3-99 #12*

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### 9.2 Test 2706-TA Sump Level Transmitter

- 9.2.1 ENSURE that liquid level in the 2706-TA Sump is at or below the low-low liquid level cutoff.
- 9.2.2 VERIFY that the CMSS "LOW-LOW LEVEL IN SUMP" indication is activated.
- 9.2.3 VERIFY that the CMSS "LOW LEVEL IN SUMP" indication is activated.
- 9.2.4 ENSURE Pump 206 is in the manual mode.
- 9.2.5 ENSURE Pump 207 is in the manual mode.
- 9.2.6 START filling the 2706-TA Sump with liquid.
- 9.2.7 VERIFY that the CMSS 2706-TA Sump icon shows a rising liquid level.
- 9.2.8 VERIFY that the "SUMP LEVEL" gallon indicator value increases with the rising liquid level.



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- 9.2.9 **RECORD** the approximate liquid volume when the CMSS "LOW LOW LEVEL IN SUMP" indication is no longer activated: 26 gallons.
- 9.2.10 **RECORD** the approximate liquid volume when the CMSS "LOW LEVEL IN SUMP" indication is no longer activated: 56 gallons
- 9.2.11 **RECORD** the approximate liquid volume when the CMSS "HIGH LEVEL IN SUMP" indication is activated: 422 gallons.

**NOTE:** To reach the CMSS 2706-TA Sump "HIGH-HIGH LEVEL IN SUMP" indication, the sump can be filled by opening Valve HV-07 during a treatment/storage tank recirculation, or by running water through a hose placed in the pipe trench leading in the 2706-TA Sump.

- 9.2.12 **STOP** filling the 2706-TA Sump with liquid after the CMSS "HIGH-HIGH LEVEL IN SUMP" alarm is activated.
- 9.2.13 **RECORD** the approximate liquid volume when the CMSS "HIGH-HIGH LEVEL IN SUMP" alarm is activated: 501 gallons.

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**NOTE:** Section 9.3 demonstrates that Pump 206 is functional in the manual mode.

**9.3 Test Pump 206 in the manual mode:**

- 9.3.1 **ENSURE** Pump 206 is in the manual mode.
- 9.3.2 **ENSURE** Pump 207 is in the manual mode.
- 9.3.3 **VERIFY** that the Pump 206 icon on the CMSS Overview screen is blue.
- 9.3.4 **VERIFY** that the Pump 206 icon on the CMSS 2706-TA Sump screen is blue.
- 9.3.5 **VERIFY** that the "on" pump status indication on the CMSS Pump 206 control subscreen is blue.
- 9.3.6 **VERIFY** that the "off" pump status indication on the CMSS Pump 206 control subscreen is white.
- 9.3.7 **ENSURE** that the 2706-TA Sump CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 9.3.8 **SELECT** the "START" button on the Pump 206 subscreen.

**NOTE:** Steps 9.3.9 through 9.3.12 demonstrate that the various Pump 206 on/off status indications are functional. Where other OTP tests require verification of Pump 206 on/off status, only one of the indications need to be verified to demonstrate the Pump 206 on/off status.

- 9.3.9 **VERIFY** that the Pump 206 icon on the CMSS Overview screen is white.
- 9.3.10 **VERIFY** that the Pump 206 icon on the CMSS 2706-TA Sump screen is white.
- 9.3.11 **VERIFY** that the "on" pump status indication on the CMSS Pump 206 control subscreen is white.
- 9.3.12 **VERIFY** that the "off" pump status indication on the CMSS Pump 206 control subscreen is blue.

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- 9.3.13 VERIFY that the CMSS 2706-TA Sump icon shows a falling liquid level.
- 9.3.14 SELECT the "STOP" button on the CMSS Pump 206 subscreen, AFTER the 2706-TA Sump CMSS "LOW LEVEL IN SUMP" indication is activated.
- 9.3.15 RECORD the approximate time lapse from when the "HIGH LEVEL IN SUMP" indication is deactivated and the "LOW LEVEL IN SUMP" is activated: 360 seconds.
- 9.3.16 VERIFY that the Pump 206 icon on the CMSS Overview screen is blue.
- 9.3.17 VERIFY that the Pump 206 icon on the CMSS 2706-TA Sump screen is blue.
- 9.3.18 VERIFY that the "on" pump status indicator on the CMSS Pump <sup>206</sup> control subscreen is blue.
- 9.3.19 VERIFY that the "off" pump status indicator on the CMSS Pump <sup>206</sup> control subscreen is white.

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**9.4 Test Pump 207 in the manual mode:**

- 9.4.1 ENSURE Pump 206 is in the manual mode.
- 9.4.2 ENSURE Pump 207 is in the manual mode.
- 9.4.3 VERIFY that the Pump 207 icon on the CMSS Overview screen is blue.
- 9.4.4 VERIFY that the Pump 207 icon on the CMSS 2706-TA Sump screen is blue.
- 9.4.5 VERIFY that the "on" pump status indication on the CMSS Pump 207 control subscreen is blue.
- 9.4.6 VERIFY that the "off" pump status indication on the CMSS Pump 207 control subscreen is white.
- 9.4.7 ENSURE that the 2706-TA Sump CMSS "LOW LEVEL IN SUMP" indication is not activated
- 9.4.8 SELECT the "START" button on the Pump 207 subscreen.

NOTE: Steps 9.4.9 through 9.4.12 demonstrate that the various Pump 207 on/off status indications are functional. Where other OTP tests require verification of Pump 207 on/off status, only one of the indications need to be verified to demonstrate the Pump 207 on/off status.

- 9.4.9 VERIFY that the Pump 207 icon on the CMSS Overview screen is white.
- 9.4.10 VERIFY that the Pump 207 icon on the CMSS 2706-T 2706-TA Sump screen is white.
- 9.4.11 VERIFY that the "on" pump status indication on the CMSS Pump 207 control subscreen is white.
- 9.4.12 VERIFY that the "off" pump status indication on the CMSS Pump 207 control subscreen is blue.
- 9.4.13 VERIFY that the CMSS 2706-TA Sump icon shows a falling liquid level.
- 9.4.14 SELECT the "STOP" button on the CMSS Pump 207 subscreen.
- 9.4.15 VERIFY that the Pump 207 icon on the CMSS Overview screen is blue.
- 9.4.16 VERIFY that the Pump 207 icon on the CMSS 2706-T Railroad Pit Sump screen is blue.
- 9.4.17 VERIFY that the "on" pump status indicator on the CMSS Pump 207 control subscreen is blue.
- 9.4.18 VERIFY that the "off" pump status indicator on the CMSS Pump 207 control subscreen is white.

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## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

NOTE: Section 9.5 demonstrates that the 2706-TA Sump Air Sparger is functional in the manual mode.

### 9.5 Test the 2706-TA Sump Air Sparger in the Manual Mode

- 9.5.1 ENSURE that the CMSS is displaying the 2706-TA Sump screen.  
9.5.2 ENSURE that the 2706-TA Sump Air Sparger is in manual mode.

NOTE: Valve HY-03 operates the 2706-TA Sump Air Sparger.

- 9.5.3 VERIFY that the CMSS Valve HY-03 icon is blue.  
9.5.4 SELECT "START" on the CMSS 2706-TA Sump screen  
9.5.5 VERIFY that the CMSS Valve HY-03 icon is white.  
9.5.6 SELECT "STOP" on the CMSS 2706-TA Sump screen.  
9.5.7 VERIFY that the CMSS Valve HY-03 icon is blue.

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NOTE: Section 9.6 demonstrates that Pump 206 and the 2706-TA Sump Air Sparger are functional in the automatic mode, and are controlled by the liquid level transmitter.

### 9.6 Test Pump 206 and the 2706-TA Sump Air Sparger in automatic mode:

- 9.6.1 ENSURE that the CMSS is displaying the 2706-TA Sump ~~Screen~~ <sup>Screen</sup>.  
9.6.2 VERIFY that the Pump 206 icon on the CMSS 2706-TA Sump screen is blue. <sup>H.R.B. 2-3-99 #17</sup>  
9.6.3 VERIFY that the Pump 207 icon on the CMSS 2706-TA Sump screen is blue.  
9.6.4 VERIFY that the Valve HY-03 on the CMSS 2706-TA Sump screen is blue  
9.6.5 ENSURE that the 2706-TA Sump CMSS "HIGH LEVEL IN SUMP" indication is not activated.  
9.6.6 SELECT automatic mode on the Pump 206 subscreen.

NOTE: Pump 207 must be in the manual mode or Pump 206 will not start in the automatic mode.

- 9.6.7 SELECT manual mode on the Pump 207 subscreen.  
9.6.8 SELECT the air sparger "AUTO" mode on the CMSS 2706-TA Sump screen.  
9.6.9 START filling the 2706-TA Sump with liquid.  
9.6.10 STOP filling the 2706-T 2706-TA Sump with liquid, after the "HIGH LEVEL IN SUMP" indication is activated.  
9.6.11 VERIFY that the Valve HY-03 icon on the CMSS 2706-TA Sump screen is white.

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- 9.6.12 **VERIFY** that the Pump 206 icon on the CMSS 2706-TA Sump screen is white approximately 30 seconds, **AFTER** the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 9.6.13 **VERIFY** that the 2706-TA Sump icon shows a falling liquid level.
- 9.6.14 **VERIFY** that the Valve HY-03 icon is blue, **AFTER** the "LOW LEVEL IN SUMP" indication is activated.
- 9.6.15 **VERIFY** that the Pump 206 icon on the CMSS 2706-TA Sump screen is blue approximately 30 seconds, **AFTER** the "LOW-LOW LEVEL IN SUMP" indication is activated.

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**NOTE:** Section 9.7 demonstrates that Pump 207 is functional in the automatic mode, and is controlled by the liquid level transmitter.

**9.7 Test Pump 207 in automatic mode:**

- 9.7.1 **ENSURE** that the CMSS is displaying the 2706-TA Sump Screen.
- 9.7.2 **VERIFY** that the Pump 207 icon on the CMSS 2706-TA Sump screen is blue.
- 9.7.3 **VERIFY** that the Pump 206 icon on the CMSS 2706-TA Sump screen is blue.
- 9.7.4 **SELECT** automatic mode on the Pump 207 subscreen.

**NOTE:** Pump 206 must be in the manual mode or Pump 207 will not start in the automatic mode.

- 9.7.5 **SELECT** manual mode on the Pump 206 subscreen.
- 9.7.6 **START** filling the 2706-TA Sump with liquid.
- 9.7.7 **VERIFY** that the CMSS 2706-TA Sump icon shows a rising liquid level.
- 9.7.8 **STOP** filling the 2706-TA Sump with liquid, after the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 9.7.9 **VERIFY** that the Pump 207 icon on the CMSS 2706-TA Sump screen is white approximately 30 seconds, **AFTER** the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 9.7.10 **VERIFY** that the 2706-TA Sump icon shows a falling liquid level.
- 9.7.11 **VERIFY** that the Pump 207 icon on the CMSS 2706-TA Sump screen is blue approximately 30 seconds, **AFTER** the CMSS "LOW-LOW LEVEL IN SUMP" indication is activated.

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## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

**9.8 Test Pumps 206 and 207 in duplex mode:**

- 9.8.1 ENSURE that the CMSS is displaying the 2706-TA Sump A Screen.
- 9.8.2 ENSURE that Pump 206 is in automatic mode.
- 9.8.3 ENSURE that Pump 207 is in automatic mode.
- 9.8.4 VERIFY that the Pump 206 icon on the CMSS 2706-TA Sump screen is blue.
- 9.8.5 VERIFY that the Pump 207 icon on the CMSS 2706-TA Sump screen is blue.
- 9.8.6 START filling the 2706-TA Sump with liquid.
- 9.8.7 VERIFY that the CMSS 2706-TA Sump icon shows a rising liquid level.
- 9.8.8 STOP filling the 2706-TA Sump with liquid, AFTER the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 9.8.9 VERIFY that either the Pump 206 icon or the Pump 207 icon on the CMSS 2706-T 2706-TA Sump screen turns white after approximately 30 seconds.
- 9.8.10 RECORD the Pump whose icon turned white in Step 9.8.9. Pump 207.
- 9.8.11 VERIFY that the CMSS 2706-TA Sump icon shows a falling liquid level.
- 9.8.12 VERIFY that the icon for the Pump recorded in Step 9.8.10 turns blue on the CMSS 2706-TA Sump screen approximately 30 seconds, AFTER the CMSS "LOW-LOW LEVEL IN SUMP" indication is activated.
- 9.8.13 START filling the 2706-TA Sump with liquid.
- 9.8.14 VERIFY that the CMSS 2706-TA Sump icon shows a rising liquid level.
- 9.8.15 STOP filling the 2706-TA Sump with liquid, AFTER the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 9.8.16 VERIFY that the icon for the 2706-TA Sump pump not identified in Step 9.8.10 is white, approximately 30 seconds, AFTER the CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 9.8.17 VERIFY that the 2706-TA Sump icon shows a falling liquid level.
- 9.8.18 VERIFY that the icon for the 2706-TA Sump pump not identified in Step 9.8.10 is blue approximately 30 seconds, AFTER the CMSS "LOW-LOW LEVEL IN SUMP" indication is activated.

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NOTE: Section 9.9 demonstrates that switching Pump 206 from manual to automatic mode while Pump 206 is running in manual will stop Pump 206. Also it demonstrates that the emergency stop interlocks will stop Pump 206 while it is running, and also prevent Pump 206 from starting. It demonstrates that the emergency stop "RESET" button is functional.

### 9.9 Test Pump 206 Interlocks in manual mode:

- 9.9.1 START Pump 206 in manual mode.
- 9.9.2 VERIFY that the CMSS Pump 206 icon is white.
- 9.9.3 SELECT automatic on the Pump 206 subscreen.
- 9.9.4 VERIFY that the CMSS Pump 206 icon is blue.
- 9.9.5 START Pump 206 in manual mode.
- 9.9.6 VERIFY that the CMSS Pump 206 icon is white.
- 9.9.7 SELECT the "EMERGENCY STOP" button on a CMSS screen
- 9.9.8 VERIFY that the CMSS Pump 206 icon is blue.
- 9.9.9 START Pump 206 in manual mode.
- 9.9.10 VERIFY that the CMSS Pump 206 icon is still blue.
- 9.9.11 SELECT (emergency stop) "RESET" button on a CMSS screen.
- 9.9.12 VERIFY that the CMSS Pump 206 icon is still blue.
- 9.9.13 START Pump 206 in manual mode.
- 9.9.14 VERIFY that the CMSS Pump 206 icon is white.
- 9.9.15 SELECT the "STOP" button on the Pump 206 subscreen.
- 9.9.16 VERIFY that the CMSS Pump 206 icon is blue.

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NOTE: Section 9.10 demonstrates that switching Pump 207 from manual to automatic mode while Pump 206 is running in manual will stop Pump 207. Also it demonstrates that the emergency stop interlocks will stop Pump 207 while it is running, and also prevent Pump 206 from starting. It demonstrates that the emergency stop "RESET" button is functional.

### 9.10 Test Pump 207 Interlocks in manual mode:

- 9.10.1 START Pump 207 in manual mode.
- 9.10.2 VERIFY that the Pump 207 icon is white.
- 9.10.3 SELECT automatic on the Pump 207 subscreen.
- 9.10.4 VERIFY that the Pump 207 icon is blue.
- 9.10.5 START Pump 207 in manual mode.

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- 9.10.6 **VERIFY** that the Pump 207 icon is white.
- 9.10.7 **SELECT** the "EMERGENCY STOP" button on a CMSS screen
- 9.10.8 **VERIFY** that the CMSS Pump 207 icon is blue.
- 9.10.9 **START** Pump 207 in manual mode.
- 9.10.10 **VERIFY** that the CMSS Pump 207 icon is still blue.
- 9.10.11 **SELECT** (emergency stop) "RESET" button on a CMSS screen.
- 9.10.12 **VERIFY** that the CMSS Pump 207 icon is still blue.
- 9.10.13 **START** Pump 207 in manual mode.
- 9.10.14 **VERIFY** that the CMSS Pump 207 icon is white.
- 9.10.15 **SELECT** the "STOP" button on the CMSS Pump 207 subscreen.
- 9.10.16 **VERIFY** that the CMSS Pump 207 icon is blue.

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**NOTE:** Section 9.11 demonstrates that the Automatic and Duplex Mode Interlocks are functional. Section 9.11 is designed to be performed sequentially.

### 9.11 Test Automatic/Duplex Mode Interlocks:

**NOTE:** Steps 9.11.1 through 9.11.12 demonstrate that Pumps 206 and 207 will not start in automatic mode if the emergency stop interlock is activated. Selecting the Duplex Pump Reset button ensures that the pumps are not in duplex mode when testing the automatic mode interlocks.

- 9.11.1 **SELECT** the "EMERGENCY STOP" button on a CMSS screen.
- 9.11.2 **ENSURE** that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-TA Sump is activated.
- 9.11.3 **ENSURE** Pump 206 is in automatic mode.
- 9.11.4 **ENSURE** Pump 207 is in manual mode
- 9.11.5 **VERIFY** that the CMSS Pump 206 icon is blue.
- 9.11.6 **ENSURE** Pump 207 is in automatic mode.
- 9.11.7 **ENSURE** Pump 206 is in manual mode.
- 9.11.8 **VERIFY** that the CMSS Pump 207 icon is blue.
- 9.11.9 **ENSURE** Pump 206 is in automatic mode.
- 9.11.10 **ENSURE** Pump 207 is in automatic mode.
- 9.11.11 **VERIFY** that the CMSS Pump 206 icon is blue.
- 9.11.12 **VERIFY** that the CMSS Pump 207 icon is blue.

**NOTE:** Steps 9.11.13 through 9.11.23 demonstrate that duplex mode will not start if Pump 207 is in manual mode.

- 9.11.13 ENSURE Pump 207 is in manual mode.
- 9.11.14 SELECT the emergency stop "RESET" button on a CMSS screen.
- 9.11.15 VERIFY that CMSS Pump 206 icon is white
- 9.11.16 VERIFY that the CMSS Pump 207 icon is blue.
- 9.11.17 SELECT the "EMERGENCY STOP" button on a CMSS screen.
- 9.11.18 SELECT (emergency stop) "RESET" button on a CMSS screen.
- 9.11.19 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-TA Sump is activated.
- 9.11.20 VERIFY that the CMSS Pump 206 icon is white.
- 9.11.21 VERIFY that the CMSS Pump 207 icon is blue.
- 9.11.22 SELECT the "EMERGENCY STOP" button on a CMSS screen.
- 9.11.23 SELECT the (emergency stop) "RESET" button on a CMSS screen.

**NOTE:** Steps 9.11.24 through 9.11.44 demonstrate that duplex mode will not start if Pump 206 is in manual mode.

- 9.11.24 ENSURE Pump 206 is in manual mode.
- 9.11.25 ENSURE Pump 207 is in automatic mode.
- 9.11.26 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indicator in the 2706-TA Sump is activated.
- 9.11.27 VERIFY that the CMSS Pump 207 icon is white.
- 9.11.28 VERIFY that the CMSS Pump 206 icon is blue.
- 9.11.29 SELECT the "EMERGENCY STOP" button on a CMSS screen.
- 9.11.30 SELECT (emergency stop) "RESET" button on a CMSS screen.
- 9.11.31 VERIFY that the CMSS Pump 207 icon is blue.
- 9.11.32 VERIFY that the CMSS Pump 206 icon is blue.
- 9.11.33 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-TA Sump is activated.
- 9.11.34 VERIFY that the CMSS Pump 207 icon is white.
- 9.11.35 VERIFY that the CMSS Pump 206 icon is blue.
- 9.11.36 SELECT "EMERGENCY STOP" button on a CMSS screen.
- 9.11.37 SELECT (emergency stop) "RESET" button on a CMSS screen.
- 9.11.38 VERIFY that the CMSS Pump 206 icon is blue.
- 9.11.39 VERIFY that the CMSS Pump 207 icon is blue.
- 9.11.40 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication in the 2706-TA Sump is activated.
- 9.11.41 VERIFY that the CMSS Pump 207 icon is white.



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- 9.11.42 VERIFY that the CMSS Pump 206 icon is blue.
- 9.11.43 SELECT "EMERGENCY STOP" button on a CMSS screen.
- 9.11.44 SELECT (emergency stop) "RESET" button on a CMSS screen.

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**NOTE:** Section 9.12 demonstrates that switching 2706-TA Air Sparger from manual to automatic mode while the air sparger is running in manual will stop the air sparger. Also it demonstrates that the emergency stop interlocks will stop the air sparger in manual mode while it is running, and also prevent the air sparger from starting.

**9.12 Test 2706-TA Sump Air Sparger Interlocks in manual mode**

- 9.12.1 ENSURE that the "LOW LEVEL IN SUMP" indication is not activated on the CMSS 2706-TA Sump screen.
- 9.12.2 START the air sparger in manual mode.
- 9.12.3 VERIFY that the CMSS Valve HY-03 icon is white.
- 9.12.4 SELECT automatic mode on the CMSS 2706-TA Sump screen.
- 9.12.5 VERIFY that the CMSS Valve HY-03 icon is blue.
- 9.12.6 START the air sparger in manual mode.
- 9.12.7 VERIFY that the CMSS Valve HY-03 icon is white.
- 9.12.8 SELECT "EMERGENCY STOP" button on a CMSS screen
- 9.12.9 VERIFY that the CMSS Valve HY-03 icon is blue.
- 9.12.10 START the air sparger in manual mode.
- 9.12.11 VERIFY that the CMSS Valve HY-03 icon is still blue.
- 9.12.12 SELECT (emergency stop) "RESET" button on a CMSS screen.
- 9.12.13 START the air sparger in manual mode.
- 9.12.14 VERIFY that the CMSS Valve HY-03 icon is white.
- 9.12.15 SELECT the "STOP" button on the CMSS 2706-TA Sump screen.
- 9.12.16 VERIFY that the CMSS Valve HY-02 icon is blue.

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**NOTE:** Section 9.13 demonstrates that switching 2706-TA Sump Air Sparger from automatic to manual mode while the air sparger is running in automatic will stop the air sparger. Also it demonstrates that the emergency stop interlocks will stop the air sparger in automatic mode while it is running, and also prevent the air sparger from starting.

**9.13 Test 2706-TA Sump Air Sparger Interlocks in automatic mode**

- 9.13.1 ENSURE that the CMSS is displaying the 2706-TA Sump screen.
- 9.13.2 ENSURE that Pump 206 is in manual mode.
- 9.13.3 ENSURE that Pump 207 is in manual mode.
- 9.13.4 VERIFY that the CMSS Valve HY-03 icon is blue.
- 9.13.5 ENSURE that the 2706-TA Sump CMSS "HIGH LEVEL IN SUMP" indication is activated.
- 9.13.6 ENSURE that the 2706-TA Sump Air Sparger is in automatic mode
- 9.13.7 VERIFY that the CMSS Valve HY-03 icon is white.
- 9.13.8 SELECT the air sparger "MANUAL" button
- 9.13.9 VERIFY that the CMSS Valve HY-03 icon is blue.
- 9.13.10 ENSURE that the 2706-TA Sump Air Sparger is in automatic mode
- 9.13.11 VERIFY that the CMSS Valve HY-03 icon is white.
- 9.13.12 SELECT "EMERGENCY STOP" button on a CMSS screen.
- 9.13.13 VERIFY that the CMSS Valve HY-03 icon is blue.
- 9.13.14 SELECT the CMSS (emergency stop) "RESET" button.
- 9.13.15 VERIFY that the CMSS Valve HY-03 icon is white.
- 9.13.16 ENSURE that the CMSS 2706-TA Sump "HIGH LEVEL IN SUMP" indication is not activated.
- 9.13.17 VERIFY that the CMSS Valve HY-03 icon is blue.
- 9.13.18 SELECT "EMERGENCY STOP" button on a CMSS screen.
- 9.13.19 ENSURE that the CMSS 2706-TA Sump "HIGH LEVEL IN SUMP" indication is activated.
- 9.13.20 VERIFY that the CMSS Valve HY-03 icon is still blue.

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### 10.0 TANK 2706-220 CMSS SCREEN TEST

NOTE: The Tank 2706-220 CMSS Screen Test demonstrates that

- Pump 212
- 2706-TB liquid level transmitter
- Pump 210
- Tank 220 liquid level transmitter and associated screen indications are functional.

The Tank Agitator is tested in a separate section of the OTP.

NOTE: The 2706-T Railroad Pit Sump Screen Test demonstrates that the system components, alarms, gauges and controls that are within the scope of the OTP and also appear on the CMSS 2706-T Railroad Pit Sump Screen are functional. Significant components include Pumps 203 and 204, an air sparger, and a liquid level transmitter. Each pump will be tested in the automatic, manual and duplex modes.

#### 10.1 Prerequisites:

10.1.1 pH Analyzer #I-XX-2706-AIT-01: 12-30-98  
Calibration date

10.1.2 Liquid Level Transmitter #I-XX-2706-LT-220 is calibrated: 2-10-99  
Calibration date

10.1.3 Air Pressure Gauge #A-HP-2706-PDI-322 is calibrated: FACTORY  
Calibration date

10.1.4 Air Pressure Gauge #A-HP-2706-PDI-322 reads approximately 50 psia H.Q.B. 2-10-99 #18

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#### 10.2 Test Tank 2706-220 Level Transmitter.

- 10.2.1 ENSURE that Tank 220 is nominally empty.
- 10.2.2 ENSURE that valve HV-05 is open.
- 10.2.3 ENSURE that the CMSS displays the Tank 2706-220 screen.
- 10.2.4 VERIFY that the CMSS "LOW LEVEL IN TANK 220" indication is activated.
- 10.2.5 START filling Tank 220 with liquid.
- 10.2.6 VERIFY that the CMSS Tank 220 icon shows a rising liquid level.
- 10.2.7 VERIFY that the CMSS "LEVEL" gallon indication value increases with the rising liquid level.
- 10.2.8 RECORD the approximate liquid volume when the CMSS "LOW LEVEL IN TANK 220" indication is no longer activated: \_\_\_\_\_ gallons.
- 10.2.9 RECORD the approximate liquid volume when the CMSS "HIGH LEVEL IN TANK 220" indication is activated: \_\_\_\_\_ gallons.
- 10.2.10 RECORD the approximate liquid volume when the CMSS "HIGH-HIGH LEVEL IN TANK 220" is activated: \_\_\_\_\_ gallons.

Verification Signature: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
PRINT NAME SIGNATURE/INITIALS DATE

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**10.8 Test Transfer Pump 210 in Transfer from Tank 220 to Truck Mode**

- 10.8.1 ENSURE the CMSS "LOW LEVEL IN TANK 220" indication is not activated.
- 10.8.2 ENSURE Valve HV-03 is open in manual mode.
- 10.8.3 ENSURE Valve HV-09 is open in manual mode.
- 10.8.4 ENSURE Valve 227 is open.
- 10.8.5 ENSURE Valve HV-02 is closed in manual mode.
- 10.8.6 ENSURE Valve HV-06 is closed in manual mode.
- 10.8.7 VERIFY that the CMSS Pump 210 icon is blue.
- 10.8.8 START Pump 210.
- 10.8.9 VERIFY that the CMSS Pump 210 icon is white.
- 10.8.10 VERIFY that the CMSS "LEVEL" in gallons indicator value is decreasing.
- 10.8.11 STOP Pump 210
- 10.8.12 VERIFY that the CMSS Pump 210 icon is blue.
- 10.8.13 START Pump 210.
- 10.8.14 VERIFY that the CMSS Pump 210 icon is white.
- 10.8.15 SELECT the CMSS "EMERGENCY STOP" button.
- 10.8.16 VERIFY that the CMSS Pump 210 icon is blue.
- 10.8.17 START Pump 210
- 10.8.18 VERIFY that the CMSS Pump 210 icon is still blue.
- 10.8.19 SELECT the CMSS (emergency stop) "RESET" button.
- 10.8.20 VERIFY that the Pump 210 icon is still blue.

Verification Signature: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 PRINT NAME SIGNATURE/INITIALS DATE

**10.9 Test Transfer Pump 210 in Transfer from Tank 220 to Tank 221**

- 10.9.1 ENSURE the CMSS "LOW LEVEL IN TANK 220" indication is not activated.
- 10.9.2 ENSURE that the CMSS "HIGH LEVEL IN TANK 221" indication is not activated on the Tank 2706-221 CMSS screen.
- 10.9.3 ENSURE Valve HV-03 is open in manual mode.
- 10.9.4 ENSURE Valve HV-06 is open in manual mode.
- 10.9.5 ENSURE Valve HV-08 is open in manual mode.
- 10.9.6 ENSURE Valve HV-04 is open in manual mode.
- 10.9.7 ENSURE Valve HV-02 is closed in manual mode.
- 10.9.8 ENSURE Valve HV-05 is closed in manual mode.
- 10.9.9 ENSURE Valve HV-07 is closed in manual mode.

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- 10.9.10 ENSURE Valve HV-09 is closed in manual mode.
- 10.9.11 VERIFY that the CMSS Pump 210 icon is blue.
- 10.9.12 START Pump 210.
- 10.9.13 VERIFY that the CMSS Pump 210 icon is white.
- 10.9.14 VERIFY that the CMSS "LEVEL" in gallons indicator value is decreasing.
- 10.9.15 VERIFY that the CMSS "LEVEL" in gallons indicator on the Tank 2706-221 screen is increasing.
- 10.9.16 STOP Pump 210
- 10.9.17 VERIFY that the CMSS Pump 210 icon is blue.
- 10.9.18 START Pump 210.
- 10.9.19 VERIFY that the CMSS Pump 210 icon is white.
- 10.9.20 SELECT the CMSS "EMERGENCY STOP" button.
- 10.9.21 VERIFY that the CMSS Pump 210 icon is blue.
- 10.9.22 START Pump 210
- 10.9.23 VERIFY that the CMSS Pump 210 icon is still blue.
- 10.9.24 SELECT the CMSS (emergency stop) "RESET" button.
- 10.9.25 VERIFY that the CMSS Pump 210 icon is still blue.

Verification Signature: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 PRINT NAME SIGNATURE/INITIALS DATE

### 10.10 Test Transfer Pump 210 in Recirculate Tank 220 Mode

- 10.10.1 ENSURE the CMSS "LOW LEVEL IN TANK 220" indication is not activated.
- 10.10.2 ENSURE Valve HV-03 is open in manual mode.
- 10.10.3 ENSURE Valve HV-06 is open in manual mode.
- 10.10.4 ENSURE Valve HV-08 is open in manual mode.
- 10.10.5 ENSURE Valve HV-05 is open in manual mode.
- 10.10.6 ENSURE Valve HV-02 is closed in manual mode.
- 10.10.7 ENSURE Valve HV-04 is closed in manual mode.
- 10.10.8 ENSURE Valve HV-07 is closed in manual mode.
- 10.10.9 ENSURE Valve HV-09 is closed in manual mode.
- 10.10.10 VERIFY that the CMSS Pump 210 icon is blue.
- 10.10.11 START Pump 210.
- 10.10.12 VERIFY that the CMSS Pump 210 icon is white.
- 10.10.13 STOP Pump 210
- 10.10.14 VERIFY that the CMSS Pump 210 icon is blue.
- 10.10.15 START Pump 210.



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- 10.10.16 **VERIFY** that the CMSS Pump 210 icon is white.
- 10.10.17 **SELECT** the CMSS "EMERGENCY STOP" button.
- 10.10.18 **VERIFY** that the CMSS Pump 210 icon is blue.
- 10.10.19 **START** Pump 210
- 10.10.20 **VERIFY** that the CMSS Pump 210 icon is still blue.
- 10.10.21 **SELECT** the CMSS (emergency stop) "RESET" button.
- 10.10.22 **VERIFY** that the CMSS Pump 210 icon is still blue.

Verification Signature: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 PRINT NAME SIGNATURE/INITIALS DATE

**10.11 Test Tank 220 in Sample Mode**

- 10.11.1 **ENSURE** Tank 220 is recirculated.
- 10.11.2 **ENSURE** that Pump 210 is off.
- 10.11.3 **ENSURE** that Pump 211 is off.
- 10.11.4 **ENSURE** Valve HV-06 is closed and in the manual mode.
- 10.11.5 **ENSURE** Valve HV-08 is closed and in the manual mode.
- 10.11.6 **ENSURE** Valve HV-07 is open in manual mode.
- 10.11.7 **HOLD** a small container under the sample port
- 10.11.8 **OPEN** manual valve T-XX-2706-243.
- 10.11.9 **OPEN** manual valve T-XX-2706-242.
- 10.11.10 **VERIFY** that liquid drains into the container.
- 10.11.11 **CLOSE** manual valve T-XX-2706-243.
- 10.11.12 **CLOSE** manual valve T-XX-2706-242.
- 10.11.13 **EMPTY** the container into the pipe trench leading into the 2706-TA Sump.
- 10.11.14 **RECORD** the pH reading on Panel -002 in 2706-TA: \_\_\_\_\_.
- 10.11.15 **RECORD** the pH reading on the CMSS Overview screen: \_\_\_\_\_.

Verification Signature: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 PRINT NAME SIGNATURE/INITIALS DATE

## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

**NOTE:** Tank 220 has overfill protection. If Valve HV-05 is open and there is a CMSS "HIGH TANK LEVEL IN TANK 220" indication, Pumps 206 and 207 will not start or run. If Valve HV-01 is open and there is a CMSS "HIGH TANK LEVEL IN TANK 220" indication, Pump 211 will not start or run.

**10.12 Test Tank 220 Overfill Interlocks**

**NOTE:** Steps 10.12.1 through 10.12.9 demonstrate that the Overfill interlock shuts off Pumps 206 and 207 when they are in the automatic mode.

- 10.12.1 ENSURE that the CMSS "HIGH LEVEL IN TANK 220" indication is not activated.
- 10.12.2 ENSURE that Valve HV-05 is open in manual mode.
- 10.12.3 ENSURE that Valve HV-04 is closed in manual mode.
- 10.12.4 ENSURE that Valve HV-08 is closed in manual mode.
- 10.12.5 ENSURE that Pump 206 is in automatic mode.
- 10.12.6 ENSURE that Pump 207 is in automatic mode.
- 10.12.7 FILL the 2706-TA Sump, UNTIL the CMSS "HIGH LEVEL IN TANK 220" indication is activated.
- 10.12.8 VERIFY that the CMSS Pump 206 icon is blue.
- 10.12.9 VERIFY that the CMSS Pump 207 icon is blue.

**NOTE:** Steps 10.12.10 through 10.12.17 demonstrate that the Overfill interlock keeps Pumps 206 and 207 from starting in the automatic mode

- 10.12.10 ENSURE that the 2706-TA Sump "HIGH LEVEL IN SUMP" indication is activated on the 2706-TA Sump CMSS screen.
- 10.12.11 ENSURE the CMSS "HIGH LEVEL IN TANK 220" indication is activated
- 10.12.12 ENSURE Pump 206 is in the manual mode.
- 10.12.13 SELECT Pump 207 automatic mode.
- 10.12.14 VERIFY that the CMSS Pump 207 icon is blue.
- 10.12.15 ENSURE Pump 207 is in the manual mode.
- 10.12.16 SELECT Pump 206 automatic mode.
- 10.12.17 VERIFY that the CMSS Pump 206 icon is blue.

**NOTE:** Steps 10.12.18 through 10.12.21 demonstrate that the Overfill interlock keeps Pumps 206 and 207 from starting in the duplex mode.

- 10.12.18 SELECT Pump 206 automatic mode.
- 10.12.19 SELECT Pump 207 automatic mode.
- 10.12.20 VERIFY that the CMSS Pump 206 icon is blue.

## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

10.12.21 **VERIFY** that the CMSS Pump 207 icon is blue.

**NOTE:** Steps 10.12.22 through 10.12.27 demonstrate that the Overfill interlock can be bypassed by Pump 207 in the manual mode. Additionally it demonstrates that the CMSS "HIGH-HIGH LEVEL IN TANK 220" interlock will close Valve HV-05, and that with both Valves HV-04 and HV-05 closed, Pump 207 will shut-off.

10.12.22 **ENSURE** Pump 207 is in the manual mode

10.12.23 **SELECT** the "START" button on the Pump 207 subscreen.

10.12.24 **VERIFY** that the CMSS Pump 207 icon is white.

10.12.25 **ENSURE** that the CMSS "HIGH-HIGH LEVEL IN TANK 220" indication is activated

10.12.26 **VERIFY** that the CMSS Valve HV-05 icon is blue.

10.12.27 **VERIFY** that the CMSS Pump 207 icon is blue.

**NOTE:** Steps 10.12.28 through 10.12.37 demonstrate that the Overfill interlock can be bypassed by Pump 206 in the manual mode. Additionally it demonstrates that the CMSS "HIGH-HIGH LEVEL IN TANK 220" interlock will close Valve HV-05, and that with both Valves HV-04 and HV-05 closed, Pump 206 will shut-off.

10.12.28 **ENSURE** that the CMSS "HIGH-HIGH LEVEL IN TANK 220" indication is not activated.

10.12.29 **ENSURE** that the CMSS "HIGH LEVEL IN TANK 220" indication is activated.

10.12.30 **ENSURE** that Valve HV-05 is open in the manual mode.

10.12.31 **VERIFY** that the CMSS Pump 206 icon is blue.

10.12.32 **ENSURE** Pump 206 is in the manual mode

10.12.33 **SELECT** the "START" button on the Pump 206 subscreen.

10.12.34 **VERIFY** that the CMSS Pump 206 icon is white.

10.12.35 **ENSURE** that the CMSS "HIGH-HIGH LEVEL IN TANK 220" indication is activated.

10.12.36 **VERIFY** that the CMSS Valve HV-05 icon is blue.

10.12.37 **VERIFY** that the CMSS Pump 206 icon is blue.

**NOTE:** Note Steps 10.12.38 through 10.12.40 demonstrate that the CMSS "HIGH-HIGH LEVEL IN TANK 220" does not allow Valve HV-01 to open

10.12.38 **ENSURE** that the CMSS "HIGH-HIGH LEVEL IN TANK 220" is activated.

10.12.39 **SELECT** Valve HV-01 manual open.

10.12.40 **VERIFY** that the CMSS Valve HV-01 icon is blue.

## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

**NOTE:** Steps 10.12.41 through 10.12.57 demonstrate that the Tank 220 Overfill interlock will stop Pumps 206 and 207 when are running in the duplex mode

- 10.12.41 ENSURE that the CMSS "HIGH LEVEL IN TANK 220" indication is not activated.
- 10.12.42 ENSURE that Valve HV-05 is open in the manual mode.
- 10.12.43 ENSURE that Pump 206 is in the automatic mode.
- 10.12.44 ENSURE that Pump 207 is in the automatic mode.
- 10.12.45 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication is activated in the 2706-TA Sump.
- 10.12.46 VERIFY that either the CMSS Pump 206 or CMSS Pump 207 icon is white.
- 10.12.47 ALLOW the activated pump to run, UNTIL the CMSS "HIGH LEVEL IN TANK 220" indication is activated.
- 10.12.48 VERIFY that the CMSS Pump 206 icon is blue.
- 10.12.49 VERIFY that the CMSS Pump 207 icon is blue.
- 10.12.50 ENSURE that the CMSS "HIGH LEVEL IN TANK 220" indication is not activated.
- 10.12.51 ENSURE that Pump 206 is in the automatic mode.
- 10.12.52 ENSURE that Pump 207 is in the automatic mode.
- 10.12.53 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication is activated in the 2706-TA Sump.
- 10.12.54 VERIFY that either the CMSS Pump 206 or CMSS Pump 207 icon is white.
- 10.12.55 ALLOW the activated pump to run, UNTIL the CMSS "HIGH LEVEL IN TANK 220" indication is activated.
- 10.12.56 VERIFY that the CMSS Pump 206 icon is blue.
- 10.12.57 VERIFY that the CMSS Pump 207 icon is blue.

**NOTE:** Note Steps 10.12.58 through 10.12.81 demonstrate that the Tank 220 Overfill interlock prevents Pump 211 from starting or running if Valve HV-01 is open and there is a CMSS "HIGH LEVEL IN TANK 220" indication.

- 10.12.58 ENSURE that Pump 206 is off and in the manual mode
- 10.12.59 VERIFY that the CMSS Pump 206 icon is blue.
- 10.12.60 ENSURE that Pump 207 is off and in the manual mode.
- 10.12.61 VERIFY that the CMSS Pump 207 icon is blue.
- 10.12.62 ENSURE that Valve HV-01 is open and in the manual mode.
- 10.12.63 VERIFY that the CMSS Valve HV-01 icon is white.
- 10.12.64 ENSURE that Valve HV-02 is closed and in the manual mode.
- 10.12.65 VERIFY that the CMSS Valve HV-02 icon is blue.
- 10.12.66 ENSURE that the CMSS "LOW LEVEL IN TANK 221" indication is not activated on the Tank 2706-221 CMSS screen.
- 10.12.67 ENSURE that the CMSS "HIGH LEVEL IN TANK 220" indication is not activated.

## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

- 
- 10.12.68 RUN Pump 211 UNTIL the CMSS "HIGH LEVEL IN TANK 220" indication is activated. VERIFY that the CMSS Pump 211 icon is blue.
- 10.12.69 SELECT Valve HV-01 manual close.
- 10.12.70 SELECT Valve HV-02 manual open.
- 10.12.71 SELECT Valve HV-06 manual open.
- 10.12.72 SELECT Valve HV-08 manual open.
- 10.12.73 SELECT Valve HV-04 manual open.
- 10.12.74 SELECT Pump 211 start.
- 10.12.75 VERIFY that the CMSS Pump 211 icon is white.
- 10.12.76 SELECT Pump 211 manual stop.
- 10.12.77 SELECT Valve HV-01 manual open.
- 10.12.78 SELECT Valve HV-02 manual close.
- 10.12.79 SELECT Pump 211 manual start.
- 10.12.80 VERIFY that the CMSS Pump 211 icon is blue.
- 10.12.81 SELECT Pump 211 manual stop.

Verification Signature: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
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## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

**11.0 TANK 2706-221 CMSS SCREEN TEST**

NOTE: The Tank 2706-221 CMSS Screen Test demonstrates that

- 2706-TB liquid level transmitter
  - Pump 211
  - Tank 221 liquid level transmitter and associated screen indications
- Are functional.

Tank 221 Agitator 214 is tested in a separate section of the OTP.

**11.1 Prerequisites:**

11.1.1 Liquid Level Transmitter #I-XX-2706-LT-221 is calibrated: 2-10-99  
Calibration date

11.1.2 Air Pressure Gauge #A-HP-2706-PDI-322 is calibrated: FACTORY  
Calibration date

11.1.3 ~~Air Pressure Gauge #A-HP-2706-PDI-322 reads approximately 50 psi.~~ H.R.B. 2-10-99 #19

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**11.2 Test Tank 2706-221 Level Transmitter**

11.2.1 ENSURE that Tank 221 is nominally empty.

11.2.2 ENSURE that valve HV-04 is open.

11.2.3 ENSURE that the CMSS displays the Tank 2706-221 screen.

11.2.4 VERIFY that the CMSS "LOW LEVEL IN TANK 221" indication is activated.

11.2.5 START filling Tank 221 with liquid.

11.2.6 VERIFY that the CMSS Tank 221 icon shows a rising liquid level.

11.2.7 VERIFY that the CMSS "LEVEL" gallon indication value increases with the rising liquid level.

11.2.8 RECORD the approximate liquid volume when the CMSS "LOW LEVEL IN TANK 221" indication is no longer activated: 1936 gallons.

11.2.9 RECORD the approximate liquid volume when the CMSS "HIGH LEVEL IN TANK 221" indication is activated: 5080 gallons.

11.2.10 RECORD the approximate liquid volume when the CMSS "HIGH-HIGH LEVEL IN TANK 221" is activated: 5503 gallons.

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## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

**11.3 Test Transfer Pump 211 in Transfer from Tank 221 to Truck Mode**

- 11.3.1 ENSURE the CMSS "LOW LEVEL IN TANK 221" indication is not activated.
- 11.3.2 ENSURE Valve HV-02 is open in manual mode.
- 11.3.3 ENSURE Valve HV-09 is open in manual mode.
- 11.3.4 ENSURE Valve 227 is open.
- 11.3.4.1 ENSURE that Valve HV-01 is closed in the manual mode. 12/10/99 #4
- 11.3.5 ENSURE Valve HV-03 is closed in manual mode.
- 11.3.6 ENSURE Valve HV-06 is closed in manual mode.
- 11.3.7 VERIFY that the CMSS Pump 211 icon is blue.
- 11.3.8 START Pump 211.
- 11.3.9 VERIFY that the CMSS Pump 211 icon is white.
- 11.3.10 VERIFY that the CMSS "LEVEL" in gallons indicator value is decreasing.
- 11.3.11 STOP Pump 211
- 11.3.12 VERIFY that the CMSS Pump 211 icon is blue.
- 11.3.13 START Pump 211.
- 11.3.14 VERIFY that the CMSS Pump 211 icon is white.
- 11.3.15 SELECT the CMSS "EMERGENCY STOP" button.
- 11.3.16 VERIFY that the CMSS Pump 211 icon is blue.
- 11.3.17 START Pump 211
- 11.3.18 VERIFY that the CMSS Pump 211 icon is still blue.
- 11.3.19 SELECT the CMSS (emergency stop) "RESET" button.
- 11.3.20 VERIFY that the Pump 211 icon is still blue.

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**11.4 Test Transfer Pump 211 in Transfer from Tank 221 to Tank 220**

- 11.4.1 ENSURE the CMSS "LOW LEVEL IN TANK 221" indication is not activated.
- 11.4.2 ENSURE that the CMSS "HIGH LEVEL IN TANK 220" indication is not activated on the Tank 2706-220 CMSS screen.
- 11.4.3 ENSURE Valve HV-01 is open in manual mode.
- 11.4.4 ENSURE Valve HV-02 is closed in manual mode.
- 11.4.5 VERIFY that the CMSS Pump 211 icon is blue.
- 11.4.6 START Pump 211.
- 11.4.7 VERIFY that the CMSS Pump 211 icon is white.
- 11.4.8 VERIFY that the CMSS "LEVEL" in gallons indicator value is decreasing.

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- 11.4.9 VERIFY that the CMSS "LEVEL" in gallons indicator on the Tank 2706-220 screen is increasing.
- 11.4.10 STOP Pump 211
- 11.4.11 VERIFY that the CMSS Pump 211 icon is blue.
- 11.4.12 START Pump 211.
- 11.4.13 VERIFY that the CMSS Pump 211 icon is white.
- 11.4.14 SELECT the CMSS "EMERGENCY STOP" button.
- 11.4.15 VERIFY that the CMSS Pump 211 icon is blue.
- 11.4.16 START Pump 211
- 11.4.17 VERIFY that the CMSS Pump 211 icon is still blue.
- 11.4.18 SELECT the CMSS (emergency stop) "RESET" button.
- 11.4.19 VERIFY that the CMSS Pump 211 icon is still blue.

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### 11.5 Test Transfer Pump 211 in Recirculate Tank 221 Mode

- 11.5.1 ENSURE the CMSS "LOW LEVEL IN TANK 221" indication is not activated.
- 11.5.2 ENSURE Valve HV-02 is open in manual mode.
- 11.5.3 ENSURE Valve HV-06 is open in manual mode.
- 11.5.4 ENSURE Valve HV-08 is open in manual mode.
- 11.5.5 ENSURE Valve HV-04 is open in manual mode.
- 11.5.5.1 ENSURE that Valve HV-01 is closed in the manual mode. *HRB 2/10/99 #5*
- 11.5.6 ENSURE Valve HV-03 is closed in manual mode.
- 11.5.7 ENSURE Valve HV-05 is closed in manual mode.
- 11.5.8 ENSURE Valve HV-07 is closed in manual mode.
- 11.5.9 ENSURE Valve HV-09 is closed in manual mode.
- 11.5.10 VERIFY that the CMSS Pump 211 icon is blue.
- 11.5.11 START Pump 211.
- 11.5.12 VERIFY that the CMSS Pump 211 icon is white.
- 11.5.13 STOP Pump 211
- 11.5.14 VERIFY that the CMSS Pump 211 icon is blue.
- 11.5.15 START Pump 211.
- 11.5.16 VERIFY that the CMSS Pump 211 icon is white.
- 11.5.17 SELECT the CMSS "EMERGENCY STOP" button.
- 11.5.18 VERIFY that the CMSS Pump 211 icon is blue.
- 11.5.19 START Pump 211
- 11.5.20 VERIFY that the CMSS Pump 211 icon is still blue.



## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

11.5.21 **SELECT** the CMSS (emergency stop) "RESET" button.

11.5.22 **VERIFY** that the CMSS Pump 211 icon is still blue.

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### 11.6 Test Tank 221 in Sample Mode

11.6.1 **ENSURE** Tank 221 is recirculated.

11.6.2 **ENSURE** that Pump 210 is off.

11.6.3 **ENSURE** that Pump 211 is off.

11.6.4 **ENSURE** Valve HV-06 is closed and in the manual mode.

11.6.5 **ENSURE** Valve HV-08 is closed and in the manual mode.

11.6.6 **ENSURE** Valve HV-07 is open and in the manual mode.

11.6.7 **HOLD** a small container under the sample port

11.6.8 **OPEN** manual valve T-XX-2706-243.

11.6.9 **OPEN** manual valve T-XX-2706-242.

11.6.10 **VERIFY** that liquid drains into the container.

11.6.11 **CLOSE** manual valve T-XX-2706-243.

11.6.12 **CLOSE** manual valve T-XX-2706-242.

11.6.13 **EMPTY** the container into the pipe trench leading into the 2706-TA Sump.

11.6.14 **RECORD** the pH reading on Panel -002 in 2706-TA: 8.75

11.6.15 **RECORD** the pH reading on the CMSS Overview screen: 8.7

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**NOTE:** Tank 221 has overflow protection. If Valve HV-04 is open and there is a CMSS "HIGH TANK LEVEL IN TANK 221" indication, Pumps 206, 207 and 210 will not start or run.

### 11.7 Test Tank 221 Overflow Interlocks

**NOTE:** Steps 11.7.1 through 11.7.9 demonstrate that the Overflow interlock shuts off Pumps 206 and 207 when they are in the automatic mode.

11.7.1 **ENSURE** that the CMSS "HIGH LEVEL IN TANK 221" indication is not activated.

11.7.2 **ENSURE** that Valve HV-04 is open in manual mode.

11.7.3 **ENSURE** that Valve HV-05 is closed in manual mode.

## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

- 11.7.4 ENSURE that Valve HV-08 is closed in manual mode.
- 11.7.5 ENSURE that Pump 206 is in automatic mode.
- 11.7.6 ENSURE that Pump 207 is in automatic mode.
- 11.7.7 FILL the 2706-TA Sump, UNTIL the CMSS "HIGH LEVEL IN TANK 221" indication is activated.
- 11.7.8 VERIFY that the CMSS Pump 206 icon is blue.
- 11.7.9 VERIFY that the CMSS Pump 207 icon is blue.

NOTE: Steps 11.7.10 through 11.7.17 demonstrate that the Overfill interlock keeps Pumps 206 and 207 from starting in the automatic mode.

- 11.7.10 ENSURE that the 2706-TA Sump "HIGH LEVEL IN SUMP" indication is activated on the 2706-TA Sump CMSS screen.
- 11.7.11 ENSURE the CMSS "HIGH LEVEL IN TANK 221" indication is activated
- 11.7.12 ENSURE Pump 206 is in the manual mode.
- 11.7.13 SELECT Pump 207 automatic mode.
- 11.7.14 VERIFY that the CMSS Pump 207 icon is blue.
- 11.7.15 ENSURE Pump 207 is in the manual mode.
- 11.7.16 SELECT Pump 206 automatic mode.
- 11.7.17 VERIFY that the CMSS Pump 206 icon is blue.

NOTE: Steps 11.7.18 through 11.7.21 demonstrate that the Overfill interlock keeps Pumps 206 and 207 from starting in the duplex mode.

- 11.7.18 SELECT Pump 206 automatic mode.
- 11.7.19 SELECT Pump 207 automatic mode.
- 11.7.20 VERIFY that the CMSS Pump 206 icon is blue.
- 11.7.21 VERIFY that the CMSS Pump 207 icon is blue.

NOTE: Steps 11.7.22 through 11.7.25 demonstrate that the Overfill interlock can be bypassed by Pump 206 in the manual mode.

- 11.7.22 ENSURE Pump 206 is in the manual mode
- 11.7.23 SELECT the "START" button on the Pump 206 subscreen.
- 11.7.24 VERIFY that the CMSS Pump 206 icon is white.
- 11.7.25 SELECT Pump 206 manual stop.

**NOTE:** Steps 11.7.26 through 11.7.31 demonstrate that the Overfill interlock can be bypassed by Pump 207 in the manual mode. Additionally it demonstrates that the CMSS "HIGH-HIGH LEVEL IN TANK 221" interlock will close Valve HV-04, and that with both Valves HV-04 and HV-05 closed, Pump 207 will shut-off.

- 11.7.26 ENSURE Pump 207 is in the manual mode
- 11.7.27 SELECT the "START" button on the Pump 207 subscreen.
- 11.7.28 VERIFY that the CMSS Pump 207 icon is white.
- 11.7.29 ENSURE that the CMSS "HIGH-HIGH LEVEL IN TANK 221" indication is activated.
- 11.7.30 VERIFY that the CMSS Valve HV-04 icon is blue.
- 11.7.31 VERIFY that the CMSS Pump 207 icon is blue.

**NOTE:** Steps 11.7.32 through 11.7.40 demonstrate that the Overfill interlock can be bypassed by Pump 206 in the manual mode. Additionally it demonstrates that CMSS "HIGH-HIGH LEVEL IN TANK 221" interlock will close Valve HV-04, and that with both Valves HV-04 and HV-05 closed, Pump 207 will shut-off.

- 11.7.32 ENSURE that the CMSS "HIGH-HIGH LEVEL IN TANK 221" indication is not activated.
- 11.7.33 ENSURE that the CMSS "HIGH LEVEL IN TANK 221" indication is activated.
- 11.7.34 ENSURE that Valve HV-04 is open in the manual mode.
- 11.7.35 VERIFY that the CMSS Pump 206 icon is blue
- 11.7.36 SELECT Pump 206 manual start.
- 11.7.37 VERIFY that the CMSS Pump 206 icon is white.
- 11.7.38 ENSURE that the CMSS "HIGH-HIGH LEVEL IN TANK 221" indication is activated.
- 11.7.39 VERIFY that the CMSS Valve HV-04 icon is blue.
- 11.7.40 VERIFY that the CMSS Pump 206 icon is blue.

**NOTE:** Steps 11.7.41 through 11.7.57 demonstrate that the Tank 221 Overfill interlock will stop Pumps 206 and 207 when they are running in the duplex mode

- 11.7.41 ENSURE that the CMSS "HIGH LEVEL IN TANK 221" indication is not activated.
- 11.7.42 ENSURE that Valve HV-05 is open in the manual mode.
- 11.7.43 ENSURE that Pump 206 is in the automatic mode.
- 11.7.44 ENSURE that Pump 207 is in the automatic mode.
- 11.7.45 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication is activated in the 2706-TA Sump.
- 11.7.46 VERIFY that either the CMSS Pump 206 or CMSS Pump 207 icon is white.
- 11.7.47 ALLOW the activated pump to run, UNTIL the CMSS "HIGH LEVEL IN TANK 221" indication is activated.
- 11.7.48 VERIFY that the CMSS Pump 206 icon is blue.
- 11.7.49 VERIFY that the CMSS Pump 207 icon is blue.

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- 11.7.50 ENSURE that the CMSS "HIGH LEVEL IN TANK 221" indication is not activated.
- 11.7.51 ENSURE that Pump 206 is in the automatic mode.
- 11.7.52 ENSURE that Pump 207 is in the automatic mode.
- 11.7.53 ENSURE that the CMSS "HIGH LEVEL IN SUMP" indication is activated in the 2706-TA Sump.
- 11.7.54 VERIFY that either the CMSS Pump 206 or CMSS Pump 207 icon is white.
- 11.7.55 ALLOW the activated pump to run, UNTIL the CMSS "HIGH LEVEL IN TANK 221" indication is activated.
- 11.7.56 VERIFY that the CMSS Pump 206 icon is blue.
- 11.7.57 VERIFY that the CMSS Pump 207 icon is blue.

**NOTE:** Steps 11.7.58 through 11.7.89 demonstrate that the Tank 221 Overfill interlock prevents Pump 210 from starting or running, if Valve HV-04 is open and there is a CMSS "HIGH LEVEL IN TANK 220" indication.

- 11.7.58 ENSURE that Pump 206 is off and in the manual mode
- 11.7.59 VERIFY that the CMSS Pump 206 icon is blue.
- 11.7.60 ENSURE that Pump 207 is off and in the manual mode.
- 11.7.61 VERIFY that the CMSS Pump 207 icon is blue.
- 11.7.62 ENSURE that Valve HV-04 is open and in the manual mode.
- 11.7.63 VERIFY that the CMSS Valve HV-04 icon is white.
- 11.7.64 ENSURE that Valve HV-03 is open and in the manual mode.
- 11.7.65 VERIFY that the CMSS Valve HV-03 icon is white.
- 11.7.66 ENSURE that Valve HV-06 is open and in the manual mode.
- 11.7.67 VERIFY that the CMSS Valve HV-06 icon is white.
- 11.7.68 ENSURE that Valve HV-08 is open and in the manual mode.
- 11.7.69 VERIFY that the CMSS Valve HV-08 icon is white.
- 11.7.70 ENSURE that Valve HV-02 is closed and in the manual mode.
- 11.7.71 VERIFY that the CMSS Valve HV-02 icon is blue.
- 11.7.72 ENSURE that Valve HV-05 is closed and in the manual mode.
- 11.7.73 VERIFY that the CMSS Valve HV-05 icon is blue.
- 11.7.74 ENSURE that Valve HV-07 is closed and in the manual mode.
- 11.7.75 VERIFY that the CMSS Valve HV-07 icon is blue.
- 11.7.76 ENSURE that Valve HV-09 is closed and in the manual mode.
- 11.7.77 VERIFY that the CMSS Valve HV-09 icon is blue.
- 11.7.78 ENSURE that the CMSS "HIGH LEVEL IN TANK 221" indication is not activated.
- 11.7.79 RUN Pump 210 UNTIL the CMSS "HIGH LEVEL IN TANK 221" indication is activated.
- 11.7.80 VERIFY that the CMSS Pump 210 icon is blue.
- 11.7.81 SELECT Valve HV-05 manual open.

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- 11.7.82 SELECT Valve HV-04 manual close.
- 11.7.83 SELECT Pump 210 start.
- 11.7.84 VERIFY that the CMSS Pump 210 icon is white.
- 11.7.85 SELECT Pump 210 manual stop.
- 11.7.86 SELECT Valve HV-04 manual open.
- 11.7.87 SELECT Pump 210 manual start.
- 11.7.88 VERIFY that the CMSS Pump 210 icon is blue.
- 11.7.89 SELECT Pump 210 manual stop.

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## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

**12.0 MISCELLANEOUS EQUIPMENT**

NOTE: This section of the OTP demonstrates that the following equipment is functional:

- Tank 220 Agitator 213
- Tank 221 Agitator 214
- Safety Showers
- Chemical Transfer Pump
- Filter Room Hoist

**12.1 Prerequisites:**

12.1.1 Liquid Level Transmitter #I-XX-2706-LT-220 is calibrated: 2-10-99  
Calibration date

12.1.2 Liquid Level Transmitter #I-XX-2706-LT-221 is calibrated: 2-10-99  
Calibration date

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NOTE: This OTP tests the agitator from three locations:

- the CMSS
- 2706-TB Motor Controller for Agitator 213
- and 2706-TB Chem Room Panel -004

**12.2 Test Tank 220 Agitator 213**

- 12.2.1 ENSURE that the Tank 220 "LOW LEVEL IN TANK 220" indication is not activated.
- 12.2.2 SELECT the Agitator "START" button on the CMSS Tank 2706-220 screen.
- 12.2.3 VERIFY that the CMSS Agitator "on" button is white.
- 12.2.4 VERIFY that the CMSS Agitator "off" button is blue.
- 12.2.5 VERIFY on Panel -004 that the red indicating light for Agitator 213 is illuminated.
- 12.2.6 VERIFY on the 2706-TB motor controller that the red indicating light for Agitator 213 is illuminated.
- 12.2.7 SELECT the Agitator "STOP" button on the CMSS Tank 2706-220 screen.
- 12.2.8 VERIFY that the CMSS Agitator "on" button is blue.
- 12.2.9 VERIFY that the CMSS Agitator "off" button is white.
- 12.2.10 VERIFY on Panel -004 that the green indicating light for Agitator 213 is illuminated.
- 12.2.11 VERIFY on the 2706-TB motor controller that the green indicating light for Agitator 213 is illuminated.
- 12.2.12 SELECT the Agitator "START" button on the CMSS Tank 2706-220 screen.
- 12.2.13 VERIFY that the CMSS Agitator "on" button is white.
- 12.2.14 PUSH the agitator stop button on Panel -004.
- 12.2.15 VERIFY that the CMSS Agitator "off" button is white.

## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

- 12.2.16 **PUSH** the agitator start button on Panel -004.
- 12.2.17 **VERIFY** that the CMSS Agitator "on" button is white.
- 12.2.18 **SELECT** the Agitator "STOP" button on the CMSS Tank 2706-220 screen.
- 12.2.19 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.2.20 **PUSH** the agitator start button on Panel -004.
- 12.2.21 **VERIFY** that the CMSS Agitator "on" button is white.
- 12.2.22 **PUSH** the agitator stop button on Panel -004.
- 12.2.23 **SELECT** the Agitator "START" button on the CMSS Tank 2706-220 screen.

**NOTE:** Steps 12.2.24 through 12.2.28 demonstrate that the emergency stop interlock stops the agitator when it is running.

- 12.2.24 **SELECT** the CMSS "EMERGENCY STOP" button
- 12.2.25 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.2.26 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.2.27 **VERIFY** on Panel -004 that the green indicating light for Agitator 213 is illuminated.
- 12.2.28 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 213 is illuminated.

**NOTE:** Steps 12.2.29 through 12.2.33 demonstrate that emergency stop prevents Agitator 213 from starting.

- 12.2.29 **SELECT** the Agitator "START" button on the CMSS Tank 2706-220 screen.
- 12.2.30 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.2.31 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.2.32 **VERIFY** on Panel -004 that the green indicating light for Agitator 213 is illuminated.
- 12.2.33 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 213 is illuminated.

**NOTE:** Steps 12.2.34 through 12.2.38 demonstrate that the emergency stop interlock disables the agitator start instruction. So when emergency stop reset is pushed the agitator will not start automatically.

- 12.2.34 **SELECT** the CMSS (emergency stop) "RESET" button.
- 12.2.35 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.2.36 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.2.37 **VERIFY** on Panel -004 that the green indicating light for Agitator 213 is illuminated.
- 12.2.38 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 213 is illuminated.

## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

**NOTE:** Steps 12.2.39 through 12.2.44 demonstrate that the "LOW LEVEL IN TANK 220" interlock stops the agitator from running

- 12.2.39 **SELECT** the Agitator "START" button on the CMSS Tank 2706-220 screen
- 12.2.40 **ENSURE** that the CMSS "LOW LEVEL IN TANK 220" indication is activated.
- 12.2.41 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.2.42 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.2.43 **VERIFY** on Panel -004 that the green indicating light for Agitator 213 is illuminated.
- 12.2.44 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 213 is illuminated.

**NOTE:** Steps 12.2.45 through 12.2.50 demonstrate that the "LOW LEVEL IN TANK 220" interlock stops the agitator from starting.

- 12.2.45 **ENSURE** that the CMSS "LOW LEVEL IN TANK 220" indication is activated
- 12.2.46 **SELECT** the Agitator "START" button on the CMSS Tank 2706-220 screen
- 12.2.47 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.2.48 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.2.49 **VERIFY** on Panel -004 that the green indicating light for Agitator 213 is illuminated.
- 12.2.50 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 213 is illuminated.

**NOTE:** Steps 12.2.51 through 12.2.60 demonstrate that the Panel -004 Agitator 213 control buttons are functional

- 12.2.50.1 **ENSURE** that the CMSS "LOW LEVEL IN TANK 220" indication is not activated
- 12.2.51 **PUSH** the Panel -004 Agitator 213 start button. *H.R.B. 2/12/99 #14*
- 12.2.52 **VERIFY** that the CMSS Agitator "on" button is white.
- 12.2.53 **VERIFY** that the CMSS Agitator "off" button is blue.
- 12.2.54 **VERIFY** on Panel -004 that the red indicating light for Agitator 213 is illuminated.
- 12.2.55 **VERIFY** on the 2706-TB motor controller that the red indicating light for Agitator 213 is illuminated.
- 12.2.56 **PUSH** the Panel -004 Agitator 213 stop button.
- 12.2.57 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.2.58 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.2.59 **VERIFY** on Panel -004 that the green indicating light for Agitator 213 is illuminated.
- 12.2.60 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 213 is illuminated.



## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

**NOTE:** Steps 12.2.61 through 12.2.70 demonstrate that the 2706-TB Agitator 213 motor controller pushbuttons are functional.

- 12.2.61 **PUSH** the 2706-TB Agitator 213 motor controller start button.
- 12.2.62 **VERIFY** that the CMSS Agitator "on" button is white.
- 12.2.63 **VERIFY** that the CMSS Agitator "off" button is blue.
- 12.2.64 **VERIFY** on Panel -004 that the red indicating light for Agitator 213 is illuminated.
- 12.2.65 **VERIFY** on the 2706-TB motor controller that the red indicating light for Agitator 213 is illuminated.
- 12.2.66 **PUSH** the 2706-TB Agitator 213 motor controller stop button.
- 12.2.67 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.2.68 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.2.69 **VERIFY** on Panel -004 that the green indicating light for Agitator 213 is illuminated.
- 12.2.70 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 213 is illuminated.

**NOTE:** Steps 0 through 12.2.76 demonstrate that the 2706-TB Agitator 213 can be started from the computer and stopped from a remote location.

- 12.2.71 **SELECT** the Agitator "START" button on the CMSS Tank 2706-220 screen.
- 12.2.72 **VERIFY** that the CMSS Agitator "on" button is white.
- 12.2.73 **PUSH** the Panel -004 Agitator 213 stop button.
- 12.2.74 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.2.75 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.2.76 **VERIFY** on Panel -004 that the green indicating light for Agitator 213 is illuminated.

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**NOTE:** This OTP tests the agitator from three locations:  
 the CMSS  
 2706-TB Motor Controller for Agitator 214  
 and 2706-TB Chem Room Panel -004

### 12.3 Test Tank 221 Agitator 214

- 12.3.1 **ENSURE** that the Tank 221 "LOW LEVEL IN TANK 221" indication is not activated.
- 12.3.2 **SELECT** the Agitator "START" button on the CMSS Tank 2706-221 screen.
- 12.3.3 **VERIFY** that the CMSS Agitator "on" button is white.
- 12.3.4 **VERIFY** that the CMSS Agitator "off" button is blue.
- 12.3.5 **VERIFY** on Panel -004 that the red indicating light for Agitator 214 is illuminated.
- 12.3.6 **VERIFY** on the 2706-TB motor controller that the red indicating light for Agitator 214 is illuminated.

## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

- 12.3.7     **SELECT** the Agitator "STOP" button on the CMSS Tank 2706-221 screen.
- 12.3.8     **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.3.9     **VERIFY** that the CMSS Agitator "off" button is white.
- 12.3.10    **VERIFY** on Panel -004 that the green indicating light for Agitator 214 is illuminated.
- 12.3.11    **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 214 is illuminated.
- 12.3.12    **SELECT** the Agitator "START" button on the CMSS Tank 2706-221 screen.
- 12.3.13    **VERIFY** that the CMSS Agitator "on" button is white.
- 12.3.14    **PUSH** the agitator stop button on Panel -004.
- 12.3.15    **VERIFY** that the CMSS Agitator "off" button is white.
- 12.3.16    **PUSH** the agitator start button on Panel -004.
- 12.3.17    **VERIFY** that the CMSS Agitator "on" button is white.
- 12.3.18    **SELECT** the Agitator "STOP" button on the CMSS Tank 2706-221 screen.
- 12.3.19    **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.3.20    **PUSH** the agitator start button on Panel -004.
- 12.3.21    **VERIFY** that the CMSS Agitator "on" button is white.
- 12.3.22    **PUSH** the agitator stop button on Panel -004.
- 12.3.23    **SELECT** the Agitator "START" button on the CMSS Tank 2706-221 screen.

**NOTE:** Steps 12.3.24 through 12.3.28 demonstrate that the emergency stop interlock stops the agitator when it is running.

- 12.3.24    **SELECT** the CMSS "EMERGENCY STOP" button
- 12.3.25    **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.3.26    **VERIFY** that the CMSS Agitator "off" button is white.
- 12.3.27    **VERIFY** on Panel -004 that the green indicating light for Agitator 214 is illuminated.
- 12.3.28    **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 214 is illuminated.

**NOTE:** Steps 12.3.29 through 12.3.33 demonstrate that emergency stop prevents Agitator 214 from starting.

- 12.3.29    **SELECT** the Agitator "START" button on the CMSS Tank 2706-221 screen.
- 12.3.30    **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.3.31    **VERIFY** that the CMSS Agitator "off" button is white.
- 12.3.32    **VERIFY** on Panel -004 that the green indicating light for Agitator 214 is illuminated.
- 12.3.33    **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 214 is illuminated.

## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

**NOTE:** Steps 12.3.34 through 12.3.38 demonstrate that the emergency stop interlock disables the agitator start instruction. So when emergency stop reset is pushed the agitator will not start automatically.

- 12.3.34 **SELECT** the CMSS (emergency stop) "RESET" button.
- 12.3.35 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.3.36 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.3.37 **VERIFY** on Panel -004 that the green indicating light for Agitator 214 is illuminated.
- 12.3.38 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 214 is illuminated.

**NOTE:** Steps 12.3.39 through 12.3.44 demonstrate that the "LOW LEVEL IN TANK 221" interlock stops the agitator from running

- 12.3.39 **SELECT** the Agitator "START" button on the CMSS Tank 2706-221 screen
- 12.3.40 **ENSURE** that the CMSS "LOW LEVEL IN TANK 221" indication is activated.
- 12.3.41 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.3.42 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.3.43 **VERIFY** on Panel -004 that the green indicating light for Agitator 214 is illuminated.
- 12.3.44 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 214 is illuminated.

**NOTE:** Steps 12.3.45 through 12.3.50 demonstrate that the "LOW LEVEL IN TANK 221" interlock stops the agitator from starting.

- 12.3.45 **ENSURE** that the CMSS "LOW LEVEL IN TANK 221" indication is activated
- 12.3.46 **SELECT** the Agitator "START" button on the CMSS Tank 2706-221 screen
- 12.3.47 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.3.48 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.3.49 **VERIFY** on Panel -004 that the green indicating light for Agitator 214 is illuminated.
- 12.3.50 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 214 is illuminated.

**NOTE:** Steps 12.3.51 through 12.3.60 demonstrate that the Panel -004 Agitator 214 control buttons are functional

- 12.3.50.1 **ENSURE** that the CMSS "LOW LEVEL IN TANK 220" indication is not activated.
- 12.3.51 **PUSH** the Panel -004 Agitator 214 start button. H.Q.B. 2/12/99 #15
- 12.3.52 **VERIFY** that the CMSS Agitator "on" button is white.
- 12.3.53 **VERIFY** that the CMSS Agitator "off" button is blue.

## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

- 12.3.54 **VERIFY** on Panel -004 that the red indicating light for Agitator 214 is illuminated.
- 12.3.55 **VERIFY** on the 2706-TB motor controller that the red indicating light for Agitator 214 is illuminated.
- 12.3.56 **PUSH** the Panel -004 Agitator 214 stop button.
- 12.3.57 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.3.58 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.3.59 **VERIFY** on Panel -004 that the green indicating light for Agitator 214 is illuminated.
- 12.3.60 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 214 is illuminated.

**NOTE:** Steps 12.2.61 through 12.3.70 demonstrate that the 2706-TB Agitator 214 motor controller pushbuttons are functional.

- 12.3.61 **PUSH** the 2706-TB Agitator 214 motor controller start button.
- 12.3.62 **VERIFY** that the CMSS Agitator "on" button is white.
- 12.3.63 **VERIFY** that the CMSS Agitator "off" button is blue.
- 12.3.64 **VERIFY** on Panel -004 that the red indicating light for Agitator 214 is illuminated.
- 12.3.65 **VERIFY** on the 2706-TB motor controller that the red indicating light for Agitator 214 is illuminated.
- 12.3.66 **PUSH** the 2706-TB Agitator 214 motor controller stop button.
- 12.3.67 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.3.68 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.3.69 **VERIFY** on Panel -004 that the green indicating light for Agitator 214 is illuminated.
- 12.3.70 **VERIFY** on the 2706-TB motor controller that the green indicating light for Agitator 214 is illuminated.

**NOTE:** Steps 12.3.71 through 12.3.76 demonstrate that the 2706-TB Agitator 214 can be started from the computer and stopped from a remote location.

- 12.3.71 **SELECT** the Agitator "START" button on the CMSS Tank 2706-221 screen.
- 12.3.72 **VERIFY** that the CMSS Agitator "on" button is white.
- 12.3.73 **PUSH** the Panel -004 Agitator 214 stop button.
- 12.3.74 **VERIFY** that the CMSS Agitator "on" button is blue.
- 12.3.75 **VERIFY** that the CMSS Agitator "off" button is white.
- 12.3.76 **VERIFY** on Panel -004 that the green indicating light for Agitator 214 is illuminated.

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**12.4 Test the Chemical Transfer Pump T-XX-2706-215**

**NOTE:** Pump 215 is an air-actuated pump. Valve A-HP-2706-288 supplies the control air. Valve T-XX-2706-248 opens the path to Tank 220, and Valve T-XX-2706-249 opens the path to Tank 221.  
**CAUTION:** The Chem Room Hose Bibb shall not be used for this procedure, unless it has been relocated from its position adjacent to the electrical disconnect on the northwest wall of the Chem Room.

**NOTE:** Steps 12.4.1 through 12.4.9 demonstrate that the chemical pump transfers liquids to Tank 220.

- 12.4.1 ENSURE that the Pump 215 suction line is connected to a 55-gallon drum that is nominally full of liquid.
- 12.4.2 ENSURE that the CMSS "LOW LEVEL IN TANK 220" is not activated.
- 12.4.3 RECORD the number of gallons registered in the "LEVEL" block on the CMSS Tank 2706-220 screen: 2934 gallons.
- 12.4.4 Slowly OPEN Valve -248.
- 12.4.5 Slowly OPEN Valve A-HP-2706-288.
- 12.4.6 RUN Pump 215, UNTIL it is no longer sucking liquid, OR the CMSS Tank 2706-220 "LEVEL" block shows an approximate 30 gallon increase to the volume recorded in Step 12.4.3.
- 12.4.7 CLOSE Valve A-HP-2706-288.
- 12.4.8 CLOSE Valve -248.
- 12.4.9 RECORD the number of gallons registered in the "LEVEL" block on the CMSS Tank 2706-221 screen: 3025 gallons

**NOTE:** Steps 12.4.10 through 12.4.18 demonstrate that the chemical pump transfers liquids to Tank 221.

- 12.4.10 ENSURE that the Pump 215 suction line is connected to a 55-gallon drum that is nominally full of liquid.
- 12.4.11 ENSURE that the CMSS "LOW LEVEL IN TANK 221" is not activated.
- 12.4.12 RECORD the number of gallons registered in the "LEVEL" block on the CMSS Tank 2706-221 screen: 1480 gallons.
- 12.4.13 Slowly OPEN Valve -249.
- 12.4.14 Slowly OPEN Valve A-HP-2706-288.
- 12.4.15 RUN Pump 215, UNTIL it is no longer sucking liquid, OR the CMSS Tank 2706-221 "LEVEL" block shows an approximate 30 gallon increase to the volume recorded in Step 12.4.12.
- 12.4.16 CLOSE Valve A-HP-2706-288.
- 12.4.17 CLOSE Valve -249.
- 12.4.18 RECORD the number of gallons registered in the "LEVEL" block on the CMSS Tank 2706-221 screen: 1910 gallons

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## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

**NOTE:** Section 12.5 tests three safety showers. Two are located in 2706-TA and the other is located in the 2706-TB Chem Room. A flow switch is connected to each of the showers. When the flow switches sense a flow, they send an alarm signal to the CMSS. The alarm registers on the CMSS "HVAC SYSTEM" screen.

### 12.5 Test the 2706-TA and 2706-TB Chem Room Safety Showers.

**CAUTION:** Activating the eyewash could splash water on the floor. Water on the floor is a slipping hazard.

- 12.5.1 **ACTIVATE** the eyewash in the North corner of 2706-TA.
- 12.5.2 **VERIFY** that the CMSS "FAH-01 HIGH FLOW SHOWER/EYEWASH" alarm indication is activated.
- 12.5.3 **DEACTIVATE** the eyewash in the North corner of 2706-TA.
- 12.5.4 **VERIFY** that the CMSS "FAH-01 HIGH FLOW SHOWER/EYEWASH" alarm indication is deactivated.
- 12.5.5 **MOP-UP** any spilled liquids.
- 12.5.6 **ACTIVATE** the eyewash in the South corner of 2706-TA.
- 12.5.7 **VERIFY** that the CMSS "FAH-02 HIGH FLOW SHOWER/EYEWASH" alarm indication is activated.
- 12.5.8 **DEACTIVATE** the eyewash in the South corner of 2706-TA.
- 12.5.9 **VERIFY** that the CMSS "FAH-02 HIGH FLOW SHOWER/EYEWASH" alarm indication is deactivated.
- 12.5.10 **MOP-UP** any spilled liquids.
- 12.5.11 **ACTIVATE** the eyewash in the 2706-TB Chem Room.
- 12.5.12 **VERIFY** that the CMSS "FAH-03 HIGH FLOW SHOWER/EYEWASH" alarm indication is activated.
- 12.5.13 **DEACTIVATE** the eyewash in the 2706-TB Chem Room.
- 12.5.14 **VERIFY** that the CMSS "FAH-03 HIGH FLOW SHOWER/EYEWASH" alarm indication is activated.
- 12.5.15 **MOP-UP** any spilled liquids.

Verification Signature:

HENRY R. BENZEL / H. R. Benzel / 12-10-98  
PRINT NAME SIGNATURE/INITIALS DATE

## 2706-T COMPLEX LIQUID TRANSFER SYSTEM OTP

**12.6 Test the Filter Room Hoist and Trolley**

**NOTE:** The Filter Room Hoist and Trolley is located in 2706-TA. Its function is to enable the replacement of filter cartridges in the process filters. It is electrically actuated, and controlled by four buttons on a suspended wand. The buttons are sequentially labeled "HOIST UP", "HOIST DOWN", "TROLLEY LEFT" and "TROLLEY RIGHT".

**NOTE:** The Hoist has three limits. Pushing the "HOIST UP" and "HOIST DOWN" buttons simultaneously results in no motion. The "HOIST UP" travel is limited to prevent running the hook into the block. The "HOIST DOWN" is limited to prevent the chain from unraveling off the drum.

**NOTE:** The Trolley has one limit. Pushing the "TROLLEY LEFT" and "TROLLEY RIGHT" buttons simultaneously results in no motion.

- 12.6.1 **ENSURE** that the Hoist and Trolley are plugged in.
- 12.6.2 **PUSH** and **HOLD** the "HOIST UP" and "HOIST DOWN" buttons simultaneously.
- 12.6.3 **VERIFY** that the Hoist does not move while both buttons are depressed.
- 12.6.4 **PUSH** and **HOLD** the "HOIST DOWN" button, UNTIL the limit switch cuts the power.
- 12.6.5 **RECORD** the approximate distance from the base of hook to the floor to the nearest inch:  
\_\_\_\_\_ inches.
- 12.6.6 **PUSH** and **HOLD** the "HOIST UP" button, UNTIL the limit switch cuts the power.
- 12.6.7 **PUSH** and **HOLD** the "TROLLEY LEFT" and "TROLLEY RIGHT" buttons simultaneously.
- 12.6.8 **VERIFY** that the trolley does not move while both buttons are depressed.
- 12.6.9 **PUSH** and **HOLD** the "TROLLEY LEFT" button until it is within approximately 18" of the building structure.
- 12.6.10 **PUSH** and **HOLD** the "TROLLEY RIGHT" button until it is within approximately 18" of the cable coil.

Verification Signature: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
PRINT NAME SIGNATURE/INITIALS DATE

### 13.0 FINAL OPERATION TEST PROCEDURE APPROVAL SIGNATURES

#### 13.1 TEST DIRECTOR:

Verification Signature: HENRY R. BENZEL / H.R. Benzel / 3-16-99  
PRINT NAME SIGNATURE/INITIALS DATE

#### 13.2 COGNIZANT ENGINEER:

Verification Signature: R.F. Boolean / R.F. Boolean / 3/23/99  
PRINT NAME SIGNATURE/INITIALS DATE

#### 13.3 OPERATIONS REPRESENTATIVE:

Verification Signature: D. C. De Rosa / D.C. DeR / 3/03/99  
PRINT NAME SIGNATURE/INITIALS DATE



***NON-OTP PROBLEMS LIST***  
***FOR OTP HNF-3610***

## *Non-OTP Problems List*

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**Item #:**1**Problem Description:**

Diaphragm Pumps 203, 204, 206, 207, 210 and 211 failed to start. When air pressure was supplied they would not cycle.

**Problem Discussion:**

The pumps were purchased early in the Project, and no attempt was made to operate them until the OTP. The ATP demonstrated that the pump operating valves were functional, but the pumps were locked out of service with the pump isolation valves. The ATP did not cycle the pumps.

When the pumps failed to work for the OTP, the problem was referred to FDNW for resolution. After a week and a half no progress was made on a resolution. Ultimately, WMH requested the pump vendor to visit the Hanford Site and assist in diagnosing the problem. He arrived on-site on New Years Eve day. Under his supervision FDNW craftspeople dismantled Pump 211. It was determined that the internal shuttle was stuck. It was the vendor's opinion that this same condition existed in the other pumps as well.

**Problem Resolution:**

Under the pump vendor's direction, FDNW craftspeople maximized the air pressure to the pump, and then used a two by four to strike the external casing of each of the pumps in the area of the shuttle valve. In each case, the shuttle valve released and the pumps began to cycle. There were no further problems with the pumps.

---

**Item #:**2**Problem Description:**

The sump liquid level gauges were not calibrated.

**Problem Discussion:**

WMH calibration of the level instruments was a prerequisite to the OTP. However the calibration was delayed when it was discovered that special equipment was required to calibrate the instruments and the equipment had not been ordered.

**Problem Resolution:**

WMH ordered the necessary equipment, which was eventually delivered. However, the OTP was delayed three weeks.

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*Non-OTP Problems List*

*Friday, April 09, 1999*

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**Item #:** 3**Problem Description:**

The Tank 220 and 221 liquid level instruments could not be calibrated.

**Problem Discussion:**

FDNW initiated efforts to calibrate the Tank 220 and 221 liquid level instruments in early December. By mid-January FDNW had no success, despite numerous contacts with the vendor. In mid-January WMH took the initiative to work with the vendor. WMH first requested that the vendor replace the instruments. The vendor agreed, but stated that they would have to provide a different model, because the original model is out of production. WMH asked why they were out of production and was advised that the discontinued model provided inconsistent readings. The vendor sent the new models special delivery and they were installed. They still did not work. WMH demanded that the vendor send a factory technician to make the units work. The vendor countered by putting the FDNW engineer in touch with the design engineers at the main factory. In discussions it was determined that the instrument signal was being absorbed by the flange connection for a pipe spool piece on top of the tank. The spool had been added to enhance access to the instrument. FDNW removed the spool piece and reinstalled the level detection instrument. One of them worked immediately, the other one was faulty. The vendor shipped a replacement instrument by special delivery. The replacement unit worked immediately. Instrument calibration was completed on 2/10/99.

**Problem Resolution:**

FDNW removed the pipe spool piece that had been added to the design and installed the replacement units that were shipped by the vendor.

**Item #:** 4**Problem Description:**

A number of valves and flanges were leaking.

**Problem Discussion:**

During the OTP performance several valves/flanges were leaking. These problems were not identified during the ATP, because the ATP did not move any liquids. The following valves/flanges were identified as leakers:

Valve T-XX-2706-240;	T-XX-2706-224;
T-XX-2706-226;	T-XX-2706-236;
T-XX-2706-238;	pipe unions on the filter bypass valves;
and the air inlet to A-HP-2706-271.	

**Problem Resolution:**

A FDNW pipefitter tightened the bolts/fittings to stop the leaks.

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*Non-OTP Problems List*

*Friday, April 09, 1999*

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**Item #:** 5

***Problem Description:***

The Tank 220 and 221 volume indications on the computer screen had two problems. One they fluctuated wildly, even when the system was at equilibrium, and two, tank volume numbers differed on different screens.

***Problem Discussion:***

The problems with the volume indications were due to software programming. In the case of the fluctuating values it was discovered that the computer was receiving input from two different sources, and those two sources did not have the same specified range. The fluctuation was caused by the computer attempting to resolve the difference between the two signals. In the case of the numbers not matching on separate screens, the indicating blocks on the separate screens were receiving input from different sources. Whereas the different sources were not calibrated exactly the same, it introduced variation in the numbers.

***Problem Resolution:***

In both cases, the computer programmer eliminated the multiple inputs into a single output. Now each volume indicator output has only one input. The volume indicators located on different screens use the same input.

---

**Item #:** 6

***Problem Description:***

Valves T-XX-2706-248 and T-XX-2706-249 were mislabelled.

***Problem Discussion:***

***Problem Resolution:***

FDNW relabelled the valves.

---

**Item #:**

7

**Problem Description:**

The power to the 2706-TB facility (which includes the air compressor) failed twice.

**Problem Discussion:**

During OTP operations the power to 2706-TB failed, which cut the power to the air compressor. Without air pressure the system will not operate. It was discovered after the first failure that the main disconnect feeding the 2706-TB facility was tripped. It was not readily apparent why it tripped. The electrician reset the switch, and testing continued for approximately 2 weeks, and the breaker tripped again. After some research, it was decided that when the compressor starts up simultaneously with a 2706-TB heater it exceeds the main disconnects adjustable setpoint. It is unlikely that this occurred during the ATP, because the ATP was performed during the summer, when the heater did not operate.

**Problem Resolution:**

FDNW adjusted the trip setpoint on the disconnect, and the problem did not recur.

---

**Item #:**

8

**Problem Description:**

The design does not permit Pumps 210 and 211 to operate at the optimum speed.

**Problem Discussion:**

When the pump vendor visited the Site, he advised that Pumps 210 and 211 were running too fast. However, the pump speed could not be reduced, because the same air line feeds both the pump and its control valve. The control valve works best at 80 psi and the pump operates best at about 25 psi. The OTP was completed successfully by setting the air pressure at 35 psi, but WMH recognized the need to separate the air supply to the pump and the control valve.

**Problem Resolution:**

WMH Engineering developed ECN 649999 and a work package to separate the air supply to a pump and its control valve.

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*Attachment VI*

*Non-OTP Problems List*

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**Item #:**

9

**Problem Description:**

The air sparger air pressure is unregulated. If two pumps and an air sparger run at the same time, the air sparger bleeds off so much pressure that the pump control valves do not function properly.

**Problem Discussion:**

The pump control valves are spring-loaded to close when air pressure is lost. The pump control valve will only open if there is enough air pressure to compress the spring. When the air sparger is running unregulated it lowers the system air pressure to the point that the pump control valve will not fully open. This is a significant concern because at the lower pressure the pump control valve will be half closed. When the valve is half closed, the computer shows it as closed, but there is still enough air to run the pump.

**Problem Resolution:**

WMH engineering wrote ECN 649999 and a work package to install air regulators on the air spargers. Reducing the air volume through the spargers will maintain enough air pressure at the pump control valves to fully open the valves. When installed the air regulators will eliminate the condition where a running pump appears to be off.

---

**Item #:**

10

**Problem Description:**

The weatherstripping on the facility doors is poorly fitted and does not seal the doors.

**Problem Discussion:**

Failure of the doors to seal is not a safety or environmental concern, because the building air pressure is negative with respect to atmosphere, and the building exhaust is HEPA filtered. However, the lack of a seal at the building entries is an operational concern. If the weatherstripping is not repaired, it will allow significant quantities of dust to be sucked into the facility. This dust will in turn enter the building exhaust, where it will be filtered out by the HEPA filter system. The dust will increase the frequency of filter changes. This is particularly significant in light of the fact that discarded filters are regulated waste. Repairing the building's weatherstripping would be a waste minimization technique.

**Problem Resolution:**

WMH Operations is reviewing this item as future work.

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*Non-OTP Problems List*

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**Item #:** 11***Problem Description:***

The system software was programmed in a way that would allow a pump to start spontaneously without the operator pushing the pump start button.

***Problem Discussion:***

When the pump start button was pushed it transmitted a constant start signal to the pump. The signal could be interrupted by a variety of interlocks, such as: an emergency stop; switching the pump from manual to automatic; etc. However, when the interlock was reset, such as when the emergency stop reset button was pushed, the pump would restart.

***Problem Resolution:***

The computer software was changed so that pump interlocks discontinued the pump start command.

---

**Item #:** 12***Problem Description:***

The system software was programmed in a way that would allow a valve to spontaneously open without the operator pushing the valve open button.

***Problem Discussion:***

When the valve open button was pushed it transmitted a constant open signal to the valve. The signal could be interrupted by a variety of interlocks, such as: an emergency stop; switching the valve from manual to automatic; etc. However, when the interlock was reset, such as when the emergency stop reset button was pushed, the valve would reopen.

***Problem Resolution:***

The computer software was changed so that valve interlocks discontinued the valve open command.

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*Non-OTP Problems List*

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**Item #:**13***Problem Description:***

The position indicating LEDs on the pump actuating valves were faulty on some of the pumps.

***Problem Discussion:***

FDNW investigated the problem and discovered that the wiring to the position indicating LEDs on the pump actuating valves was not connected.

***Problem Resolution:***

FDNW connected the wiring. The LEDs work correctly.

---

**Item #:**14***Problem Description:***

2706-TA Unit Heater, #E-UH-2706-282 had an intermittent rattling that sounded like something was loose in the fan.

***Problem Discussion:***

WMH craftspeople did not identify an exact source of the rattle, but a bad bearing in the fan motor was suspected.

***Problem Resolution:***

The heater was replaced with a spare. FDNW was evaluating whether it would be cost effective to pursue a replacement under warranty.

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*Non-OTP Problems List*

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**Item #:****15*****Problem Description:***

There was no software configuration management plan to support the software changes required to resolve the problems identified in the OTP.

***Problem Discussion:***

Whereas WMH expected FDNW to provide complete and tested system, WMH did not anticipate the need to change the software. However, the OTP soon demonstrated that the design was flawed and substantial changes to the control software were needed. Whereas the FDNW contract with the vendor had expired, WMH contracted with the vendor to modify the software. Before the changes could be made, WMH had to have a software configuration management plan. WMH assigned this task to Mr. Mac Teats and Mr. Brad Benton. They were (are) WMH engineers who have worked extensively with Hanford Site PLC programming.

***Problem Resolution:***

Software configuration plan, #HNF-3940, was developed and issued in approximately two weeks.

---

**Item #:****16*****Problem Description:***

Instrument Panel I-XX-2706-001 was missing terminal strip numbers and raceway covers.

***Problem Discussion:***

The missing items were not functional parts of the system, and their absence did not impact the OTP completion.

***Problem Resolution:***

As of 3-25-99 the missing materials were on order. Work Ticket #T-22090 will be used to install the missing pieces when they arrive.

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*Non-OTP Problems List*

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**Item #:****17*****Problem Description:***

There were missing signs and mislabelled piping.

***Problem Discussion:***

There were no load limit signs on the gantries over Tanks 220 and 221, on the crane rail over the filters or on the 2706-TB floor grating. Additionally, a water line in the 2706-T Complex was labelled as both sanitary and process water.

***Problem Resolution:***

As of 3-25-99 load limit signs had been placed on the gantries and the crane rail over the filters. WMH employees will use a work ticket to make and install the load limit signs on the 2706-TB flooring and to fix the water line labels.

---

**Item #:****18*****Problem Description:***

The Intellution Key did not have the capacity for the 2706-T system.

***Problem Discussion:***

The 2706-TA system is controlled by the Intellution software. The Intellution key that was purchased with the system has capacity for 300 inputs and outputs. The system needs currently requires capacity for 311. Noting that the modicon has expansion capacity beyond 400 inputs and outputs, it is anticipated that the 311 number will increase. A larger Intellution key is needed.

***Problem Resolution:***

During the OTP, WMH borrowed a larger key from the vendor, PLCs Plus, until WMH could procure one of its own.

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**Item #:**

19

***Problem Description:***

During OTP testing, Pump 203 had a diaphragm failure signal. During the investigation of the signal, it was determined that the diaphragm failure signal wiring was crossed. The diaphragm failure was actually in Pump 204.

***Problem Discussion:***

The diaphragm pumps each have a liquid sensor that detects liquid if a pump diaphragm is leaking. The liquid sensor sends a signal to the computer that activates an alarm. During OTP testing the Pump 203 diaphragm failure was activated. When the sensor was removed from the pump, approximately 2 cups of water drained out of the air chamber. However, when the pump was drained, the sensor dried out, and the pump was operated the leak did not recur. It is believed that the liquid was siphoned into the chamber through the air exhaust. This was possible, because the pit was flooded during OTP testing, and the pump exhaust is piped down to the floor level. This should not be a problem during operations, because the liquid removal system will prevent pit flooding.

Note that over time the pump exhaust may wear a hole in the pit lining. This area should be inspected at least once a year.

It took approximately two days for the instrument technician to correct the wiring to the leak detectors on the diaphragm pumps. Not only were the wires crossed, but they were not wired to distinguish which pump diaphragm was leaking. Each pump has two diaphragms, and the leak detection equipment is designed to tell which one is leaking. The Project did not hook up this wiring. It is unknown how this item passed the ATP.

***Problem Resolution:***

The liquid was drained from Pump 204. The diaphragm failure signal did not recur during later operations. The leak detectors were rewired and tested in accordance with a work package.

---

**Item #:**

20

***Problem Description:***

The ACT II would not run in automatic mode.

***Problem Discussion:***

During ACT II PID setpoint adjustments, it was discovered that ACT II functioned in the manual mode but would not run in automatic mode. In the automatic mode, it would run for about 10 seconds then stop. Troubleshooting revealed that the system is not wired as shown on the vendor prints. The prints show a hold-in contact hardwired to the computer start signal. The wire was missing.

***Problem Resolution:***

The software vendor programmed a computer generated contact to hold-in the fan run signal.

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**Item #:**21***Problem Description:***

The emergency shower lighting was controlled by a wall switch.

***Problem Discussion:***

The emergency shower lighting was wired to an area lighting circuit, and was turned off and on by area lighting wall switch. This is against emergency lighting regulations.

***Problem Resolution:***

WMH planned to correct this situation prior to facility start-up.

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*Attachment VI*

*Non-OTP Problems List*

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