PREVENTATIVE MAINTENANCE PLAN FOR THE EMERGENCY PUMPING TRAILERS	SYSTEM EMERGENCY

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Preventative Maintenance Plan for Emergency Pumping Trailers

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This document was reviewed following the procedures described in WHC-CM-3-4 and is:

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(Signature)

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TABLE OF CONTENTS

1.0 INTRODUCTION

The purpose/goal of this document is to identify the maintenance requirements and resources available to properly maintain the readiness and condition of the Emergency Pumping Equipment controlled by the Tank Waste Remediation System Tank Farms Plant Engineering and Tank Stabilization Operations. This equipment is intended to pump a single-shell tank (SST) that has been identified as an assumed leaking tank. The goal is to commence pumping (submersible or jet) as soon as safely possible after identifying a SST as an assumed leaking tank. Important information pertaining to the Emergency Pumping Equipment, Over-Ground Piping installation, and procedures is found in WHC-SD-WM-AP-005, "Single Shell Tank Leak Emergency Pumping Guide."

2.0 EMERGENCY PUMPING SKID, AND WHEELED TRAILER

The pump control station contains power and instrumentation for the jet-pump (and any submersible pump) that may be used to pump a tank. The 480 volt, three phase AC power is supplied by the cable reel from a tank farm welding receptacle source. This power is controlled and apportioned by a transformer, switchgear, fuses, and safety features. Power at 110 V AC (converted to 24 V DC) is supplied to the Weight Factor Instrument Enclosure and the self-contained instrumentation within: the specific gravity transmitter, the factor transmitter, and the electro/pneumatic converter. A heater is also in the Enclosure for wintertime operation.

The instrumentation in the cabinet includes a flowrate/totalizer programmable computer, a three-color pen recorder for specific gravity, weight factor, and flow rate, an elapsed time indicator, a circuit for an audible alarm and flashing strobe for the pump pit leak detector, and pump pressure and pump pit leak detector indicating lights. Power is also supplied to the portable air compressor, which supplies instrument air. Power receptacles are available for tools, and a light system will allow easier nighttime operation. Indicating lights are installed for the exterior of the control cabinets to aid operators.

The power supply to the pumps will be protected by fuses that will be sized according to the pump used for any particular tank. The compressor is controlled separately at the pump control station by switchgear. Switchgear is available to shut down the complete system, the pump, the transformer, the compressor, or AC power separately.

2.0 EMERGENCY PUMPING SKID, AND WHEELED TRAILER (Continued)

The Emergency Pumping Skid and the Emergency Pumping Trailer will have their raw water needs supplied by a water source, either in place in the tank farm, or by water truck.These units will each be moved by crane or pulled by truck to a leaker tank pump pit for the purpose of pump control, and hooked to a tank farm welding receptacle for power supply. Instrumentation does not currently exist on the skid or trailer for automatic control of the jet pumps. Manual surveillance of instrumentation and control of the jet pump system will be necessary for tank farm use.

2.1 TRACTOR-TYPE EMERGENCY PUMPING TRAILER (H.O.-64-05192)

A 45 foot Tractor-Type trailer is equipped to provide storage space and service facilities for emergency pumping equipment: this consists of two dedicated jet pump jumpers and two jet pumps, piping and dip tubes for each, two submersible pumps and attached piping, and a skid-mounted Weight Factor Instrument Enclosure (WFIE) with an air compressor and electronic recording instruments. The skid also contains a power control station for the pumps, pump pit leak detection, and instrumentation. A rack for over 100 feet of overground double-contained piping is also in the trailer. A roll-off roof on the trailer facilitates equipment removal by crane.Drawings H-2-82557 to H-2-82564, and H-2-99136 describe this equipment.

2.2 WHEELED UTILITY TRAILER (H.O.-64-5482) AND NON-WHEELED EMERGENCY SKID

A utility-sized trailer (Drawings H-2-99136, H-2-99137, H-2-99139 and H-2-99142) has been equipped to provide the required support services to the emergency jet pump, or a submersible pump. It is equipped with a Weight Factor Instrument Enclosure (WFIE) and associated electronic instrumentation, 5 hp electric air compressor, pump motor controls, electrical utility components and a reel holding 500 feet of power cord. A more detailed equipment listing is in Appendix A. The skid-mounted control system stored in the larger tractor-type emergency pumping trailer contains the same components, except that it has no wheels. The skid is equipped with lights for night-time operation. Either one of these systems provides all of the necessary instruments for monitoring one jet pump operation, which includes a strip-chart recorder, flow totalizer, and a pump pit leak detector jet pump shutdown alarm beacon and buzzer. The skid will be removed by crane from the trailer.

2.0 EMERGENCY PUMPING SKID, AND WHEELED TRAILER (Continued)

2.3 JET PUMP AND JET PUMP JUMPER ASSEMBLIES

The jet pump is assembled according to Drawing H-2-73990 (assembly 2). The pump length will be modified to the necessary length for pumping the tank in question.

The jet pump jumper is assembled according to Drawing H-2-78320. The interlocks that will be used include Limit Switch (LS) LS-1, Pressure Switch (PS) PS-1, PS-2, and the Pump Pit Leak Detector. These alarms are wired between the jet pump jumper intended for use, and the emergency pumping relay and instrumentation cabinet on the emergency trailer or emergency skid. If activated, these alarms will shut down the jet pump, and operations personnel will evaluate the cause of the alarm. It also is possible to connect the emergency control relays to a Master Shutdown System in a single-shell tank farm.

2.4 OVERGROUND PUMPING

The Over-ground Piping (OGT) system is described in Drawings found is Section 3.0. Portions of the equipment and material will be stored in the WHC Convenience Storage System, and in the Emergency Pumping Trailer.

2.5 SUBMERSIBLE PUMP

Submersible pumps have been fabricated to Drawing H-2-68521. Several of the various assemblies on this drawing can be used, depending upon the head requirements of the pump and whether rigid pipe or flexible hose is to be used. The pump length will be modified to the necessary length for pumping the tank in question.

See Step 5.1 for a complete listing of submersible pumps exclusively available for single-shell tank emergency pumping.

A pump pit leak detection induction relay (to boost capability to detect liquid within a single-shell tank pump pit), and a saltwell jet-pump heat trace control cabinet (to increase capabilities for jumper heating) exist on the Emergency Pumping Skid (See Step 2.2). A quick connection system for all power and control wire interfaces will speed all wiring connections in the field (spare wiring and connectors are available).

3.0 EMERGENCY PUMPING SUPPORT SYSTEMS

3.1 EQUIPMENT DRAWINGS

Equipment Descriptions	Drawing Title	Drawing Number
Wheeled Utility-Type Trailer	Wiring Diagram Portable Jet Pump Station	H-2-99142
Wheeled Utility-Type Trailer and Weight Factor Instrument Skid	Skid Mounted Portable Jet Pump Station	H-2-99136 (12 Sheets)
	Trailer Mounted Portable Jet Pump Station	H-2-85187
	Instrument Enclosure Portable Jet Pump Station	H-2-99139
	Weight Factor Enclosure	H-2-70877
	Instrument & WT Factor Skid	H-2-82561
Tractor-Type Trailer	Pumping Trailer Assembly	H-2-82557
	Electrical Installation	H-2-82558
	Overground Piping Storage Rack	H-2-82562
	Overground Piping Support Stand Storage Rack	H-2-82563
	Equipment Arrangement	H-2-82564
Jet Pump	Jet Pump	H-2-73990 (5 sheets)
Jet Pump Jumper	Jet Pump Jumper	H-2-78320 (3 sheets)
Submersible Pumps	Universal Submersible Pump	H-2-68521

3.0 EMERGENCY PUMPING SUPPORT SYSTEMS (Continued)

3.1 EQUIPMENT DRAWINGS (Continued)

Equipment Descriptions	Drawing Title	Drawing Number
Weight Factor Instrument Enclosure (WFIE) WFIE Cabinet	Weight Factor Instrument Enclosure (WFIE) WFIE Cabinet	H-2-94182 (4 sheets)
	Alternate Configuration for Enclosure	H-2-70877 (4 sheets)
Saltwell Screens	Saltwell Screens	H-2-69757
Portable Leak Detector Assembly	Saltwell Pump Pits	H-2-85196
Overground Transfer System	Piping - Plan, Elevation and Detail System	H-2-818279
	Piping - Overground Transfer System Assemblies	H-2-818280
	Piping - Overground Transfer System Support	H-2-818281 (sh.1)
	Piping - Overground Transfer System Support Assemblies	H-2-818281 (sh.2)
	Piping - Overground Transfer System Loop/Detail DWG	H-2-818283
	Procurement Specification Overground TRANS SYS	ER5313-P1

3.0 EMERGENCY PUMPING SUPPORT SYSTEMS (continued)

3.2 MAINTENANCE OF EMERGENCY PUMPING SUPPORT SYSTEMS

The Emergency Pumping Equipment, stored properly, has relatively low maintenance requirements. The maintenance organization responsible for the tank farms has the responsibility to maintain any pumping equipment while it is being used in the field. While on standby in storage, the equipment and storage trailers are the responsibility of Plant Engineering.

Plant Engineering will request the services of the appropriate Maintenance organization within the tank farms to accomplish the work required by this Plan. Their personnel have the qualifications and training required by any applicable DOE orders.

The maintenance intervals will be established by the cognizant engineer for emergency pumping (within Plant Engineering). In general, the following guidelines will be established:

1. The storage requirements will be established by the cognizant engineer, and "WHC Convenience Storage" will list all requested equipment under his or her name in its database. It will be his responsibility to complete all storage re-justification forms required by Warehouse Services.
2. In general, re-calibrations of instruments will be required when pump control equipment returns from field use, entering standby storage status, and will remain on the "inactive" list until needed in the field once again. All required calibrations will then be accomplished just prior to use in the field.

3. The cognizant engineer will be responsible for initiating the following activities at the intervals specified:

   Monthly

   - Inspect trailer roll-off roof for damage due to weather.
   - Check for damage to trailer exterior, tires, contents, doors,exterior electrical components, door locks.

   Six-Month

   - Rotate submersible pumps impellers and bearings.
   - Replace the AA NiCad batteries within the computer memory of the Yokagawa Pen Recorder in the Instrumentation Cabinet of the control stations.

3.0 EMERGENCY PUMPING SUPPORT SYSTEMS (continued)

4. It will be the responsibility of the Plant Engineering Cognizant Engineer to update the requirements of this plan as additional equipment becomes available, and as requirements change. He will maintain, with the manager of the saltwell component of the tank farms Operations organization, the keys for the trailer doors. Also, he will maintain a listing of the spare components on hand to support readiness to emergency pump a single-shell tank using the equipment described in this plan.

4.0 INSTRUCTION MANUALS FOR INSTRUMENTATION

Note: These documents can be found in the Tank Farms Vendor Information files directory under their manufacturer for future reference:

Brooks Instrument Brooks Wafer-Mag 7400 Electromagnetic Flowmeter with Complete Remote Electronics(CVT) Installation and Operating Instructions

Foxboro Instrument 823 DP Series Electronic d/p Cell Transmitters (WFT and SGT) in WFIE
WFT is 0-750 inches water
SGT is 0-20 inches water
Installation, Maintenance, Operation Manual

Kessler-Ellis Products Flow Computer, Masstrol Mass Flow, MCF-A-BL, Installation and Operating Instructions

Yokogawa Electric Corp.YEW Three Pen Recorder, Model 4153 (now Johnson-Yokogawa)(Part no. 4153-555-32/BU/AK-04/REM/S25N1 Recorder with resistor, Instruction Manual

The referenced below are found in the WHC Maintenance Database:

PSCP-1-002 Calibration Procedure
"Fairchild Models T-5100B-1, T-5100B-4, 5200 and T-5600 I/P Transducers"

PSCP-4-141 Calibration Procedure
"Yokagawa (YEW) Micro R100 Series Recorder"

PSCP-6-068 Calibration Procedure
"Foxboro, Model 823 D/P Cell Transmitter"

PSCP-1-073 Calibration Procedure
"Tank Farm Model 3560, Series 111 Brooks Mag-Flow Converters"

PSCP-6-001 Calibration Procedure
"Diaphragm Operated Pressure Switches"

G-TF-042 MTS Maintenance Procedure
"Testing of Liquid Detector (LDE & LLE)"

7-GN-031 FMSS Maintenance Procedure
"Testing of Pressure Relief Valves and Combination Pressure-Temperature Relief Valves"

7-GN-038 Maintenance Procedure
"CBRS Recalled Instrumentation Maintenance Activities"

5.0 PUMPING EQUIPMENT INVENTORY FOR EMERGENCY

5.1 SUBMERSIBLE PUMPS

One Flygt Submersible pump, on rigid piping, modified according to H-2-68521, assembly 22. The Flygt pump itself is modified according to H-2-72507. The model no. is B-2060, and two controllers are on hand (Controller no. 4.802), along with 180 feet of the special Flygt cable (AWG # 12/3-2-1-GC). Use of these controllers and cable allows the full use of the Flygt safety features. These units are inside the emergency pumping storage trailer.

One Peabody Flow Way 4 HOH Shrouded Submersible Turbine pump, on rigid piping, fabricated according to H-2-68521, Assembly 24, is to be stored within the emergency pumping trailer. This pump is useable within a saltwell screen.

5.2 PUMP PIT LEAK DETECTORS

Pump Pit Leak Detectors according to H-2-34965, sht 1, rev. 23.

5.3 PIPING

Two Flushing Tees with valves (for submersible pumps) according to H-2-75254, Rev. 1, sheet 1, assembly 1, will be available for the emergency trailer storage.

Two inch diameter stainless steel flex hoses, with 2" SST flanges.

Two inch and three inch size PUREX connector heads with flanges.

Saltwell jet pump insulated stainless steel flex hose for 3" wall nozzles (PUREX) connector heads, quantity 2.

400 ft. of 1" EPDM-lined braided flexible hose with nipples

5.4 INSULATED, HEAT-TRACED 1 INCH STAINLESS STEEL FLEX JUMPERS FOR VALVE PITS

H-2-93653, Assembly 26, 14 ft. with 3" horiz. Purex connector and 2" vertical Purex Connector

H-2-93653, Assembly 28, 14 ft. with 3" horiz. Purex connector and 2" horiz. Purex connector

H-2-93653, Assembly 27, 14 ft. with 2" horiz. Purex connector and 3" vertical Purex connector

5.0 PUMPING EQUIPMENT INVENTORY FOR EMERGENCY (Continued)

5.4 H-2-93655, Rev. 1 (special 3 head flexible jumper)

H-2-93653, Assembly 2, Length A

H-2-93653, Assembly 1, Length A

H-2-93653, Assembly 4, Length D

APPENDIX A

EXISTING PUMP EQUIPMENT INVENTORY
(WHC CONVENIENCE STORAGE)

TANK #	Pump	Jumper(2)
A-101	Yes	Yes
AX-101	Yes	Yes
B-104	Yes (1)	Yes (3)(5)(B-106)
B-107	Yes	Yes
B-110	No	Yes (5)
B-111	Yes	Yes (4)(5)(B-109)
BX-106	(Submersible)	N/A
BX-110	Yes (B-106)	Yes (TY-103)
BX-111	Yes (B-108)	Yes (TY-105)
BY-103	Yes (AX-102)	Yes (5)(AX-103)
BY-105	Yes (C-104)	Yes (C-104)
BY-106	Yes (C-112)	Yes (C-112)
C-103	(Submersible)	N/A
C-105	Yes	Yes
C-106	Note: Contingency linked to Retrieval from C-106.	
S-101	Yes (7)	Yes (7)
S-102	Yes	Yes
S-103	Yes (7)	Yes (7)
S-106	Yes (7)	Yes (7)
S-107	Yes (7)	Yes (7)
S-108	Yes (7)	Yes (7)
S-109	Yes (7)	Yes (7)
S-110	Yes (7)	Yes (7)
S-111	Yes (7)	Yes (7)
S-112	Yes	Yes
SX-101	Yes	Yes
SX-102	Yes	Yes
SX-103	Yes	Yes
SX-104	Yes (T-109)	Yes (T-109)
SX-105	Yes	Yes
SX-106	Yes (T-105)	Yes (T-105)
T-101	Yes	Yes (tank submersible pumped)
T-102	(Submersible)	N/A
T-104	Yes	Yes
T-107	Yes	Yes
T-110	Yes	Yes
T-111	Yes	Yes
T-112	(Submersible)	N/A
U-102	Yes	Yes
U-103	Yes	Yes
U-105	Yes	Yes

APPENDIX A (Continued)

EXISTING PUMP EQUIPMENT INVENTORY
(WHC CONVENIENCE STORAGE)

TANK #	Pump	Jumper(2)
U-106	Yes	Yes
U-107	Yes	Yes (6)
U-108	Yes	Yes
U-109	Yes	Yes
U-110	Yes	Yes (6)
U-111	Yes	Yes
Emergency 1	Yes(7) in Emerg.Trlr,	Yes (7) in Emerg. Trailer
Emergency 2	Yes(7) in Emerg.Trlr,	Yes (7) in Emerg. Trailer
not allocated	B-105	
not allocated	B-109	
not allocated	TY-101	

NOTES:

(1) No canned rotor centrifugal pump on apparatus; spares available.
(2) All funnels require modification, with the exception of 1992 fabrications (all (7) notations).
(3) Flow meter is rotated 90 degrees. Pump is tagged BY-106.
(4) Flow meter is rotated 90 degrees. Pump is tagged BY-109.
(5) No funnels currently on the jumper.
(6) Has a blue rework tag attached.
(7) Completed by Fabrication Shops in 1992

SIGNATURE APPROVAL SHEET

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