

Operation and Maintenance Manual for Temporary Septic Holding Tanks at the ERDF Shop Maintenance Facility and Office Trailers

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*Prepared for the U.S. Department of Energy, Richland Operations Office
Office of Environmental Restoration*

Submitted by: Bechtel Hanford, Inc.

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Operation and Maintenance Manual for Temporary Septic Holding Tanks at the ERDF Shop Maintenance Facility and Office Trailers

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METRIC CONVERSION CHART

Into Metric Units			Out of Metric Units		
<i>If You Know</i>	<i>Multiply By</i>	<i>To Get</i>	<i>If You Know</i>	<i>Multiply By</i>	<i>To Get</i>
Length			Length		
inches	25.4	millimeters	millimeters	0.039	inches
inches	2.54	centimeters	centimeters	0.394	inches
feet	0.305	meters	meters	3.281	feet
yards	0.914	meters	meters	1.094	yards
miles	1.609	kilometers	kilometers	0.621	miles
Area			Area		
sq. inches	6.452	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.093	sq. meters	sq. meters	10.76	sq. feet
sq. yards	0.836	sq. meters	sq. meters	1.196	sq. yards
sq. miles	2.6	sq. kilometers	sq. kilometers	0.4	sq. miles
acres	0.405	hectares	hectares	2.47	acres
Mass (weight)			Mass (weight)		
ounces	28.35	grams	grams	0.035	ounces
pounds	0.454	kilograms	kilograms	2.205	pounds
ton	0.907	metric ton	metric ton	1.102	ton
Volume			Volume		
teaspoons	5	milliliters	milliliters	0.033	fluid ounces
tablespoons	15	milliliters	liters	2.1	pints
fluid ounces	30	milliliters	liters	1.057	quarts
cups	0.24	liters	liters	0.264	gallons
pints	0.47	liters	cubic meters	35.315	cubic feet
quarts	0.95	liters	cubic meters	1.308	cubic yards
gallons	3.8	liters			
cubic feet	0.028	cubic meters			
cubic yards	0.765	cubic meters			
Temperature			Temperature		
Fahrenheit	subtract 32, then multiply by 5/9	Celsius	Celsius	multiply by 9/5, then add 32	Fahrenheit
Radioactivity			Radioactivity		
picocuries	37	millibecquerel	millibecquerels	0.027	picocuries

1.0 INTRODUCTION

This document was prepared to provide detailed information for operation and maintenance (O&M) of the sanitary wastewater holding system at the Environmental Restoration Disposal Facility (ERDF) shop maintenance facility and the ERDF shop office trailers. These two sanitary wastewater holding systems are co-located in the Hanford Site's 200 West Area. The two systems are identified in the "Permit to Operate" Hanford On-Site Sewage Systems as "(Bechtel) Holding Tank System (Temporary) for ERDF New Shop Facility" and "(Bechtel) Holding Tank System (Temporary) for ERDF Construction Trailers."

This document describes the operations, including the type and frequency of required maintenance, and system failure response procedures. For the purposes of this O&M manual, the requirements for the two co-located systems have been combined into one O&M manual under a consistent inspection and maintenance program. The engineering report for the ERDF shop maintenance facility (Meier Associates 1996) and the ERDF shop office trailers (BHI 1995a) contain the original design details.

2.0 SYSTEM DESCRIPTION

2.1 ERDF SHOP MAINTENANCE FACILITY HOLDING TANKS

The system consists of a temporary 3,785-L (1,000-gal) double-chamber septic tank and a temporary 7,570-L (2,000-gal) single-chamber holding tank. The tanks are linked by a 10.2-cm (4-in.)-diameter polyvinyl chloride (PVC) pass-through pipe and a 10.2-cm (4-in.)-diameter vent line located near the top of each tank. The system includes two level alarms. The maximum daily design flow is 795 L (210 gal). Water is supplied to the shops by the Hanford Site potable water supply system. The tank location and system configuration are presented in Appendix A. The figures were obtained from the original O&M manual for this system (Meier Associates 1996).

2.2 ERDF SHOP OFFICE TRAILERS HOLDING TANK

The system consists of a temporary 5,678-L (1,500-gal) holding tank and includes two level alarms. The maximum daily design flow is 227 L (60 gal). Water is supplied to the office trailers by the Hanford Site potable water supply system. The tank location and system configuration are presented in Appendix B. The figures were obtained from the original O&M manual for this system (BHI 1995b).

3.0 SYSTEM OPERATION

3.1 ERDF SHOP MAINTENANCE FACILITY HOLDING TANKS OPERATION

An accumulation of more than 7,793 L (2,059 gal) of effluent in the tank will produce an alarm signal, indicating that the system requires pumping (Appendix A). A local audible alarm will sound, and the annunciator light-emitting diode (LED) on the control panel will illuminate. Continued filling will activate a second alarm at 10,685 L (2,823 gal), indicating that the reserve storage (RS) capacity has been exceeded. A local audible alarm will sound, and the RS annunciator LED on the control panel will illuminate.

3.1.1 Standard Operating Procedures

Sanitary wastewater and raw sewage enter the holding tank through the 10.2-cm (4-in.) drain from the shop facility. The pumping frequency will depend upon the occupancy of the support facility. For design purposes (i.e., full occupancy), pumping was assumed to occur once per week. The date and volume pumped (based on the records provided routinely [e.g., monthly] by the pumper) are to be recorded in the operation and inspection log (see Appendix C for an example of the log).

3.2 ERDF SHOP OFFICE TRAILERS HOLDING TANK OPERATION

An accumulation of more than 1,363 L (360 gal) of effluent in the tank will produce an alarm signal, indicating that the normal operating volume (NOV) has been exceeded and the system requires pumping (Appendix B). A local audible alarm will sound and the NOV annunciator LED on the control panel will illuminate. Continued filling will activate a second alarm at 4,921 L [1,300 gal]), indicating that the RS capacity has been exceeded. A local audible alarm will sound, and the RS annunciator LED on the control panel will illuminate.

3.2.1 Standard Operating Procedures

Sanitary wastewater and raw sewage enter the holding tank through the 10.2-cm (4-in.) drain from the office trailers. The pumping frequency will depend upon the occupancy of the support facility. For design purposes (i.e., full occupancy), pumping was assumed to occur once per week. The date and volume pumped (based on the records provided routinely [e.g., monthly] by the pumper) are to be recorded in the operation and inspection log (see Appendix C for an example of the log).

3.3 NONSTANDARD OPERATING CONDITIONS

Nonstandard alarm conditions may be caused by several events, including a delay in septic tank content removal, facility over-use, or alarm malfunction. If an alarm occurs, proceed as follows:

- Turn off the alarm.
- If the level in the holding tank has reached or has exceeded the RS level, restrict access to water use (as appropriate) to prevent overflow. Direct personnel to use alternative facilities.
- Contact the facility administrator, building warden, or designee, who will coordinate the proper response action.
- Determine the cause of the alarm (e.g., excessive use of facilities, delay in pumping schedule, or malfunctioning fixtures in the restroom or shower facilities).
- Note the cause of the alarm and the response actions taken in the inspection and operation log.

Any nonstandard event shall be reported to the appropriate Bechtel Hanford, Inc. (BHI) subcontract technical representative (STR). Repairs/modifications to the holding tank system or other components upstream of the holding tanks that alter the sewage design basis (e.g., daily sewage flow) shall not be made without prior BHI approval.

4.0 PERIODIC INSPECTION

The system components shall be inspected every 6 months to ensure that the overall system functions as designed. The inspection shall be recorded in the inspection and operation log.

If deficiencies are observed during inspection, contact the facility administrator, building warden, or designee for resolution. Also notify the BHI STR. Note any conditions requiring action and any maintenance performed in the inspection and operation log. An example log is included in Appendix C. This log may be modified to incorporate operational considerations, as appropriate.

Regular inspection of key holding tank system components is necessary to ensure the integrity of the system during the design life. These inspections shall be recorded in the inspection and operation log and submitted to BHI.

In addition to periodic inspections, project personnel will inspect the fixtures in the restroom and shower facilities on a regular basis (i.e., at least monthly) to ensure that the fixtures are functioning appropriately. Properly functioning fixtures are important to ensure that the

designed flows to the holding tanks are not exceeded. Malfunctioning fixtures shall be fixed as soon as possible and shall be noted in the comment section of the inspection and operation log.

4.1 ALARM PANEL

Manually activate the lower float switch to a level above the NOV set point to verify the alarm function. Then manually activate the upper float switch to a level above the RS set point to verify the alarm function.

4.2 HOLDING TANK ACCESS PORTS

4.2.1 Manway Access

Inspect the 61-cm (24-in.) manway access ports for proper condition.

4.2.2 Pumping Port

Inspect the 25.4-cm (10-in.) pumping port for proper condition.

5.0 SEWAGE PUMPING AND DISPOSAL

The septic tanks shall be pumped on a regularly scheduled basis by a licensed sewage pumping contractor. The frequency of pumping is dependent on facility use and should be set so that the system is normally pumped prior to reaching the NOV alarm. The pumping contractor is responsible for hauling the sewage to a treatment or disposal facility, approved in accordance with applicable local and/or state regulations. The service contract shall be maintained at the facility.

6.0 RECORDKEEPING AND ANNUAL REPORTING TO WASHINGTON STATE DEPARTMENT OF HEALTH

An annual report for the holding tank systems is required to be submitted to the Washington State Department of Health, as required by the annual onsite sewage system permit to operate. The report will consist of the inspection and operations log for the system. The report may be submitted through the U.S. Department of Energy, Richland Operations Office.

Septic system records shall be maintained. These records include the inspection and operation log, and records documenting maintenance, repairs, pumping, etc.

7.0 REFERENCES

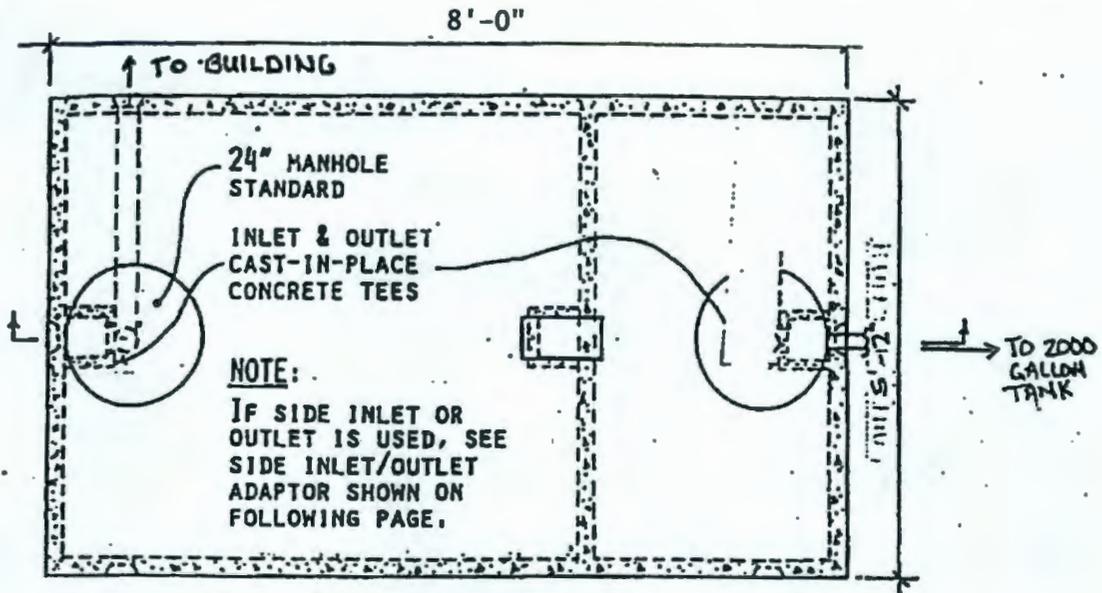
BHI, 1995a, *Temporary Septic Holding Tank for the Environmental Restoration Disposal Facility Engineering Report*, BHI-00365, Rev. 00, Bechtel Hanford, Inc., Richland, Washington.

BHI, 1995b, *Temporary Septic Holding Tank for the Environmental Restoration Disposal Facility Operation and Maintenance Manual*, BHI-00366, Rev. 00, Bechtel Hanford, Inc., Richland, Washington.

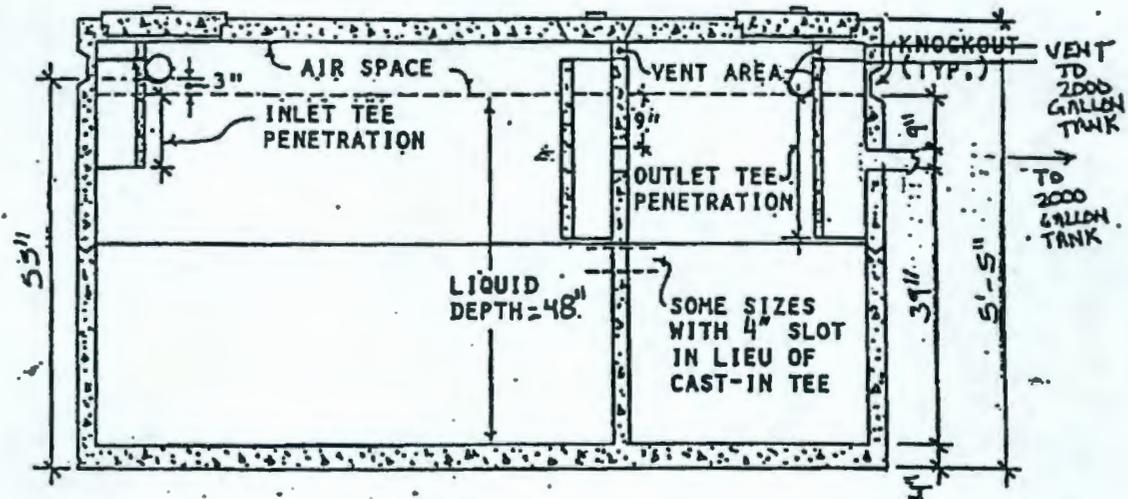
Meier Associates, 1996, *Septic System Operations and Maintenance Manual for ERDF Shop Maintenance Facility Temporary Holding Tank System*, CCN 934117, dated July 31, 1996, Meier Associates, Inc., Kennewick, Washington.

APPENDIX A

**FIGURES AND CALCULATION FOR THE ERDF
SHOP MAINTENANCE FACILITY HOLDING TANKS**



PLAN



SECTION

NOTE:

- SEE CHART FOR SIZES AND DIMENSIONS
- SINGLE COMPARTMENT TANKS SAME AS SHOWN ABOVE WITHOUT PARTITION

1000 GALLON SEPTIC TANK
MODEL # 1627

SEPTIC TANK

(PRODUCT #'s ON PRICE LIST)

2228.1

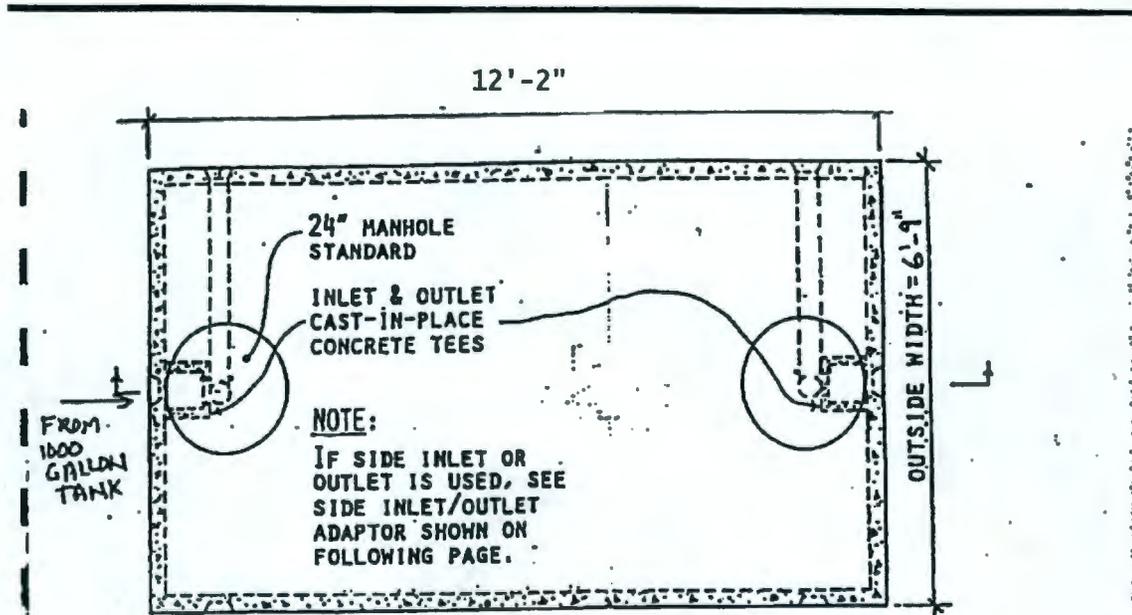
FIG. 3

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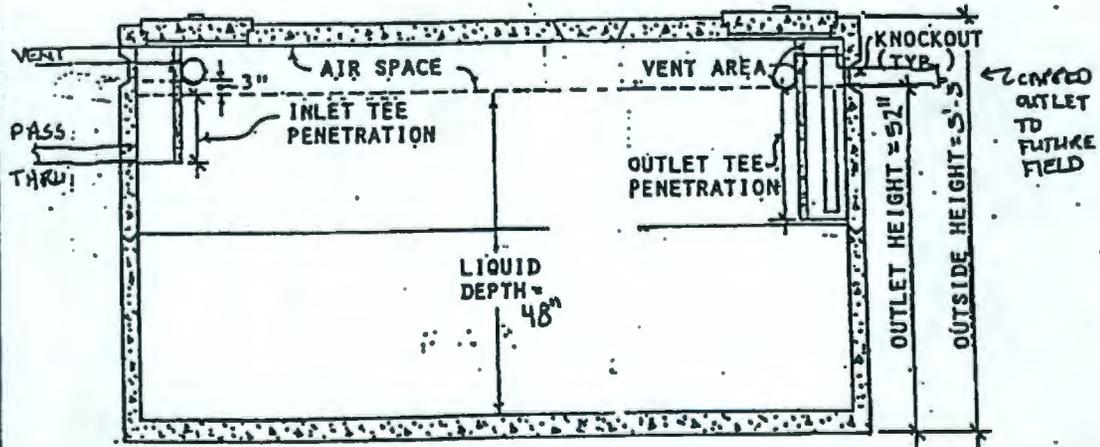
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PAGE 2

7/20/6



PLAN



SECTION

NOTE:
-SEE CHART FOR SIZES AND DIMENSIONS
-SINGLE COMPARTMENT TANKS SAME AS SHOWN ABOVE WITHOUT PARTITION

2000 GALLON TANK
MODEL 1614

SEPTIC TANK

(PRODUCT #'S ON PRICE LIST)

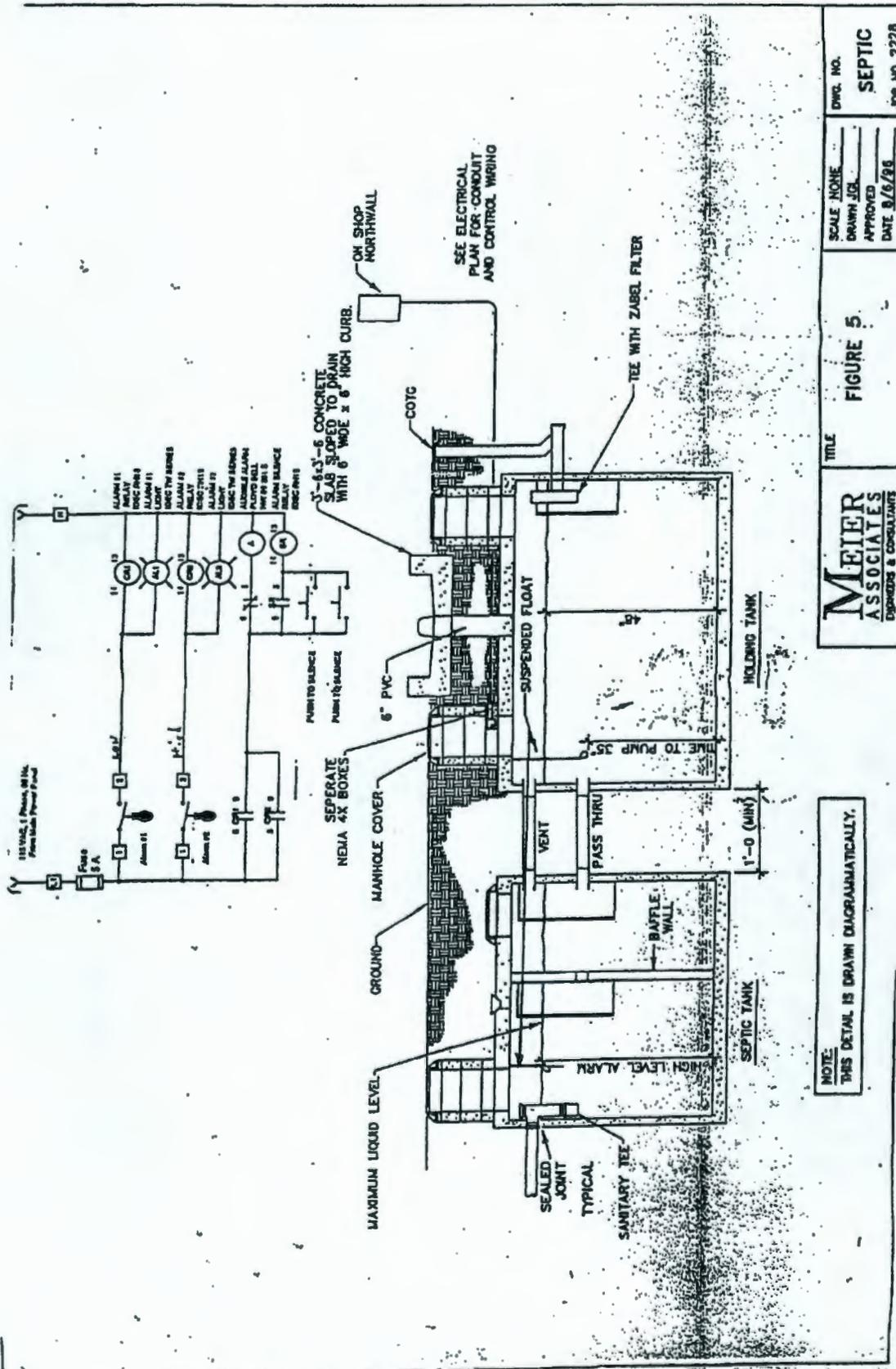
222A1

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DALE



<p>MEIER ASSOCIATES DESIGNERS & CONSULTANTS</p>	<p>TITLE</p> <p>FIGURE 5</p>	<p>SCALE NONE</p> <p>DRAWN JCL</p> <p>APPROVED</p> <p>DATE 8/6/98</p>	<p>DWG. NO.</p> <p>SEPTIC</p> <p>JOB NO. 2228</p>
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NOTE: THIS DETAIL IS DRAWN DIAGRAMMATICALLY.

ORIGINAL

CALCULATION COVER SHEET

Project Title: RAWD Job No. 22192
 Area: ERDF
 Discipline: Environmental Calc. No. 0600X-CA-V0035
 Subject: Temporary Holding Tank at ERDF Shop Maintenance Facility (Septics)
 Computer Program: N/A Program No. N/A

Use of this calculation by persons who do not have access to all of the pertinent facts could lead to incorrect conclusions or assumptions. Before applying this calculation in your work, this calculation must be thoroughly reviewed with appropriate and authorized Hanford site ERC personnel. Without this review, the ERC cannot assume any responsibility for the use of these calculations.

Committed Calculation Preliminary Superseded

Rev.	Sheet Numbers	Originator	Checker	Reviewer	Approval	Date
0	Cover = 1 Calc. = 1 Total = 2	J. W. Donnelly 3/27/03	S. E. Pamell S.E. Pamell 3/27/03	J. G. Woolard J.G. Woolard 3/27/03	F. M. Corpuz F.M. Corpuz 3/31/03	3/31/03
SUMMARY OF REVISIONS						

*Obtain Calc. No. from DIS
DE01-437.03

January 2003

ORIGINAL



Bechtel Hanford, Inc.

CALCULATION SHEET

Originator J. W. Donnelly Date 03-03-2003 Calc. No. 0600X-CA-V0035 Rev. No. 0
 Project ERDF Job No. 22192 Checked S. E. Parnell Date March 13, 2003
 Subject Temporary Holding Tank at ERDF Shop Maintenance Facility (Septics) Sheet No. 1 of 1

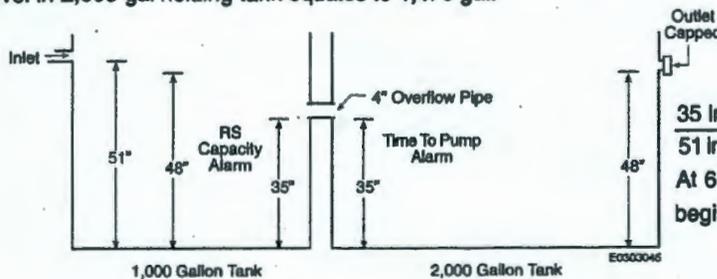
1 Purpose: Determine the amount of sewage, in gallons, when the time-to-pump alarm and reserve storage capacity
 2 alarm will sound.

3 Normal Operating Volume (NOV) = Daily sewage flow x pumping frequency
 4 = 210 gal/day x 7 days = 1,470 gal

(Reference: "Recommended Standards and Guidance for Holding Tank Sewage Systems," Washington State Department of Health, 12/31/98)

5 What level in 2,000-gal holding tank equates to 1,470 gal:

6 1)



$\frac{35 \text{ in.}}{51 \text{ in.}} \times 1,000 \text{ gal} = 686 \text{ gal}$ (see page A-1)
 At 686 gal – overflow to 2,000-gal tank begins

14 2) Level in 2,000-gal tank at NOV (see page A-2)

15 $1,470 \text{ gal} - 686 \text{ gal} = 784 \text{ gal}$
 16 784 gal in 2,000-gal tank equals what level?

17
$$\frac{x}{51 \text{ in.}} \times 2,000 \text{ gal} = 784 \text{ gal}$$

18
$$x = \frac{784 \text{ gal} \times 51 \text{ in.}}{2,000 \text{ gal}} = 20 \text{ in.}$$

21 3) Time to pump alarm = 35 in. in 2,000-gal tank
 22 What volume of waste in both tanks does this represent?

23
$$= \frac{35 \text{ in.}}{51 \text{ in.}} (1,000 \text{ gal}) + \frac{35 \text{ in.}}{51 \text{ in.}} (2,000 \text{ gal})$$

24
$$= 686 \text{ gal} + 1,373 \text{ gal} = 2,059 \text{ gal}$$
 (NOV alarm set @ 2.8 days excess capacity)

27 4) Reserve storage volume required (RSV) = (3)(210 gal/day) = 630 gal

(Reference: "Recommended Standards and Guidance for Holding Tank Sewage Systems," Washington State Department of Health, 12/31/98)

29 5) RSV exceeded alarm = 48 in. in 1,000-gal tank
 30 What volume of waste in both tanks does this represent?

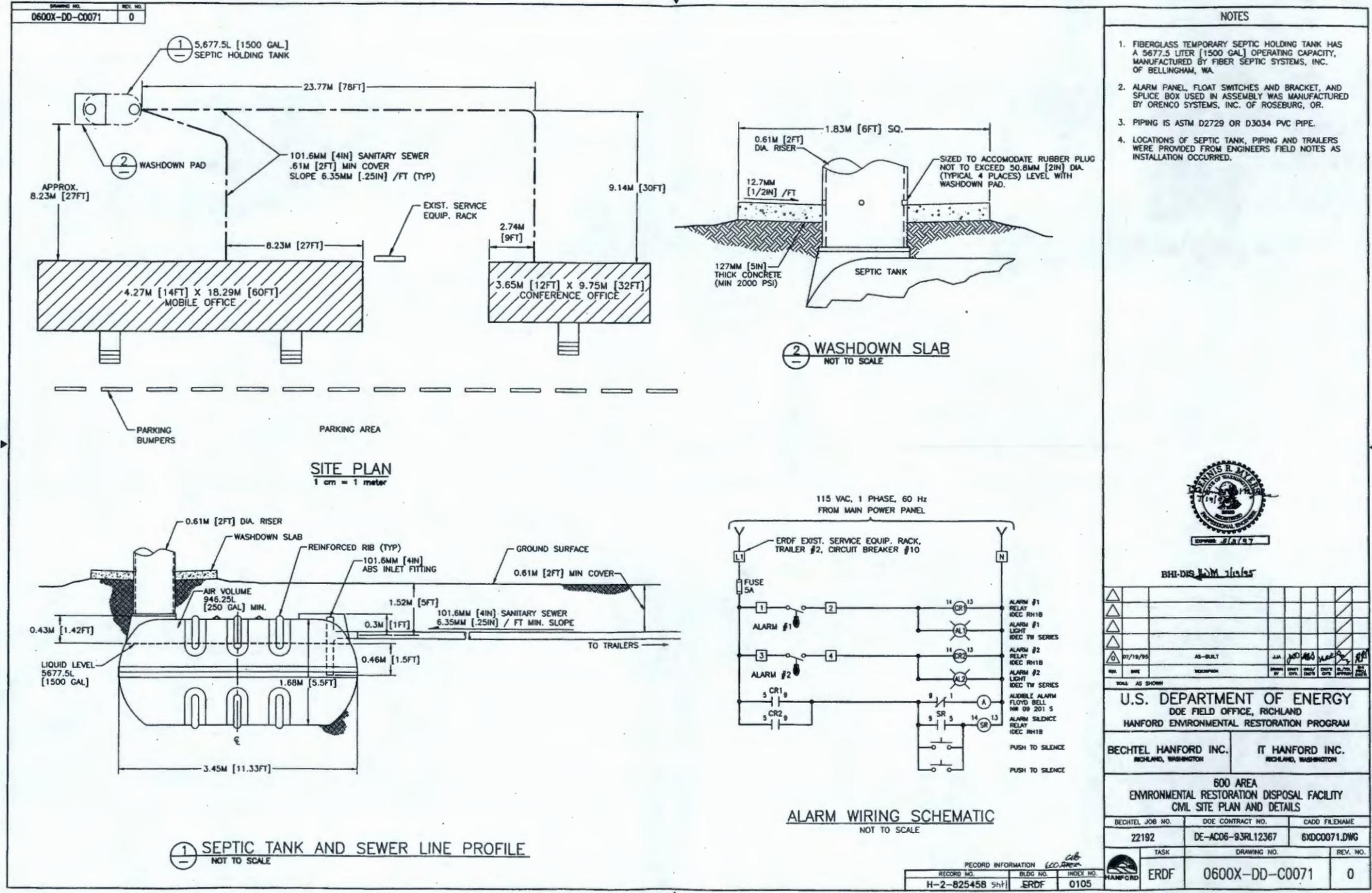
31
$$= \frac{48 \text{ in.}}{51 \text{ in.}} (1,000 \text{ gal}) + \frac{48 \text{ in.}}{51 \text{ in.}} (2,000 \text{ gal})$$

32
$$= 941 \text{ gal} + 1,882 \text{ gal} = 2,823 \text{ gal}$$

35 6) Volume between time to pump alarm and RSV exceeded alarm = $2,823 \text{ gal} - 2,059 \text{ gal} = 764 \text{ gal}$
 36 764 gal of reserve storage capacity.

APPENDIX B

**FIGURES FOR THE ERDF
SHOP OFFICE TRAILER HOLDING TANK**



APPENDIX C
INSPECTION AND OPERATION LOG

DISTRIBUTION

U.S. Department of Energy,
Richland Operations Office

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O. Robertson	A3-04
E. B. Dagan	A5-15

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