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1	/	Program Mgr. JW Osborne	<i>J.W. Osborne</i>	12/14/94	R2-78						
1	/	QA H. K. Ananda	<i>H.K. Ananda</i>	1/11/95	S1-57						
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1	/	Safety E. R. Hewitt	<i>E.R. Hewitt</i>	1-16-95	R3-01						

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Number:**

WHC-SD-WM-ETP-107 Rev. 0

**Document
Title:**

Engineering Task Plan for the Vapor Monitor
Installation into 241-C-103 Tank

Release Date:

January 19, 1995

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

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

V.L. Birkland

V.L. Birkland

January 20, 1995

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7. Abstract A vapor flow monitor is to be installed into the 241-C-103 tank's exhaust, just downstream of the HEPA filter. The flow monitor system includes the flow sensor, the baffle assembly, the signal conditioning and control electronics, and a chart recorder. The electronics package and the chart recorder are installed into a small, heated instrument cabinet that is mounted on the same steel pallet on which the flowmeter and the diffuser assembly is mounted. The flowmeter is connected to the HEPA filter with an unheated, un-insulated flex hose. An automatic drain, upstream of the flowmeter, is designed to automatically drain the condensate into an evaporating pan. The flowmeter is heated with a temperature controlled heater to avoid condensation.		
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WHC-SD-WM-ETP-107

Rev. 0

ENGINEERING TASK PLAN
FOR THE VAPOR MONITOR INSTALLATION
INTO 241-C-103 TANK

December 1994

Author

N. A. Hertelendy
Mechanical Equipment

MASTER

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ETN-94-0161

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TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	1
1.1 PURPOSE	1
1.2 BACKGROUND	1
2.0 SCOPE	1
2.1 OBJECTIVES	1
2.2 TASK DESCRIPTION	1
2.3 SCOPE CHANGES	2
3.0 DESCRIPTION	2
3.1 PHYSICAL DESCRIPTION	2
3.2 DELIVERABLES	2
4.0 RESPONSIBILITY OF ASSIGNMENTS	3
4.1 PROJECT MANAGEMENT	3
4.2 SUPPORT DOCUMENTATION	3
4.2.1 Engineering Task Plan	3
4.2.2 Unreviewed Safety Question (USQ) Evaluation	3
4.3 INSTALLATION DOCUMENTATION	3
4.3.1 Flow Monitor Installation/In-place Testing	3
4.3.2 Flow Monitor Electrical/Electronic Installation Documentation	3
4.3.3 Installation Management	4
4.4 SCHEDULING	4
4.4.1 Installation Coordination	4
4.4.2 Material Procurement	4
4.5 TESTING	4
4.5.1 Operational Setup	4
4.5.2 Testing and Test Coordination	4
4.6 INSTALLATION EVALUATION	5
5.0 SCHEDULE	5
6.0 COST ESTIMATE	7
FIGURE 1	6

ENGINEERING TASK PLAN FOR THE VAPOR MONITOR INSTALLATION INTO 241-C-103 TANK

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this Engineering Task Plan (ETP) is to establish the line of responsibility for the installation of the vapor flow monitor into the 241-C-103 (C-103) waste tank, as part of the vapor flow monitoring and sampling system. The system is to be installed downstream of the tank C-103 breather filter.

1.2 BACKGROUND

Tank C-103 is vented to the atmosphere through a high efficiency particle air (HEPA) filter and is thought to be the source of noxious vapor emissions. The primary motive force for these emissions is believed to be the normal barometric pressure changes, wind, tank ambient temperature difference, and chimney effect. In order to assess the danger caused by these vapors, tank breathing must be characterized. There is no flowmeter on the market with sufficiently low pressure drop that can measure such a low flow, nor is there one with sufficient range to accommodate possible "flow variations" which may occur in tank C-103. Westinghouse Hanford Company (WHC) developed such a flowmeter, WHC-SD-WM-ETP-004 (Hertelendy, 1993), and it is now ready for installation onto tank C-103. Tanks 241-C-101 (C-101), 241-C-102 (C-102), and C-103 are interconnected via underground cascade overflow. Presently, C-101 and C-103 are valved off and all three tanks are breathing through C-102. After the flow monitor installation, the C-103 vent-valve will be opened and the vent valve on C-102 will be closed to channel all flow through the flowmeter.

2.0 SCOPE

2.1 OBJECTIVES

The objectives of this task are to:

- Install the Serial Number (SN) SN1 vapor flow monitor downstream of the HEPA filter.
- Complete the electrical hook-up to bring system on line.

2.2 TASK DESCRIPTION

At the end of this engineering task, the vapor flow monitor will be installed on tank C-103. It will have the capability to measure the flow in and out of the tank, continuously record flow data, turn on/off grab samplers, turn on/off alarms, or any other instruments (up to a maximum of five).

2.3 SCOPE CHANGES

Any deviations from this document are considered scope changes and will require revisions to this ETP. All changes to this document shall be handled formally in accordance with WHC-CM-6-1, Standard Engineering Practices, Section EP-2.2, and shall include changes in schedules and cost.

3.0 DESCRIPTION

3.1 PHYSICAL DESCRIPTION

The breather filter for C-103 is a Flanders¹ G1 housing. Two carbon filters are presently installed downstream of the breather filter. These carbon filters will have to be removed prior to the vapor monitor installation. The flow monitor is designed for installation downstream of the breather filter. The flow monitor has a "diffuser module" (the baffle), which is mounted at the exhaust end of the monitor to reduce the effects of wind and air turbulence. The whole assembly is mounted on the center of a steel pallet with the supporting electronics and chart recorder (which are mounted in a standard electric enclosure). The steel pallet is a standard, 4 ft x 4 ft, "forklift" pallet to which the flowmeter is mounted as low as possible to keep the center of gravity (Cg) low. The electronics cabinet is mounted on a UNI-STRUT frame welded to the pallet. Thus the Cg of the pallet assembly is kept very low to minimize the effects of a seismic event. The cabinet is equipped with a heater and with a 8° tilt switch which disconnects power to the cabinet in case the cabinet tilts over 8° during a seismic event. The flowmeter is mounted vertically on the top of a flanged 4", 90° polyvinyl chloride (PVC) elbow and a steel support frame. On the bottom of the elbow there is an automatic drain to drain the condensate into a heated, aluminum evaporation pan. The vapor monitor itself is equipped with an internal heater and it is insulated, but the flexible line between the flowmeter and the HEPA filter does not have to be heat traced.

3.2 DELIVERABLES

The deliverables are identified as follows:

- 3.2.1 Installation of SN1 vapor flow monitor in tank C-103 in ready to operate condition. All vapor and electrical connections completed.
- 3.2.2 Removal of two carbon adsorber filters.
- 3.2.3 Operational testing of the installed system to demonstrate function.
- 3.2.4 Installed system ready to record tank breathing flow.

¹Flanders Filters, Inc., Washington, North Carolina.

4.0 RESPONSIBILITY OF ASSIGNMENTS

4.1 PROJECT MANAGEMENT

Responsible Organization: Mechanical Equipment/71130
Manager: T. L. Moore J. L. Moore 12/14/94
Engineer: N. A. Hertelendy

4.2 SUPPORT DOCUMENTATION

4.2.1 Engineering Task Plan

This ETP identifies the criteria, activities, responsibilities, schedule, and cost for the overall program.

Responsible Organization: Mechanical Equipment/71130
Manager: T. L. Moore J. L. Moore 12/14/94
Engineer: N. A. Hertelendy

4.2.2 Unreviewed Safety Question (USQ) Evaluation

A USQ evaluation will be performed.

Responsible Organization: Waste Tank Safety Analysis/74200
Manager: G. L. Smith J. M. Grigsby 12-16-94
Engineer: W. G. Farley

4.3 INSTALLATION DOCUMENTATION

4.3.1 Flow Monitor Installation/In-place Testing

This task includes the mechanical design of the vapor flow monitor installation, testing prior to turnover, and writing the necessary Engineering Change Notices (ECNs). It also includes writing the necessary ECNs to remove the carbon filters and ensuring the removal.

Responsible Organization: Test Engineering/7CH40
Manager: G. T. Bear G. T. Bear 12-15-94
Engineer: D. W. Strasser

4.3.2 Flow Monitor Electrical/Electronic Installation Documentation

This task includes the electrical/electronic design of the vapor flow monitor installation, testing prior to turnover, and writing the necessary ECNs, as well as the electrical/electronic installation drawings and cabinet installation coordination.

Responsible Organization: Test Engineering/7CH40
Manager: G. T. Bear G. T. Bear 12-15-94
Engineer: D. W. Strasser

4.3.3 Installation Management

This organization shall coordinate the installation, including the preparation of the work packages, mechanical and electrical hook-ups, and set up the Readiness Review.

Responsible Organization: TWRS Operations/7C550
 Manager: M. D. Harding
 Person in Charge (PIC): R. L. Wright

[Signature]

4.4 SCHEDULING

4.4.1 Installation Coordination

Responsible Organization: TWRS Operations/7C550
 Manager: M. D. Harding
 PIC: J. Sanders

[Signature]

4.4.2 Material Procurement

In order to expedite installation, this organization shall ~~identify items to be procured~~ and issue procurement requisitions as required. *based on The Bill of Material from The Planner or PIC*

Responsible Organization: Maintenance Integration/
 Material Services/7CB41
 Manager: J. E. Allison
 Plant Engineer: R. B. Dunn

[Signature]

4.5 TESTING

4.5.1 Operational Setup

This organization will assist Mechanical Engineering in the setup and testing of the flow monitors in preparation of turnover.

Responsible Organization: Characterization Equipment/71510
 Manager: R. J. Blanchard
 Engineer: P. R. Deichelbohrer

[Signature]

4.5.2 Testing and Test Coordination

This organization will be responsible to install and test the vapor monitor and cabinet assembly, and writing the turnover report.

This organization will have primary responsibility.

Responsible Organization: Mechanical Equipment/71130
 Manager: T. L. Moore
 Engineer: N. A. Hertelendy
 Engineer: P. R. Deichelbohrer

[Signature] 12/14/94

4.6 INSTALLATION EVALUATION

The installation design will be evaluated by Quality Assurance (QA) and Industrial Safety to ensure that all Hanford standards are met.

Manager, Quality Assurance: Don Board Date: 1-16-95
Manager, Industrial Safety: E R Hunt Date: 1/16/95

5.0 SCHEDULE

See Figure 1 for schedule.

07/23/04
KAM

FIGURE 1

MAJOR MILESTONE
 SIGNIFICANT MILESTONE
 MILESTONE
 COMPLETED STATUS SLIPAGE RECOVERED

6.0 COST ESTIMATE

TASK #	RESPONSIBILITY OF ASSIGNMENT	ORG. CODE	TYPE	RATE	FUNCTIONAL OVERHEAD	HOURS	TOTAL ESTIMATE IN FUNCTIONAL \$
4.1	PROJECT MANAGEMENT	71130	E	39.85	1.185	80	3778
4.2	SUPPORT DOCUMENTATION						
4.2.1	Engineering Task Plan	71130	N	15.97	1.185	40	757
4.2.2	USQ Evaluation	8D113	E	40.56	1.508	16	979
4.3	INSTALLATION DOCUMENTATION						
4.3.1	Flow Monitor Installation/ In-place Testing	7CH40	E	39.85	1.185	16	756
4.3.2	Flow Monitor Electrical/ Electronic Installation Documentation	7CH40	E	39.85	1.185	16	756
4.3.3	Installation Management	7C550	E N	39.85 15.97	1.185	32 8	1512 152
4.4	SCHEDULING						
4.4.1	Installation Coordination	7C550	E	35.73	1.320	16	755
4.4.2	Material Procurement	7CB41	E	35.73	1.185	16	677
4.5	TESTING						
4.5.1	Operational Setup	71510	E	39.85	1.185	40	1889
4.5.2	Testing and Test Coordination	71130	E	39.85	1.185	24	1133
4.6	INSTALLATION EVALUATION						
	Quality Assurance Evaluation	38220	E N	37.95 22.36	1.440	16 8	874 258
	Industrial Safety Evaluation	31111	E N	34.58 22.16	1.440	12 4	598 128
	MATERIALS						1000
	SUBTOTAL						16002
	25% CONTINGENCY						4000
	TOTAL COST						20000