JAN 25 2000 STA#4

4 ENGINEERING DATA TRANSMITTAL S

Page 1 of 1

1 EDT 619709

2 To (Receiving Organization)	3 From (Originating Organization)	4 Related EDT No
Distribution	WRSS/DST Engineering	N/A
5 Proj /Prog /Dept /Div	**6 Design Authority/Design Agent/Cog Engr**	**7 Purchase Order No**
W-320/WRSS	D A Bragg/D B Parkman	
8 Originator Remarks		**9 Equip /Component No**
This document is being released to determine how much heat load is remaining in tank 241-C-106		241-C-106
		10 System/Bldg /Facility
		241-C
		12 Major Assm Dwg No
		N/A
11 Receiver Remarks	**11A Design Baseline Document?** ○ Yes ◉ No	**13 Permit/Permit Application No**
		N/A
		14 Required Response Date

15 DATA TRANSMITTED

(A) Item No	(B) Document/Drawing No	(C) Sheet No	(D) Rev No	(E) Title or Description of Data Transmitted	(F) Approval Desig nator	(G) Reason for Trans-mittal	(H) Origi nator Dispo sition	(I) Receiv er Dispo sition
1	RPP-5646	N/A	0	Process Test Plan Shutdown P16 Exhauster	ESQ	2	1	1

16 KEY

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

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
2	1	Design Authority D A Bragg	D A Bragg	1-20-2000	S5-05	2	1	J A Bailey	J A Bailey	R3-25 1/18/00	
		Design Agent				2	1	K S Gasiorowski	K S Gasiorowski	R2-11 1/25/00	
2	1	Cog Eng D B Parkman	D B Parkman	1 18 2000	S5 13						
2	1	Cog Mgr D G Baide	D G Baide	1-20-00	S5-05						
2	1	QA John J Verdegan	John J Verdegan	1-20-00	S6-15						
		NF&S Safety	Pat T Smith	1/19/00		2	1	Pamela Arendal	Pamela Arendal	1/19/00	S5-12
	1	Env	T A Dimitroff	1/19/00	S5-03						

18	19	20	21 DOE APPROVAL (if required)
D B Parkman 1-20 2000	NA	D G Baide 1-20-00	Ctrl No _____
Signature of EDT Originator / Date	Authorized Representative for Receiving Organization / Date	Design Authority/ Cognizant Manager / Date	○ Approved ○ Approved w/comments ○ Disapproved w/comments

Process Test Plan Shutdown P16 Exhauster

D B Parkman, CH2M Hill Hanford Group, Inc
Richland WA 99352
U S Department of Energy Contract DE AC06 96RL13200

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Org Code LK810000 Charge Code 101990
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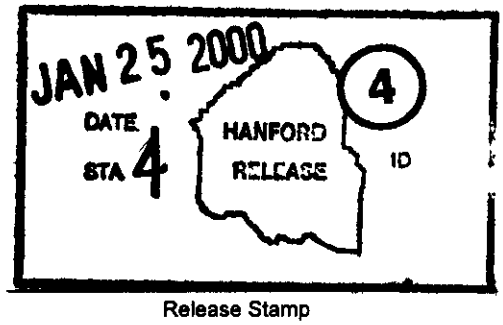
Key Words Waste Retrieval Sluicing System (WRSS), W-320, 241-C-106, 296-P-16 exhauster

Abstract This Process Test Plan was written to gather temperature data to determine the amount of heat load remaining in tank 241-C-106



1/25/00

Release Approval Date Release Stamp

Approved For Public Release

RPP 5646 Revision 0

PROCESS TEST PLAN
Shutdown P16 Exhauster

January 2000

David B Parkman
Double Shell Tank Engineering

CH2M Hill Hanford Group, Inc

Richland, Washington 99352

TABLE OF CONTENTS

1 0 INTRODUCTION

This process test plan is being conducted to gather the temperature data necessary to determine how much of the initial heat load is still left in 241-C-106 The heat load will be determined by shutting off the C-106 exhaust system, monitoring the change in tank temperature, and plugging the resulting data into the thermal model for this tank

2 0 BACKGROUND

2 1 Completion of Sluicing C-106

The Waste Retrieval Sluicing System (WRSS) was installed under Project W-320 and provided the necessary equipment to safely retrieve and transfer tank 241-C-106 waste to double-shell tank 241-AY-102 for interim storage

Tank 241-C-106 was sluiced to remove as much waste as possible At the present time the material balance for the waste transfer shows that 97% of the solids have been removed The preliminary heat balance shows that only 50% of the heat has been removed from C-106 To resolve this apparent discrepancy the C-106 exhaust system (P16) will be shutdown and tank temperature will be monitored to generate a second set of actual tank data needed to refine the heat load estimate for tank C-106

2 2 Information on C-105

A Process Test was conducted during 1993 and 1994 for tank 241-C-105 The following information was taken from the 241-C-105 Process Test Evaluation Report (WHC-SD-WM-PTR-013) "The worst case, predicted maximum temperature the waste will reach at 0 CFM ventilation is 160 °F at the tank center, per the updated thermal model The maximum temperature predicted at riser 1 thermocouple 1, by the same model is 140 °F " Based on these numbers the maximum waste temperature will not exceed operating specifications for C-105 without any active ventilation

3 0 PROCESS TEST OBJECTIVES AND CRITERIA

3 1 Objectives

The main objective of this Process Test is to safely obtain temperature data from C-106 during a ventilation outage

3 2 Process Criteria

3 2 1 C-105 and C-106 Process Control Criteria

The process criteria and specification limits by which this test will be measured are those strictly associated with ensuring that tanks 241-C-105 and 241-C 106 are maintained in a safe configuration during the Process Test For this Process Test, safety-related parameters include waste and dome space temperatures and flammable gas generation The process criteria, specification limits, required monitoring frequencies, and reporting requirements for these safety-related parameters are derived from the requirements contained in authorization basis documentation, administrative controls, and operating specification document requirements These documents are listed below

- HNF-SD-WM-SAR-067, Tank Waste Remediation System Final Safety Analysis Report
- HNF-SD-WM-TSR-006, Tank Waste Remediation System Technical Safety Requirements
- OSD-T 151-00013, Operating Specifications for Single-Shell Tank Process Engineering
- HNF-IP-1266, Tank Farm Operations Administrative Controls

The Process Test shall be stopped and active ventilation shall be restarted if any of the process criteria are exceeded as described in section 4 2

4 0 TEST DESCRIPTION

4 1 Process Test

The C-106 exhaust system (P16) will be shutdown for 14 days to monitor tank temperatures Shutting down the P16 exhauster will also affect the ventilation on C-105 To be conservative all actions and controls that apply to C 106 will also apply to C-105

4 2 Process Test Parameters, Limits, and Recovery Actions

The sections below outline the desired values and permissible ranges for the process and operating variables that will be relied upon for process control, and a description of corrective or shutdown actions taken when deviating from permissible ranges In the event that any one of the following parameters are exceeded the C 106 ventilation system will be restarted

The shutdown of the P16 exhaust system will require that LCO 3 2 2 Action Statements to be entered These are action statements require that the ventilation system be restored immediately and that the flammable gas concentration be verified as less than 25% of the LFL The definition of immediately is as follows " The required action is to be commenced without delay and continuously pursued in a controlled manner until complete The use of immediately implies the highest sense of urgency Implementation of immediately shall be given top priority over all other activities " For this case the definition of immediately will be that the P16 exhaust system will be restarted upon completion of the Process test

4 2 1 Flammable Gas Monitoring And Response

4 2 1 1 Flammable Gas Criteria

HNF-SD-WM-TSR-006, *Tank Waste Remediation System Technical Safety Requirements* fully establishes the flammable gas criteria and controls for this Process Test LCO 3 2 2 requires that the flammable gas concentration be less than 25% of the LFL This criteria and control is implemented via PTP-320-002

4 2 1 2 Monitoring Frequencies

Flammable gas concentrations will be monitored once per 7 days (LCO 3 2 2 action A) for tanks C-105 and C-106

4 2 1 3 Response and Recovery

In the event that flammable gas criteria are exceeded, the shift manager will be notified and with his/her concurrence the P16 exhaust system will be restarted per LCO 3 2 2 action condition B

4 2 2 Temperature Monitoring and Response

4 2 2 1 Tank Temperature Criteria

HNF-SD-WM-PCP-013, *Tank 241-C-106 Waste Retrieval Sluicing System Process Control Plan*, addresses authorization basis requirements for temperature control The temperature limit of 220 °F is found in Table 4-3 Tank 241-C-106 waste and dome space temperatures are monitored and recorded continuously The data is used to determine if waste temperatures are within the established baseline Waste temperature in tank 241-C-106 is a key parameter for safety control This limit will also be used for 241-C-105

4 2 2 2 Monitoring Frequencies

Tank 241-C-106 sludge temperature and dome space temperature readings are recorded continuously by TMACS The TMACS alarms on high temperatures Significant temperature

transients for tanks 241-C-105 and 241-C-106 are not expected during the Process Test

4 2 2 3 Response and Recovery

In the event the temperature criteria referenced above in Section 4 2 2 1 is approached, the Process Test will be terminated and the P16 exhaust system will be restarted

4 2 3 Additional Process Control Criteria

The temperature and flammable gas models developed for sluicing operations were used to predict conservative action points or shutdown parameters for the process test

These models were based on current temperature, flammable gas concentration, 55,000 BTU/hr heat source, and P16 exhauster shutdown of 14 days See graph 1 in Appendix B for temperature and graph 2 for flammable gas concentration

From graph #1, tank C-106 supernate temperature increases from approximately 55 °F to approximately 80 °F The predicted maximum waste temperature after 14 days without ventilation is less than 120 °F Based on this data the action statements are as follows

1 If the tank temperature reaches 120°F notify Shift Manager
2 If the tank temperature reaches 150°F notify Shift Manager and restart P16 exhauster
3 AC 5 26 limit is 220 °F (From PCP-013 Table 4-3)
4 OSD-T-151-00013 section 13 2 1 E has change in tank temperature limit of 20 °F/day

From graph #2, tank C-106 flammable gas concentration increases from the baseline of 10 ppm (H2) to less than 1,000 ppm (H2) The tank vapor space 25% LFL value is 6250 ppm (H2) (SAR page KA-11) Based on these numbers the action statements are as follows

1 If the flammable gas concentration exceeds 10% LFL, notify shift manager

2 If the flammable gas concentration exceeds 15% LFL, notify shift manager and restart the P16 exhauster

3 The LCO 3 2 2 action statement is in effect if the flammable gas concentration exceeds of 25% LFL

4 3 Process Test Conditions

This section identifies the conditions required for starting the Process Test, the conditions required for maintaining the Process Test and the conditions that will result in a termination of the Process Test

4 3 1 Process Test Pre-start and Continuous Conditions

The following conditions must be met throughout the duration of the Process Test

- Tank Farms Shift Manager shall be notified prior to starting the Process Test
- Health Physics Technicians (HPT) shall provide continuous HPT coverage during in farm activities
- Environmental Operations Compliance Manager (Phillip Miller, 373-1920) shall be notified 24 prior to the planned Process Test
- Thermocouple 1 and 4 on the thermocouple tree located in Riser #14 and Riser #8 must be operational for monitoring of both the waste and dome space temperatures in tank 241-C-106
- Thermocouple 1 and 4 on the thermocouple tree located in Riser #1 must be operational for monitoring of both the sludge and dome space temperatures in tank 241-C-105
- Access to the 241-C Farm area shall be limited to essential personnel
- IH&S shall evaluate and establish respiratory protection zones, as appropriate, in accordance with HNF-SD-WM-HSP-002, *Tank Farm Health and Safety Plan*

4 3 2 Process Test Duration Conditions

The Process Test shall proceed for a duration of 14 days The clock starts when the P16 exhaust system is shutdown and stops when the P16 exhaust system is restarted

4 3 3 Process Test Termination Conditions

The process test shall be terminated and a controlled restart of the P16 exhaust system be initiated if the following conditions occur

- The waste temperatures for C-105 or C-106 exceeds 150 °F
- Both of the 241-C-106 #1 thermocouples fail for risers #8 and #14
- The flammable gas concentration in C-105 or C-106 exceeds 15% of the LFL
- If the Shift manager requests that the P16 exhaust system be restarted

5 0 TEST REQUIREMENTS

5 1 Data Requirements and Test Documentation

5 1 1 Testing shall be controlled in accordance with HNF-IP-0842, RPP Administrative Procedure, Volume IV, Engineering Section 4 7, Process Tests Data shall be obtained during the testing as identified in Section 4 0 of this Process Test Plan Any data sheets generated by this Process Test shall be forwarded to the Test Director for daily review These data sheets will then be transmitted to Surveillance and Data Acquisition (SDA, Nancy Scott-Proctor, 373-1945) for safekeeping until the test is complete The SDA group will transmit copies of data sheets to the Cognizant Engineer, Process Engineer and Design Authority of WRSS as received At the completion of this test, the data sheets and/or their information will be included in the final test evaluation report

5 2 Personnel Requirements

- A Certified Operations Engineer (OE) will act as the Test Director and be available for the duration of Process Test The Test Director is responsible for supervising all field activities ensuring and documenting that prerequisite conditions are met, and coordinating activities among the various organizations

- The Cognizant Engineer is responsible for providing technical assistance to Operations management and the test director throughout the Process Test

- A Tank Farms certified "routines" operator is responsible for operation of the tank 241-C 106 SHMS "C" unit, obtaining temperature data, and providing general support during the Process Test

- Industrial Hygiene Technicians are responsible for performing pre-established stack, area, and personnel sampling during the process test Additional sampling will be performed as directed by the Industrial Hygienist

- Industrial Hygienists are responsible for providing Industrial Hygiene support to C-106 Process Test operations as identified in HNF-SD-WM-HSP-002, *Tank Farm Health and Safety Plan*

- Health Physics Technicians shall be available for the duration of the Process Test and are responsible for radiological surveys and recommending radiological controls and actions to the Test Director during the performance of this procedure

6 0 SAFETY AND QUALITY ASSURANCE

6 1 Safety

This test shall be performed in accordance with but not limited to all applicable DOE orders as designated within the following Hanford Facility documents and will be delineated in PTP-320-002

- HNF-SD-WM-HSP-002, *Tank Farm Health and Safety Plan*
- HSRCM 1, *Hanford Site Radiological Control Manual*

7 0 ENVIRONMENTAL COMPLIANCE

- Environmental Operations Compliance must be notified when the P16 exhauster is shutdown and restarted

8 0 OPERATIONAL SAFETY REQUIREMENTS AND OPERATING SPECIFICATIONS DEVIATIONS

Most of the Process Test parameters and process criteria identified for this Process Test are more conservative than the limits and controls identified for these parameters in authorization basis documentation including applicable operational safety requirement and operations specification documents (OSRs and OSDs respectively) No deviations from TSR, OSR or OSD limits are planned for this Process Test

9 0 CONCLUSION

The P16 exhaust system is being shutdown to provide data for the C-106 thermal model The conservative action parameters will allow sufficient time to restart the P16 exhaust system if 50% of the original heat load remains in the tank

10 0 REFERENCES

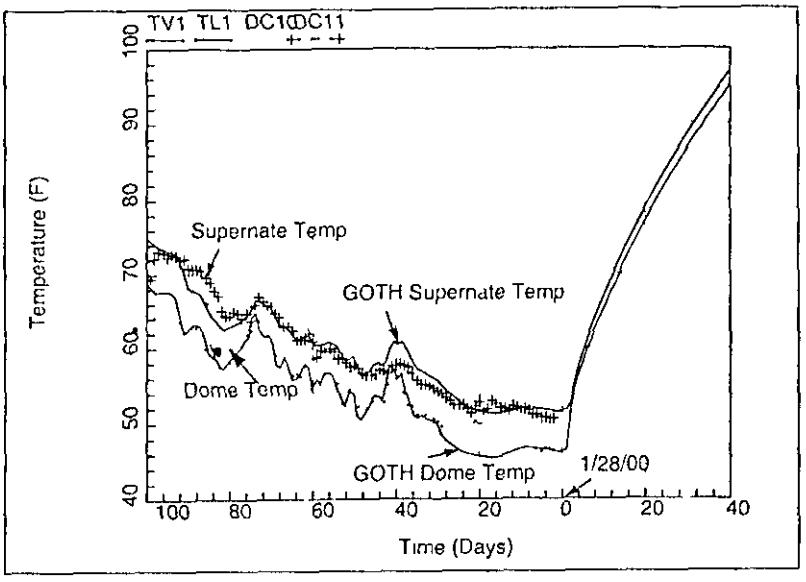
Email from Don Ogden to Dave Parkman, 12/14/99 (See appendix B for Ogden's data)

Appendix A Plant Operating Procedures Applicable to Process Test

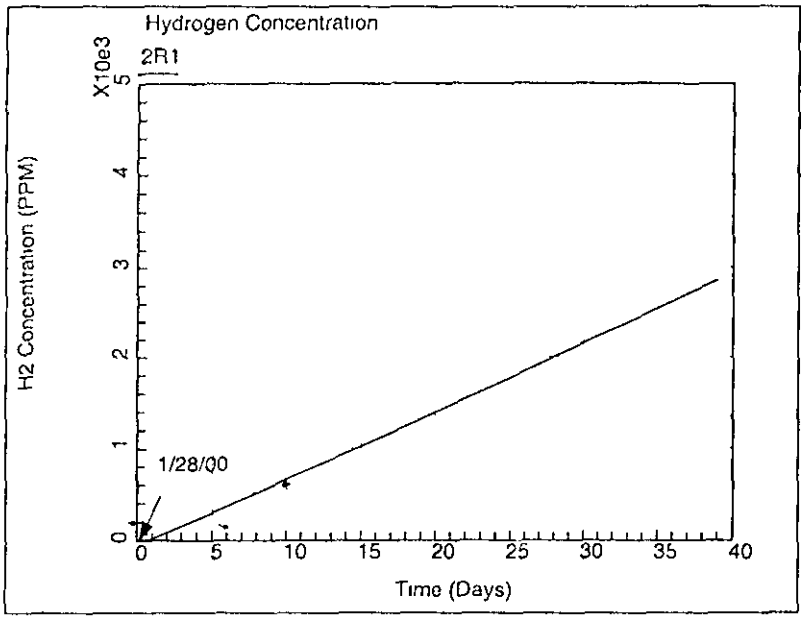
- TO 060 050, Operate 296 P-16 Exhauster
- TO-040-650, Obtain and Record Single Shell Temperature Data

Appendix B Temperature and Flammable Gas Graphs

Graph # 1



Graph # 2



This analyses assumes that there is 55000 BTU/hr remaining in C106 and the ventilation system is shut off The supernate temperature after 14 days is below 100 F Waste temperatures are not measured directly However the model conservatively assumes a 1 foot waste thickness The predicted maximum waste temperatures after 14 days is less than 120 F Clearly there are not any temperature limits associated with turning of the ventilation system for 14 days

The figure above shows the hydrogen concentration assuming a release rate which gives an initial concentration of about 10 ppm This is near the original baseline of the tank

After 14 days the concentration is less than 1000 ppm (10 cfm passive breathing flow was assumed which is conservative) This is well below the lower flammability limit

Appendix C HNF-IP-0842 Volume IV Section 4 7

Attachment A

Process Flow Assessment

Item		Responsible Individual	Pre-Startup (Yes-No)	Signature (When Completed)
1	Are defined test objectives adequate?			
2	Are defined measurement criteria adequate?			
3	Are defined permissible ranges appropriate?			
4	Is sampling plan adequate?	NA		
5	Are sampling methods adequate?			
6	Are analytical methods adequate?			
7	Are defined data requirements adequate?			
8	Is equipment furnished adequate?			
9	Are operating procedures adequate?			

Test uses existing procedures to perform work

DBP 1/28/2000

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	WRSS/DST Engineering	Date 01/18/00
Project Title/Work Order		EDT No 619709
Process Test Plan Shutdown P16 Exhauster		ECN No N/A

Name	MSIN	Text With All Attach	Text Only	Attach / Appendix Only	EDT/ECN Only
CH2M Hill Hanford Group, Inc					
J E Andrews	S5-04	X			
D G Baide	S5-05	X			
J R Bellomy	R1-56	X			
D A Bragg	S5-05	X			
K G Carothers	R2-11	X			
T A Dillhoff	S5-03	X			
D B Parkman	S5-13	X			
P L Smith	S7-01	X			
J J Verderber	S6-15	X			
Numatec Hanford Corp					
J W Bailey	R3-25	X			
Central Files	B1-07	X			