Stk #4 (15)
JUL 25 1998

ENGINEERING DATA TRANSMITTAL

Page 1 of 1 S

1. EDT 624760

2. To: (Receiving Organization) Distribution	3. From: (Originating Organization) TWRS Projects/SST Retrieval	4. Related EDT No.: n/a
5. Proj./Prog./Dept./Div.: W-320 TWRS/TCPN # D2991	6. Design Authority/ Design Agent/Cog. Engr.: JW Bailey, NHC	7. Purchase Order No.: n/a
8. Originator Remarks: Document issued for review and approval.		9. Equip./Component No.: n/a
		10. System/Bldg./Facility: 241-C-106
11. Receiver Remarks: 11A. Design Baseline Document? [X] Yes [] No		12. Major Assm. Dwg. No.: n/a
		13. Permit/Permit Application No.: n/a
		14. Required Response Date: 17 July 1998

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 Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	HNF-2518	-	0	Project W-320 Waste Retrieval Sluicing System BIO/SER Implementation Matrices	NA			-

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
1		Design Authority	JW Bailey	7/23/98	S2-48	3		DA Smith			R1-49
1	1	Design Agent	T.J. Baxter	7/16/98	E6-46	1	1	PA Young	P.A. Young	07/16/98	S2-48
1		Cog.Eng.	JM Jones	07-23-98	S5-13	3		WJ Powell			S5-13
1	1	Cog. Mgr.	JW Lentsch	7/16/98	S2-48	3		DA Bragg			S5-05
1		QA	KC Conrad	7-23-98	S2-48	3		GN Hanson			S5-07
1		Safety	SU Zaman		S5-12	3		MJ Bailey			T4-07
		Env.									

18.	19.	20.	21. DOE APPROVAL (if required)
JW Bailey 7/14/98 7/23/98 Signature of EDT Originator Date	PA Young 7/14/98 Authorized Representative for Receiving Organization Date	JW Lentsch 7/14/98 Design Authority/ Cognizant Manager Date	Ctrl. No. [] Approved [] Approved w/comments [] Disapproved w/comments

BD-7400-172-2 (05/96) GEF097

BD-7400-172-1

Project W-320 Waste Retrieval Sluicing System BIO/SER Implementation Matrices

John W. Bailey
Numatec Hanford Co., Richland, WA 99352
U.S. Department of Energy Contract DE-AC09-96RL13200

EDT/ECN: 624760 UC: 506
Org Code: 8C452 Charge Code: D2991/HANA0600
B&R Code: EW3130010 Total Pages: 133 (JCB 7/25/98)

Key Words: W-320, Sluicing, Tank 241-C-106, Tank 241-AY-102, WRSS, Tank Waste Remediation System, Basis for Interim Operations, implementation matrix.

Abstract: This document provides verification that the safety related commitments specified in HNF-SD-WM-BIO-001, Addendum 1 for the Waste Retrieval Sluicing System, Project W-320 and Project W-320 Safety Evaluation Report (SER), have been implemented in the project hardware, procedures and administrative controls. Four appendices include matrices which show where the BIO commitments are implemented for limiting conditions of operation and surveillance requirements controls, administrative controls, defense-in-depth controls and controls discussed in BIO Addendum 1. A fifth appendix includes the implementation of Project W-320 SER issues and provisions.

TRADEMARK DISCLAIMER. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

Printed in the United States of America. To obtain copies of this document, contact: Document Control Services, P.O. Box 950, Mailstop H6-08, Richland WA 99352, Phone (509) 372-2420; Fax (509) 376-4989.

JUL 25 1998
DATE:
STA:
#4
HANFORD RELEASE
ID:
15

Iris Braden 7/25/98
Release Approval Date

Release Stamp

Approved for Public Release

1.0 INTRODUCTION 1

2.0 PURPOSE 1

APPENDIX A, LIMITING CONDITIONS OF OPERATIONS AND SURVEILLANCE REQUIREMENT IMPLEMENTATION A-1

APPENDIX B, ADMINISTRATIVE CONTROL IMPLEMENTATION B-1

APPENDIX C, DEFENSE-IN-DEPTH CONTROLS IMPLEMENTATION C-1

APPENDIX D, BIO ADDENDUM 1 TEXT REQUIRED CONTROLS IMPLEMENTATION D-1

APPENDIX E, SER REQUIRED CONTROLS IMPLEMENTATION E-1

1.0 INTRODUCTION

The Waste Retrieval Sluicing System (WRSS) is being installed on Single Shell Tank 241-C-106 by Project W-320. The system will be used to transfer Tank C-106 high heat sludge to Double Shell Tank 241-AY-102 using the past practice sluicing technology. The transfer will eliminate a high heat safety issue and demonstrate a single shell tank retrieval technology. The high heat safety issue necessitates the addition of approximately 6000 gallons of water per month to Tank C-106 to evaporatively cool its waste. Tank C-106 is past its design life. Tanks similar in type and age have a 50% failure rate (i.e. leak). Water additions would continue even if a leak were to occur to control the temperatures in the tank. However, the water additions would likely leak from the tank into the soil column and not control temperatures in the tank.

2.0 PURPOSE

Core Requirement (CR) 1 of the Project W-320 Plan of Action (POA) states "*There are adequate and correct procedures and safety limits for operating the process systems and utility systems*" and defines the Scope to be: "The sluicing project related procedures will be reviewed. Procedures include project related operating, surveillance, maintenance, and alarm response procedures necessary and sufficient to attain and support continued operation. INCORPORATION OF TECHNICAL SAFETY REQUIREMENTS AND DEFENSE-IN-DEPTH CONTROLS INTO PROCEDURES WILL BE VERIFIED.

CR 4 states "*Facility safety documentation is in place that describes the "safety envelope" of the facility. The safety documentation should characterize the hazards/risks associated with the facility, and should identify mitigating measures (systems, procedures, administrative controls, etc.) that protect workers and the public from those hazards/risks. Safety systems and systems essential to worker and public safety are defined and a system to maintain control over the design and modification of facilities and safety-related utility systems is established.*" and defines the Scope to be: "Verify the authorization basis amendment package includes safety systems related to the sluicing project and is approved and IMPLEMENTED. Verify that all systems essential to worker and public safety identified in the authorization basis amendment package are IMPLEMENTED IN PROCEDURES AND EQUIPMENT APPLICATION. Management systems utilized to control facility modifications and screen for impacts on the approved authorization basis will be reviewed.

This document serves several purposes. First, to verify by review that TSRs and defense-in-depth controls have been incorporated into procedures (Core Requirement (CR) 1). Second, to show the authorization basis is implemented through project procedures (CR 4). Third, to ensure that concerns identified in SER-97-WSD-209 are adequately addressed for Project W-320.

Appendix A details the Limiting Conditions of Operation and Surveillance Requirement Controls and their implementing procedure. Appendix B details the Administrative Controls and their implementing procedures and documents. Appendix C details the Project W-320 Defense-in-Depth Controls and their

implementing procedures and documents. Appendix D details the controls specified in BIO Addendum 1 and their implementation in Project W-320 procedures, documents and hardware. Appendix E details the implementation of provisions to address concerns identified in the "Tank 241-C-106 Waste Retrieval Project W-320 Safety Evaluation Report".

3.0 METHODOLOGY

The appendices to this report were developed using Addendum 1 to HNF-SD-WM-BIO-001, Tank Waste Remediation System Basis for Interim Operation (BIO) which contains those elements of the BIO specific to Project W-320, Tank 241-C-106 Waste Retrieval Sluicing System (WRSS). Accident analysis discussions furnished in Chapter 5 of Addendum 1 include tables listing Technical Safety Requirement (TSR) controls and Defense-in-Depth controls for each of the accident scenarios. These Addendum 1 tables were used to develop the requirements lists for Appendices A, B, and C for verification against the W-320 project procedures. Information taken from the TWRS TSRs (HNF-SD-WM-TSR-006) was used to identify the Limiting Conditions of Operation (LCO) and Surveillance Requirements (SR) specific to Project W-320 associated with each of the Addendum 1 SAR controls to complete the requirements for Appendices A and B.

Appendix D was developed by reviewing the entirety of Addendum 1 for controls specified in the text and accident analysis discussions that are applicable to Project W-320. These controls are implemented, as reported in Appendix D, in Project W-320 procedures, documents, and hardware. Note that Project W-320 will operate within the authorization basis specified in the overall TWRS BIO supplemented by project specific controls specified in Addendum 1 to the BIO.

Addendum E discusses controls that have been implemented in response to concerns identified in the "Tank 241-C-106 Waste Retrieval Project W-320 Safety Evaluation Report."

Project W-320 procedures are intended to be set up in a top-down hierarchy. The main entry point is through procedure TO-320-005, WRSS Startup and Process Control. Most of the other project procedures can be located by carefully reading TO-320-005. However, additional references to other procedures are provided in many of the implementation matrix entries for "Implementing Procedure" to facilitate review of the matrices.

The two primary sets of project specific controls for the WRSS sluicing process are provided by the project procedures and the Process Control Plan (PCP)(HNF-SD-WM-PCP-013). The procedures entered through TO-320-005 govern the operations related sluicing activities. The operations procedure provides for incremental sluicing material mass transfers followed by monitoring periods. During these monitoring periods TO-320-005 transfers decision authority to the Process Engineering organization for evaluation of the effect of each incremental mass transfer. The PCP includes a description of the sluicing process and operating sequence; safety, environmental, and process operating limits; and the process control strategy. Specific monitoring and process evaluation activities must be completed to meet program requirements specified in the PCP before the Batch

Control data sheet can be provided to operations to start the next incremental mass transfer. The approval process for these activities is discussed in TO-320-005, Section 4.0 Prerequisites. Thus, the PCP is referenced as a control in many entries in the implementation matrices.

4.0 REFERENCES

LMHC, 1997, *Tank Waste Remediation System Basis for Interim Operation, Volumes 1 and 2*, HNF-SD-WM-BIO-001, Rev. 0, by Lockheed Martin Hanford Corporation for U.S. Department of Energy Assistant Secretary for Environmental Management, Richland, Washington.

ECN-640409, June 2, 1997, HNF-SD-WM-BIO-001, Rev. 0-B, Addendum 1, Tank 241-C-106 Waste Retrieval Sluicing System (WRSS), Project W-320 Safety Analysis.

Noorani, Y.G., 1998, *Tank Waste Remediation System Technical Safety Requirements*, HNF-SD-WM-TSR-006, Rev. 0-L, Fluor Daniel Hanford, Inc., Richland, Washington, June.

Carothers, K.G. et. al, 1998, *Tank 241-C-106 Waste Retrieval Sluicing System Process Control Plan*, HNF-SD-WM-PCP-013, Rev. 1, Fluor Daniel Hanford, Inc., Richland, Washington, June.

Letter dated September 17, 1997 from J.D. Wagoner to H.J. Hatch, Subject: Contract Number DE-AC06-96RL13200, *Approval of Authorization Basis (AB) Amendment Package for Project W-320, Tank C-106 Sluicing;* correspondence number 9758458 with attachment. Attachment: Safety Evaluation Report, Tank 241-C-106 Waste Retrieval Project W-320, Addendum 1 to the Tank Waste Remediation System Basis for Interim Operations, August 11, 1997.

PROJECT W-320, TANK C-106 SLUICING, AUTHORIZATION BASIS COMPLIANCE MATRIX APPENDIX A, LIMITING CONDITIONS OF OPERATIONS AND SURVEILLANCE REQUIREMENT IMPLEMENTATION

LCO	SR	Requirement	Implementing Procedure	Comments
LIMITING CONDITIONS OF OPERATION AND SURVEILLANCE REQUIREMENTS				
3.1 CONFINEMENT				
3.1.1		Transfer System Covers and Entry Doors: Transfer system covers and entry doors, RCSTS Diversion Box and RCSTS Vent Station structure penetration seals shall be OPERABLE. a. Entry Doors are closed. b. Emergency pumpout line, air sample line, Exhauster hookup, and liner washdown system penetrations are sealed.	TO-320-005, *WRSS Startup and Process Control*	Project W-320 has implemented the transfer system covers portion of this requirement.
	3.1.1.1	VERIFY covers are OPERABLE. Once within 72 hours prior to removing the administrative lock from a physically connected waste transfer pump AND Once per 10 days thereafter.	TO-320-005, *WRSS Startup and Process Control*	
	3.1.1.2	VERIFY entry doors and RCSTS diversion box and vent station penetrations are OPERABLE.	Not Applicable	This requirement is specific to the Cross Site Transfer Line System.
3.1.2		Service Water Pressure Detection Systems: Service water pressure detection systems shall be OPERABLE.	Not Applicable	Project W-320 has no service water pressure detection systems.
	3.1.2.1	VERIFY service water pressure detection systems are OPERABLE. Once with 72 hours prior to removing an administrative lock from a PHYSICALLY CONNECT WASTE transfer pump.	Not Applicable	Project W-320 has no service water pressure detection systems.

LCO	SR	Requirement	Implementing Procedure	Comments
	3.1.2.2	Perform FUNCTIONAL TEST on the service water pressure detection systems and VERIFY a setpoint of less than or equal to 20 psi on increasing pressure.	Not Applicable	Project W-320 has no service water pressure detection systems.
3.1.3		Transfer Leak Detection Systems: Transfer Leak Detection Systems shall be OPERABLE.	TO-320-005, *WRSS Startup and Process Control*	
	3.1.3.1	Perform FUNCTIONAL TEST on conductivity probe transfer leak detection systems. Once within 92 days prior to removing an administrative lock from a PHYSICALLY CONNECTED WASTE transfer pump AND Once per 92 days thereafter.	TF-FT-259-007, Revision C-1, *Perform Functional Test for AY/AZ Farm Transfer Leak Detectors* TF-FT-359-009, Revision A-0, *Perform Functional Test for C Farm Transfer Leak Detectors*	
	3.1.3.2	Perform FUNCTIONAL TEST on the weight factor leak detection systems used in AWF leak detection pits. Once within 182 days prior to removing an administrative lock from a PHYSICALLY CONNECTED WASTE transfer pump AND Once per 182 days thereafter.	TF-FT-259-008, *Perform Aging Waste Tanks 241-AY/AZ Annulus Leak Detection Functional Test*	
3.1.4		Ventilation Stack Continuous Air Monitor (CAM) Interlock Systems: The Ventilation Stack CAM Interlock Systems shall be OPERABLE.	TO-320-005, *WRSS Startup and Process Control*	

LCO	SR	Requirement	Implementing Procedure	Comments
	3.1.4.1	Perform a FUNCTIONAL TEST on the ventilation stack CAM interlock and VERIFY the interlock is OPERABLE with a setpoint less than or equal to 10,000 CPM.	AY-102: TF-FT-269-008, *Perform AY/AZ Aging Waste Tanks 241-AY/AZ 702-AZ Primary Exhaust Stack Radiation Interlock/Alarm Functional Test* C-106: P-16: TF-FT-359-008, *Perform Functional Test for C Farm Tank 105/106 Exhaust Stack Radiation Monitor* C-006: TF-FT-359-010, *Perform Functional Test for C-006 Exhaust Stack Radiation Monitor*	
	3.1.4.2	Perform a CALIBRATION on the ventilation stack CAM interlock loop.	AY-102: 6-TF-168, *Eberline AMS-4 Continuous Air Monitor Calibration* C-106: P-16 CAM: 6-TF-507, *Eberline AMS-3, AMS-3A, AMS-3-1 and 700300* C-006 CAM: 6-TF-168, *Eberline AMS-4 Continuous Air Monitor Calibration*	

LCO	SR	Requirement	Implementing Procedure	Comments
3.1.4A		<u>HEPA Filter Differential Pressure and Stack High Radiation Systems</u>: One of the two systems listed below shall be OPERABLE: a. HEPA filter low differential pressure interlock system <u>OR</u> b. Stack high radiation alarm system	TO-320-005 *WRSS Start-up and Process Control*	
	3.1.4A.1	Perform a FUNCTIONAL TEST on each required interlock or alarm system. The required system is one of the following: HEPA filter low differential pressure interlock system. <u>OR</u> Stack high radiation alarm system	TO-320-005 *WRSS Startup and Process Control* <u>AY-102</u>: TF-FT-269-008, *Perform AY/AZ Aging Waste Tanks 241-AY/AZ 702-AZ Primary Exhaust Stack Radiation Interlock/Alarm Functional Test* <u>C-106</u>: <u>P-16:</u> TF-FT-359-008, *Perform Functional Test for C Farm Tank 105/106 Exhaust Stack Radiation Monitor* <u>C-006:</u> TF-FT-359-010, *Perform Functional Test for C-006 Exhaust Stack Radiation Monitor*	

LCO	SR	Requirement	Implementing Procedure	Comments
	3.1.4A.2	Perform a CALIBRATION on each required interlock or alarm system. The required system is one of the following: HEPA filter low differential pressure interlock system. OR Stack high radiation alarm system	TO-320-005 *WRSS Startup and Process Control* AY-102: 6-TF-168, *Eberline AMS-4 Continuous Air Monitor Calibration* C-106: P-16 CAM: 6-TF-507, *Eberline AMS-3, AMS-3A, AMS-3-1 and 700300* C-006 CAM: 6-TF-168, *Eberline AMS-4 Continuous Air Monitor Calibration*	
		3.2 FLAMMABLE GAS		
3.2.1		DST and AWF Tank Ventilation Systems: An active primary tank ventilation system shall be OPERABLE.	TO-320-005, *WRSS Startup and Process Control*	
	3.2.1.1	VERIFY the active primary tank ventilation system is OPERABLE once every 24 hours.	TF-OR-EF-AYAZ-D, *AY and AZ Tank Farms Daily Rounds*	
3.2.2		SST Ventilation Systems -Active: An active ventilation system shall be operable	TO-320-005, *WRSS Startup and Process Control*	
	3.2.2.1	VERIFY the active ventilation system is OPERABLE once every 7 days	TF-OR-EF-C-D, *C, CR and 244-A DCRT Lift Station Daily Rounds* TF-OR-WRSS-C-1, *C-Farm WRSS Equipment Rounds*	

LCO	SR	Requirement	Implementing Procedure	Comments
3.2.3		SST Ventilation Systems - Passive: The HEPA breather filter isolation valve shall be open and no blank installed.	TO-320-005, *WRSS Startup and Process Control*	
	3.2.3.1	VERIFY the HEPA breather filter isolation valve is open and no blank is installed once every 7 days.	TO-320-009, Operate WRSS 296-C-006 HVAC System TO-060-50 Operate 296-P-16 Exhauster	The isolation valve will only be open during sluicing activities.
3.2.4		DCRT Ventilation Systems: DCRT ventilation systems shall be: a. The inlet air supply shall be greater than or equal to 3.0 cfh for DCRTs 244-A, 244-BX, 244-S, 244-TX, and 244-U AND The inlet air supply shall be 5.0 cfh for DCRT 244-S during WASTE transfers from Tank 241-SX-104 and Tank 241-SX-105 b. The active ventilation system shall be OPERABLE for DCRT 244-CR TK-003.	Not Applicable	Project W-320 does not have any DCRTs along its transfer route.
	3.2.4.1	VERIFY inlet air supply is greater than or equal to 3.0 cfh for DCRTs 244-A, 244-BX, 244-TX and 244-U AND VERIFY inlet air supply is greater than or equal to 5.0 cfh for DCRT 244-S during WASTE transfers from Tank 241-SX-104 and Tank 241-SX-105 once every 12 hours	Not Applicable	Project W-320 does not have any DCRTs along its transfer route.

LCO	SR	Requirement	Implementing Procedure	Comments
	3.2.4.2	VERIFY the active ventilation system is OPERABLE for DCRT 244-CR TK-003 once every 12 hours	Not Applicable	Project W-320 does not have any DCRTs along its transfer route.
3.2.5		244-AR TK 002 Ventilation System: The inlet air supply shall be greater than or equal to 3.0 cfh.	Not Applicable	Project W-320 does not use 244-AR TK-002
	3.2.5.1	VERIFY inlet air supply is greater than or equal to 3.0 cfh.	Not Applicable	Project W-320 does not use 244-AR TK-002.
3.2.6		Primary Tank Leak Detection Systems: One of the two primary tank leak detection systems listed below shall be operable: a. The annulus conductivity probe system OR b. The annulus continuous air monitor system	TO-320-005, *WRSS Startup and Process Control*	
	3.2.6.1	Perform FUNCTIONAL TEST on each primary tank leak detection system once every 182 days.	TF-FT-259-008, *Perform Aging Waste Tanks 241-AY/AZ Annulus Leak Detection Functional Test* TF-FT-259-016, *Perform AY/AZ Aging Waste Facility Annulus CAM Leak Detection Functional Test*	

LCO	SR	Requirement	Implementing Procedure	Comments
		3.3 TEMPERATURE		
3.3.1		SST WASTE Temperature Controls: The WASTE temperature shall be less than or equal to 205 degrees Fahrenheit	TO-320-006, Tk 241-C-106 WRSS Sluicing Operations	This temperature control LCO is superseded by AC5-26 for tank C-106 when sluicing begins.
	3.3.1.1	VERIFY the WASTE temperature is less than or equal to 205 degrees Fahrenheit once every 10 days.	TF-OR-EF-C-W, *C Tank Farm Weekly Rounds* TO-040-650, *Obtain and Record Single Shell Tank Temperature Data*	
3.3.2		DST and AWF Tank WASTE Temperature Controls: The WASTE temperature shall be either: a. less than or equal to 195 degrees Fahrenheit in all levels of the WASTE. OR b. less than or equal to 195 degrees Fahrenheit in the top 15 ft of the WASTE AND less than or equal to 215 degrees Fahrenheit in the WASTE below 15 ft.	TO-320-005, *WRSS Startup and Process Control* TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	

LCO	SR	Requirement	Implementing Procedure	Comments
	3.3.2.1	VERIFY the WASTE temperature is either: a. less than or equal to 195 degrees Fahrenheit in all levels of the WASTE. OR b. less than or equal to 195 degrees Fahrenheit in the top 15 ft of the WASTE AND less than or equal to 215 degrees Fahrenheit in the WASTE below 15 ft once every 10 days.	TF-OR-EF-AYAZ-W, *AY and AZ Tank Farms Weekly Rounds* TO-040-660, *Obtain/Record Double Shell Tank Temperature Data*	
3.3.3		Tank 241-AY-102 Annulus Ventilation System: Tank 241-AY-102 annulus ventilation system shall be OPERABLE.	TO-320-005, *WRSS Startup and Process Control* TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	Note: This requirement applies only after two feet of C-106 Sludge has been transferred to AY-102.
	3.3.3.1	VERIFY the Tank 241-AY-102 annulus ventilation system is OPERABLE once every 24 hours.	TF-OR-EF-AYAZ-D, *AY and AZ Tank Farms Daily Rounds*	Rounds require operability check twice daily

PROJECT W-320, TANK C-106 SLUICING, AUTHORIZATION BASIS COMPLIANCE MATRIX APPENDIX B, ADMINISTRATIVE CONTROL IMPLEMENTATION

AC	Requirement	Implementing Procedure	Comments
	ADMINISTRATIVE CONTROLS		
AC 5.1	Purpose: The purpose of the Administrative Controls (ACs) is to state the provisions relating to organization and management, procedures, record keeping, reviews, audits, and specific program requirements for risk reduction necessary to ensure safe operation of the Tank Waste Remediation System (TWRS) facilities.	HNF-SD-WM-BIO-001, Chapter 4.0, Safety Management and HNF-IP-0842, TWRS Administration, Volumes I through XI. HNF-IP-1266, *Tank Farm Operations Administrative Controls*, Section 5.1, *Purpose*	

AC	Requirement	Implementing Procedure	Comments
AC 5.2	Contractor Responsibility Fluor Daniel Hanford, Inc. is responsible to the U.S. Department of Energy (DOE) for the safe operation of the DOE-owned TWRS facilities in accordance with the Technical Safety Requirements (TSRs) as approved by the Cognizant Secretarial Officer (CSO), or designee, including any modification by the CSO. The contractor shall be responsible for maintaining the current DOE-approved TSRs as a controlled document. 5.2.1.1 Facility Manager The Project Hanford Management Contractor (PHMC) Director, Tank Farm Operations, shall be responsible for overall TWRS facilities operation and shall delegate in writing the succession to this responsibility, as appropriate. 5.2.1.2 Shift Manager The Shift Manager shall be responsible for the local command function. During any absence of the Shift Manager from the facility, a designated, qualified individual shall assume the command function.	HNF-IP-0842, Volume I, Section 3.1, *TWRS Charter* HNF-IP-0842, Volume II Section 4.1.1, *Operations Organization and Administrations* HNF-IP-0842, Volume II, Section 4.2.1, *Shift Routines and Operating Practices* HNF-IP-1266, Section 5.2, *Contractor Responsibility*	

AC	Requirement	Implementing Procedure	Comments
AC 5.3	Compliance: The PHMC Director, Tank Farm Operations, is responsible for ensuring that the requirements of the TWRS facilities TSRs are met. Compliance shall be demonstrated by: a. Operating within the Safety Limits (SLs), Limiting Control Settings (LCSs), Limiting Conditions for Operation (LCOs), and the associated Surveillance Requirements (SRs) during their Applicability. b. Operating within the ACTIONS of LCOs when required. c. Performing all SRs when required. d. Establishing, implementing, and maintaining the required ACs. e. Maintaining required DESIGN FEATURES.	HNF-IP-0842, Volume IV, Section 5.7, *Interim Operational/Technical Safety Requirement Compliance* HNF-IP-1266, Section 5.3, *Compliance*	

AC	Requirement	Implementing Procedure	Comments
AC 5.4	Technical Safety Requirements Violations: VIOLATION Criteria VIOLATIONS of the TSRs occur as the result of any of four circumstances: a. Exceeding an SL. b. Failure to take the ACTIONS required within the required time limit following: 1. Exceeding an LCS. 2. Failure to meet an LCO. 3. Failure to successfully meet an SR. c. Failure to perform an SR within the required time limit. d. Failure to comply with an AC requirement. ----------NOTE---------- 1. A VIOLATION relates only to failure to comply with an ACTIONS statement. Exceeding an LCO limit by itself, or failure of an SR by itself (acceptance criteria not met), is not considered a VIOLATION. 2. Failure to perform an SR within the required time limit includes the allowable 25% extension (see SR 3.0.2, "Frequencies"). The extension shall not be used routinely as an operational convenience to extend SR intervals or periodic Completion Time intervals beyond those specified.	HNF-IP-0842, Volume IV, Section 5.7, *Interim Operational/Technical Safety Requirement Compliance* HNF-IP-1266, Section 5.4, *Technical Safety Requirement Violations*	

AC	Requirement	Implementing Procedure	Comments
AC 5.4 Continued	3. AC requirements are found in each AC program requirement section. Minimum requirements for each AC program are found in the program key elements section. Failure to comply with an AC program or the intent of an AC program is considered a VIOLATION. A noncompliance within a specific procedure that implements an AC program is not necessarily a VIOLATION. 4. Planned maintenance activities, which render a system inoperable and which are performed within Completion Times specified in ACTIONS statements, do not constitute a VIOLATION. ---------- 5.4.2 Response to a Safety Limit VIOLATION If a VIOLATION of an SL occurs, proceed as follows: a. Place the UNIT in the most safe and stable condition attainable Immediately. b. Notify the DOE of the VIOLATION and prepare an occurrence report in accordance with Section 5.5, "Occurrence Reporting." c. Perform and document a technical evaluation of the SL VIOLATION to determine if any damage may have occurred and evaluate the capacity of the UNIT to return to an operational MODE. d. Prepare a recovery plan describing the steps leading to returning the UNIT to an operational MODE. e. Obtain approval of the recovery plan from the PHMC Director, Tank Farm Operations.	HNF-IP-0842, Volume IV, Section 5.7, *Interim Operational/Technical Safety Requirement Compliance* HNF-IP-1266, Section 5.4, *Technical Safety Requirement Violations*	

AC	Requirement	Implementing Procedure	Comments
AC 5.4 Continued	f. Submit the approved recovery plan to the RL-TWRS Director, Waste Storage Division, for information. g. Obtain approval from the RL Assistant Manager, Office of Tank Waste Remediation System, prior to returning the UNIT to an operational MODE. 5.4.3 Response to a Limiting Condition for Operation and Limiting Control Setting VIOLATION. If a VIOLATION of an LCO/LCS occurs, proceed as follows: a. Place the UNIT in a safe and stable condition Immediately. b. Notify the DOE of the VIOLATION and prepare an occurrence report in accordance with Section 5.5, "Occurrence Reporting." c. Prepare a recovery plan describing the steps leading to operation in a compliant condition. d. Obtain approval of the recovery plan from the PHMC Director, Tank Farm Operations. e. Submit the approved recovery plan to the RL-TWRS Director, Waste Storage Division, for information. f. Perform and document a technical evaluation of the LCO/LCS VIOLATION to determine if any damage may have occurred.	HNF-IP-0842, Volume IV, Section 5.7, *Interim Operational Technical Safety Requirement Compliance* HNF-IP-1266, Section 5.4, *Technical Safety Requirement Violations*	

AC	Requirement	Implementing Procedure	Comments
AC 5.4 Continued	5.4.4 Response to a Surveillance Requirement VIOLATION If a VIOLATION of an SR occurs, proceed as follows: 5.4.4.1 Failure to Implement ACTIONS Upon Failure to Successfully Meet an SR a. Notify the DOE of the VIOLATION and prepare an occurrence report in accordance with Section 5.5, "Occurrence Reporting." 5.4.4.2 Failure to Perform an SR Within the Required Time Limit a. Enter SR 3.0.3, "Delay of Required Actions," and perform the SR within 24 hours or up to the limit of the specified Frequency, whichever is less. 1. If the SR is successfully met (i.e., SR acceptance criteria satisfied), exit SR 3.0.3, "Delay of Required Actions," and continue operation in a compliant condition. 2. If the SR is not successfully met (i.e., SR acceptance criteria not satisfied), evaluate whether the LCO is met. If the LCO is met, continue operation in a compliant condition. If the LCO is not met, enter the LCO ACTIONS. If the ACTIONS Completion Times are met, continue operation in a compliant condition. If the ACTIONS Completion Times are not met, proceed in accordance with Section 5.4.4.1. b. Notify the DOE of the VIOLATION and prepare an occurrence report in accordance with Section 5.5, "Occurrence Reporting."	HNF-IP-0842, Volume IV, Section 5.7, *Interim Operational Technical Safety Requirement Compliance* HNF-IP-1266, Section 5.4, *Technical Safety Requirement Violations*	

AC	Requirement	Implementing Procedure	Comments
AC 5.4 Continued	5.4.5 Response to an AC VIOLATION If a VIOLATION of an AC occurs, proceed as follows: a. Notify the DOE of the VIOLATION and prepare an occurrence report in accordance with Section 5.5, "Occurrence Reporting." b. Prepare a recovery plan describing the steps leading to compliance with the AC. c. Obtain approval of the recovery plan from the PHMC Director, Tank Farm Operations. d. Submit the approved recovery plan to the RL-TWRS Director, Waste Storage Division, for information. e. Perform and document a technical evaluation, if appropriate, of the AC VIOLATION to determine if any damage may have occurred.	HNF-IP-0842, Volume IV, Section 5.7, *Interim Operational Technical Safety Requirement Compliance* HNF-IP-1266, Section 5.4, *Technical Safety Requirement Violations*	

AC	Requirement	Implementing Procedure	Comments
AC 5.5	Occurrence Reporting: 5.5.1 Requirement for Occurrence Reporting A program shall be maintained for occurrence reporting of events and conditions, which may involve health and safety. It is the policy of Fluor Daniel Hanford, Inc. to encourage a positive attitude toward reporting occurrences. Consistent reporting of occurrences assures that both DOE and contractor line management are kept fully and currently informed of all events which could have the following results: (1) affect the health and safety of the public or (2) endanger the health and safety of workers. 5.5.2 Program Key Elements The program key elements include the following: a. Timely identification, categorization, notification, and reporting to DOE and contractor management of all reportable occurrences at DOE-owned or operated facilities. Occurrence notifications should be made to the RL Assistant Manager, Office of Tank Waste Remediation System, unless otherwise specified. b. Timely evaluation of and implementation of appropriate corrective actions. c. Review of reportable occurrences to assess significance, root causes, generic implications, and the basis for any corrective actions taken to prevent recurrence. 5.5.3 TSR VIOLATIONS shall be reported in accordance with DOE occurrence reporting requirements.	HNF-IP-0842, Volume II, Section 4.6.2, *Occurrence Reporting and Processing Operations Information* HNF-IP-1266, Section 5.5, *Occurrence Reporting*	

AC	Requirement	Implementing Procedure	Comments
AC 5.5 Continued	5.5.4 Failure of any safety SSC system when it is required to be OPERABLE shall constitute a significant performance degradation and shall be reportable. Process parameters discovered to be outside LCO limits shall also be reportable. Planned entry into ACTIONS statements to perform surveillance, maintenance, or investigation of operational problems is not reportable.	HNF-IP-0842, Volume II, Section 4.6.2, *Occurrence Reporting and Processing Operations Information* HNF-IP-1266, Section 5.5, *Occurrence Reporting*	

AC	Requirement	Implementing Procedure	Comments
AC 5.6	Organization: 5.6.1 Lines of authority, responsibility, and communication shall be established and defined for the highest management levels through intermediate levels to and including all safety and operating organization positions. These relationships shall be documented and updated, as appropriate, in the form of organization charts, functional descriptions of departmental responsibilities and relationships, and job descriptions for key personnel positions, or in equivalent forms of documentation. The individuals who train the operating staff and those who carry out safety and quality assurance functions may report to the Facility Manager. However, they shall have sufficient organizational freedom to ensure their independence from operating pressures. 5.6.1.1 Facility Manager The PHMC Director, Tank Farm Operations, shall be responsible for safe operation within the facility. Safe operation shall include, as necessary, interface requirements with other onsite organizations and facilities. 5.6.1.2 Minimum Operations Shift Complement The number of managers, engineers, operators, and support personnel shall be adequate to operate and support the TWRS facilities safely. Abnormal plant conditions shall be considered in determining staffing assignments. Management shall provide additional personnel, as necessary, to support other activities.	HNF-IP-0842, Volume I, Section 3.0, *Charters* HNF-IP-0842, Volume I, Section 4.1, *Safety/Security* HNF-IP-0842, Volume II, Section 4.1.1, *Operations Organization and Administration* HNF-IP-0842, Volume II, Section 4.2.1, *Shift Routines and Operating Practices* HNF-IP-0842, Volume III, Section 1.1, *Training Structure Mission, Goals and Objectives* HNF-IP-1266, Section 5.6, *Organization*	

AC	Requirement	Implementing Procedure	Comments
AC 5.6 Continued	The minimum complement of personnel can be 1 person less than the required number for a period of time not to exceed 4 hours in OPERATION and LIMITED MODES. The minimum complement accommodates unexpected absences, provided immediate action is taken to restore the shift complement to within the minimum requirements specified in Table 5.6-1. Managers or engineers who are also trained in an approved training program, including facility-specific operating procedures, may be substituted for operators. See also LCO 3.0.7, "Emergency Exceptions."	HNF-IP-0842, Volume I, Section 3.0, *Charters* HNF-IP-0842, Volume I, Section 4.1, *Safety/Security* HNF-IP-0842, Volume II, Section 4.1.1, *Operations Organization and Administration* HNF-IP-0842, Volume II, Section 4.2.1, *Shift Routines and Operating Practices* HNF-IP-0842, Volume III, Section 1.1, *Training Structure Mission, Goals and Objectives* HNF-IP-1266, Section 5.6, *Organization*	

AC	Requirement	Implementing Procedure	Comments
AC 5.7	Nuclear Criticality Safety: A program shall be maintained for ensuring WASTE remains subcritical Program Key Elements: a. Criticality limits and controls shall be documented in Criticality Safety Evaluation Reports (CSERs) and implemented in Criticality Prevention Specifications (CPSs) and procedures. b. Procedures shall be established for recovery from a CPS nonconformance. c. Criticality Safety training shall be provided for operations and technical personnel. d. For transfers into the tanks farms from non-tank farm facilities (e.g. Plutonium Finishing Plant, B-Plant) the following pretransfer conditions shall be met: The pH shall be less than or equal to 8 The plutonium concentration shall be less than 0.04 g/L averaged over the entire volume of the transferred WASTE. The neutron absorber (X) to plutonium (Pu) mass ratio (X/Pu) shall be greater than at least one of the minimum subcritical ratios show in Table 5.7-1. This condition is not required if the plutonium concentration is less than or equal to 0.001 g/L. Compliance with the above conditions may be demonstrated by sample analysis or calculation of final conditions based on initial sample analysis,	a. Not Applicable b. Not Applicable c. Not Applicable d. Not Applicable	The Project has no criticality issues. Refer to HNF-SD-W320-CSA-001, Revision 1, *Criticality Safety Assessment of Tank 241-C-106 Remediation*

AC	Requirement	Implementing Procedure	Comments
AC 5.7 Continued	e. Activities in MISFs (except for sampling/monitoring are prohibited without characterization of the WASTE and, if required, preparation of a CSER and CPS	e. Not Applicable	The Project has no criticality issues. Refer to HNF-SD-W320-CSA-001, Revision 1, *Criticality Safety Assessment of Tank 241-C-106 Remediation*
	f. Transfers via the Replacement Cross Site Transfer System which will intentionally transfer high solids contents will require characterization of the WASTE, and preparation and approval of a CSER and, if required, a CPS prior to initiating the transfer.	f. Not Applicable	

AC	Requirement	Implementing Procedure	Comments
AC 5.8	Source Inventory Controls: A program shall be maintained to ensure that the radiological and toxicological inventories assumed in the accident analyses will not be exceeded without proper analysis. Program Key Elements: a. VERIFY that new information or planned changes to source inventories are within the bounding applicable concentrations in the following safety analysis report references. • WHC-SD-WM-SARR-011, *Toxic Chemical Considerations for Tank Farm Releases* • WHC-SD-WM-SARR-016, *Tank Waste Compositions and Atmospheric Dispersion Coefficients for Use in Safety Analysis Consequence Assessments* • WHC-SD-WM-SARR-037, *Development of Radiological Concentrations and Unit Liter Doses for Tank Waste Remediation System Final Safety Analysis Report Radiological Consequence Calculations* b. VERIFY the following before accepting WASTE at the 204-AR Waste Unloading Facility. • Tank trailer WASTE receipts from the 222-S Laboratory shall conform to the container, volume, radioactive loading, and administrative control criteria established by WHC-SD-TP-SEP-011, *Safety Evaluation for Packaging for the 222-S Laboratory Cargo Tank*, and in accordance with 49 CFR Parts 173.403, 173.425, and 173.435	a. HNF-IP-1266, Section 5.8, *Source Term Controls* b. Not Applicable	b. Project W-320 does not accept waste at the 204-AR Waste Unloading Facility nor does it deliver waste to the facility.

AC	Requirement	Implementing Procedure	Comments
AC 5.8 Continued	• Rail car WASTE receipts shall conform to the container, volume, radioactive loading, and administrative control criteria established by WHC-SD-RE-SAP-013, *Safety Analysis Report for Packaging, Railroad Liquid Waste Tank Car.* • WASTE receipts shall be nonflammable and thermally stable.	b. (Continued) Not Applicable	
AC 5.9	<u>Flammability Controls</u>: A program shall be maintained to manage flammable gas hazards. <u>Program Key Elements</u>: a. Tank 241-SY-101 Flammability Controls • Implement the Level 1 requirements for Tank 241-SY-101 in LA-UR-92-3196, *A Safety Assessment for Proposed Mixing Pump Operations to Mitigate Episodic Gas Releases in Tank 241-SY-101*, Chapter 6. • Establish controls for the removal of the mixer pump from Tank 241-SY-101 to minimize the risk of a flammable gas deflagration. b. Flammable gas Facility Groups Flammable gas Facility Group assignments are shown in Table 5.9-1. c. Flammable Gas Control Restriction Saltwell pumping is prohibited in the Facility Group 2 tanks listed in Table 5.9-1.	a. Not Applicable b. HNF-IP-1266, Section 5.9 *Flammable Controls* c. Not Applicable	a. Project W-320 sluicing activities do not occur in Tank 101-SY.

AC	Requirement	Implementing Procedure	Comments
AC 5.10	Ignition Controls: A program shall be maintained to manage potential ignition sources that can initiate a fire or flammable gas deflagration. Program Key Elements a. INTRUSIVE Controls		
	• Stop operations and activities in INTRUSIVE regions of tanks with a potential flammable gas hazard, organic solvent hard or organic salt-nitrate hard when lightning is identified within a 50 mile radius of the tank farm.	HNF-IP-1266, Section 5.10, *Ignition Controls*	
	• Secure equipment in lowest position (e.g. lay down equipment elevated above the tanks and lower crane boom) if lightning is identified with a 50 mile radius of the tank farm.	HNF-IP-1266, Section 5.10, *Ignition Controls*	
	• PHMC President written authorization is required to conduct flame cutting/welding in a tank with a potential organic solvent or organic salt nitrate hazard. This approval requirement cannot be delegated. If flame cutting/welding is authorized and performed where debris could fall on to the waste surface, a barrier or device shall be used to prevent hot metal/slag from falling onto the waste surface.	Not Applicable	Sluicing activities will not involve flame cutting or welding.
	• When installing equipment (e.g. cameras, videos, lights) with hot filaments in a tank with potential organic salt-nitrate hazard, a method shall be used to prevent these hot surfaces from falling onto the WASTE surface.	HNF-IP-1266, Section 5.10, *Ignition Controls*	A PNNL study (Temperature Measurement Test Results for 241-AN-107

AC	Requirement	Implementing Procedure	Comments
AC 5.10 Continued			In Tank Imaging System) shows the camera lights do not produce enough heat to cause problems with waste ignition.

AC	Requirement	Implementing Procedure	Comments
AC 5.10 Continued	Vehicle Controls • Vehicle access within the tank farm boundary shall be limited to vehicles whose fuel systems are protected from damage to the integrity of the fuels systems caused by potential collisions with tank structures (e.g. mechanical protection such as a skid plate on the fuel tank or reservoir tanks physically located higher than risers or vehicle axles.) • Physical barriers (i.e. chain link fencing, metal interlock rail systems, concrete of concrete filled piping posts, concrete barriers, or T-Posts connected with chain) shall be established around tank structures outside the tank farm boundary to restrict vehicle access in the vicinity of aboveground WASTE tank structures. Access inside the physical barriers is allowed for vehicles with fuel system protection for maintaining the integrity of the fuel system. • Establish controls to limit vehicle speeds within tank farms	HNF-IP-1266, Section 5.10, *Ignition Controls* The following three requirements must be implemented through the work packages used to perform a specific procedure or procedures. (A Project W-320 example is the Transfer Line Flushing Procedure) TO-320-014, *Flush WRSS Transfer Line*	
	c. Flammable Gas Ignition Controls Ignition Source Control Set # 1 The ignition source Control Set #1 is used for equipment that is installed or used during work activities for that portion in a WASTE INTRUSIVE region or inside WASTE INTRUDING EQUIPMENT.	HNF-IP-1266, Section 5.10, *Ignition Controls*	

AC	Requirement	Implementing Procedure	Comments
AC 5.10 Continued	1. Mechanical tooling, equipment, and materials (including lubricants, adhesives, gaskets, corrosion inhibitors, epoxies, etc.) shall be constructed of spark resistant material, or shall be rendered incapable of sparking with sufficient energy to combust hydrogen, or shall have been analyzed and evaluated to be incapable of sparking with sufficient energy to combust hydrogen under the applied conditions. Material compatibility shall be evaluated for thermite reaction potential. 2. Electrostatic ignition sources shall be controlled by providing bonding or grounding according to NFPA 77, *Recommended Practice on Static Electricity* 3. Exposed polymer materials shall be rendered incapable of electrostatic charge or discharge potential with sufficient energy to combust hydrogen either by design or through acceptable work around practice, or by evaluation of the applied conditions (NFPA 77). 4. The surface temperatures of heat-generating devices (this includes potential compression heating and open flames) shall not exceed 780 degrees fahrenheit. The surface temperature is limited to a maximum of 320 degrees Fahrenheit if the device can contact the waste and cause ignition by triggering exothermic reactions in the WASTE (i.e organic salt-nitrate reactions). Internal temperatures of heat generating	1. Project W-320 equipment is designed to meet this requirement. HNF-SD-W320-TA-001, *Assessment of Project W-320 Equipment for Compliance with Flammable Gas Controls*, specified by East/West Tank Farms Standing Order 97-01 2. Project W-320 equipment is designed to meet this requirement. *Assessment of Project W-320 Equipment for Compliance with Flammable Gas Controls*, specified by East/West Tank Farms Standing Order 97-01 3. Project W-320 equipment is designed to meet this requirement. *Assessment of Project W-320 Equipment for Compliance with Flammable Gas Controls*, specified by East/West Tank Farms Standing Order 97-01 4. Project W-320 equipment is designed to meet this requirement. Refer to Design Specifications. *Assessment of Project W-320 Equipment for Compliance with Flammable Gas Controls*, specified by East/West Tank Farms Standing Order 97-01	

AC	Requirement	Implementing Procedure	Comments
AC 5.10 Continued	(4 Continued) devices may exceed these temperatures (NFPA 70, *National Electric Code*, *Articles 500 Hazardous [Classified] Locations and 501 Class I Locations)* if the heat source is either isolated (pressurized) from the gas environment, or if the design of the device enclosure meets the requirements for explosion-proof housings. 5. Electrical equipment shall be designed to meet NFPA 70, Class I, Division I, Group B Criteria or provide equivalent safety. As a minimum, this shall be interpreted to mean that no single point failure of energized equipment can result in an arc, spark, or gas burn propagation to the environment external to the source enclosure (NFPA 70). In the case of WASTE-submerged equipment containing potential ignition sources, demonstration by design that the equipment is nonsparking under normal operation and is designed to be isolated from the WASTE environment is an acceptable alternative. 6. Shutdown of purged and pressurized electrical equipment and purged and pressurized heat generating equipment, on loss of protective gas pressure or flow, shall be automatic by design as defined by NFPA 496, *Standard for Purged and Pressurized Enclosures for Electrical Equipment, Type X Pressurization.* 7. Interlocked start-up of purged and pressurized electrical or purged and pressurized heat generating equipment shall only be allowed when system senses	(4 Continued) 5. Project W-320 equipment is designed to meet this requirement. *Assessment of Project W-320 Equipment for Compliance with Flammable Gas Controls*, specified by East/West Tank Farms Standing Order 97-01 6. Project W-320 equipment is designed to meet this requirement. *Assessment of Project W-320 Equipment for Compliance with Flammable Gas Controls*, specified by East/West Tank Farms Standing Order 97-01 7. Project W-320 equipment is designed to meet this requirement. *Assessment of Project W-320 Equipment for Compliance with Flammable Gas Controls*, specified by East/West Tank Farms Standing Order 97-01	

AC	Requirement	Implementing Procedure	Comments
AC 5.10 Continued	(7 Continued) preset limits (e.g. adequate protective gas pressure established as defined by NFPA 496). If pressurized enclosures are used to isolate energized components, a minimum of four enclosure volumes shall be purged through the enclosure for energized components, and/or ten volumes shall be purged for enclosed motors before controlled start-up of the system components(NFPA 70, NFPA 496)	HNF-IP-1266, Section 5.10, *Ignition Controls*	
	<u>Ignition Source Control Set #2</u> The Ignition Source Control Set #2 is applied to vapor space regions (EX-TANK INTRUSIVE and DOME INTRUSIVE) when a gas release event (GRE) is postulated to create flammable conditions.		
	1. Mechanical tooling, equipment, and materials (including lubricants, adhesives, gaskets, corrosion inhibitors, epoxies, etc.) shall be constructed of spark-resistant material, or shall be rendered incapable of sparking with sufficient energy to combust hydrogen, or shall have been analyzed and evaluated to be incapable of sparking with sufficient energy to combust hydrogen under the applied conditions. Material compatibility shall be evaluated for thermite reaction potential.	1. Project W-320 equipment is designed to meet this requirement. *Assessment of Project W-320 Equipment for Compliance with Flammable Gas Controls*, specified by East/West Tank Farms Standing Order 97-01	
	2. Electrostatic ignition sources shall be controlled by providing bonding or grounding according to NFPA 77.	2. W-320 equipment is designed to meet this requirement. *Assessment of Project W-320 Equipment for Compliance with Flammable Gas Controls*, specified by East/West Tank Farms Standing Order 97-01	
	3. Exposed polymer materials shall be rendered incapable of electrostatic charge or discharge potential with sufficient energy to combust hydrogen either by design or through acceptable work around practices or by	3. Project W-320 equipment is designed to meet this requirement. *Assessment of Project W-320 Equipment for Compliance with Flammable Gas Controls*, specified by East/West Tank Farms Standing Order 97-01	

AC	Requirement	Implementing Procedure	Comments
AC 5.10	evaluation of the applied conditions(NFPA 77)		
	4. The surface temperatures of heat-generating devices (this includes potential compression heating and open flames) shall not exceed 780 °F. The surface temperature is limited to a maximum of 320 °F if the device can contact the WASTE and cause ignition by triggering exothermic reactions in the WASTE (i.e., organic salt-nitrate reactions). Internal temperatures of heat-generating devices may exceed these temperatures (NFPA 70) if the heat source is either isolated (pressurized) from the gas environment, or if the design of the device enclosure meets the requirements for explosion-proof housings.	4. Project W-320 equipment is designed to meet this requirement. *Assessment of Project W-320 Equipment for Compliance with Flammable Gas Controls*, specified by East/West Tank Farms Standing Order 97-01	
	5. Electrical equipment shall be designed to meet NFPA 70, Class I, Division 2, Group B criteria or provide equivalent safety. As a minimum, this shall be interpreted to mean the equipment is nonsparking under normal operation or, if normally sparking, the sparking component(s) shall be continuously isolated (purged and pressurized) from the potentially flammable gas environment, or the design of the device enclosure shall be of sufficient strength (explosion-proof) to prevent propagation of a gas burn to the environment external to the enclosure (NFPA 70).	5. Project W-320 equipment is designed to meet this requirement. *Assessment of Project W-320 Equipment for Compliance with Flammable Gas Controls*, specified by East/West Tank Farms Standing Order 97-01	
	6. Either automatic shutdown or alarming with manual shutdown is required upon loss of protective gas pressure or flow as defined by NFPA 496 Type Z pressurization. In EX-TANK INTRUSIVE region applications, electrical equipment that does not meet Class I,	6. Project W-320 equipment is designed to meet this requirement. *Assessment of Project W-320 Equipment for Compliance with Flammable Gas Controls*, specified by East/West Tank Farms Standing Order 97-01	

AC	Requirement	Implementing Procedure	Comments
AC 5.10 Continued	(6 Continued) Division 2, Group B may be used, if it is automatically shutdown by combustible gas detection systems.		
	7. Automatic or manual start-up controls of purged and pressurized electrical or purged and pressurized heat-generating equipment shall only be allowed on system sensing of preset limits (e.g., adequate protective gas pressure established as defined by NFPA 496). If pressurized enclosures are used to isolate energized components, at least four enclosure volumes shall be purged through the enclosure for energized components, and/or ten volumes shall be purged for enclosed motors before controlled start-up of the system components (NFPA 70, NFPA 496). When combustible gas detection shutdown systems are employed, start-up of equipment shall only be allowed once measured acceptable flammable gas levels are indicated.	7. Project W-320 equipment is designed to meet this requirement. *Assessment of Project W-320 Equipment for Compliance with Flammable Gas Controls*, specified by East/West Tank Farms Standing Order 97-01	
	d. <u>Deviations From Flammable Gas Ignition Controls</u> Deviations from Ignition Source Control Sets #1 and #2 are permitted provided the equipment, materials or work practices: (1) provide equivalent ignition source control safety, as approved by the Flammable Gas Equipment Advisory Board or (2) is an approved exception listed in HNF-SD-WM-BIO-001, Appendix E, "Flammable Gas/Slurry Growth Unreviewed Safety Question: Justification for Continued Operation for the Tank Farms at the Hanford Site." Deviations from Ignition Source Control Sets #1 and #2, or from the DOE-approved list of exceptions listed in HNF-SD-WM-BIO-001, Appendix E, are subject to the unreviewed safety question (USQ)	*Assessment of Project W-320 Equipment for Compliance with Flammable Gas Controls*, specified by East/West Tank Farms Standing Order 97-01 discusses equivalencies.	

AC	Requirement	Implementing Procedure	Comments
AC 5.10 Continued	process. e. <u>Compensatory Ignition Controls</u> The following temporary compensatory measures which are valid through September 30, 1998 are required: 1. For high level probes in DSTs and AWF tanks, either: (1) disconnect the induction relays (after obtaining RL-TWRS Director, Waste Storage Division, concurrence) prior to conducting GLOBAL WASTE DISTURBING operations and activities, or (2) measures shall be used to ensure that the WASTE level in the respective DSTs and AWF tanks will be at least 12 inches below the high level alarm probe by using the standard analog level instrumentation (e.g., ENRAFs, FICs, manual tape). 2. For pit leak detectors using the compensatory measures from LCO 3.1.3, the following requirements shall apply: No WASTE transfers shall be conducted in Facility Group 1 tanks until the pit leak detector relays are replaced. Immediately halt all GLOBAL WASTE DISTURBING operations and activities in any tank in the event of loss of ventilation. Sample associated (on PHYSICALLY CONNECTED routes) catch tank pump pits for flammable gas concentrations within 7 days prior to a transfer, or after a previous transfer through associated transfer piping, whichever is shorter.	e. HNF-IP-1266, Section 5.10, *Ignition Controls*	

AC	Requirement	Implementing Procedure	Comments
AC 5.10 Continued	(2 continued) This allows observation of increasing flammable gas concentrations in the catch tank pump pit that could result from a leaking transfer line. The timing is adequate because of the low likelihood of a misrouting through associated transfer piping, piping leaks, and flammable gas accumulation.		

AC	Requirement	Implementing Procedure	Comments
AC 5.11	Flammable Gas Monitoring Controls A program shall be maintained to monitor flammable gas concentrations to prevent deflagrations. Program Key Elements a. Manned Work Activity Controls 1. Work activity entry monitoring. VERIFY flammable gas concentrations in INTRUSIVE tank regions are ≤ 25% of the Lower Flammability Limit (LFL) prior to commencing any work. This entry monitoring does not require the monitoring of the EX-TANK INTRUSIVE region defined as the environment outside of tank openings that are directly connected to the headspace out to a distance of 18 opening diameters; 4.92 m (15 ft); or the boundary of temporary containment devices, whichever is shorter. If flammable gas concentrations are > 25% of the LFL, do not start manned work activities. This requirement shall be applied to all manned work activities in WASTE containing vessels (i.e., when the manned work activity is near an opening in the vessel containment) to ensure that flammable conditions in the work space are not present because of steady-state accumulation and/or recent gas release events (GREs).	1. HNF-IP-1266, Section 5.11, *Flammable Gas Monitoring Controls*	Most WRSS operations are unmanned activities. There are a limited number of manned activities such as transfer line flushing (TO-320-014) and tank 241-AY-102 grab sampling, (TO-080-403),

AC	Requirement	Implementing Procedure	Comments
AC 5.11 Continued	For manned activities on tanks, the entry monitoring requirements are:		
	a. Monitor at breather filter (passive ventilation) or vent duct (active ventilation) prior to start of activity.	HNF-IP-1266, Section 5.11, *Flammable Gas Monitoring Controls*	
	b. For work in pits, monitor inside of pit prior to start of pit work.	TO-320-014, Flush WRSS Transfer Lines	
	c. Monitor inside riser (passive or active ventilation) or allow for a one minute pause with riser opened (active ventilation only) prior to start of operations and activities in DOME INTRUSIVE regions.	HNF-IP-1266, Section 5.11, *Flammable Gas Monitoring Controls*	
	d. For DOME INTRUSIVE work, a and c above, plus monitor below bottom of riser (passive or active ventilation) or in vent duct upstream of the first mixing point (active ventilation only) prior to start of activity.	TO-320-005, *WRSS Startup and Process Control* HNF-IP-1266, Section 5.11, *Flammable Gas Monitoring Controls*	
	e. For manned activities inside of WASTE-INTRUDING EQUIPMENT, monitor in the vapor space prior to start of activity.	Not Applicable	
	For manned activities in non-tank WASTE transfer system regions, monitor in the vapor space where the activity is to be performed.	HNF-IP-1266, Section 5.11, *Flammable Gas Monitoring Controls*	
	2. If flammable gas concentrations are > 25% of the LFL, manned work activities shall be stopped except for gas sampling, taking necessary actions to reduce gas concentrations, and discontinuing use of	HNF-IP-1266, Section 5.11, *Flammable Gas Monitoring Controls*	

AC	Requirement	Implementing Procedure	Comments
AC 5.11 Continued	5.10, "Ignition Controls." Installed equipment that meets AC 5.10 may continue to be used (not be de-energized) if > 25% of the LFL.		
	3. During the performance of manned work activities there is the possibility of flammable conditions developing as a result of a GRE, therefore, work space (EX-TANK INTRUSIVE or DOME INTRUSIVE) flammable gas monitoring is continued as indicated in Table 5.11-1. Continuous monitoring means use of a continuous monitor (e.g., Standard Hydrogen Monitoring System [SHMS]) or use of portable combustible gas monitors (CGMs) that monitor continuously and alarm at ≤ 25% LFL. It is acceptable to disconnect a CGM or similar instrument during continuous monitoring to permit the temporary connection of alternate measurement devices such as organic vapor monitors (OVMs) or Drager tubes. Continuous monitoring requirement applicability is shown in Table 5.11-1. Stop manned work activities if flammable gas concentrations are > 25% of the LFL with an exception for gas sampling, necessary actions to reduce gas concentrations, and discontinuing use of ignition sources that do not meet the ignition source controls in AC 5.10.	HNF-IP-1266, Section 5.11, *Flammable Gas Monitoring Controls*	

AC	Requirement	Implementing Procedure	Comments
AC 5.11 Continued	b. <u>Unmanned Operations Controls</u>		
	1. Unmanned operations such as WASTE transfers, operation of air lift circulators (ALCs) or mixer pumps in actively ventilated tanks do not require continuous monitoring as the installed equipment must meet Ignition Source Control requirements in AC 5.10 and there are no manned activities that might result in an uncontrolled (errant) spark.	1. Project W-320 equipment is designed to meet this requirement. See AC 5.10	WRSS operations provide continuous flammable gas monitoring with alarm capacity.
	2. Provide periodic monitoring of flammable gas concentrations during unmanned GLOBAL WASTE DISTURBING operations in passively ventilated tanks. In passively ventilated tanks, flammable gas concentrations from GREs may persist for a significant length of time because of the low ventilation flows. For long-duration operations such as saltwell pumping, periodic monitoring can be defined as follows: • Monitor dome space and/or saltwell pit hourly for 5 hours following initiation of pumping, then • Monitor dome space and/or saltwell pit daily for the next 3 days (or once per 24 nominal hours run time), then • Monitor once per 7 days, (or once per 168 hours nominal run time). Revise sampling period based on the flammable gas concentrations as follows:	2. Not Applicable	2. Tank C-106 and AY-102 will be actively ventilated during sluicing activities.

AC	Requirement	Implementing Procedure	Comments
AC 5.11 Continued	a. Less than 15% of the LFL, sample every 7 days (not to exceed 10 days) b. In the range from 15% to ≤ 25% of the LFL, sample every 24 hours. Stop WASTE DISTURBING operation if the flammable gas concentration is > 25% of the LFL.		
	c. <u>Non-GRE Facilities</u> If adequate ventilation is not VERIFIED or OPERABLE, monitoring is required to VERIFY < 25% LFL before use of installed equipment that does not meet Ignition Source Control Set #2 in AC 5.10.	c. TO-320-013, *Operate WRSS Sump Pumps P-1363 and P-1368*	c. Tank C-106 and AY-102 have verifiable operating ventilation systems.
	d. <u>DCRT Ventilation Requirements</u> Establish and VERIFY ventilation rates are adequate to maintain double-contained receiver tank (DCRT) flammable gas concentration ≤ 25% of the LFL before placing new WASTE types from a new WASTE source in the receiver tank. New WASTE types are defined as WASTE originating from different tanks or WASTE-generating facilities other than those that have been evaluated for flammable gas generation in the DCRTs.	d. Not Applicable	d. Project W-320 does not use any DCRTs during its sluicing activities.

AC	Requirement	Implementing Procedure	Comments
AC 5.12	Transfer Controls A program shall be maintained to control WASTE transfers through the TWRS WASTE transfer systems. Program Key Elements a. Transfer System Configuration Management • Establish and maintain controlled status of the WASTE transfer systems as-built and jumper configuration. • Perform WASTE transfer system operations by approved procedures. • Isolate WASTE transfer paths connected to ACTIVE WASTE transfer pumps not under administrative lock by two closed valves (including 3-way valves), where the valves exist and where this practice is feasible. • INDEPENDENTLY VERIFY the planned WASTE transfer route is proper for the intended transfer; piping is in place per configuration status controls; correct and OPERABLE pumps are specified; and valves are properly aligned prior to transfer. • Prior to WASTE transfer through overground WASTE transfer piping, VERIFY either vehicle restrictions (i.e., vehicle access	HNF-IP-0842, Volume I, Section 4.8.2, *Routing Boards* HNF-IP-0842, Volume I, Section 4.8.2, *Transfer Line Configuration Management* HNF-IP-1266, Section 5.12, *Transfer Controls* TO-320-005, *WRSS Startup and Process Control* AND TO-320-006, *WRSS Sluicing Operations* TO-320-005, *WRSS Startup and Process Control* and TO-320-014, *Flush WRSS Transfer Lines* TO-320-005, *WRSS Startup and Process Control* Not Applicable	Transfer lines have valves associated with flushing operations. They do not, however, allow misrouting of a transfer. This control is applicable to the contingency supernate removal procedure.

AC	Requirement	Implementing Procedure	Comments
AC 5.12 Continued	limitations to the tank farm) or concrete shielding systems surrounding the overground transfer line portion of the transfer route are in place.		
	• Single-walled direct buried/bermed WASTE transfer lines outside of the tank farm boundaries shall be identified with permanent aboveground labels. Single-walled direct buried/bermed WASTE transfer lines within the tank farm boundary shall be identified with either 1) permanent aboveground labels, 2) temporary aboveground labels in place during WASTE transfer through the associated lines, or 3) a marker system and status drawing available for operator use.	Not Applicable	Singled wall transfer lines are not being used by Project W-320
	• Open nozzles PHYSICALLY CONNECTED to jumpers shall be sealed with caps, process blanks, or equivalent to prevent misroutes of WASTE. (Open nozzles on PHYSICALLY CONNECTED transfer lines downstream of two closed valves, demonstrated to be closed by INDEPENDENT VERIFICATION, are temporarily exempt through September 30, 1998 from being sealed with caps, process blanks, or equivalent. This compensatory measure is adequate because of its temporary nature and because of its demonstrated value as a current practice.)	TO-320-005, *WRSS Startup and Process Control* and TO-320-014, *Flush WRSS Transfer Lines*	

AC	Requirement	Implementing Procedure	Comments
AC 5.12 Continued	• Newly installed jumpers shall be leak tested prior to use.	A work package will be developed using the following procedure: TO-320-014, *Flush WRSS Transfer Lines* and TO-020-005, *Perform Pit Examinations and Leak Checks Using a Stick Camera, MCCS and Vitis II Camera*	
	• <u>204-AR Waste Unloading Facility</u>. VERIFY that the west exterior rollup door and the west exterior personnel access door are closed during WASTE transfers PHYSICALLY CONNECTED to the 204-AR Waste Unloading Facility.	Not Applicable	Project W-320 will not use the 204-AR Waste Unloading Facility in any capacity.
	b. <u>Operating Requirements</u>	TO-320-006, *WRSS Sluicing Operations*	
	• Material balance monitoring criteria based on planned WASTE transfer rates shall be documented. The transfer shall be stopped if periodic material balance calculations indicate a variance that exceeds the criteria.	TO-320-003, *WRSS Material Balance* HNF-SD-WM-PROC-021, TWRS Process Engineering Instruction Manual, Section 23 (Material Balance)	
	• Perform material balance calculations during each WASTE transfer through the WASTE transfer system. Calculations shall be performed at 30 and 60 minutes following WASTE transfer initiation and each 2 hours thereafter until the transfer is complete. **This requirement does not apply to Waste Retrieval Sluicing System operations (Project W-320).**	Not Applicable	

AC	Requirement	Implementing Procedure	Comments
AC 5.12 Continued	• MONITOR for increasing level in all tanks (including catch tanks) PHYSICALLY CONNECTED to the WASTE transfer route, during WASTE transfer through a WASTE transfer system. MONITORING shall be performed at 30 and 60 minutes following WASTE transfer initiation and each 2 hours thereafter until the transfer is complete. **This requirement does not apply to Waste Retrieval Sluicing System operations (Project W-320).**	Not Applicable	
	• Perform ground-level radiation surveys of any single-walled direct buried/bermed lines that are part of the WASTE transfer route every 12 hours during saltwell pumping (maximum of 4 gal/min), and every 30 minutes during submersible pumping (maximum of 50 gal/min). **This requirement does not apply to Waste Retrieval Sluicing System operations (Project W-320)**	Not Applicable	
	Ground-level radiation surveys shall be performed based on baseline criteria. If radiation surveys indicate a variance that exceeds the criteria, actions shall be taken to investigate whether transfer line leakage has occurred. If transfer line leakage is confirmed, response actions shall be taken according to procedures.	Not Applicable	

AC	Requirement	Implementing Procedure	Comments
AC 5.12 Continued	Note: For multiple saltwell pumping through a common line, radiation surveys shall be performed at an increased frequency. #Saltwells / Maximum Flow / Survey 2 / 8 gal/min / every 6 hours 3 / 12 gal/min / every 4 hours 4 / 16 gal/min / every 3 hours 5 / 20 gal/min / every 2 hours	(Continued)	
	• WASTE transfers are prohibited into SSTs. **This requirement does not apply to Waste Retrieval Sluicing System operations (Project W-320).**	Not Applicable	
	• VERIFY PHYSICALLY CONNECTED catch tanks and DCRTs which are not in the direct transfer route are < 50% full prior to WASTE transfer.	Not Applicable	No Catch Tanks or DCRTs are on the transfer path.
	• VERIFY all pit drains associated with the cross-site transfer route are open prior to a cross-site WASTE transfer.	Not Applicable	This requirement is specific to the cross site transfer system.
	• Perform WASTE transfers during excavation activities in accordance with AC 5.17, "Excavation Controls."	See AC 5.17 Excavation Controls	

AC	Requirement	Implementing Procedure	Comments
AC 5.12 Continued	• Inspect the 204-AR Waste Unloading Facility to ensure there is no spray or pool leakage in transfer and flush water piping during transfers PHYSICALLY CONNECTED to this facility using the following schedule: 1/2 hour after start of transfer, 1 hour after start of transfer, and every 2 hours thereafter. VERIFY that a CAM is OPERABLE and not alarming within the inspection area prior to these transfers. These temporary compensatory measures are valid through September 30, 1998.	Not Applicable	Project W-320 does not use the 204-AR Unloading Facility.
	c. <u>WASTE Compatibility Controls</u>		
	• <u>Final Tank State Controls Application</u>. Evaluate pumped and receiving tanks prior to WASTE transfers to ensure that controls for criticality, tank bumps, flammable gas deflagrations, organic solvent fires, and organic salt-nitrate reactions are applied to the final state of the tank. See also AC 5.15, "Moisture Controls."	TO-320-005, *WRSS Startup and Process Control* Letter dated June 29, 1998 from T.M. Blaak to P.G. O'Connor, Correspondence No. 74100-98-019, subject: Waste Compatibility Assessment of Tank	
	• <u>Chemical Compatibility</u>. Ensure chemical additions are ≥ pH of 8 prior to transfer into tank farms (excluding water additions and drums containing caustic chemicals).	TO-200-010, *Addition of Sodium Hydroxide to 241-AY-102 Using a Vendor Truck*	

AC	Requirement	Implementing Procedure	Comments
AC 5.12 Continued	• <u>DST and AWF Tank Time to LFL Determination</u>. VERIFY prior to any planned transfer(s) (including WASTE and other additions) into a DST and AWF tank, that the minimum time to reach 25% of the Lower Flammability Limit (LFL) for the tank vapor space, assuming loss of the primary tank ventilation, will remain ≥ 7 days, using the methodology contained in HNF-SD-WM-CN-117, *Calculations of Hydrogen Release Rate at Steady State for Double-Shell Tanks*.	TO-320-005, WRSS Startup and Process Control	JTB-01-014
	• <u>DCRT Time to LFL Determination</u>. VERIFY prior to any planned saltwell transfer(s) into a DCRT, that the DCRT vapor space will remain ≤ 25% of the LFL using the methodology contained in HNF-SD-WM-CN-118, *Calculation of Flammable Gas Mixtures in Double-Contained Receiver Tanks*.	Not Applicable	Project W-320 activities do not involve DCRTs.
	d. <u>Waste Retrieval Sluicing System Operations (WRSS) Controls</u> Note: The following controls apply only when Waste Retrieval Sluicing System operations (WRSS) are being performed.		
	• Prior to initiation of a WASTE transfer, establish communications between control rooms for Tanks 241-C-106 and 241-AY-102 to ensure immediate shutdown of WASTE transfers when leakage is indicated from mass flowmeter monitoring data, waste levels, or other observation.	TO-320-006, *Tank 241-C-106 WRSS Sluicing Operations*	

AC	Requirement	Implementing Procedure	Comments
AC 5.12 Continued	• Perform WASTE transfers of sludge from Tank 241-C-106 to Tank 241-AY-102 in one foot increments, followed by a hold period to monitor tank and WASTE parameters to ensure that the tank is within analyzed thermal conditions. During the monitoring period, the heat load of the sludge in Tank 241-AY-102 will be determined based on the sludge volume transferred. The sludge volume determination will be made by calculation utilizing the ENRAF densitometer data, sample analysis results and mass flow meter monitoring data.	TO-320-005, *WRSS Startup and Process Control*	
	• Perform material balance calculations following each sluicing batch of 12 hours maximum duration. The material balance shall include (a) total material transferred, (b) heat generation rate, and (c) solids loading calculation.	TO-320-005, *WRSS Startup and Process Control* AND TO-320-003, *WRSS Material Balance* AND HNF-SD-WM-PROC-021, *TWRS Process Engineering Instruction Manual, Section 23 (Material Balance)*	

AC	Requirement	Implementing Procedure	Comments
AC 5.13	<u>Encasement Seal Loop Controls</u> A program shall be maintained to control encasement seal loop drain line isolation valves (hydrostatic test valves).	HNF-IP-1266, Section 5.13, *Encasement Seal Loop Controls*	
	<u>Program Key Elements</u> During WASTE transfer through a WASTE transfer system, all encasement seal loop drain line isolation valves associated with PHYSICALLY CONNECTED piping shall be in the "open," "drain," or "operate" position, as applicable to the particular valve to provide an open drain path.	TO-320-005, *WRSS Startup and Process Control*	

AC	Requirement	Implementing Procedure	Comments
AC 5.14	Emergency Preparedness A program shall be maintained to ensure that emergency response plans are developed to direct facility actions in the event of an accident. 5.14.2 Program Key Elements a. The emergency preparedness program shall address the following elements: emergency response organization, notification, emergency event assessment, protective actions, medical support, recovery, emergency equipment, training, drills and exercises, and program administration. b. Emergency response plans for a seismic event shall include the following: • Identification of seismic event detection method used to initiate response procedure actions (e.g., 200 Areas seismic monitor, notification from external source). • Response procedures based on the magnitude of the seismic event to protect the offsite public, onsite worker, and facility worker (e.g., facility inspections, transfer termination, INTRUSIVE activity termination, ventilation system evaluation of required functionality, site evacuation). • Recovery plan to address restart of services and equipment.	HNF-IP-1266, *Tank Farm Operations Administrative Controls*, Section 5.14, Emergency Preparedness a. WHC-IP-0971, *Emergency Preparedness Program Plan* WHC-IP-0263-TF, *Tank Farms Building Emergency Plan* WHC-IP-839-TF, *Tank Farm Emergency Response Guide* WHC-IP-1178, *Tank Farm Emergency Response Manual* b. WHC-IP-0839, ERG J, *Seismic Event*	

AC	Requirement	Implementing Procedure	Comments
AC 5.14 Continued	c. Emergency response plans for a fire shall include response procedures based on the type, location, and size of the fire to protect the offsite public, onsite worker, and facility worker (e.g., firefighting coverage and response, limitations on TWRS activities, site evacuation).	c. WHC-IP-0263-TF, *Tank Farms Building Emergency Plan* WHC-IP-0839, ERG M, *Waste Tank Fire and/or Explosion* WHC-IP-0839, ERG Q, *Confirmed Underground Nonhazardous Material/Waste Release to Soil* WHC-IP-1178, ERG B, *Event Command and Control*	
	d. Emergency response plans for a WASTE leak shall include response procedures based on the magnitude of the leak to protect the offsite public, onsite worker, and facility worker (e.g., transfer termination, leakage containment and removal, site evacuation). WASTE leakage resulting in a pool requires immediate evacuation of affected personnel. Emergency response plans for WASTE leaks into WASTE transfer system structures (i.e., process pits, diversion boxes, vault pits, cleanout boxes, and catch tanks) shall include ignition control considerations (per AC 5.10, "Ignition Controls") because of the possibility of unfavorable flammable gas conditions within the structure.	d. WHC-IP-0839, ERG N, *Hazardous Material Release Spill to the Environment* WHC-IP-0839, ERG Q, *Confirmed Underground Hazardous Material Release/Spill to Soil* WHC-IP-1178, ERG B, *Event Command and Control* See AC 5.10	
	e. VERIFY safety structures, systems, and components for degradation of design criteria parameters that are credited in the analyses, following significant, relevant, natural phenomena events (e.g., high winds).	e. DOE-0223, *RL Emergency Implementing Procedures*	

AC	Requirement	Implementing Procedure	Comments
AC 5.15	Moisture Controls A program shall be maintained to prevent removal of moisture that protects WASTES from potential propagating organic salt-nitrate reactions. 5.15.2 Program Key Elements	HNF-IP-1266, Section 5.15, *Moisture Controls*	
	a. Interim Stabilization Supernatant pumping of excess liquid above the solid WASTE surfaces is acceptable. Saltwell pumping of liquids below the solid WASTE surfaces of Safe, Conditionally Safe, Unsafe or Unassigned tanks (HNF-SD-WM-BIO-001) is prohibited unless sampling and analysis have shown that the post saltwell-pumped condition of the remaining WASTE meets the following safety criteria (WHC-SD-WM-CN-058, *Compilation of Calculation Notes in Support of Organic Salt-Nitrate Reactions Safety Analysis*): Total organic carbon (TOC)/moisture safety criteria: • Wt% free $H_2O \geq 20\%$ OR • TOC (wt%) $< 4.5 + 0.17$ (wt% free H_2O) when wt% free $H_2O < 20\%$, where wt% TOC is the wet basis TOC concentration and wt% free H_2O is the moisture content of the WASTE.	a. Not Applicable	a. Project W-320 will not use Saltwell Pumping during its sluicing activities.
	b. Emergency Pumping Emergency pumping of Safe, Conditionally Safe, Unsafe, or Unassigned tanks in response to tank leaks shall be limited to supernatant pumping of the excess liquid above the solid WASTE surfaces unless the safety criteria in	b. TO-320-005, *WRSS Startup and Process Control* and HNF-SD-WM-PCP-013, *Tank 241-C-106 WRSS Process Control*	b.

AC	Requirement	Implementing Procedure	Comments
AC 5.15 Continued	5.15.2.a is met or until DOE approval of a waiver to this requirement is received by Fluor Daniel Hanford, Inc.	(b. continued)	
	c. <u>Moisture Monitoring</u>		
	Periodic VERIFICATIONS by liquid level monitors, visual observation, or other available means shall be performed to ensure that tanks that are classified as Safe or Conditionally Safe (HNF-SD-WM-BIO-001) continue to have sufficient moisture to be classified as Safe or Conditionally Safe, respectively. If moisture cannot be VERIFIED, control of potential ignition sources in the WASTE is required in accordance with AC 5.10, "Ignition Controls," for organic salt-nitrate reactions.	TO-320-005, *WRSS Startup and Process Control* AND TF-OR-EF-AYAZ-D, *AY and AZ Tank Farm Daily Rounds* TF-OR-EF-C-D, *C, CR Tank Farms and 244-A DCRT Lift Station Daily Rounds*	
	d. <u>Ventilation System Changes</u>		
	SST ventilation system design or operating changes that could cause increased WASTE moisture loss shall be evaluated for the effect on the organic salt-nitrate reaction risk and controls. The use of temporary active ventilation on passively ventilated tanks is allowed up to 672 hours (28 days) of cumulative operation in a 6-month period without evaluation. This assumes a nominal ventilation flow rate of 1,000 ft^3/min (WHC-SD-WM-SARR-033, *Preliminary Safety Criteria For Organic Watch List Tanks at the Hanford Site*). Use longer than 672 hours in a 6-month period requires an evaluation of the effect on WASTE moisture loss. The time interval was judged to not have a significant impact on WASTE moisture loss.	TO-060-050, *Portable Exhauster Operation for Tank 105-C and Tank-106-C (296-P-16)*	

AC	Requirement	Implementing Procedure	Comments
AC 5.16	<u>Dome Loading Controls</u> A program shall be maintained to limit loads so WASTE is not released from structures in the tank farms from accidental equipment drops or excessive loads leading to upper tank structural failure. <u>Program Key Elements</u> a. For mechanical lifts within 20 ft of underground storage tanks, the lower equipment boundary of the lifted item (e.g., bottom of the cover block, thermocouple tree) shall be less than 20 ft above surface grade, or pit floor above a WASTE storage tank (covered or uncovered). Mechanical lifts travelling over a MISF are not allowed. This control is applicable for SSTs (100 series), DSTs, and AWF tanks. b. Use the *Hanford Site Hoisting and Rigging Manual* (DOE/RL-92-36) for critical lifts. c. A dome loading program shall be established that manages soil and concentrated load baselines above WASTE storage tanks per Table 5.16-1.	TO-320-014, *Flush WRSS Transfer Lines* b. DOE/RL 92-36, HNF-IP-1266, Section 5-16, Dome Loading Controls c. HNF-IP-1266, Section 5-16, Dome Loading Controls	

AC	Requirement	Implementing Procedure	Comments
AC 5.17	Excavation Controls A program shall be maintained to ensure that controls are in place to coordinate excavation activities in areas of WASTE transfers to minimize the potential for WASTE leakage to the surface from an excavation accident. 5.17.2 Program Key Elements a. Obtain an excavation permit prior to excavating in areas where underground WASTE transfer lines exist (i.e., 200 East Area, 200 West Area, and right-of-way for the cross-site transfer line). Excavation activities include: (1) movement of earth by mechanical means below existing grade, or (2) any hand-digging to a depth greater than approximately 1 ft. The excavation permitting process shall provide for the following: • Composite map for the planned excavation site indicating approximate horizontal and vertical locations of WASTE transfer piping, piping encasement, and transfer structures. • Radiological evaluation for the planned excavation activity, including the issuance of a radiological work permit as required. • Physical marking of the ground surface to identify WASTE transfer lines based on the composite map and a documented subsurface scan. • Approval of the proposed excavation activity by TWRS cognizant facility engineer and Facility Manager, or delegate.	HNF-IP-1266, Section 5.17, *Excavation Controls* a. Project W-320 operating procedures do not require any excavation activities.	

AC	Requirement	Implementing Procedure	Comments
AC 5.17 Continued	• All excavations within 15 ft of an ongoing WASTE transfer are prohibited. • Hand-digging only is allowed within approximately 5 ft of a WASTE transfer line.	(a. Continued)	
	b. Encased pipe (concrete encased and pipe-in-pipe encased) outside of the tank farm boundaries shall be identified with permanent aboveground labels. Additional aboveground labeling requirements for WASTE transfer lines are provided in AC 5.12 "Transfer Controls."	b. TO-320-005. *WRSS Startup and Process Control*	
	c. WASTE transfers are prohibited through lines uncovered by excavation activities unless compensatory controls are established (e.g., vehicle access limitations, concrete shielding system installed).	c. TO-320-005, *WRSS Startup and Process Control*	
	d. WASTE transfers are prohibited through lines within approximately 15 ft of an ongoing excavation activity. This requirement does not restrict WASTE transfers if the excavation activity is stopped (e.g., at night). Ensure this requirement is met as follows: (1) Once per 24 hours, VERIFY from the excavation supervisor or by a review of approved excavation permits that no WASTE transfers are planned in the vicinity of an excavation activity.	d. TO-320-005, *WRSS Startup and Process Control*	
	<u>AND</u> (2) Prior to WASTE transfer and once per 24 hours during a transfer, VERIFY by surveying the WASTE transfer route that no excavation activities are in progress.	TO-320-005, *WRSS Startup and Process Control*	

AC	Requirement	Implementing Procedure	Comments
AC 5.17 Continued	e. Prior to initiation of an excavation activity, identify emergency response actions and establish communications between the excavation site and operations personnel to ensure immediate shutdown of WASTE transfers when leakage is indicated.	e. Not Applicable	e. The project will not perform any excavation activities during sluicing operations.
	f. Prior to initiating a slurry transfer through the replacement cross-site transfer line (WT-SLL-3160) VERIFY that the route markers are in place at approximately 150 feet intervals.	f. Not Applicable	f. This requirement is specific to the Cross Site Transfer System

AC	Requirement	Implementing Procedure	Comments
AC 5.18	HEPA Filter Controls A program shall be maintained to limit the radioactive material inventories on HEPA, high-efficiency gas adsorber (HEGA), and high-efficiency mist eliminator (HEME) (for AWF) filters and prefilters to protect the source term assumptions in the accident analyses. The program also ensures the capability of HEPA filters to mitigate the consequences of specific accident scenarios. 5.18.2 Program Key Elements a. VERIFY periodically that the HEPA and HEGA (for AWF) filter and prefilter housing radiation level is ≤ 200 mrem/h on contact. Replace the HEPA and HEGA (for AWF) filters and prefilters before filter housing radiation levels exceed 200 mrem/h. b. Verify periodically that the AWF 702-AZ HEME housing radiation level is ≤ 800 mrem/h on contact. Replace the HEME before the housing radiation level exceeds 800 mrem/h.	HNF-IP-1266, Section 5.18, *HEPA Filter Controls* a. TO-06-050, Operate 296-P-16 Exhauster TO-060-121, Operate TK24-AY-102 Annulus Ventilation System TO-060-350, Start/Stop and Operate AY/AZ Tank Ventilation Primary Exhaust System TO-320-009, Operate TK-241-C-106, 296-C-006 HVAC System b. TO-060-350, Start/Stop and Operate AY/AZ Tank Ventilation Primary Exhaust System	

AC	Requirement	Implementing Procedure	Comments
AC 5.18 Continued	c. VERIFY HEPA filter nominal particulate removal efficiency is ≥ 99.95% by performance of an aerosol test with the design air flow through the filter, according to the guidance in American Society of Mechanical Engineers (ASME) N510, *Testing of Nuclear Air Treatment Systems*, and Energy Research and Development Administration (ERDA) 76-21, *Nuclear Air Cleaning Handbook*. Perform the aerosol test after installation and every 12 months thereafter. Also establish controls for replacement of the HEPA filters.	c. 6-TF-156TR, *241-AY/AZ Tank Inlet Filter Aerosol Test* 6-TF-156, *241-AY/AZ Tank Exhauster 296-A-42 Aerosol Test Data Sheets* 6-TF-156TJ, *Appendix TJ, 241-C-105/106 Tank Inlet Filter Aerosol Test Data Sheets* 6-TF-156TK, *Appendix TK, 241-C-105/106 Tank Exhauster 296-P-16 Hepa Filter Aerosol Test Data Sheets* 6-TF-156TT, *Appendix TT, 241-C-106 Tank Exhauster 296-C-006 Aerosol Test Data Sheets* 6-TF-156AK, *Appendix AK, 241-AY-102 Annulus Exhauster 296-A-19 HEPA Filter Aerosol Test Data Sheets* 6-TF-157C, *Appendix C, 241-C Tank Farm Breather Filter Aerosol Test Data Sheets*	

AC	Requirement	Implementing Procedure	Comments
AC 5.19	<u>Process Instrumentation and Measuring and Test Equipment</u> A program shall be maintained to identify and programmatically control process instrumentation and measuring and test equipment used to VERIFY process parameters (e.g., level, temperature, flammable gas concentrations) to comply with the TSRs. <u>Program Key Elements</u> a. Identification and traceability of TSR-related instrumentation and equipment shall be maintained. b. Instrumentation and equipment shall either have a FUNCTIONAL TEST or CALIBRATION as applicable at appropriate intervals to VERIFY required performance. c. Records shall be maintained to provide evidence that the instrumentation and equipment are within the FUNCTIONAL TEST or CALIBRATION when used.	HNF-IP-0842, Volume V, Section 3.8, *Control and Calibration of Measuring and Test Equipment* HNF-IP-1266, Section 5.19, *Process Instrumentation and Measuring and Test Equipment* a. HNF-IP-1217, *Preventive Maintenance and Surveillance* b. Refer to the Job Control System Data Sheets c. HNF-IP-1217, *Preventative Maintenance and Surveillance*	

AC	Requirement	Implementing Procedure	Comments
AC 5.20	Transfer Pump Administrative Lock Controls A program shall be maintained for administrative lock controls on WASTE transfer pumps to minimize the potential for inadvertent pump starts. Program Key Elements a. The administrative lock of a WASTE transfer pump is demonstrated by removing and securing the motive force from the pump (e.g., electrical power, steam, water, or air). b. Transfer system covers, service water pressure detection systems, and transfer leak detection systems PHYSICALLY CONNECTED to a WASTE transfer route with WASTE transfer pumps locked in accordance with AC 5.20, Transfer Pump Administrative Lock Controls," shall normally be maintained OPERABLE. OPERABILITY is demonstrated by periodic VERIFICATION that the transfer system covers are in place, and periodic performance of a FUNCTIONAL TEST of the service water pressure detection systems and transfer leak detection systems. Transfer system covers, service water pressure detection systems, and transfer leak detection systems may be inoperable provided they are specifically identified and periodic management reviews are performed to approve their continued inoperability. The frequency of management reviews is based on the number of affected transfer system covers, service water pressure detection systems, and transfer leak detection systems, and the duration of their inoperability.	HNF-IP-1266, Section 5.20, *Administrative Lock Program* a. TO-320-005, *WRSS Startup and Process Control* b. Cover Blocks: TO-320-005, *WRSS Startup and Process Control* Leak Detectors: C Farm: TF-FT-359-009, *Perform Functional Test for C-Farm Transfer Leak Detectors* AY-Farm: TF-FT-259-007, *Perform Functional Test for AY Farm Transfer Leak Detectors*	

AC	Requirement	Implementing Procedure	Comments
AC 5.20 Continued	c. Transfer system covers, service water pressure detection systems, and transfer leak detection systems PHYSICALLY CONNECTED to a WASTE transfer route with WASTE transfer pumps not locked in accordance with the administrative lock control program are controlled in accordance with LCO 3.1.1, "Transfer System Covers and Entry Doors;" LCO 3.1.2, "Service Water Pressure Detection Systems;" and LCO 3.1.3, "Transfer Leak Detection Systems," respectively.	See LCOs, 3.1.1, 3.1.2 and 3.1.3	
AC 5.21	<u>Tank Service Water Intrusion Monitoring Program</u> A program shall be maintained to monitor for service water leaks that could fill and overflow tanks. <u>Program Key Elements</u> a. Monitor service water usage or tank levels every 24 hours to detect leaks. Monitoring service water usage requires reading each tank farm's flow totalizer to VERIFY that there has been no unaccounted for service water usage. Local inspection of the associated service pit or flush pit for leakage is also required when monitoring service water usage. Monitoring tank levels requires a VERIFICATION that the WASTE levels in tank farms serviced by the water system are not increasing unexpectedly. b. Procedures shall identify required operator responses to the detection of a service water leak.	HNF-IP-1266, Section 5.21, *Tank Service Water Intrusion Monitoring Program* a. TF-OR-EF-C-D, *C, CR and 244-A Lift Station Daily Rounds* AND TF-OR-EF-AYAZ-D, *AY and AZ Tank Farm Daily Rounds* AND TO-040-540, *Raw Water Surveillance and Usage* b. HNF-IP-0842, Volume II, Section 5.2, *Liquid Level Data Review*	

AC	Requirement	Implementing Procedure	Comments
AC 5.22	Transfer System Cover Removal Controls A program shall be maintained to control transfer system cover removal. Program Key Elements	HNF-IP-1266, Section 5.22, *Transfer System Cover Removal Controls*	
	a. Obtain management approval prior to removing a transfer system cover in accordance with this AC. Covers associated with structures PHYSICALLY CONNECTED to an ACTIVE WASTE transfer pump, not under administrative lock, and not controlled under this AC are required to be OPERABLE in accordance with LCO 3.1.1, "Transfer System Covers and Entry Doors."	a. TO-320-014, *Flush WRSS Transfer Line*	
	b. Provide continuous monitoring for WASTE leaks while covers are removed. Monitoring includes such methods as the use of continuous air monitors or other radiation monitoring devices near potential WASTE leak locations. See AC 5.20, "Transfer Pump Administrative Lock Controls."	b. Not Applicable	b. Project W-320 will not remove any cover blocks while the administrative lock is removed from its pumps.
	c. Establish procedures that identify required operator responses to the detection of a WASTE leak.	c. Not Applicable	c. Project W-320 will not remove any cover blocks while the administrative lock is removed from its pumps.

AC	Requirement	Implementing Procedure	Comments
AC 5.23	Caustic Transfer Controls A program shall be maintained to control caustic spray leak toxicological hazards. Program Key Elements a. Polyethylene (or similar) sleeving around delivery piping. b. Caustic delivery system pressure shall be ≤ 125 psig or below the cargo tank's specified maximum allowable operating pressure, whichever is less. c. Steel pipe shall be Schedule 10 or heavier wall thickness; polyethylene hose or other delivery piping shall be designed for appropriate pressure delivery. Caustic transfer piping shall have a wall thickness of ≥ 0.109 in. d. Vendors shall be required to provide documentation that the cargo tanks used for caustic transfers meet Department of Transportation Specifications 306, 307, 312, 406, 407 or 412 in accordance with 49 CFR Parts 178.345, 178.346, 178.347, or 178.348, as applicable. e. Traffic barriers shall surround the cargo tank (e.g., traffic cones or stanchions and chains).	HNF-IP-1266, Section 5.23, *Caustic Transfer Controls* a-e. TO-200-010, *Addition of Sodium Hydroxide in 241-AY-102 or 702-A De-Entrainers using a Vendor Truck.*	

AC	Requirement	Implementing Procedure	Comments
AC 5.24	Safety Management Programs The safety management programs listed below shall be maintained as part of the TWRS safety management system to minimize risks to the public, onsite workers, and facility workers, and to ensure the safe operation of TWRS facilities. Details of the listed safety management programs are provided in HNF-SD-WM-BIO-001, Chapter 4.0, "Safety Management." Program Key Elements	HNF-IP-1266, Section 5.24, *Safety Management Programs*	
	a. Radiological Protection Program	HNF-IP-1266, Section 5.24, *Safety Management Programs*	
	b. Hazardous Material Protection Program including: • WHC-SD-WM-HSP-002, *Tank Farm Health and Safety Plan* (HASP) • Chemical hazards • Industrial hygiene • Industrial safety	HNF-IP-1266, Section 5.24, *Safety Management Programs*	
	c. Radioactive and Hazardous Material WASTE Management Program including: • Effluent controls • Environmental monitoring	HNF-IP-1266, Section 5.24, *Safety Management Programs*	

AC	Requirement	Implementing Procedure	Comments
		(C Continued) *Quality Assurance Program*	
	d. Testing, Surveillance, and Maintenance Program including: • Initial testing, in-service surveillance, and maintenance e. Fire Protection Program	d. HNF-IP-1266, Section 5.24, *Safety Management Programs* HNF-3021, *Project W-320, Functional Design Criteria/Basis for Interim Operation - Addendum 1,* Testing Matrix e. HNF-IP-1266, Section 5.24, *Safety Management Programs*	

AC	Requirement	Implementing Procedure	Comments
AC 5.25	<u>Ventilation Controls</u> a. A ventilation control program shall be established, implemented, and maintained to inspect portions of the ventilation ductwork on Tank 241-C-106 to prevent an unfiltered release. b. A ventilation control program shall be established, implemented, and maintained to confirm cooling capacity in Tank 241-AY-102 complies with LCS/LCO 3.3.2, "DST and AWF Tank WASTE Temperature Controls," to prevent a tank bump. <u>Program Key Elements</u> a. Perform an external visual inspection of the above-ground recirculation ventilation ductwork for Tank 241-C-106 to identify any obvious visual damage every 24 hours during operation of recirculation fan FN 1361. The recirculation ventilation ductwork for Tank 241-C-106 includes the ductwork within Process Building 241-C-91, the inlet duct, and return duct to the tank. Monitor and evaluate ventilation flow data during operation of FN 1361 to determine if any recirculation losses are occurring. b. Periodically determine the cooling capacity required for Tank 241-AY-102 ventilation system to maintain WASTE temperatures in accordance with the requirements of LCS/LCO 3.3.2. This determination shall be based on a heat balance developed from tank WASTE temperature and liquid level; and ventilation parameters such as flow rate, temperature and humidity, as applicable, including planned activities that could impact the cooling requirements. Provide the necessary cooling capability before each campaign to transfer two	a and b. HNF-SD-WM-PCP-013, Revision 0, *Tank 241-C-106 Waste Retrieval Sluicing System Process Control Plan* TO-320-005, *WRSS Startup and Process Control* a. TO-320-005, *WRSS Startup and Process Control* and TO-320-006, *Tank 241-C-106 WRSS Sluicing Operations* TO-320-009, *Operate WRSS 296-C-006 HVAC System* TF-OR-WRSS-C-1, *C Farm WRSS Equipment Rounds* b. HNF-SD-WM-PCP-013, Revision 0, *Tank 241-C-106 Waste Retrieval Sluicing System Process Control Plan* TO-320-005, *WRSS Startup and Process Control*	

AC	Requirement	Implementing Procedure	Comments
AC 5.25 Continued	feet of Tank 241-C-106 sludge to Tank 241-AY-102.		

AC	Requirement	Implementing Procedure	Comments
AC 5.26	<u>Tank 241-C-106 WASTE Temperature Controls</u> A program shall be established, implemented, and maintained to maintain the temperature at the bottom of Tank 241-C-106 below the local saturation temperature to prevent a liner breach and steam release event. <u>Program Key Elements</u> a. Using the predicted height of the WASTE following each incremental transfer from Tank 241-C-106 to Tank 241-AY-102, predict the saturation temperature at the bottom of Tank 241-C-106. Use this temperature as the limiting temperature throughout the given incremental transfer. b. Periodically monitor the WASTE temperature to ensure that the limiting temperature for each incremental transfer and long term storage following completion of the WRSS transfer is not exceeded. The monitoring period will be based on the expected rate of waste temperature increase. For example, if the projected time to reach local saturation is 1 day, establish a monitoring frequency of several measurements per day to allow time for corrective action. Establish limiting thermocouple readings based on the predicted saturation temperature (for the given WASTE increment found in key element [a]) and thermal modeling to ensure that the tank bottom temperature does not exceed the local saturation temperature. Available WASTE temperature profiles are used in the thermal modeling to determine specific thermal limits. develop a recovery plan to be implemented if temperatures are expected to exceed the established limit or if measured temperatures exceed the limit.	a and b. HNF-SD-WM-PCP-013, Revision 0, *Tank 241-C-106 Waste Retrieval Sluicing System Process Control Plan* TO-320-005, *WRSS Startup and Process Control* TO-320-006, *241-C-106 WRSS Sluicing Operations*	

AC	Requirement	Implementing Procedure	Comments
AC 5.26 Continued	c. Before the first two sluicing increments (each nominally 1 ft. of Tank 241-C-106 sludge removal), the liquid level in Tank 241-C-106 will be reduced until only enough liquid WASTE will remain to completely cover the sludge layer. The liquid level established before the start of each sluicing increment must be maintained during the sluicing increment to prevent a steam release as a result of reduced hydraulic head in the tank. d. Prior to sluicing operations, the WASTE in Tank 241-C-106 shall be chilled to its winter temperature by operation of the Tank 241-C-106 primary ventilation system and the inlet chiller. e. After transfer is complete the final control temperature will be based on the amount of heat generating material remaining in the tank.	TO-320-005, *WRSS Startup and Process Control* and c,d, & e. HNF-SD-WM-PCP-013, Revision 0, *Tank 241-C-106 Waste Retrieval Sluicing System Process Control Plan*	

PROJECT W-320, TANK C-106 SLUICING, AUTHORIZATION BASIS COMPLIANCE MATRIX APPENDIX C, DEFENSE-IN-DEPTH CONTROLS IMPLEMENTATION[1]

Requirement	Implementing Procedure	Comments
DEFENSE-IN-DEPTH CONTROLS FOR HIGH EFFICIENCY PARTICULATE AIR FILTER FAILURE		
Low Delta P interlock across the HEPA filters on the ventilation system	TO-320-005, *WRSS Startup and Process Control*	
High Delta P (across the HEPA filters) alarm (remotely, at a manned facility) on the ventilation system	TO-320-005, *WRSS Startup and Process Control*	
Annual testing of filters following installation and annually, thereafter	See AC 5.18	
Record Sampling on CAM (to be tested periodically)	OSD-T-151-00016, See AC 5.18	
Interlock/alarm on heater overtemperature (Interlock/alarms tested periodically where provided)	Dwg. No. H-2-818561, Shts 3 & 6 TISH-13634 A,B,C TISH-13610 A,B,C	
Periodic surveillance of HEPA Delta P and continuous air monitor	TF-OR-EF-AYAZ-D TF-OR-EF-C-D	
HEPA filter replacement typically performed at 1 mSv/h (100 mrem)	HNF-IP-1266, Section 5.18, HEPA Filter Controls	
DEFENSE-IN-DEPTH CONTROLS FOR UNFILTERED RELEASES		
Transfer controls with the following key element: Waste Compatibility Controls	See AC 5.12 in Appendix B Letter dated June 29, 1998 from T.M. Blaak to P.G. O'Conner, Correspondence No. 74100-98-019, subject: Waste Compatibility Assessment of Tank 241-C-106 Waste (ETF-98-02) with Tank 241-AY-102 Waste, including attachments 1,2,3,4 & 5.	

Requirement	Implementing Procedure	Comments
Ignition Controls with the following key elements: Speed limit controls	See AC 5.10 in Appendix B	
Plastic Sleeves on above ground ventilation flanges	H-2-818470, Sht 2, Sht 3	

Requirement	Implementing Procedure	Comments
DEFENSE-IN-DEPTH CONTROLS FOR POTENTIAL FIRE IN CONTAMINATED AREAS		
Fire Protection Program	See AC 5.24	
Radiation Protection Program	See AC 5.24	
Contamination Control Program	HNF-IP-0842, Vol. VII	
Vehicle Positioning Spotters	These controls will have to be implemented through work packages used to position vehicles in tank farms to allow performance of procedure(s).	
Tank Farm Fences	Access Control for Hazardous Facilities Dwg. No. H-2-820723, Sht 1 of 1	
Vegetation Control Program	HNF-IP-0842, Vol. IX, Section 5.1, Fire Protection Program HNF-PRO-359 Control of Combustibles	
DEFENSE-IN-DEPTH CONTROLS FOR CAUSTIC SPRAY LEAK		
Operating training	HNF-IP-0842, Volume III, Training. Doc. No. 79610-98001, WRSS (Project W-320) Training Plan	
TWRS Hazardous Material Protection Program	See AC 5.23, 5.24	
Emergency Response Plans and Procedures	See AC 5.14	
DEFENSE-IN-DEPTH CONTROLS FOR LOAD DROPS		
A Radiation Protection Program will be established and implemented consistent with applicable procedures	See AC 5.24	
A facility Health and Safety Plan will be established and implemented consistent with applicable procedures	See AC 5.24	

Requirement	Implementing Procedure	Comments
A Job Control System will be established and implemented consistent with applicable procedures	HNF-IP-0842, Vol V, Section 7.1 TWRS Work Control	
Operator training is required prior to performance of activities affecting safety	HNF-IP-0842, Vol III, Training	
Operating procedures will be established and implemented for activities affecting safety	DOE-RL-92-36, Hanford Site Hoisting and Rigging Manual See AC 5.16	
Emergency Response Plan/Procedures will be established and implemented consistent with applicable procedures	See AC 5.14 HNF-IP-1266, Section 5.14 Emergency Preparedness	

Requirement	Implementing Procedure	Comments
DEFENSE-IN-DEPTH CONTROLS FOR FLAMMABLE GAS DEFLAGRATIONS		
Monitor dome pressure in Tank 241-AY-102 and Tank 241-C-106 during sluicing	TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	
Periodic video monitoring of the waste in Tank 241-AY-102	TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	
Measure background concentrations on both tanks for 3-4 weeks prior to sluicing.	TO-320-005, *WRSS Startup and Process Control* HNF-SD-WM-PCP-013, *Tank 241-C-106 WRSS Process Control Plan*	
Monitor the ventilation flow rates in both tanks during and after sluicing	TO-320-006, TK 241-C-106 *WRSS Sluicing Operations* *TO-320-005, WRSS Startup and Process Control* *TF-OR-EF-AYAZ-D, AY and AZ Tanks Farm Daily Rounds* *TF-OR-EF-C-D, C, CR and 244-A DCRT Lift Station Daily Rounds*	
Monitor level growth and use barometric pressure evaluation after sluicing	TO-320-005, *WRSS Startup and Process Control* TO-320-003, *WRSS Material Balance* HNF-SD-WM-PROC-021, Section 23, *Engineering Material Balance for Tank 241-C-106 Sluicing and Retrieval*: for compliance	
Flammable gas monitoring during sluicing	TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	
DEFENSE-IN-DEPTH CONTROLS FOR ORGANIC SOLVENT FIRE		
Vehicle Positioning Spotters (spotters provide additional level of control in positioning cranes/vehicles)	These controls will have to be implemented through work packages used to position vehicles in tank farms to allow performance of procedure(s).	

Requirement	Implementing Procedure	Comments
Tank Farm Fences (Provide line of demarcation within which Ignition Control Program key elements related to vehicle fuel systems must be met)	HNF-IP-0842, Vol II, Section 3.1, Access Control for Hazardous Facilities, See Dwg. Nos. H-2-820723, Sht 1 of 1 and H-2-820724, Sht 1 of 1.	
HEPA Filter replacement typically performed at 1 mSv/h (100 mrem/h)	See AC 5.18 TO-060-050, Operate 296-P-16 Exhauster TO-060-121, Operate TK 241-AY-102 Annulus Ventilation Primary Exhaust System TO-060-350, Start/Stop and Operate AY/AZ Tank Ventilation Primary Exhaust System TO-360-009, Operate TK-241-C-006 HVAC System	
DEFENSE-IN-DEPTH CONTROLS FOR TANK BUMPS		
The airlift circulators in Tank 241-AY-102 will be disabled prior to the start of sluicing operations	TO-320-005, *WRSS Startup and Process Control*	
Communications between the Tanks 241-C-106 and 241-AY-102 control trailer will be maintained during sluicing operations	TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	
Pump pit and sluice pit cover blocks (including removable plugs) will be in place prior to any sluicing operations and prior to enabling of the sluice and slurry pumps	TO-320-005, *WRSS Startup and Process Control*	
The transfer pumps associated with the sluice and slurry lines must be administratively locked out except as necessary for actual sluicing operations and maintenance	TO-320-005, *WRSS Startup and Process Control*	
DEFENSE-IN-DEPTH CONTROLS FOR LINER BREACHES		
Active ventilation or other heat removal mechanisms will be maintained.	TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations* TO-320-005, *WRSS Startup and Process Control*	

Requirement	Implementing Procedure	Comments
Pump pit and sluice pit cover blocks (including removable plugs) will be in place whenever the conditions for initiation of a liner breach are present (i.e. known leaking liner, active ventilation system down indefinitely).	TO-320-005, *WRSS Startup and Process Control*	
Emergency response plan/procedures 1. Will be in place and implemented in response to emergency conditions resulting from a liner breach 2. Will be in place and implemented in response to emergency conditions resulting from site wide emergencies such as a seismic event.	See AC 5.14 HNF-IP-1266, Section 5.14, Emergency Preparedness	
A material balance will be performed every 24 hours during transfer operations, including total material transferred and solids loading calculation.	TO-320-006, *Tank 241-C-106 WRSS Sluicing Operations* and TO-320-003, *WRSS Material Balance*	
Syphon protection is provided on the slurry distributor and the submersible sluice pump discharge line with Tank 241-AY-102	See Drawing H-2-818537 Sheets 1 and 2, *Distributor Assembly, Plan, Elevation and Details* and Drawing H-2-818498, Sht 3, *Winch and Shielding Plate Details*	
Material balance including level monitoring to identify leakage into the liner	TO-320-005, *WRSS Startup and Process Control* AND HNF-SD-WM-PROC-021, TWRS Process Engineering Instruction Manual, Section 23	
Raw water is metered	TO-040-540, *Raw Water Usage and Surveillance*	
Communication between Tank 241-C-106 and Tank 241-AY-102 control trailers will be maintained during sluicing operations	TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	

Requirement	Implementing Procedure	Comments
Sluicing controls (Sluicing controls are in the process control plan. During the early stages of sluicing, the sluice stream will not be directed at the waste near the walls.)	TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	
Design feature - The stiff hose is engineered to maintain integrity. Prevent sluicer hose from breaking off and causing liner breach.	See Dwg. No. H-2-818556, Sht 1 of 1	
Design feature - Positive mechanical stops are provided to limit nozzle travel to less than 25 degrees above horizontal.	See Dwg. No. H-2-818549, Shts 1, 2 and 3, and H-2-818551, Sht 1.	
DEFENSE-IN-DEPTH CONTROLS FOR SUBSURFACE LEAKS REMAINING SUBSURFACE		
Pressure/leak testing of transfer route before material transfer	HNF-SD-W320-TP-001, Rev. 1, Project W-320 Tank 241-C-106, WRSS Testing Plan	
Operator Training	HNF-IP-0842, Vol III, Training Doc. No. 79610-98001 WRSS (Project W-320) Training Plan	
Operating Procedures	TO-320-005, *WRSS Startup and Process Control*	
Emergency Response Plan/Procedures	See AC 5.14	
DEFENSE-IN-DEPTH CONTROLS FOR SUBSURFACE LEAKS RESULTING IN POOLS		
Walkdowns are performed once per shift to detect surface leaks from transfer line	TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	
WRSS pipe-encased transfer lines are equipped with encasement leak detectors	See Drawing H-2-818558 Sheet 3 of 4 Detail 1, *P & ID Details*	
Monitor flow rate	TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	
DEFENSE-IN-DEPTH CONTROLS FOR SURFACE LEAKS RESULTING IN POOL		
Tank farms are visually surveyed by operators at least once a day	TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	

Requirement	Implementing Procedure	Comments
Pit drains, where open, Allow leak to drain back to storage or catch tank, prevents overflow of pit to soil surface	See Drawings: H-2-818544 Sheet 1 of 2, *Jumper Arrangement Pump Pit AY-02A* H-2-818545 Sheet 1 of 1, *Jumper Arrangement Sluice Pit AY-02E* H-2-818498, Sht 1 *Piping Winch Plate* H-2-818537, Shts 1 & 2, *Distributor Assembly Plans, Elevations and Details* H-2-818526, Sht 1, *241-C-06C Jumper Arrangement Sluice Pit*	
Backflow preventers	See Drawings H-2-818572 Sheet 1 of 4, *Air and Water Service Building Plan, Details and Elevations* AND H-2-818481 Sheet 1 of 4, *Piping Process Building Skid Plan*	
Material balance every 24 hours during transfer operations, including total material transferred and solids loading calculations	TO-320-006, *Tank 241-C-106 WRSS Sluicing Operations* and TO-320-003 *WRSS Material Balance*	
Encasement leak detectors	See Drawing H-2-818558 Sheet 3 of 4, Detail 1, P & ID details and Drawing H-2-818559, Shts 2 & 4, P & ID Tank 241-C-106.	

Requirement	Implementing Procedure	Comments
DEFENSE-IN-DEPTH CONTROLS FOR TRANSFER SYSTEM SPRAY LEAKS		
Repositioned jumpers are in service tested, during initial sluicing. Cameras lowered through penetrations in the cover block are used to verify initial jumper integrity during the leak test	OTP-320-002, *W-320 Slurry Transfer System Preoperational Test* OTP-320-003, *W-320 Supernate Transfer System Preoperational Test* TO-320-005, *Perform Pit Examination and Leak Checks Using a Stick Camera, MCCS and Vitis II Camera*	
Process pit and vault pit leak detectors	See Drawings H-2-818575, *Leak Detector Elements Assembly and Installation*	
Material balance every 24 hours during transfer operations, including total material transferred and solids loading calculation	TO-320-006, *Tank 241-C-106 WRSS Sluicing Operations* and TO-320-003, *WRSS Material Balance*	
Encasement leak detectors	See Drawing H-2-818558, Sheet 3 of 4, Detail 1, *P & ID Details*	
Isolation valves, manual valve is closed to isolate the flush system when not in use	TO-320-014, *Flush WRSS Transfer Line*	
Backflow preventers (Prevent backflow of waste into the raw water supply)	See Drawings H-2-818572 Sheet 1 of 4, *Air and Water Service Building Plan, Details and Elevations* AND H-2-818481 Sheet 1 of 4, *Piping Process Building Skid Plan*	

Requirement	Implementing Procedure	Comments
DEFENSE-IN-DEPTH CONTROLS FOR SPRAY LEAK AND SURFACE POOLS FROM UNDERGROUND WASTE TRANSFER LINES		
T-bars and chains (Restrict access to transfer lines)	TO-320-005, *WRSS Startup and Process Control* and TO-320-009, *Operate WRSS 296-C-006 HVAC System*	
Material balance every 24 hours during transfer operations, including total material transferred and solids loading calculation	TO-320-006, *Tank 241-C-106 WRSS Sluicing Operations* AND TO-320-003, *WRSS Material Balance*	
Notes: 1. Information References: • HNF-2427, Documentation Bibliography Listing, Project W-320, Tank 241-C-106 Sluicing • HNF-2527, Project W-320, Sluicing Master Calculations List • Drawing H-2-818423, Shts. 1, 2, 3 and 4, Drawing List C-106 Sluicing System		

PROJECT W-320, TANK C-106 SLUICING, AUTHORIZATION BASIS COMPLIANCE MATRIX APPENDIX D, BIO ADDENDUM 1 TEXT REQUIRED CONTROLS IMPLEMENTATION[1]

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Executive Summary, Page iv, Section ES 2	Backup Power for AY and C Farm Ventilation systems will be provided.	HNF-SD-WM-BIO-001, Rev. 0, Volume 2, Section 8.2.8.4, *Electrical Power Distribution* and TO-060-047, *Operate Emergency Backup 241-C-106 1000 CFM Exhauster* and TO-060-048, *Operate Emergency Backup 241-AY-102 1000 CFM Exhauster* and TO-060-049, *Operate Emergency Backup 241-AY-102 Annulus 1000 CFM Exhauster* MOA 8C620-98-004, *Memorandum of Agreement for Portable Generator Use*	
Executive Summary, Page iv, Section ES 2	Backup power for other systems will be provided as determined by the engineering analysis discussed in Section 4.2.	See HNF-2050, *Project W-320 Safety Class and Safety Significant Equipment Engineering Evaluation (SEL)* for this analysis. No additional backup power requirements have been identified.	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Executive Summary, Page iv, Section ES 2	The use of existing septic systems or portable facilities will be considered for the personnel using the control trailer	Portable toilet facilities are in place at the MO-211 Control Room. Existing sanitary facilities are available near the AY farm operator station.	
Page 2-4, Section 2.3.5			
Page 2-5, Section 2.3.6	Initial sluicing campaign will be limited to two (2) feet.	TO-320-005, *WRSS Startup and Process Control* and HNF-SD-WM-PCP-013, *Tank 241-C-106 Waste Retrieval Sluicing System Process Control Plan*	
Page 2-5, Section 2.3.6	Following the transfer of the initial (and each subsequent) increment, an evaluation of the system will be performed to determine its ability to maintain the waste at 30 degrees F below local saturation temperatures as required by TSR controls (AC 5.12.2 and 5.25.2)	TO-320-005, *WRSS Startup and Process Control*	
Page 2-5, Section 2.3.6	If this evaluation (i.e. thermal monitoring and modeling) indicates that 30 degrees F subcooling cannot be maintained for further waste additions, then the addition of blowers or a combination of blowers and chillers, before transferring additional waste.	TO-320-005, *WRSS Startup and Process Control*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 2-10, Section 2.4.1.2.2	Tank 241-AY-102 in leakage pathways will be sealed to the maximum extent practical to maintain negative pressure in the tank.	See Drawing Nos. H-2-818448, Sheet 2 of 5, H-2-818453, Sheet 2 of 3, H-2-818454, Sheet 2 of 4. Operations has tape sealed AWF facilities to support the operation of the 702-AZ ventilation system which provides lower ventilation exhaust rates than the older 702-A systems.	
Page 2-12, Section 2.4.1.3	The control of the pump will be addressed in the process control plan and WRSS operating procedures.	*TO-320-006, Tk 241-C-106 WRSS Sluicing Operations*	
Page 2-13, Section 2.4.1.4	During the early stages of sluicing the sluice stream will not be aimed directly at the tank walls.	TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	
Page 2-14, Section 2.4.1.7	Grab samples will be taken periodically to validate the material balance.	TO-320-005, *WRSS Startup and Process Control*	
Page 2-15, Section 2.4.1.7	Solids loading is measured during sluicing by mass flow meter, and periodically verified during the hold periods between sluicing activities.	TO-320-005, WRSS Startup and Process Control TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 2-22, Section 2.4.2	Backup power for other systems will be provided, based on their safety function, as determined by the engineering analysis discussed in Section 4.2.	See HNF-2050, *Project W-320 Safety Class and Safety Significant Equipment Engineering Evaluation (SEL)* for the analysis. No additional backup power requirements have been identified.	
Page 2-22, Section 2.4.2	The use of portable facilities for sanitary sewage will be provided for the personnel using the control trailer.	Portable toiler facilities are in place at the MO-211 Control Room. Existing sanitary facilities are available near the AY Farm operator station.	
Page 2-25, Section 2.5.1.1	The sludge in Tank 241-C-106 will be subcooled (the temperature reduced to below the local saturation temperature) to prevent a steam release event from occurring.	TO-320-005, *WRSS Startup and Process Control*	
Page 2-25, Section 2.5.1.2	A number of small supernate liquid transfers will be required between the two tanks to equalize the temperatures in the tank liquids. The number and volume of transfers to accomplish the equalization will be dependent on the initial liquid volume in Tank 241-C-106 and its initial temperature. This equalization procedure will be performed only before the start of WRSS operations or after extended delay periods between sluicing increments.	TO-320-005, *WRSS Startup and Process Control* TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 2-25, Section 2.5.1.3	To establish the startup thermal baseline for Tanks 241-AY-102 and 241-C-106, the temperature in both tanks will be monitored for a period of not less than one month in advance of the start of sluicing.	TO-320-005, *WRSS Startup and Process Control* HNF-SD-WM-PCP-013, *WRSS Process Control Plan*	
Page 2-25, Section 2.5.1.4	The flammable gas concentrations will be monitored in Tanks 241-AY-102 and 241-C-106 for a period of not less than four weeks before the start of sluicing to establish the flammable gas baselines. The baseline will also include the flammable gas compositions for the tanks based on vapor space sampling results.	TO-320-005, *WRSS Startup and Process Control* HNF-SD-WM-PCP-013, *WRSS Process Control Plan*	
Page 2-26, Section 2.5.1.5	Using the existing 241-AY-02D pit transfer pump, the waste level in Tank 241-AY-102 will be reduced before the start of sluicing to approximately 4.3 m (14 ft) by a transfer of supernate to a double shell receiver tank through the existing transfer system.	TO-320-005, *WRSS Startup and Process Control* Procedure requires verification of transfer, transfer activity itself is outside the scope of the WRSS project BIO Addendum 1. TO-230-022, *Transfer from Tk-102-AY to Tk-102-AW*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 2-26, Section 2.5.2.1.1	The first sluicing campaign retrieval operation is characterized by a requirement to maintain a specified liquid cover over the sludge in Tank 241-C-106 and the requirement to limit the amount of material transferred (WHC-SD-WM-ER-588, *Tank 241-C-106 Sluicing Evaluation*)	TO-320-005, *WRSS Startup and Process Control* TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	
Page 2-27, Section 2.5.2.1.2	Parameters to monitored between sluicing batches include: Gas Release rates (SHMS) Waste Levels (ENRAF) Sludge Level (ENRAF Densitometer) Waste Temperatures (TC Trees, Multi-function Instrument Tree, Air Lift Circulator TC's, and under tank TC's) Annulus ventilation flow rate and inlet and outlet temperatures. Dome space ventilation flow rate, inlet and outlet temperatures, relative humidity and chiller performance.	TO-320-005, *WRSS Startup and Process Control* and TO-320-004, *Operate WRSS Data Acquisition System*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 2-28, Section 2.5.2.1.2	The post batch monitoring period will extend for a minimum of threes days following each batch. The batch monitoring durations are established by the solids-settling velocity reported in HNF-SD-WM-TI-756, *Chemical and Chemically Related Considerations Associated with Sluicing Tank C-106 Waste to Tank AY-102*, which is such that the initial settling period will be completed and a distinct sludge-supernate interface will have formed in Tank 241-AY-102. During the monitoring period, the volume of Tank 241-C-106 sludge transferred to Tank 241-AY-102 will be calculated using ENRAF densitometer density profile data and Tank 241-AY-102 grab samples analysis results. This estimate will be compared with the mass flow meter totalizer readings. The monitoring period duration may also be extended until adequate confidence is established in the estimated sludge volume/heat load transferred. For example, if sludge settling takes longer than expected, a longer monitoring period will be required to establish volume and heat load values since these hi values	TO-320-005, *WRSS Startup and Process Control* and HNF-SD-WM-PCP-013, *Tank 241-C-106 WRSS Process Control Plan*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
	values are highly dependent on sludge depth.	TO-320-005, *WRSS Startup and Process Control*	
Page 2-28, Section 2.5.2.1.2	The post increment monitoring period will extended for a minimum of seven days following the completion of each increment. The increment monitoring durations are established in the WRSS process control plan. At the completion of each sluicing increment, an updated thermal baseline for both the tanks is established prior to proceeding with further sluicing. All of these considerations have some bearing on how subsequent retrieval actions will be performed, perhaps determining if they can be performed at all. During the increment monitoring period, the sludge volume will be calculated as discussed above. In addition, tank thermal data will be collected and reviewed to verify that anticipated thermal responses are occurring. Deviations from the anticipated response will be re-evaluated.	TO-320-005, *WRSS Startup and Process Control* and HNF-SD-WM-PCP-013, *Tank 241-C-106 WRSS Process Control Plan*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 2-28, Section 2.5.2.1.2	The post first-sluicing campaign monitoring period will extend for a minimum of two weeks following the completion of the campaign. The increment monitoring durations are established by LA-UR-97-1330. Both thermal and flammable gas process parameters will be monitored during this period.	TO-320-005, *WRSS Startup and Process Control* HNF-SD-WM-PCP-013, *WRSS Process Control Plan*	
Page 2-29, Section 2.5.2.1.3	The sluicing strategy of the second campaign will be planned to minimize AY-102 waste temperatures and gas retention during subsequent waste transfers. For example, high temperatures would occur if the heat generating isotopes were in a stratified layer at mid-depth in the sludge of AY-102, than if they were at the top or mixed throughout (see Report HNF-SD-W320-ER-004)	TO-320-005, *WRSS Startup and Process Control* and HNF-SD-WM-PCP-013, *Tank 241-C-106 WRSS Process Control Plan*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 2-29, Section 2.5.2.1.3 (Continued)	Based on monitoring results of the quantity of heat generating materials transferred to AY-102 and remaining in C-106 after the first sluicing campaign, the model predications, the depth of localized sluice jet penetrations in C-106 will be adjusted to the extent practicable to optimize the subsequent waste transfers. This can be done by either excavating deeper in one area of the tank, or conversely, by removing a layer of more uniform thickness from the surface of the sludge.	TO-320-005, *WRSS Startup and Process Control* and HNF-SD-WM-PCP-013, *Tank 241-C-106 WRSS Process Control Plan*	
Page 2-29, Section 2.5.2.1.6	The waste in Tank 241-AY-102 is monitored to ensure that the waste remains within the tank's operating specifications and applicable Technical Safety Requirements (TSRs) for waste storage. Monitoring is specified through the process control plan which describes the requirements for the incremental transfer and monitoring.	TO-320-005, *WRSS Startup and Process Control* TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations* HNF-SD-WM-PCP-013, *WRSS Process Control Plan*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 2-30, Section 2.5.2.2.1	The slurry booster pump speed is set for a flow of 1325 L/min (350 gal/min) assuming a 0% solids loading. As the solids loading increases, the slurry flow rate is estimated to decrease approximately 4 gal/min for each 1% solids loading change. The sluicing operator will monitor this flow rate to determine the effectiveness of the sluicing operations. To assist the operator in controlling the slurry loading at a level that will not potentially allow transfer lines solid settling, the flow for a 20 wt% solids loading will cause an alarm to sound. The response to this alarm will be to take action to avoid future solids loading increase or to reduce the solids loading to below 20wt%. The following process control actions to reduce the solids loading would be implemented incrementally in the listed order to the extent required to reduce the solids loading to below 20%: 1. Raise the submersible slurry pump level 2. Direct the sluice stream to the area of the submersible slurry pump intake to dilute the	TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
	solids entering the pump. 3. Increase the pump speed to achieve 1700 liters/min (450 gal/min) flow rate until the higher solids content slurry clears the system. NOTE: This actions would have to be reversed as soon as the higher slurry content stream cleared the transfer line to reestablish the slurry loading process control pump speed setting.	TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	
Page 2-31, Section 2.5.2.2.2	After the sludge transfer, a batch material balance is performed by operations followed by a cumulative material balance performed by process engineering, using the monitoring data from both tanks (i.e. levels, temperatures, ventilation flow, temperature and humidity data) to refine the thermal analysis baseline (HNF-SD-W320-ER-002) and verify the subsequent sluicing operations can be accomplished safely.	TO-320-005, *WRSS Startup and Process Control* and HNF-SD-WM-PCP-013, *Tank 241-C-106 WRSS Process Control Plan*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 2-31, Section 2.5.2.2.3	The phenomena related to flammable gas generation, retention, and release for transfer of the Tank 241-C-106 sludge to Tank 241-AY-102 (LA-UR-97-1330). A presluicing flammable gas baseline with a four week monitoring period,k using the SHMS instrumentation installed on the tanks, will be established for Tanks 241-AY-102 and 241-C-106. The flammable gas baselines will include flammable gas release rates, flammable gas compositions, and rate projections for the rates at key points in the planned sluicing operations. Data Evaluations include the following: Gas concentrations and ventilation rates in both tanks. An accurate accounting of all materials introduced into or removed from the tank. Video monitoring of the Tank 241-AY-102 waste surface for indications of foaming or crust formation during the initial sluicing operations. Headspace grab sampling at Tank 241-AY-102	TO-320-005, *WRSS Startup and Process Control* and HNF-SD-WM-PCP-013, *Tank 241-C-106 WRSS Process Control Plan*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
	Liquid level monitoring in both tanks (Tank 241-C-106 monitoring is limited to nonsluicing periods) Tank 241-AY-102 sludge settling monitoring (densitometer and/or multi-functional instrument tree) Evaporation rate determined by ventilation flow rate and relative humidity.	TO-320-005, *WRSS Startup and Process Control* HNF-SD-WM-PCP-013, *WRSS Process Control Plan*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 2-31, Section 2.5.2.2.3	Subsequent flammable gas monitoring will continue throughout the WRSS operations. Data from this monitoring will be compared to projections and significant deviations will be evaluated to determine if mitigative actions are warranted. Process monitoring during the period between sluicing batches, increments, and campaigns will be the same as discussed under baseline development above. The data related to gas retention in the Tank 241-AY-102 sludge will be carefully evaluated during the hold periods between sluicing increments and campaigns. If this evaluation identifies a potentially unacceptable flammable gas buildup, then the void fraction measurement instrument would be deployed as described in section 2.5.2.3.8. If the void fraction measurement instrument confirms the flammable gas buildup condition, the tank excess supernate removal contingency plan would be implemented. As discussed in LA-UR-97-1330, the primary mitigation option selected is the removal of the Tank 241-AY-102 supernate. A summary of the process control for flammable gas	TO-320-005, *WRSS Startup and Process Control* TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations* HNF-SD-WM-PCP-013, *Tank 241-C-106, WRSS Process Control Plan*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 2-31 Section 2.5.2.2.3 (Continued)	in the following discussions.		
Page 2-32, Section 2.5.2.2.3	Waste (tank) level and flammable gas concentration are monitored in Tank 241-AY-102. The waste level and background hydrogen concentrations will equilibrate within two to four weeks. The void fraction of the sludge can be estimated by comparing the background hydrogen concentration transient with the steady state concentrations using the level rise. During this time, barometric pressure evaluation (BPE) may also be deployed to obtain additional data. Sludge density measurements using the ENRAF densitometer and the sludge thickness measurements using the same instrument along with the multi-functional instrument tree validation probe will also be required. Using the gas inventory data from Tank 241-AY-102, a decision will be made to either transfer more waste or spend additional time evaluating the situation. Sluicing in the presence of a gas inventory indicating a buoyancy instability requires implementation of a mitigation plan to remove the excess supernate from the tank.	TO-320-005, *WRSS Startup and Process Control* and HNF-SD-WM-PCP-013, *Tank 241-C-106 WRSS Process Control Plan*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 2-32, Section 2.5.2.2.3 Continued	If the gas inventory estimates contain large uncertainties (as defined in the WRSS Process Control Plan), the void fraction instrument must be deployed to measure the gas inventory at a few locations in Tank 241-AY-102. If a level swell of more than 10 cm (4 inches), corrected for evaporation, is detected and high voids are indicated by the void fraction instrument the supernate in Tank 241-AY-102 will be removed. The decision to remove the supernate will be based on the calculated potential for a buoyancy induced roll over. Such a calculation will include the total data gathered such as gas release rates, level growth, barometric pressure evaluations, and void fraction measurements. The measurements are described in reports LA-UR-97-1330 and PNL -11627, *Monitoring Gas Retention and Slurry Transport During the Transfer of Waste from C-106 to AY-102*, and will be implemented in the PCP.		

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 2-32, Section 2.5.2.2.4	Until the steam bump accident concern is eliminated, the liquid level in Tank 241-C-106 will have to be controlled at or above a set level to avoid affecting the subcooling provided by the hydraulic head of the liquid in the tank. The minimum liquid level is established to maintain the measured temperature of the waste at all locations below the local saturation temperature. The minimum liquid level to maintain safe operations is maintained thorough a TSR level control (AC 5.26)	See AC 5.26 in Appendix B. TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations* HNF-SD-WM-PCP-013, *Tank 241-C-106 WRSS Process Control Plan*	
Page 2-33, Section 2.5.2.2.5	Minimize leak potential by maintaining liquid level as low as practical AND avoid directing sluice at tank walls during early stages.	TO-320-005, *WRSS Startup and Process Control* TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	
Page 2-33, Section 2.5.2.2.6	The capability to draw a high annulus vacuum must be provided.	TO-060-121, *Operate 241-AY-102 Annulus Ventilation System*	
Page 2-33, Section 2.5.2.2.6	Incremental sluicing with real-time mass control and monitoring will limit the thermal response caused by the heat-generating material added to Tank 241-AY-102.	TO-320-005, *WRSS Startup and Process Control* TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 2-34, Section 2.5.2.2.6	Adequate subcooling can be maintained in Tank 241-C-106 with presluice chilling of the waste and incremental sluicing with hold periods for subsequent cooling before removing the hydrostatic head. The hold periods for cooling were established by thermal modeling.	TO-320-005, *WRSS Startup and Process Control*	
Page 2-35, Section 2.5.2.2.10	Re-establish performance baseline and modify predictive models following each sluicing increment.	TO-320-005, *WRSS Startup and Process Control* and HNF-SD-WM-PCP-013, *Tank 241-C-106 WRSS Process Control Plan*	
Pages 2-35 and 36, Section 2.5.2.3.1	Perform Operations and monitoring to maintain acceptable solids loading in slurry line.	TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	
Page 2-36, Section 2.5.2.3.1	Maintain slurry pump flow rate at or above 250 gpm to ensure no solids settling occur in transfer lines.	TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations* Note: The minimum pump speed limit is 1500 rpm which is required to maintain minimum pump bearing oiling. This speed produces flow rates between 340 gpm and 260 gpm for solids loadings of 0% and 30% respectively.	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 2-36, Section 2.5.2.3.2	Sluice time shall be based upon mass transfer and time limits.	TO-320-005, *WRSS Startup and Process Control* TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations* HNF-SD-WM-PCP-013, *Tank 241-C-106 WRSS Process Control Plan*	
Page 2-37, Section 2.5.2.3.2	Maintain constant liquid level in Tank 241-C-106 for first two sluicing increments to minimize the potential for a steam release event.	TO-320-005, *WRSS Startup and Process Control* TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	
Page 2-37, Section 2.5.2.3.2	Lower liquid level in Tank 241-C-106 for Tank leakage considerations after the first sluicing campaign.	TO-320-005, *WRSS Startup and Process Control*	
Page 2-38, Section 2.5.2.3.3	Position and Operate sluicer and booster pump to minimize solids loading in transfer line prior to shutdown of WRSS.	TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	
Page 2-39, Section 2.5.2.3.5	Provide jumper connecting the U11 nozzle (SL100) slurry line to the U3 (SL503) transfer line in the 02A pit will be available for installation to support supernate removal contingency plan.	See Drawing No. H-2-818501, Shts. 1 and 2 TO-270-035, *Tank AY-102 Supernate Routing Contingency Procedure*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 2-39, Section 2.5.2.3.6	In the event of a leak (confirmed through verification of material balance calculations) in Tank 241-C-106 at or above the minimum detectable level of 30,000 L (8000 gallon), the following actions would be taken to place the tank in the safest possible condition while follow-on actions are determined in consultation with the U.S. Department of Energy Richland Operations Office (DOE-RL) and the Washington State Department of Ecology (Ecology) Stop sluicing retrieval, pending consultation with DOE-RL and Ecology Minimize liquid level within liquid level limitation. Maintain evaporative cooling by wetting the waste surface, pending a thermal determination of the need to continue this practice. Determine if the leak has stopped (by liquid level monitoring)	TO-320-005, *WRSS Startup and Process Control* and HNF-SD-WM-PCP-013, *Tank 241-C-106 WRSS Process Control Plan* and TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 2-42, Section 2.5.2.3.6	LA-UR-97-1330 identifies the need for a contingency plan to add void fraction monitoring to Tank 241-AY-102 within two weeks of the identification of the flammable gas buildup that would warrant this monitoring enhancement.	TO-320-005, *WRSS Startup and Process Control* and HNF-SD-WM-PCP-013, *Tank 241-C-106 WRSS Process Control Plan* JCS-98-XXXXX	A draft JCS package is in work. We are working at getting the correct reference.
Page 2-42, Section 2.5.3.1	Liquid grab sampling is planned during sluicing operations to provide necessary process control characterization data. This sampling will generally be accomplished through an existing above grade riser at Tank 241-AY-102 suing existing sampling procedures.	TO-320-005, *WRSS Startup and Process Control*	
Page 2-42, Section 2.5.3.2	The supernate in Tank 241-AY-102 will be adjusted to meet double shell tank corrosion specifications before station sluicing operations (HNF-SD-WM-TI-756)	TO-320-005, *WRSS Startup and Process Control*	
Page 3.4.1-1, Section 3.4.1	Samples will be periodically taken to ascertain that the Project is remaining within the analyzed scope.	TO-320-005, *WRSS Startup and Process Control*	
Page 3.4.2.1-4&6, Section 3.4.2.1.5	Implement AC 5.7 Nuclear Criticality Program	See AC 5.7 in Appendix B of this document	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 3.4.2.2-2, Section 3.4.2.2-2	Control HEPA filter loading at 200 mrem/hr or less	TO-060-050, *Operate 296-P-16 Exhauster* and TO-060-121, *Operate Tk 241-AY-102 Annulus Ventilation System* and TO-060-350, *Start/Stop and Operate AY/AZ Tank Ventilation Primary Exhaust System* and TO-320-009, *Operate Tk 241-C-106, 296-C-006 HVAC System*	
Page 3.4.2.2-5&10	Implement AC 5.12, Transfer Controls and AC 5.18 HEPA Filter Controls	See AC 5.12 and AC 5.18 in Appendix B of this document. TO-320-005, *WRSS Startup and Process Control* TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations*	
Page 3.4.2.2-5&11, Section 3.4.2.2.5	Implement Defense-in-Depth Controls for High Efficiency Particulate Air Filter Failure.	See Defense-in-Depth Controls for High Efficiency Particulate Air Filter Failure in Appendix C of this document.	
Page 3.4.2.3-4&6, Section 3.4.2.3.5	Implement AC 5.25 Ventilation Controls	See AC 5.25 in Appendix B of this document.	
Page 3.4.2.3-4&6, Section 3.4.2.3.5	Implement Defense-in-Depth Controls for Unfiltered Releases	See Defense-in-Depth Controls for Unfiltered Releases Appendix C of this document.	
Page 3.4.2.5-2&5, Section 3.4.2.4.5	Implement AC 5.10, Ignition Controls and AC 5.14 Emergency Preparedness	See AC 5.10 and AC 5.14 in Appendix B of this document.	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 3.4.2.4-2&6, Section 3.4.2.4.5	Implement Defense-in-Depth Controls for Potential Fire is Contaminated Areas	See Defense-in-Depth Controls for Potential Fire is Contaminated Areas in Appendix C of this document.	
Page 3.4.2.5-3&5, Section 3.4.2.5.5	Implement AC 5.23, Caustic Transfer Controls	See AC 5.23 in Appendix B of this document.	
Page 3.4.2.5-3&5, Section 3.4.2.5.5	Implement Defense-in-Depth Controls for Caustic Spray Leaks	See Defense-in-Depth Controls for Caustic Spray Leaks in Appendix C of this document.	
Page 3.4.2.6-4,5&7, Section 3.4.2.6.5	Implement AC 5.16 Dome Loading Controls	See AC 5.16 in Appendix B of this document.	
Page 3.4.2.6-5&8, Section 3.4.2.6.5	Implement Defense-in-Depth Controls for Load Drops	See Defense-in-Depth Controls for Load Drops in Appendix C of this document.	
Page 3.4.2.8-4, Section 3.4.2.8.1	Provide flammable gas monitoring after startup of new ventilation system for Tank 241-C-106.	TO-320-005, *WRSS Startup and Process Control*	
Page 3.4.2.8-4, Section 3.4.2.8.1	Maintain 296-P-16 in an available condition until flammable gas monitoring after completion of all C-106 sluicing campaigns.	TO-320-005, *WRSS Startup and Process Control* and HNF-SD-WM-PCP-013, *Tank 241-C-106 WRSS Process Control Plan*	
Page 3.4.2.8-5, Section 3.4.2.8.1	Provide flammable gas monitoring after sludge transfer for Tank 241-AY-102.	TO-320-005, *WRSS Startup and Process Control* and HNF-SD-WM-PCP-013, *Tank 241-C-106 WRSS Process Control Plan*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 3.4.2.8-6, Section 3.4.2.8.2	Verify design modifications to meet applicable Ignition Control Sets have been implemented for 241-C-106.	Design modifications have been made as required by: HNF-SD-W320-FDC-001, *Functional Design Criteria for Tank 241-C-106 Waste Retrieval Project W-320* and HNF-SD-W320-DE-001, *Design Basis Document Project W-320 Tank 241-C-106 Sluicing Project Rebaselining Change Request New Scope* HNF-SD-W320-TA-001, *Assessment of Project W-320 Equipment for Compliance with Flammable Gas Controls Specified by East/West Tank Farms, Standing Order 97-01.*	
Page 3.4.2.8-7, Section 3.4.2.8.2	Verify design modifications to meet applicable Ignition Control Sets have been implemented for 241-AY-102.	HNF-SD-W320-TA-001, *Assessment of Project W-320 Equipment for Compliance with Flammable Gas Controls Specified by East/West Tank Farms, Standing Order 97-01.*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 3.4.2.8-8&11, Section 3.4.2.8.3	Implement AC 5.9, Flammability Controls, AC 5.10, Ignition Controls, AC 5.11 Flammable Gas Monitoring, and AC 5.14 Emergency Preparedness	See AC 5.9, 5.10, 5.11 and 5.14 in Appendix B of this document. HNF-SD-W320-TA-001, *Assessment of Project W-320 Equipment for Compliance with Flammable Gas Controls Specified by East/West Tank Farms, Standing Order 97-01.* AC 5.9 is implemented in work packages, AC 5.10 is implemented in work packages and TA-001 AC 5.11 is implemented in TO-320-005, *WRSS Startup and Process Control*	
Page 3.4.2.8-9&12, Section 3.4.2.8.3	Implement Defense-in-Depth Controls for Flammable Gas Deflagrations	See Defense-in-Depth Controls for Flammable Gas Deflagrations in Appendix C of this document.	
Page 3.4.2.9-10&11, Section 3.4.2.9.5	Implement AC 5.10, Ignition Controls, AC 5.12 Transfer Controls, AC 5.14 Emergency Preparedness and AC 5.18 HEPA Filter Controls	See AC 5.10, 5.12, 5.14, and 5.18 in Appendix B of this Document.	
Page 3.4.2.9-8&11, Section 3.4.2.9.5 and 3.4.2.10.5	Implement Defense-in-Depth Controls for Organic Solvent Fire	See Defense-in-Depth Controls for Organic Solvent Fire in Appendix C of this document.	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 3.4.2.11-2, Section 3.4.2.11	Real Time temperature data on the tank contents will be entered into a thermal model in the form of an initial temperature history to project thermal response of the sludge. The results will be used to calibrate the model, establish hold times between transfer, and further evaluate cooling requirement for sludge transfers.	TO-320-005, *WRSS Startup and Process Control* and HNF-SD-WM-PCP-013, *Tank 241-C-106 WRSS Process Control Plan*	
Page 3.4.2.11-5,6&10, Section 3.4.2.11.5	Implement AC 5.12, Transfer Controls, AC 5.10 Process Instrumentation and Measuring and Test Equipment, AC 5.25 Ventilation Controls and 5.26 Tank 241-C-106 Waste Temperature Control	See AC 5.10, 5.12, 5.19, 5.25 and 5.26 in Appendix B of this document.	
Page 3.4.2.11-6&11, Section 3.4.2.11.5	Implement Defense-in-Depth controls for Tank Bumps	See Defense-in-Depth Controls for Tank Bumps in Appendix C of this document.	
Page 3.4.2.12-1, Section 3.4.2.12	Chill Tank 241-C-106 to about 107 degrees C prior to sluicing	TO-320-005, *WRSS Startup and Process Control*	
Page 3.4.2.12-3, Section 3.4.12.1	Eliminate heat sources and restore or initiate waste cooling if a rising temperature trend is detected	TO-320-006, *Tk 241-C-106 WRSS Sluicing Operations* and TO-320-005, *WRSS Startup and Process Control*	
Page 3.4.2.12-5, Section 3.4.12.5	A Recovery plan will is required if temperature limits of AC 5.26 are exceeded	See AC 5.26 in Appendix B of this document	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 3.4.2.12-7, Section 3.4.2.12	Implement LCO 3.3.1, SST Waste Temperature, AC 5.12 Transfer Controls, AC 5.19, Process Instrumentation and Measuring and Test Equipment, AC 5.26 Tank 241-C-106 Waste Temperature Controls	See LCO 3.3.1 in Appendix A of this document. See AC 5.12, 5.19 and 5.26 in Appendix B of this document.	
Page 3.4.2.12.8, Section 3.4.2.13	Implement Defense-in-Depth Controls for Liner Breaches	See Defense-in-Depth Controls for Liner Breaches in Appendix C of this document.	
Page 3.4.2.13-7, Section 3.4.2.13	Implement LCO 3.1.3 Transfer Leak Detection Systems, AC 5.13 Encasement Seal Loop Controls, AC 5.17 Excavation Control Program, and AC 5.20 Transfer Pump Administrative Lock	See LCO 3.1.3 in Appendix A of this document. See AC 5.13, AC 5.17 and AC 5.20 in Appendix B of this document.	
Page 3.4.2.13-8, Section 3.4.2.13	Implement the Defense-in-Depth Controls for Subsurface Leaks Remaining Subsurface	See Defense-in-Depth Controls for Subsurface Leaks Remaining Subsurface in Appendix C of this document.	
Page 3.4.2.14-7, Section 3.4.2.14	Implement AC 5.12 Transfer Controls and AC 5.14 Emergency Preparedness	See AC 5.12 and AC 5.14 in Appendix B of this document.	
Page 3.4.2.15-8, Section 3.4.2.14	Implement Defense-in-Depth Controls for Subsurface Leaks Resulting in Pools.	See Defense-in-Depth Controls for Subsurface Leaks Resulting in Pools in Appendix C of this document.	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 3.4.2.15-4, Section 3.4.2.15	Implement LCO 3.1.3 Transfer System Leak Detection , LCO 3.2.6 Primary Tank Leak Detection System, AC 5.12 Transfer Controls, AC 5.14 Emergency Preparedness, AC 5.17 Excavation Controls, AC 5.20 Transfer Pump Administrative Lock and AC 5.22 Transfer System Cover Removal	See LCO 3.1.3 and LCO 3.2.6 in Appendix A of this document. See AC 5.12, AC 5.14, AC 5.17, AC 5.20 and AC 5.22 in Appendix B of this document.	
Page 3.4.2.15-6, Section 3.4.2.15	Implement Defense-in-Depth Controls for Surface Leak Resulting in Pools	See Defense-in-Depth Controls for Surface Leak Resulting in Pools in Appendix C of this document.	
Page 3.4.2.16-10, Section 3.4.2.16	Implement LCO 3.1.1 Transfer System Covers, LCO 3.1.4 Ventilation Stack CAM Interlock System, AC 5.12 Transfer Controls, AC 5.13 Encasement Seal Loop Control, AC 5.20 Transfer Pump Administrative Lock Controls, AC 5.22 Transfer System Cover Removal Controls	See LCO 3.1.1 and LCO 3.1.4 in Appendix A of this document. See AC 5.12, AC 5.13, AC 5.20 and AC 5.22 in Appendix B of this document.	
Page 3.4.2.16-11, Section 3.4.2.16	Implement Defense-in-Depth Control for Transfer System Spray Leaks	See Defense-in-Depth Control for Transfer System Spray Leaks in Appendix C of this document.	
Page 3.4.2.17-3, Section 3.4.2.17	Implement AC 5.12 Transfer Controls and AC 5.17 Excavation Controls	See AC 5.12 and AC 5.17 in Appendix B of this document.	
Page 3.4.2.17-4, Section 3.4.2.17	Implement Defense-in-Depth Controls for Spray Leak and Surface Pools from Underground Waste Transfer Lines	See Defense-in-Depth Controls for Spray Leak and Surface Pools from Underground Waste Transfer Lines in Appendix C of this document.	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 4-1, Section 4.2	An engineering analysis will be performed for each safety class and safety significant system of the WRSS to ensure that it is able to perform its safety function and fulfill its reliability before startup of WRSS operations and will include the following: failure modes and effects analysis allowed outage times reliability criteria spare parts requirements provision of fail safe modes of operation or alarms an updated Fire Hazards Analysis Operational attributes and critical characteristics. Upon completion of the engineering analysis, a cost/risk benefit determination will be made that (1) the system is acceptable "as-is", (2) the systems need upgrade or spare parts availability or (3) waivers or deviations requested as necessary.	HNF-2050, *Project W-320 Safety Class and Safety Significant Engineering Evaluation (SEL)* HNF-SD-WM-FHA-020, *TWRS Fire Hazards Analysis*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 4-1, Section 4.2	Perform Acceptance Testing for Safety Class and Safety Significant Systems, where practical.	HNF-3021, *Project W-320 Functional Design Criteria/ Basis of Interim Operations, Addendum 1, Testing Matrix*	
Page 4-1 & 2, Section 4.2	Perform cost/risk benefit determination to show system is acceptable "as-is", the system needs upgrade or spare parts availability, or waivers or deviations need to be requested.	HNF-2050, *Project W-320 Safety Class and Safety Significant Engineering Evaluation (SEL)*	
Page 4-3, Section 4.3.1.3	Tank 241-AY-102 waste temperatures must be controlled below those temperatures that could lead to waste boiling, steam generation, overpressurization conditions, and unfiltered releases.	TO-320-005, *WRSS Startup and Process Control* TO-060-121, *Operate 241-AY-102 Annulus Ventilation System*	
Page 4-3, Section 4.3.1.4	To meets its safety function, the annulus ventilation system must provide the sufficient cooling capacity to maintain waste temperatures below the limits described above. Under analyzed conditions, the system will require a flow rate capability of up to 71 m^3/min (2500 ft^3/min) and may require provision of 4 degree C (40 degree F) inlet air (HNF-SD-W320-ER-002). Final determination will be made based on data from the first sluicing campaign.	TO-320-005, *WRSS Startup and Process Control* and HNF-SD-WM-PCP-013, *Tank 241-C-106 WRSS Process Control Plan*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 4-3, Section 4.3.1.4	During WRSS Operations, the operability of the annulus ventilation system shall be verified at a surveillance frequency of 10 days.	TF-OR-EF-AYAZ-D, *AY and AZ Farm Daily Rounds*	
Page 4-4, Section 4.3.2.2	Maintain HVAC system 296-P-16 in operable, standby status as a backup for cooling tank 241-C-106.	TO-320-005, *WRSS Startup and Process Control*	
Page 4-6, Section 4.3.2.5	Operability of tank ventilation systems shall be verified prior to WRSS operations. Operability assumptions include monitoring of differential pressure across the ventilation system's HEPA filters, or monitoring of the tank pressures, or verification of the flow.	TO-320-005, *WRSS Startup and Process Control*	
Page 4-6, Section 4.3.3.4	The operability of the annulus leak liquid waste leak detectors must be verified by a system functional test prior to WRSS operations.	TO-320-005, *WRSS Startup and Process Control*	
Page 4-7, Section 4.3.4.4	The seismic trip system will have setpoints that shut down the slurry pump, sluice pump, and booster pumps at ground accelerations less than current safety-significant design seismic loads for the pipe-in-pipe system.	Setpoint accelerations are 0.12g horizontal (2 axes) and 0.08g vertical. Reference: Transfer Line Process Piping Stress Analysis Calculation W320-27-013.	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 4-7, Section 4.3.4.4	The drain path into the pit(s) from the annulus of the encased piping system shall be verified to be free of obstructions prior to the start of a waste transfer	Open Item	WRSS Issue
Page 4-7, Section 4.3.4.5	The encasement seal loop valves shall be in their operating position and free from obstruction prior to WRSS operations.	TO-320-005, *WRSS Startup and Process Control*	
Page 4-8, Section 4.3.5.4	The operation of the leak detector and the associated alarm shall be verified prior to WRSS operations.	TO-320-005, *WRSS Startup and Process Control*	
Page 4-8, Section 4.3.5.5	The transfer line leak detection system operability assumptions include ensuring the leak detection system is operational and that the alarm and control functions activated by the leak detector are routinely verified.	TF-FT-259-007, *Functional Test of AY Farm Transfer Leak Detectors* TF-FT-359-009, *Functional Test of C Farm Transfer Leak Detectors* 6-TF-042, *Testing of Liquid Detector Elements*	
Page 4-9, Section 4.3.6.5	Each time a pit cover block is opened, the pit structure and its covers shall be visually inspected for damage and/or degradation in structural integrity.	Open Item	Tank Farm Issue

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 4-9, Section 4.3.6.5	The exterior of the pit cover block and cover assembly shall be visually inspected prior to WRSS operation to ensure that (1) covers are installed and operable, and (2) cover plugs are installed and operable.	TO-320-005, *WRSS Startup and Process Control*	
Page 4-10, Section 4.3.7.4	The CAMS and interlocks shall be calibrated and verified to be operable prior to waste transfers out of the facility and during tank farm transfers through routes physically connected to the unloading facility.	TO-320-005, *WRSS Startup and Process Control*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 4-10, Section 4.3.7.5	The operability function for the stack CAM and their associated alarms and interlocks includes 1) the vacuum pump operates as designed, 2) isokinetic sampling conditions are maintained, 3) CAMs accurately measure radionuclides levels in the sample, 4) the CAMs are properly set to actuate interlocks when high radionuclides levels are detected, 5) the interlocks performs s required and 6) local and remote alarms, both visual and audible, are actuated by failure of the CAMs.	TO-320-005, *WRSS Startup and Process Control* <u>AY-102</u>: TF-FT-269-008, *Perform AY/AZ Aging Waste Tanks 241-AY/AZ 702-AZ Primary Exhaust Stack Radiation Interlock/Alarm Functional Test* <u>C-106</u>: <u>P-16:</u> TF-FT-359-008, *Perform Functional Test for C Farm Tank 105/106 Exhaust Stack Radiation Monitor* and TF-FT-259-016, *Perform AY/AZ AWF Annulus CAM Leak Detection Functional Test* <u>C-006:</u> TF-FT-359-010, *Perform Functional Test for C-006 Exhaust Stack Radiation Monitor*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 4-11, Section 4.4.1.4	The stack CAMs shall be calibrated prior to WRSS operations and periodically as required. CAMs shall be inspected and tested in accordance with existing procedures	TO-320-005, *WRSS Startup and Process Control*	
Page 4-11, Section 4.4.1.5	The operability function for the stack CAM and their associated alarms and interlocks includes 1) the vacuum pump operates as designed, 2) isokinetic sampling conditions are maintained, 3) CAMs accurately measure radionuclides levels in the sample, 4) the CAMs are properly set to actuate interlocks when high radionuclides levels are detected, 5) the interlocks performs s required and 6) local and remote alarms, both visual and audible, are actuated by failure of the CAMs.	AY-102: TF-FT-269-008, *Perform AY/AZ Aging Waste Tanks 241-AY/AZ 702-AZ Primary Exhaust Stack Radiation Interlock/Alarm Functional Test* and TF-FT-259-016, *Perform AY/AZ AWF Annulus CAM Leak Detection Functional Test* C-106: P-16: TF-FT-359-008, *Perform Functional Test for C Farm Tank 105/106 Exhaust Stack Radiation Monitor* C-006: TF-FT-359-010, *Perform Functional Test for C-006 Exhaust Stack Radiation Monitor*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 4-12, Section 4.4.2.4	Tank level detections systems shall measure waste levels with an accuracy of plus or minus 0.5 inches and will be verified operable prior to WRSS operations.	Verify Operability: TO-320-005, *WRSS Startup and Process Control*	
Page 4-12, Section 4.4.2.5	The operability assumption for the tank level detection includes calibration of level detection instrument and indicators is properly performed and is kept current, and level readings are taken and/or recorded at intervals that will allow early detection of leaks or misroutes into Tanks 241-C-106 and 241-AY-102.	6-TF-300, *ENRAF Series 854 Displacer Weight and Calibration Check* and JCS. Levels will be recorded daily per: TF-OR-EF-AYAZ-D, *AY and AZ Tank Farms Daily Rounds* and TO-320-005, *WRSS Startup and Process Control*	
Page 4-12, Section 4.4.3.4	Backflow preventers shall be functionally tested and verified to be operating correctly. The backflow preventer shall be operated within their design limits as specified by the manufacturer.	TO-320-005, *WRSS Startup and Process Control* S-CC-0044, *Reduced Pressure Backflow Assembly Test using a Differential Pressure Gauge Type Test Kit*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 10-2, Section 10.3.1	Acceptance testing will be performed by Project W-320 on all WRSS equipment and components to demonstrate fabrication, assembly, installation, and construction requirements specified in design documents were met. Acceptance testing includes fabrication and cleanliness inspections; wire continuity checks, and adjustment of electrical protective devices; adjustment of torque-limiting devices; instrument calibration; testing instrumentation loops; and adjustment of controllers, limit switches, and other similar devices. Acceptance testing may also include equipment mock up and run tin tests, conducted both prior to and following installation.	HNF-3021, *Functional Design Criteria / Basis for Interim Operation, Addendum 1, Testing Matrix* HNF-SD-W320-ATP-001, Revision 0, *Cathodic Protection - Rectifier 46* WHC-SD-W320-ATP-002, Revision 0, *Cathodic Protection - Addition of 6 Anodes to Existing Rectifier 31* HNF-SD-W320-ATP-003, Revision 0, *Cathodic Protection - Rectifier 47* WHC-SD-W320-ATP-004, Revision 0, *ERS, C-Farm Electrical Distribution* WHC-SD-W320-ATP-005, Revision 0, *ERS, AY-Farm Electrical Distribution* WHC-SD-W320-ATP-006, Revision 0, *C-Farm Air Supply Chiller* HNF-SD-W320-ATP-007, Revision 0, *AY Farm Electrical Distribution* HNF-SD-W320-ATP-008, Revision 0, *AY Farm Equipment and Instrumentation*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 10-2, Section 10.3.1 Continued		HNF-SD-W320-ATP-009, Revision 0, *Tank 241-AY-102, Immersible Pump P-0621 - Winch Assembly W-0621, Assembly and Installation Instructions* HNF-SD-W320-ATP-010, Revision 0, *C-Farm Electrical Distribution* HNF-SD-W320-ATP-011, Revision 0, *C-Farm Instrumentation* HNF-SD-W320-ATP-012, Revision 0, *C-106 Tank Process Ventilation System* HNF-SD-W320-ATP-013, Revision 0, *C-Farm Slurry Pump Winch* HNF-SD-W-320-ATP-014, Revision 0, *C-106 Tank Sluicer Control System* HNF-1827, Revision 0, *Project W-320 AY Farm Instrumentation Upgrades* HNF-1825, Revision 0, *C-Farm New Scope Instrumentation Upgrades* HNF-1831, Revision 0, *C-Farm Chiller Modifications*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 10-3, Section 10.3.2	Perform OTPs on the sluicing, ventilation and instrumentation systems.	WHC-OTP-W320-001, *241-AY-102, Annulus Ventilation System Operational Test* WHC-OTP-W320-002, *Project W-320, Slurry Transfer System Preoperational Test* WHC-OTP-W320-003, *Project W-320, Supernate Transfer System Preoperational Test* WHC-OTP-W320-004, *Project W-320, Tank 241-C-106 Ventilation Exhaust System Preoperational Test* WHC-SD-W320-OTP-005, *Tank 241-C-106 In-Tank Imaging System Operational Test* WHC-SD-W320-OTP-006, *Project W-320 Cathodic Protection System Operational Test* OTP-320-007, *Operational Test for Emergency Backup 241-C-106 1000 CFM Exhauster* OTP-320-008, *Operational Test for Emergency Backup 241-AY-102 Annulus* OTP-320-009, *Operational Test for Emergency Backup 241-AY-102 Primary*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 10-3, Section 10.3.2 Continued		OTP-320-010, *W-320 ENRAF Series 854 Densitometer Operational Test*	
Page 10-3, Section 10-5	In service surveillance and inspections at TWRS WRSS will be performed according to DOE 4330.4B using a graded approach.	HNF-IP-0842, Volume V, *Maintenance/Production Control*	
Page 10-3, Section 10.5.2	The control and calibration of measuring and test equipment shall follow the guidelines of DOE 4330.4B and WHC-IP-0842, Volume V, *Maintenance/Production Control"*	HNF-IP-0842, Volume V, Section 3.8, *Control and Calibration of Measuring and Test Equipment*	
Page 10-4, Section 10.5.3	Training of maintenance personnel shall follow the guidelines and procedures of HNF-IP-0842, Volume III, Section 10.6 *Maintenance Training* which includes references to DIE 4330.4B and also apply to training used for in-service surveillance personnel.	HNF-IP-0842, Volume III, Section 10.6, *Maintenance Training*	
Page 12-1, Section 12.2	Procedures and training requirements for areas specifically related to Waste Retrieval Sluicing System activities will be developed in accordance with DOE 5480.19, *Conduct of Operations Requirements for DOE Facilities*, and with the results of the accident analysis.	HNF-IP-0842, Volume II, Section 4.0, *Conduct of Operations* HNF-IP-0842, Volume III, *Training*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 16-1, Section 16.2	Detailed plans for decontamination and decommission will be prepared as required to support the decontamination and decommissioning of the Waste Retrieval Sluicing System.	Not yet required by project scope definition.	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 16-1, Section 16.3	The design of the Waste Retrieval Sluicing System shall facilitate decontamination per HNF-SD-W320-FDC-001, *Functional Design Criteria for Tank 241-C-106 Waste Retrieval, Project W-320.* The following principles shall be employed to the extent practicable: Modular, separable confinements shall be used for radioactive and other hazardous materials to preclude contamination of fixed portions of the structure. Filtration components of the ventilation system shall be located at or near individual enclosures and as close as practical to eh sources of contamination to minimize long runs of internally contaminated duct. Areas subject to contamination shall be designed to facilitate decontamination. Liners and coatings shall be selected to withstand decontaminating agents and radiation degration throughout the life of the facility. Surfaces should be free of crevices, ledges, and/or protrusions that could collect	HNF-SD-W320-FDC-001, *W-320, Tank 241-C-106 Sluicing, Functional Design Criteria, Section 5.8, Decontamination and Decommissioning* HNF-IP-0842, Volume IV, *Engineering*	

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 16-1, Section 16.3 Continued	radioactive material. Penetrations shall be designed to minimize technical and construction problems in the structural closing and sealing of those penetrations at the time of decommissioning. Penetrations shall be waterproofed for protection during decontamination efforts. Fixtures and outlets shall be sealed. Drains and similar piping shall have physical provisions for cleaning. Piping systems shall be sloped and free of traps except as required for retrieval process isolation. Adequate clearance shall be provided for transfer of equipment. Lifting lugs shall be used on large tanks or equipment. Modular radiation shielding shall be used in lieu of, or in addition to monolithic shielding walls.		

Page and Section Number in BIO Addendum 1	Requirement	Implementing Procedure	Comments
Page 17-1, Section 17.1	The Waste Retrieval Sluicing System design and operations will be in accordance with the Tank Waste Remediation System organization structures, policies, and programs that ensure safety is the fundamental principle guiding all Tank Waste Remediation System Operations.	HNF-IP-0842, *TWRS Administration Manual, Volumes I-XII* HNF-W320-PMP-001, *Project Management Plan for Project W-320, Tank 241-C-106 Sluicing*	
Notes:	1. Information References: • HNF-2427, Documentation Bibliography Listing, Project W-320, Tank 241-C-106 Sluicing • HNF-2527, Project W-320, Sluicing Master Calculations List • Drawing H-2-818423, Shts. 1, 2, 3 and 4, Drawing List C-106 Sluicing System		

PROJECT W-320, TANK C-106 SLUICING, AUTHORIZATION BASIS COMPLIANCE MATRIX, APPENDIX E
SER REQUIRED CONTROLS IMPLEMENTATION

SER Concern/ Provision No.	Requirement	Project Implementation	Comments
INEEL Tier II Technical Review Open Issue I	Some of the existing systems are not labeled as Safety Class but are required to perform Safety Class functions. For example, the Ventilation Upgrade System (Project W-030) is classified as Safety Significant, although, required to be a Safety Class system on the basis of the Project W-320 Safety Analysis. Additional systems include the annulus leak detection system (Tank 241-AY-102), the transfer line pipe-in-pipe system, the transfer line leak detection systems, the pit cover blocks, and the stack continuous air monitor and interlock to the exhaust fan. An engineering evaluation shall be performed to demonstrate that those existing systems can perform their safety function, or be modified to do so. The successful completion of this evaluation will be verified during the RL Operations Readiness Review prior to commencement of sluicing operations.	The engineering evaluation has been completed and is reported in HNF-2050, Project W-320 Safety Class and Safety Significant Engineering Evaluation (SEL).	
INEEL Tier II Technical Review Open Issue II	The Project W-320 Safety Analysis identifies certain decisions the Contractor shall make after initial sluicing operations, depending on actual process parameters. These decisions are intended to ensure that uncertainties within the initial bounding calculations are further evaluated to validate expected safety margins. The Contractor shall ensure that these decisions are in accordance with the approved Project W-320 bounding analyses. RL/TWRS approval will be obtained prior to commencement of each subsequent WRSS campaign.	The WRSS process is controlled by procedure TO-320-005, WRSS Startup and Process Control and HNF-SD-WM-PCP-013, WRSS Process Control Plan. Procedure TO-320-005 requires verification of DOE TWRS approval prior to the start of each sluicing campaign. Procedure TO-320-005 also requires sign-off by Process Engineering of a set of evaluations controlled by PCP-013 prior to the start of each sluicing campaign so that the process is controlled within the safety envelope reported in BIO Addendum 1.	
Provision 1	Closure of the previously addressed open issues prior to Project W-320 operations, as appropriate.	See implementation for INEEL Tier II Technical Review, Open Issues I & II.	

PROJECT W-320, TANK C-106 SLUICING, AUTHORIZATION BASIS COMPLIANCE MATRIX, APPENDIX E
SER REQUIRED CONTROLS IMPLEMENTATION

SER Concern/ Provision No.	Requirement	Project Implementation	Comments
Provision 2	Changes to the chemical composition of the contents in Tanks 241-AY-102 or 241-C-106 require a safety evaluation to ensure that mixing of the two streams will not create inorganic and/or organic chemical reaction concerns, either, immediately after transfer or on a long term storage basis, for the mixed waste streams.	The most recent evaluation of chemical compatibility is reported in HNF-SD-WM-TI-756, Rev. 2 "Chemical and Chemically Related Considerations Associated with Sluicing Tank C-106 Waste to Tank AY-102. Procedure TO-320-005 requires that the compatibility be verified as a readiness review prior to each sluicing campaign in accordance with PCP-013. This includes sign-off by Process Engineering during the readiness review.	
Provision 3	Changes in the operations or equipment must be preceded by an Unreviewed Safety Question (USQ) assessment.	See HNF-IP-0842, TWRS Administration Vol. IV, Engineering, Section 5.4 "Unreviewed Safety Questions".	
Provision 4	Changes directed in this SER shall be incorporated into the addendum and the TWRS BIO during the final document production. An integration review will be performed to ensure configuration management is maintained and changes generated by the BIO implementation review or other project implementations are incorporated.	Changes in response to the SER concerns/issues are at a lower level than the TWRS BIO and Addendum 1. The integrated reviews are recorded on the Engineering Data Transmittal cover sheets for W-320 project documents as they are issued; and on the procedure USQ screening cover sheets as the procedures are developed and approved. See response to Provision 3 for project configuration management controls.	

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	JW Bailey	Date 14 July 98
Project Title/Work Order		EDT No. 624760
HNF-2518, Rev. 0, Project W-320 Waste Retrieval Sluicing System BIO/SER Implementation Matrices.		ECN No. n/a

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
JW Bailey	S2-48				
JR Bellomy	S2-48				
DG Baide	S5-05				
MA Lane	S2-47				
JW Lentsch	S2-48				
SW Shaw	S2-48				
KJ Anderson	S5-04				
JM Jones	S5-13				
GN Hanson	S5-07				
JE Andrews	S5-04				
DA Bragg	S5-05				
WJ Powell	S5-13				
RL Powers	S5-13				
GR Tardiff	S5-05				
W-320 Project Files	R1-29				