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Title/Desc:
INTERIM SAFETY EQUIPMENT LIST FOR 241C106 WASTE RETRIEVAL PROJECT W-320

Pages: 251

COMPLETE

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 198594

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	3a. USQ Required?	4. Date
Supplemental [] Direct Revision [X] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	J.C. Conner/SA&E/A2-25/376-2058	[] Yes [X] No	1/25/96
	5. Project Title/No./Work Order No. Interim Safety Equipment List for 241-C-106 Waste Retrieval, Project W-320/D2M70	6. Bldg./Sys./Fac. No. N/A	7. Approval Designator ~~SQ~~ N/A
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This revision to the Safety Equipment List, WHC-SD-WM-SEL-033, Rev 1, reflects design at 100% of Project W-320.

13a. Justification (mark one)

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13b. Justification Details

This document incorporates design of Project W-320 Safety Equipment at 100% stage.

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[X] No	Savings	[] $	Savings	[] $	Delay	[]

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]	Tickler File	[]
Environmental Report	[]	Inspection Plan	[]	Interim Safety Equipment List	[X]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
N/A		

20. Approvals

OPERATIONS AND ENGINEERING	Signature	Date
Cog. Eng. J. C. Conner	[signature]	1-25-96
Cog. Mgr. L. E. Johnson	[signature]	1/25/96
~~QA J. J. Huston~~ QC	1/25/96	
Safety		
Environ.		
Other		

ARCHITECT-ENGINEER	Signature	Date
PE		
QA		
Safety		
Design		
Environ.		
Other		

DEPARTMENT OF ENERGY

Signature or a Control Number that tracks the Approval Signature

ADDITIONAL

Interim Safety Equipment List for 241-C-106 Waste Retrieval, Project W-320

J. C. Conner
Westinghouse Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

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Key Words: Safety Equipment List, C-106, AY-102, Sluicing Retrieval

Abstract: This revision to the Safety Equipment List, WHC-SD-WM-SEL-033, reflects design of Project W-320 at 100% stage.

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RECORD OF REVISION	(1) Document Number WHC-SD-WM-SEL-033	Page 2

(2) Title
Interim Safety Equipment List for 241-C-106 Waste Retrieval, Project W-320

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release (5) Cog. Engr.	(6) Cog. Mgr.	Date
2 RC	(7) Direct Revision of Entire Document			
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SAFETY EQUIPMENT LIST FOR TANK 241-C-106
WASTE RETRIEVAL PROJECT W-320
Revision 2

WHC-SD-WM-SEL-033

January 1996

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EXECUTIVE SUMMARY

The purpose of this supporting document is to provide safety classifications for systems, structures, and components of the Tank 241-C-106 Waste Retrieval Sluicing System (WRSS) and to document the methodology used to develop these safety classifications.

The WRSS requires two transfer lines, one to carry sluiced waste slurry to tank 241-AY-102 and the other to return supernatant to tank 241-C-106; pumps in each tank; sluicers to direct the supernatant stream inside tank 241-C-106; a slurry distributor in tank 241-AY-102; heating, ventilation, and air conditioning for tank 241-C-106; and instrumentation and control devices.

The WRSS components have been classified on the basis of the safety functions they perform and on the consequences should a system fail to perform its safety function. Existing systems used in support of WRSS operations have been classified on the basis of safety equipment lists for the single-shell tank systems and the Aging Waste Facility systems.

Radionuclide concentrations for tank 241-C-106 and for tank 241-AY-102 have been used as the basis for source-term development and accident consequence analysis. The tank 241-C-106 WRSS safety classifications are based on onsite and offsite effective dose equivalent values developed from the consequence analyses for the various accident scenarios. Safety classifications for WRSS and for the existing tank 241-C-106 and tank 241-AY-102 systems are given in the following summary tables, Tables ES-1, ES-2, and ES-3.

Table ES-1. Tank 241-C-106 Waste Retrieval Sluicing Equipment List and Safety Classification.

New Systems	Safety class (SC)	Justifications	
		Section of this document	WHC-CM-4-46, Table 1 criterion[a]
Safety systems			
Sluicing waste transfer system	SC-1	4.1	
• Seismic switch	SC-1	4.1.1	2
• Primary transfer pipes to and from tanks	SC-2	4.1.2	9
• Secondary transfer pipes to and from tanks	SC-3	4.1.3	16
• Slurry distributor	SC-3	4.1.4	16
• Syphon protection	SC-3	4.1.5	16
• Pit cover blocks	SC-3	4.1.6	16
• Seal loop	SC-1	4.1.7	2
• Waste transfer equipment (e.g., pumps, valves, pipes, flanges) in pits	SC-3	4.1.8	16
• Raw water supply and transfer line flushing system	SC-3	4.1.9	16
• Compressed air system	SC-3	4.1.10	16
Ventilation system	SC-3	4.2	
• Process building skid	SC-3	4.2.1	16
• Chiller skid	SC-3	4.2.2	16
• Exhaust skid	SC-3	4.2.3	16
Ventilation exhaust radiation monitoring system (continuous air monitors and record samplers)	SC-3	4.3	16
In-tank imaging system	SC-3	4.4	16
AC power	SC-3	4.5	16
Instrumentation Control System	SC-3	4.6	16

[a]WHC-CM-4-46, Safety Analysis Manual, Section 9.0, Table 1.

AC = alternating current.
SC = safety class.

Table ES-2. Existing Systems List and Interim Safety Classifications for Tank 241-C-106. (2 sheets)

Existing system descriptions	Safety class (SC)	Justifications	
		Section of SST ISEL[a]	WHC-CM-1-3, Table 1[b]
Safety systems			
Primary dome and tank	SC-1	4.1.1, 4.2.1	1,2
Active ventilation system	SC-3	4.1.2	3
• Exhaust duct headers	SC-3	4.1.2	3
• Exhaust fan, HEPA filters	SC-3	4.1.2	3
• Steam or electric preheater	SC-3	4.1.2	3
• Process condensate drain with seal pot	SC-3	4.1.2	3
• Air inlet filters	SC-3	4.1.2	3
Active ventilation exhaust radiation monitoring system	SC-2	4.3.4, 4.7	19
• Continuous air monitors	SC-2	4.3.4, 4.7	2
• Record samplers	SC-2	4.3.4, 4.7	2
Tank temperature instrumentation	[IOSR]*	4.3.1	--
• Thermocouples	[IOSR]*	4.3.1	--
Tank liquid-level instrumentation	[IOSR]*	4.3.3	--
• ENRAF[c]	[IOSR]*	--	--
• Manual tapes	SC-3	4.3.3	3
Tank leak detection instrumentation	SC-3	4.3.2	3
• Dry wells	SC-3	4.3.2	3
Support systems			
AC power[d]	[IOSR]*	4.4.3	--
• Active ventilation system	SC-3	4.4.3	3
• Temperature monitoring instrumentation	[IOSR]*	4.4.3	--
• Liquid level monitoring instrumentation	[IOSR]*	4.4.3	--
• Leak detection monitoring instrumentation	SC-3	4.4.3	3
Compressed air	SC-3	4.4.4	3
• Instrument air supply to monitoring instrumentation	SC-3	4.4.4	3

Table ES-2. Existing Systems List and Interim Safety Classifications for Tank 241-C-106. (2 sheets)

Existing system descriptions	Safety class (SC)	Justifications	
		Section of SST ISEL[a]	WHC-CM-1-3, Table 1[b]
Raw water supply	SC-3	4.4.5	3
Fire protection system	SC-3	4.5	22

[a]Kidder, R. J., 1993, Single-Shell Waste Tanks Interim Safety Equipment List, WHC-SD-WM-SEL-027, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

[b]WHC-CM-1-3, 1991, Management Requirements and Procedures, MRP 5.46, "Safety Classification of Systems, Components, and Structures."

[c]ENRAF is a trademark of the ENRAF Corporation.

[d]The AC power is classified according to its safety support function and not according to its source or distribution. Classifications provided are only applicable to the tank farm fence line. Classification of offsite sources and distribution networks is beyond the scope of this document.

AC = alternating current.
HEPA = high-efficiency particulate air.
IOSR = interim operational safety requirement.
SC = safety class.

[IOSR]* The notation [IOSR]* has been designated for those systems, components, and structures important to health, safety, and environmental protection but for which current analyses are not sufficient to establish the safety classification. Such items shall be treated as safety class 3, with additional designation as operational safety requirement (OSR) related. The additional OSR designation will ensure the priority and funding for continued operation and maintenance of these items consistent with OSR requirements (IOSR where applicable).

The [IOSR]* safety classification will be replaced to be consistent with the requirements of WHC-CM-1-3, MRP 5.46, "Safety Classification of Systems, Components, and Structures," as analyses are completed to establish definite safety classifications. In the interim, approval requirements shall include Nuclear Safety and Quality Assurance, as a minimum, and Environmental Assurance where deemed appropriate.

Table ES-3. Existing Systems List and Interim Safety Classifications for Tank 241-AY-102. (2 sheets)

Existing system descriptions	Safety class (SC)	Justifications	
		Section of AWF ISEL[a]	WHC-CM-1-3, Table 1[b]
Tank	SC-1	--	10
• Primary tank	SC-1	4.2.1	10
• Secondary tank, refractory support pad, concrete structure	SC-1	4.2.2	23
• Secondary tank leak detection system	SC-3	4.3.6	--
Waste transfer system	SC-1	4.2.3	--
• Primary tank and secondary intertank transfer pipes	SC-1	4.2.3.2	10
• Waste transfer system pits/boxes	SC-1	4.2.3.3	1, 12
• Waste transfer system pits/boxes equipment (e.g., pumps, valves, pipes, flanges, leak detectors)	SC-3	4.2.3.3	3
Primary tank ventilation system (A-702 Building)[c]	SC-2	4.1.3	2
• Ventilation duct work	SC-2	4.1.3	2
• Seal loops	SC-2	4.1.3	2
• Deentrainers, condensers, heaters	SC-2	4.1.3	2
• Exhaust fans	SC-2	4.1.3	2
Backup ventilation system (A-702 Building)[c]	SC-2	4.1.4	2
• Exhauster, 112-m^3/s (4,000 ft^3/min)	SC-2	4.1.4	2
• Ventilation duct work	SC-2	4.1.4	2
Annulus ventilation system	SC-2	4.1.5, 4.8	24
Instrumentation (for various systems)			
• Primary tank instrumentation system			
- Temperature measurement system	[IOSR]*	4.3.2	--
- Liquid-level measuring system	[IOSR]*	4.3.7	--
- Pressure/vacuum measuring system	[IOSR]*	4.3.1	--
• Primary tank leak detection systems			
- Liquid-level detector element	SC-2	4.3.5, 4.8	2
- Continuous air monitors	SC-2	4.3.5, 4.8	2
• Ventilation system radiation monitors			
- Primary ventilation exhaust radiation monitoring system	SC-2	4.3.8, 4.8	19
- Annulus ventilation exhaust radiation monitoring system	SC-3	4.3.9	14
• Secondary tank instrumentation			
- Tank concrete structure thermocouples	SC-3	4.3.3	3
- Pressure/vacuum measuring system	SC-2	4.3.4, 4.8	24

Table ES-3. Existing Systems List and Interim Safety Classifications for Tank 241-AY-102. (2 sheets)

Existing system descriptions	Safety class (SC)	Justifications	
		Section of AWF ISEL[a]	WHC-CM-1-3, Table 1[b]
Compressed air system (A-701 Building)	SC-2	4.4.7, 4.8	24
• Process air	SC-2	4.4.7, 4.8	24
• Instrument air	SC-2	4.4.7, 4.8	24
• Balance of plant	SC-3	4.4.7, 4.8	--
AC power system (AWF boundaries)	[IOSR]*	--	--
• Normal AC power for primary tank instrumentation	[IOSR]*	4.4.3	--
• Caterpillar[d] diesel generator	[IOSR]*	4.4.3.1	--
• Normal AC power for ventilation	SC-2	4.4.5, 4.4.6	24
• Detroit[e] diesel generator	SC-2	4.4.5.1	24
Raw water system (AWF boundaries)	SC-2	4.4.9, 4.8	24
Raw water system (service pits and boxes)	SC-3	4.4.9	3
Emergency cooling water system[c]	SC-2	4.4.10, 4.8	24
Steam supply system (AWF boundaries)[c]	SC-2	4.4.2, 4.8	24
Steam supply system (balance of plant)	SC-3	--	3
Fire protection system	SC-3	4.5	22
Air-lift circulators	[IOSR]*	4.4.1	--
• Compressed air system – process air		4.4.1	--
• Raw water system		4.4.1	--

[a]Kidder, R. J., 1993, Aging Waste Facility Interim Safety Equipment List, WHC-SD-WM-SEL-020, Rev. 2, Westinghouse Hanford Company, Richland, Washington.
[b]WHC-CM-1-3, 1991, Management Requirements and Procedures, MRP 5.46, "Safety Classification of Systems, Components, and Structures."
[c]May be replaced by Project W-030 ventilation system.
[d]Caterpillar is a trademark of the Caterpillar Corporation.
[e]Detroit is a trademark of the Detroit Corporation.

AC = alternating current.
AWF = Aging Waste Facility.
IOSR = interim operational safety requirement.
ISEL = interim safety equipment list.
SC = safety class.

[IOSR]*: The notation [IOSR]* has been designated for those systems, components, and structures important to health, safety, and environmental protection but for which current analyses are not sufficient to establish the safety classification. Such items shall be treated as safety class 3, with additional designation as operational safety requirement (OSR) related. The additional OSR designation will ensure the priority and funding for continued operation and maintenance of these items consistent with OSR requirements (IOSR where applicable).

The [IOSR]* safety classification will be replaced to be consistent with the requirements of WHC-CM-1-3, MRP 5.46, "Safety Classification of Systems, Components, and Structures," as analyses are completed to establish definite safety classifications. In the interim, approval requirements shall include Nuclear Safety and Quality Assurance, as a minimum, and Environmental Assurance where deemed appropriate.

CONTENTS

1.0 INTRODUCTION 1-1
1.1 PURPOSE 1-1
1.2 SCOPE 1-1
1.3 BASIS OF ANALYSIS 1-3
1.4 GENERAL FACILITY DESCRIPTION 1-4
1.4.1 Background 1-4
1.4.2 Sluicing Waste Transfer System 1-5
1.4.3 Leak Detection Monitoring 1-5
1.4.4 Ventilation 1-6
1.4.5 Radiation Monitoring 1-6
1.4.6 Tank 241-C-106 Existing Facility Description 1-7
1.4.7 Tank 241-AY-102 Existing Facility Description 1-7

2.0 METHODOLOGY 2-1
2.1 SAFETY CLASSIFICATION CRITERIA 2-1
2.2 WASTE RETRIEVAL SLUICING SYSTEM FUNCTIONS AND INTERFACES . . . 2-1
2.3 SYSTEM SAFETY CLASSIFICATION METHODOLOGY 2-1

3.0 IDENTIFICATION OF HAZARDS AND CONSEQUENCE ANALYSES 3-1
3.1 PRELIMINARY HAZARD ANALYSIS 3-1
3.2 SOURCE TERM 3-1
3.3 CONSEQUENCE ANALYSES 3-3
3.3.1 Radiological Consequences 3-3
3.3.2 Soil Contamination 3-3
3.3.3 Chemical Contamination 3-3

4.0 JUSTIFICATIONS FOR SAFETY CLASSIFICATIONS 4-1
4.1 SLUICING WASTE TRANSFER SYSTEM — SAFETY CLASS 1 4-7
4.1.1 Seismic Switch — Safety Class 1 4-7
4.1.2 Primary Transfer Pipes — Safety Class 2 4-8
4.1.3 Secondary Transfer Pipes — Safety Class 3 4-8
4.1.4 Slurry Distributor — Safety Class 3 4-9
4.1.5 Syphon Protection — Safety Class 3 4-9
4.1.6 Pit Cover Blocks — Safety Class 3 4-11
4.1.7 Seal Loop — Safety Class 1 4-12
4.1.8 Waste Transfer Equipment in Pits — Safety Class 3 . . 4-13
4.1.9 Raw Water Supply and Transfer Line Flushing System — Safety Class 3 4-13
4.1.10 Compressed Air System — Safety Class 3 4-13
4.2 VENTILATION SYSTEM — SAFETY CLASS 3 4-14
4.2.1 Process Building Skid — Safety Class 3 4-14
4.2.2 Chiller Skid — Safety Class 3 4-14
4.2.3 Exhaust Skid — Safety Class 3 4-15
4.3 VENTILATION EXHAUST RADIATION MONITORING SYSTEM — SAFETY CLASS 3 4-15
4.4 IN-TANK IMAGING SYSTEM — SAFETY CLASS 3 4-16
4.5 AC POWER SYSTEMS — SAFETY CLASS 3 4-16
4.5.1 AC Power for Tank 241-C-106 — Safety Class 3 4-16
4.5.2 AC Power for Tank 241-AY-102 — Safety Class 3 4-17
4.5.3 AC Power for the Control Station — Safety Class 3 . . 4-17

CONTENTS (Continued)

4.6 INSTRUMENTATION CONTROL SYSTEMS — SAFETY CLASS 3 4-17
4.6.1 Raw Water System — Safety Class 3 4-18
4.6.2 Compressed Air System — Safety Class 3 4-18
4.6.3 Waste Retrieval Sluicing System Leak Detection System — Safety Class 3 4-18
4.6.4 Transfer System Interlocks — Safety Class 3 4-18
4.6.5 Heating, Ventilating, and Air Conditioning System — Safety Class 3 4-18
4.6.6 Ventilation Exhaust Radiation Monitoring System — Safety Class 3 4-20
4.6.7 Sluicing Control Station — Safety Class 3 4-20
4.6.8 Instrumentation Failure Modes and Effects 4-20

5.0 EFFECTIVE DOSE EQUIVALENT VALUES FOR SLUICING SYSTEM ACCIDENT SCENARIOS 5-1

6.0 REFERENCES 6-1
6.1 TEXTS REFERENCED 6-1
6.1.1 Documents 6-1
6.1.2 Drawings 6-3
6.2 BIBLIOGRAPHY 6-4

APPENDIXES

A SOURCE TERMS A-1

B DOSE CALCULATIONS B-1

C EQUIPMENT SAFETY CLASSIFICATION C-1

LIST OF TABLES

1-1 Tank 241-C-106 Waste Retrieval Sluicing System: Systems and Equipment List 1-2

3-1 Effective Dose Equivalent/Unit Liter Release for an Offsite and Onsite Individual with and without Plume Meander. 3-2

3-2 Summary of Accident Consequences 3-4

4-1 Tank 241-C-106 Waste Retrieval Sluicing Equipment List and Safety Classification 4-2

4-2 Existing Systems List and Interim Safety Classifications for Tank 241-C-106 4-3

4-3 Existing Systems List and Interim Safety Classifications for Tank 241-AY-102 4-5

LIST OF TERMS

ALARA	as low as reasonably achievable
AWF	Aging Waste Facility
CAM	continuous air monitor
CF	conservative multiplication factor
DOE	U.S. Department of Energy
EDE	effective dose equivalent
FDC	functional design criteria
HEME	high-efficiency moisture eliminator
HEMF	high-efficiency moisture filter
HEPA	high-efficiency particulate air (filter)
HVAC	heating, ventilating, and air conditioning
PHA	preliminary hazards analysis
PUREX	plutonium-uranium extraction
SEL	safety equipment list
SST	single-shell tank
TMACS	Tank Monitoring and Control System
VERMS	ventilation exhaust radiation monitoring system
WHC	Westinghouse Hanford Company
WRSS	waste retrieval sluicing system

UNITS OF MEASURE AND METRIC CONVERSION CHART

If you know	Multiply by	To get
Length		
centimeters	0.393	inches
meters	3.2808	feet
kilometers	0.62	miles
Area		
square kilometers	0.39	square miles
square meters	10.763915	square feet
square centimeters	0.1550003	square inch
Mass (weight)		
grams	0.0352	ounces
kilograms	2.2046	pounds
milligrams	2.2046226 E-6	pounds
Volume		
liters	0.26	gallons
cubic meters	35.3147	cubic feet
Temperature		
Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Joules	9.47 E-4	British thermal unit
kilowatts	3412.14	British thermal unit
Pressure		
kilograms per-square-centimeter	14.223334	pounds per-square-inch
Pascal	2.952 E-4	inch Mercury
Pascal	4.0147 E-3	inch water gauge
Flow Rate		
meters per-second	3.2808398	feet per-second
meters per-second	2.2371364	miles per-hour

Source: R. C. Weast, Ph.D., 1989-1990, CRC Handbook of Chemistry and Physics, 70th Ed., CRC Press, Incorporated, Boca Raton, Florida.

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SAFETY EQUIPMENT LIST FOR TANK 241-C-106
WASTE RETRIEVAL PROJECT W-320

1.0 INTRODUCTION

"Safety Measures for Waste Tanks at Hanford Nuclear Reservation," Section 3137 of the *National Defense Authorization Act for Fiscal Year 1991*, Public Law 101-510, passed in November 1990, directs the Secretary of Energy to resolve and report to Congress all safety issues concerning waste tanks at the Hanford Site. *A Plan to Implement Remediation of Waste Tank Safety Issues at the Hanford Site*, WHC-SP-0697 (Wilson 1993), has identified tank 241-C-106 as the fourth Priority 1 safety issue.

The *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1994), also known as the Tri-Party Agreement, requires initiation of a "full-scale demonstration of waste retrieval technology. . . by October 1996" as the initial phase of single-shell tank (SST) closure. Tank 241-C-106 has been identified as the retrieval demonstration tank by the U.S. Department of Energy (DOE), and the Washington State Department of Ecology has concurred in this selection. The goals of the Tank 241-C-106 Waste Retrieval Sluicing System (WRSS) are (1) to stabilize the tank by reducing the heat load in the tank to less than 42 MJ/h (40,000 Btu/h) and (2) to initiate demonstration of SST retrieval technology.

1.1 PURPOSE

DOE orders and Westinghouse Hanford Company (WHC) procedures require safety classifications for the systems, structures, and components in all nonreactor facilities for which safety analysis reports or safety assessment documents are prepared. This supporting document provides safety classifications for systems, structures, and components that are part of the WRSS and documents the methodology used to develop the safety classifications. Appropriate references are made with regard to use of existing systems, structures, equipment, components, and parts for tank 241-C-106, a single-shell transfer tank located in the C Tank Farm, and for 241-AY-102, a double-shell receiver tank located in the Aging Waste Facility (AWF).

1.2 SCOPE

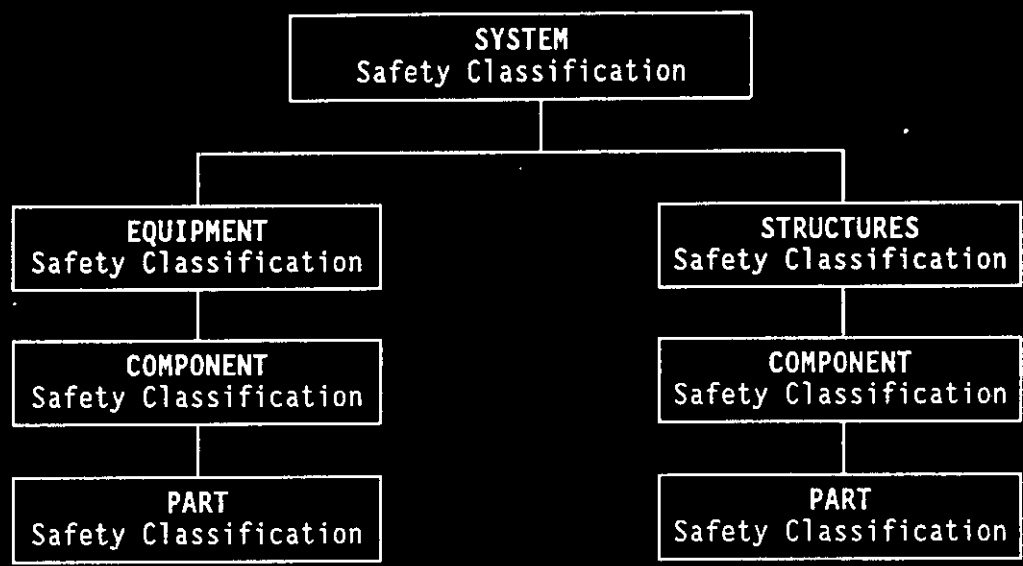
This supporting document has been written in accordance with *Nonreactor Facility Safety Analysis Manual*, WHC-CM-4-46, Section 9.0, "Assigning Safety Classes to Systems, Structures, and Components," to provide safety classifications for new or modified items that are part of the WRSS. Items considered in this safety classification process are listed in Table 1-1. The safety equipment list (SEL) will be revised as additional safety classifications are determined. Descriptions of existing items that are used to support the WRSS operation are outlined in *Aging Waste Facility Interim Safety Equipment List*, WHC-SD-WM-SEL-020 (Kidder 1993a) and *Single-Shell Waste Tanks Interim Safety Equipment List*, WHC-SD-WM-SEL-027 (Kidder 1993b).

Table 1-1. Tank 241-C-106 Waste Retrieval Sluicing System: Systems and Equipment List.

Systems	Equipment
Sluicing waste transfer system	Seismic switch Primary transfer pipes Secondary transfer pipes Slurry distributor Syphon breaker Pit cover blocks Seal loop Waste transfer equipment in pits Raw water supply and transfer line flushing Compressed air system
Ventilation system	Process building skid Chiller skid Exhaust skid
Ventilation exhaust radiation monitoring system	Continuous air monitors, record samplers
In-tank imaging system	In-tank monitoring of level and distribution of slurry
AC power systems	C Tank Farm • MCC-N1, ventilation system and monitoring instrumentation • MCC-N2, WRSS slurry and heel pumps and monitoring instrumentation AY Tank Farm • MCC, sluice pumps and monitoring instrumentation

AC = alternating current.
MCC = motor control center.
WRSS = Waste Retrieval Sluicing System.

The relationships between the safety classification criteria are diagrammed as follows.



1.3 BASIS OF ANALYSIS

The interim safety classifications for existing items are based on the AWF SEL (Kidder 1993a); the SST SEL (Kidder 1993b); *Safety Analysis Report Stabilization of Single-Shell Waste Storage Tanks by Salt Well Jet Pumping*, WHC-SD-WM-SAR-034 (Boyles 1989); and *Single-Shell Tank Isolation Safety Analysis Report*, WHC-SD-WM-SAR-006 (Prosk and Smith 1989); and are augmented by the following:

- *Tank Farm Risk Assessment Plant Familiarization and Hazard Identification Report* (Powers 1991)
- *Hanford Site Tank Farm Facilities Interim Safety Basis*, WHC-SD-WM-ISB-001 (Leach and Stahl 1993)
- *Preliminary Safety Evaluation for 241-C-106 Waste Retrieval, Project W320*, WHC-SD-WM-PSE-010 (Conner 1994).

The safety classifications in this document are based on the accident analyses in WHC-SD-WM-PSE-010 (Conner 1994), safety classification guidelines

in WHC-CM-4-46, and available supporting data for the WRSS. The following new analyses were done to determine safety classifications for new or modified items:

- Source terms (Section 3.2; constituent listing of source terms in Appendix A)
- Dose exposure calculations (see Appendix B)
- Offsite radioactive soil contamination (see Section 3.3.2 and Appendix B).

1.4 GENERAL FACILITY DESCRIPTION

This general description of the C Tank Farm, AY Tank Farm, and WRSS includes background, monitoring systems, ventilation, and stabilization activities along with brief descriptions of the existing support systems that will monitor temperature, liquid level, leaks, and radiation during operation of the WRSS. Detailed descriptions of the existing support systems for tanks 241-AY-102 and 241-C-106 are in the AWF and SST SELs (Kidder 1993a and 1993b).

1.4.1 Background

Past fuel reprocessing operations conducted at the DOE Hanford Site have generated high-level liquid and solid wastes. One hundred forty-nine SSTs and four aging waste tanks were built between 1943 and 1964 to store liquid radioactive wastes. The SSTs are located in the 200 East and 200 West Areas; the AWF tanks are located in the 200 East Area.

Tank 241-C-106 is a 2,000,000-L- (530,000-gal-) capacity SST located in the C Tank Farm in the 200 East Area. This tank has been used for radioactive waste storage since 1947. Between 1963 and 1969, tank 241-C-106 received about 500,000 L (132,000 gal) of high-heat waste, including neutralized plutonium-uranium extraction (PUREX) high-level waste and strontium-bearing solids from the strontium and cesium recovery program. Tank 241-C-106 was withdrawn from active service in 1979 and is categorized as sound (i.e., not known to be leaking).

According to *Waste Tank Summary Report for Month Ending September 30, 1995*, WHC-EP-0182-90 (Hanlon 1995), the waste contained in tank 241-C-106 consists of 746,000 L (197,000 gal) of sludge. This waste is stratified into two layers: the top layer consists of 655,000 L (173,000 gal) of sludge containing a sufficient amount of ^{90}Sr to generate excessive heat (high-heat layer), and the bottom layer consists of 91,000 L (24,000 gal) of hardened material that, based on tank fill records, is a coating waste from dissolution of aluminum fuel cladding. Of the 182,000 L (48,000 gal) of liquids reported for tank 241-C-106 in *Chemical Compatibility of Tank Wastes in 241-C-106, 241-AY-101, and 241-AY-102*, WHC-SD-WM-ES-290 (Sederburg 1994), 121,000 L (32,000 gal) are supernatant and 61,000 L (16,000 gal) are interstitial.

In 1971, temperatures exceeding 99 °C (210 °F) were measured in tank 241-C-106. As a result of these high temperature measurements, a ventilation system was installed to cool the tank. About 23,000 L (6,000 gal) of cooling water are added to the tank each month to prevent the sludge from drying out and the tank from overheating. The current radiogenic heat rate is calculated at 116 MJ/h (1.1 x 10^5 Btu/h) according to *Revised Thermal History of Tank 241-C-106*, WHC-SD-WM-ER-200 (Bander 1993a); *Tank 241-C-106 — Radial Variation of Thermal Conductivity and Heat Generation*, WHC-SD-WM-ER-217 (Bander 1993b); and *Tank 241-C-106 Process Test Report*, WHC-SD-WM-ER-427 (Bander 1995).

Tank 241-C-106 WRSS, Project W-320, is intended to mobilize and remove the heat-generating sludge from tank 241-C-106 in the C Tank Farm and transfer it to tank 241-AY-102 in the AWF. Tank-to-tank sluicing, an existing technology, provides the earliest possible closure of this high-heat safety issue. The WRSS functional design criteria (FDC) are given in *Functional Design Criteria for Tank 241-C-106 Waste Retrieval, Project W320*, WHC-SD-W320-FDC-001 (Bailey 1995).

1.4.2 Sluicing Waste Transfer System

The WRSS is designed to use a high-volume, high-velocity stream of inhibited water, moved by a submersible sluice pump in series with a variable-speed-drive sluice booster pump in tank-241-AY-102 and a sluicer in tank 241-C-106, to mobilize the waste sludge in tank 241-C-106 and prepare a slurry suitable for pumping. The sludge is broken up by the sluicer, forming a slurry in tank 241-C-106; the mobilized waste is removed by the pumps at about the same rate that the inhibited water is introduced into tank 241-C-106. The waste is then transferred to tank 241-AY-102 through an encased slurry transfer pipeline. (The term "inhibited water" is synonymous with the term "supernatant" in this report.)

Before beginning sluicing operations, the supernatant contained in tank 241-AY-102 will be transferred through existing transfer lines to either the 242A Evaporator/Crystallizer, for volume reduction, or to another double-shell tank. Inhibited water will then be transferred to tank 241-AY-102 through existing lines or other supporting systems in the AY Tank Farm. Transfer of the supernatant in tank 241-AY-102 to the 242A Evaporator/Crystallizer, or to another double-shell tank, and the transfer of the inhibited water to tank 241-AY-102 are not within the scope of Project W-320.

1.4.3 Leak Detection Monitoring

No release of hazardous material is expected during normal transfer operations although small residual amounts of radioactive material are expected to be available for release during jumper change operations. Large leaks that result in an accumulation of solution on the floor of the pit will be detected by a leak detection element and controlled by returning the leaked wastes to the tank with which they are associated.

If the addition of cooling water (23,000-L [6,000-gal] per month) to tank 241-C-106 is stopped, the tank will dry out, sludge temperatures will rise to exceed established limits, and structural damage to the tank may result. Should the tank start to leak, continuing the water additions required to cool the waste may increase the amount of leakage to the soil.

Leaks located between the primary and secondary tanks' confinement liners in tank 241-AY-102 (a double-shell tank) will be controlled by the annulus leak detection system. This system is designed to detect and recover any leakage should a primary tank liner rupture.

The dry well monitoring system provides a limited leak detection surveillance function in the C Tank Farm. The wells are open-bottomed mild steel casings either 15- or 20-cm (6- or 8-in.) in diameter. Their depths range from 22.9 to 45.7 m (75 to 150 ft). Although a number of these wells are randomly situated within the tank farm, most are located adjacent to specific tanks at distances of 1.8 to 3 m (6 to 10 ft) from the outer walls. Radiation probes are used on a weekly to quarterly schedule to determine the radiation profile in the well. The well monitoring systems require electrical power when in use.

1.4.4 Ventilation

A new heating, ventilating, and air conditioning (HVAC) system will be provided for the WRSS as part of the tank 241-C-106 modification for confinement of airborne particulate (Section 4.2). The ventilation system has been designed to perform the following functions:

- Maintain a negative pressure
- Remove heat from the tank
- Dehumidify recirculating air
- Remove aerosols from ventilation emissions
- Serve as a passive breather during interruptions of sluicing operations or for active ventilation during extended maintenance
- Reduce fog formation in the tank's vapor space to improve visibility for the remote viewing cameras, in accordance with *Project W-320 Tank 241-C-106 Sluicing Process Flowsheet*, WHC-SD-W320-TI-002 (Estey 1995).

1.4.5 Radiation Monitoring

The Ventilation Exhaust Radiation Monitoring System (VERMS) will consist of a continuous air monitor (CAM) and a record sampler that will provide continuous radiation monitoring of the ventilation exhaust (see Drawing H-2-818561). The VERMS will be able to detect and partially mitigate a radioactive aerosol leak, resulting from an unfiltered release of the exhaust gases to the environment, by initiating a shutdown of the exhaust system.

1.4.6 Tank 241-C-106 Existing Facility Description

The C Tank Farm comprises 12 tanks (tanks 241-C-101 to 241-C-112) rated at 2,000,000 L (530,000 gal) each and 4 smaller tanks (tanks 241-C-201 to 241-C-204) rated at 207,500 L (55,000 gal) each. These tanks were constructed during 1943 and 1944. Each of the tanks in the C Tank Farm has a dry well monitoring system.

Tank 241-C-106 is partially interim isolated. Manual temperature readings in tank 241-C-106 are taken weekly because the tank contains a high heat load. Tank surface levels are determined using an ENRAF[1] series 854 level gauge, a high-precision, low-maintenance device that detects variations in the weight of a displacer suspended in the tank waste. Active ventilation is provided for tank 241-C-106. A CAM monitors the exhaust flow and alarms if limits are exceeded.

1.4.7 Tank 241-AY-102 Existing Facility Description

The AWF consists of four double-shell tanks (241-AY-101, 241-AY-102, 241-AZ-101, and 241-AZ-102) and associated monitoring and control facilities. The tanks are underground, double-shell, carbon steel tanks encased in concrete shells. The primary tanks are designed to hold about 3,785,000 L (1,000,000 gal) of radioactive wastes. The tanks are connected to each other and to other tanks through a network of underground transfer piping, diverter stations, and valve pits. Each tank is vented to the vessel vent header, which is connected to the AY and AZ ventilation system. The AY and AZ Aging Waste Tank Farms are supported by facilities located in the A Tank Farm complex and are served by utility systems that provide electrical power, process and instrument air, steam, cooling water, and sanitary water. Buildings, systems, and components of the AY and AZ Tank Farms are listed in the AWF SEL, Table 1-1 (Kidder 1993a).

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[1]ENRAF is a trademark of the ENRAF Corporation.

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2.0 METHODOLOGY

This chapter describes the criteria, interfaces, and methodology that were used to develop the WRSS safety classifications.

2.1 SAFETY CLASSIFICATION CRITERIA

The WRSS systems are classified on the basis of the safety function they perform and on the consequences should a system fail to perform its safety function. The classification process follows the guidelines provided in WHC-CM-4-46, Section 9.0, and summarized in Section 2.3. Safety classifications consider recovery time if appropriate; recovery time is the time needed for a system to be mitigated, repaired, or replaced in the event of failure. Credible accident scenarios were derived from existing WRSS safety analysis documents (see Section 3.1).

2.2 WASTE RETRIEVAL SLUICING SYSTEM FUNCTIONS AND INTERFACES

Information in the FDC (Bailey 1995) was used to determine the functions of and interfaces between various WRSS systems. Existing tank farm systems used to support tanks 241-C-106 and 241-AY-102 and the WRSS operation are outlined in the AWF and SST SELs (Kidder 1993a and 1993b).

2.3 SYSTEM SAFETY CLASSIFICATION METHODOLOGY

The logical order for safety class determination requires the following steps:

1. Identify hazards
2. Identify existing safety systems (systems that mitigate radiological or toxicological releases)
3. Identify the safety functions of each system
4. Identify credible accidents (probability of occurrence $>1 \times 10^{-6}$/yr)
5. Determine the tank inventory (activity and volume)
6. Determine release quantities (activity, and volume or mass of material released in the accident scenario)
7. Identify the consequences of system failure
8. Determine radiological offsite and onsite doses
9. Evaluate the consequences of system failures against safety class criteria
10. Assign appropriate safety classes to the systems.

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3.0 IDENTIFICATION OF HAZARDS AND CONSEQUENCE ANALYSES

This chapter describes the preliminary hazards analysis (PHA), source term definition, and consequence analyses for the WRSS. The PHA and the consequence analyses for existing tank 241-C-106 and tank 241-AY-102 systems that will be used for WRSS operation are in the AWF and SST SELs (Kidder 1993a and 1993b).

3.1 PRELIMINARY HAZARD ANALYSIS

The PHA conducted to identify potential hazards for the WRSS is documented in WHC-SD-WM-PSE-010, Table 4-1 (Conner 1994). The potential accidents were analyzed by determining event sequences, potential consequences, mitigating features, recovery measures, and probability of occurrence. The safety classifications for the front-line systems were determined based on the hazards assessment (see Chapter 4.0). Chapter 5.0 describes the analysis of waste transfer line leaks, unfiltered releases to the environment because of recirculation caused by an HVAC duct break, and waste leaks from jumpers or connectors with pit covers in place.

3.2 SOURCE TERM

The radionuclide inventory data used to calculate radiological dose consequences to onsite and offsite individuals are provided in *Tank Waste Compositions and Atmospheric Dispersion Coefficients for Use in Accelerated Safety Analysis Consequence Assessments*, WHC-SD-WM-SARR-016 (Savino 1995), and in *Source Term for Safety Analysis Support of the Waste Retrieval of Tank 241-C-106*, Internal Memorandum 8M110-JCC-95002 (Conner 1995). The radionuclide inventory data for tanks 241-C-106 and 241-AY-102 are included in Appendix A, Tables A-1 and A-2.

Source Term Clarifications. The GENII dosimetry code (Napier et al. 1988) and laboratory sample data for tank 241-C-106 solids and tank 241-AY-101 supernatant in tank 241-AY-102 were used in WHC-SD-WM-ISB-001, Appendix C (Leach and Stahl 1993) to determine unit liter respirable releases from selected Hanford Site high-level waste tanks. The effective dose equivalent (EDE) values are summarized in Table 3-1; the dose consequence calculations are documented in Appendix B. It has been assumed that the solids and/or sludge within tank 241-AY-102 will not be disturbed during sluicing from tanks 241-C-106 to 241-AY-102.

All the radionuclides of concern have long half-lives, so doses to the receptors at other locations are proportional to the maximum doses calculated for the offsite individual. The atmospheric dispersion coefficients used to derive these conversions are from WHC-SD-WM-ISB-001, Appendix C, Table C-5 (Leach and Stahl 1993). The receptor location conversion factors given in WHC-SD-WM-ISB-001, Appendix C, Table C-10 (Leach and Stahl 1993), have been

Table 3-1. Effective Dose Equivalent/Unit Liter Release for an Offsite and Onsite Individual with and without Plume Meander.

	CF	EDE rem/L Solids	EDE, rem/L Liquid
Offsite			
Inhalation without PM	1	2.30 E-02	1.80 E-05
Inhalation with PM	0.64	1.47 E-02	1.15 E-05
Onsite			
Inhalation without PM	1,900	4.37 E+01	4.32 E-02
Inhalation with PM	610	1.40 E+01	1.10 E-02

Note: 1.0 rem = 1.0 x 10^{-2} Sv.

EDE = effective dose equivalent.
CF = conservative multiplication factor.
PM = plume meander.

used to convert from the maximum offsite individual dose to doses for other receptors. For purposes of this evaluation, and as recommended in WHC-SD-WM-ISB-001, Appendix C (Leach and Stahl 1993), the most conservative multiplication factors (CF), with or without plume meander, have been used.

- CF = 1 for maximum dose to an offsite individual, without plume meander.
- CF = 0.64 for maximum dose to an offsite individual, with plume meander.
- CF = 610 for maximum dose to an onsite individual at 100 m, with plume meander.
- CF = 1,900 for maximum dose to an onsite individual at 100 m, without plume meander.

The plume meander CF has been applied to accident releases assumed to occur for 1 hour or more.

3.3 CONSEQUENCE ANALYSES

This section discusses potential radiological consequences, soil contamination, and chemical contamination.

3.3.1 Radiological Consequences

The personnel onsite and offsite radiological dose consequences used in determining system safety classifications were calculated based on the airborne release volumes indicated in the appropriate accident scenarios in Chapter 5.0. The environmental radiological consequences used in determining system safety classifications were calculated based on the liquid release volumes indicated in the appropriate accident scenarios in Chapter 5.0. A summary of offsite and onsite EDE values for each credible accident scenario analyzed in Chapter 5.0 is provided in Table 3-2.

3.3.2 Soil Contamination

Safety class 2 designation for the WRSS transfer system, along with a seismic switch to shut down the transfer system, will significantly reduce the impact to personnel safety and health as well as reducing soil contamination from a postulated break of both supply and return transfer lines.

3.3.3 Chemical Contamination

Chemical inventory data for tanks 241-C-106, 241-AY-101, and 241-AY-102 are included in Appendix A, Tables A-3 and A-4. The inventories are based on *Toxic Chemical Considerations for Tank Farm Releases*, WHC-SD-WM-SARR-011 (Van Keuren et al. 1995). Sample data can be misleading because inhomogeneities in horizontal and vertical distributions of chemicals within the tanks are often not characterized. Chemicals listed in the *Tank Farm Health and Safety Plan*, WHC-SD-WM-HSP-002 (Mickle 1994), also have been considered.

Table 3-2. Summary of Accident Consequences.

Description		EDE Offsite (mrem)	EDE Onsite (rem)
Number from PHA table[a]	Accident scenario		
1a and 1b	Waste transfer supply line and return line failure[b]	2.0 E+00	1.6 E+00
1c and 1d	Waste transfer supply line and return line failure[c]	8.4 E-02	1.6 E-01
2	Unfiltered release caused by duct failure[d,e]	4.4 E-01	4.2 E-01
3a	Jumper/connector failure, with pit cover open[b]	6.2 E+03	5.8 E+03
3b	Jumper/connector failure, with pit cover closed, with all openings closed[f]	3.2 E-04	3.0 E-04
3c	Jumper/connector failure, with pit cover closed, with 2-in. valve handle open for portable imaging system[f]	1.3 E-01	1.3 E-01

Note: 1.0 rem = 1.0 x 10^{-2} Sv.

[a]The preliminary hazard analysis is found in Table 4-1 of Conner, J. C., 1995, Preliminary Safety Evaluation for the 241-C-106 Waste Retrieval Project, WHC-SD-WM-PSE-010, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

[b]2-hour release time; CF = 0.64 for conversion to offsite dose with plume meander, and CF = 610 for conversion to onsite dose with plume meander.

[c]10-second release time with seismic switch shut off; CF = 1,900 for conversion to onsite dose without plume meander.

[d]1-hour release time; CF = 0.64 for conversion to offsite dose with plume meander, and CF = 610 for conversion to onsite dose with plume meander.

[e]Based on tank 241-C-106 vapor space loading at 100 mg/m^3, consisting of 10% tank 241-C-106 solids and 90% tank 241-AY-102 supernatant by way of the HVAC recirculation exhaust duct.

[f]8-hour release time; CF = 0.64 for conversion to offsite dose with plume meander, and CF = 610 for conversion to onsite dose with plume meander.

CF = conservative multiplication factor.
EDE = effective dose equivalent.
PHA = preliminary hazards analysis.

4.0 JUSTIFICATIONS FOR SAFETY CLASSIFICATIONS

The criteria and process for the identification and safety classification of systems, structures, and components are provided by WHC-CM-4-46, Section 9.0, Table 1, which is in accordance with criteria established in *General Design Criteria*, DOE Order 6430.1A. The consequences of failures of systems, structures, and components have been determined by the accident analysis (Chapter 5.0) and compared to the criteria in WHC-CM-4-46, Section 9.0, Table 1. Depending on the criteria and the consequences identified in the failure analysis, the systems, structures, and components of the WRSS have been designated as safety class 1, 2, or 3.

Safety classifications for the equipment associated with WRSS systems are presented in Appendix C. The following sections provide justifications for the safety classifications of the sluicing waste transfer system, ventilation system, support systems, and instrumentation and controls. A summary of the safety classifications for the new systems associated with the WRSS is given in Table 4-1. Systems lists and interim safety classifications for existing AWF and SST systems required to support WRSS operation have been taken from the AWF and SST SELs (Kidder 1993a and 1993b) and are shown in Tables 4-2 and 4-3.

The dose calculations in Appendix B are based on the radioactive inventory data presented in WHC-SD-WM-SARR-016 (Savino 1995) and in Internal Memorandum 8M110-JCC-95002 (Conner 1995). The radionuclide inventory data for tanks 241-C-106 and 241-AY-102 are included in Appendix A, Tables A-1 and A-2.

According to WHC-SD-WM-ER-200 (Bander 1993a), WHC-SD-WM-ER-217 (Bander 1993b), and WHC-SD-WM-ER-427 (Bander 1995), the current estimated radiogenic heat load of the waste in tank 241-C-106 is 32.2 KW (110,000 Btu/h). Based on data from WHC-SD-WM-SARR-016 (Savino 1995), the calculated heat load caused by radioactive elements in tank 241-C-106 is dominated by decay of ^{90}Sr and ^{137}Cs, with a negligible contribution from other radionuclides, and is equivalent to 16.4 KW. This discrepancy between the radiogenic heat load in WHC-SD-WM-ER-200 (Bander 1993a), WHC-SD-WM-ER-217 (Bander 1993b), and WHC-SD-WM-ER-427 (Bander 1995) and the estimated heat load from the current radioactive inventory in tank 241-C-106 (Savino 1995) introduces a scaling factor of 2.0. According to the guidelines in WHC-CM-4-46, the EDE values for postulated accidents are to be used to determine the safety classification of the WRSS and the radiological risk acceptance. The risk is based on the frequency of occurrence of an accident and on the consequences of the accident.

Table 4-1. Tank 241-C-106 Waste Retrieval Sluicing Equipment List and Safety Classification.

New Systems	Safety class (SC)	Justifications	
		Section of this document	WHC-CM-4-46, Table 1 criterion(*)
Safety systems			
Sluicing waste transfer system	SC-1	4.1	
• Seismic switch	SC-1	4.1.1	2
• Primary transfer pipes to and from tanks	SC-2	4.1.2	9
• Secondary transfer pipes to and from tanks	SC-3	4.1.3	16
• Slurry distributor	SC-3	4.1.4	16
• Syphon protection	SC-3	4.1.5	16
• Pit cover blocks	SC-3	4.1.6	16
• Seal loop	SC-1	4.1.7	2
• Waste transfer equipment (e.g., pumps, valves, pipes, flanges) in pits	SC-3	4.1.8	16
• Raw water supply and transfer line flushing system	SC-3	4.1.9	16
• Compressed air system	SC-3	4.1.10	16
Ventilation system	SC-3	4.2	
• Process building skid	SC-3	4.2.1	16
• Chiller skid	SC-3	4.2.2	16
• Exhaust skid	SC-3	4.2.3	16
Ventilation exhaust radiation monitoring system (continuous air monitors and record samplers)	SC-3	4.3	16
In-tank imaging system	SC-3	4.4	16
AC power	SC-3	4.5	16
Instrumentation Control System	SC-3	4.6	16

(*)WHC-CM-4-46, Safety Analysis Manual, Section 9.0, Table 1.

AC = alternating current.
SC = safety class.

Table 4-2. Existing Systems List and Interim Safety Classifications for Tank 241-C-106 (2 sheets)

Existing system descriptions	Safety class (SC)	Justifications	
		Section of SST ISEL[a]	WHC-CM-1-3, Table 1[b]
Safety systems			
Primary dome and tank	SC-1	4.1.1, 4.2.1	1,2
Active ventilation system	SC-3	4.1.2	3
• Exhaust duct headers	SC-3	4.1.2	3
• Exhaust fan, HEPA filters	SC-3	4.1.2	3
• Steam or electric preheater	SC-3	4.1.2	3
• Process condensate drain with seal pot	SC-3	4.1.2	3
• Air inlet filters	SC-3	4.1.2	3
Active ventilation exhaust radiation monitoring system	SC-2	4.3.4, 4.7	19
• Continuous air monitors	SC-2	4.3.4, 4.7	2
• Record samplers	SC-2	4.3.4, 4.7	2
Tank temperature instrumentation	[IOSR]*	4.3.1	--
• Thermocouples	[IOSR]*	4.3.1	--
Tank liquid-level instrumentation	[IOSR]*	4.3.3	--
• ENRAF[c]	[IOSR]*	--	--
• Manual tapes	SC-3	4.3.3	3
Tank leak detection instrumentation	SC-3	4.3.2	3
• Dry wells	SC-3	4.3.2	3
Support systems			
AC power[d]	[IOSR]*	4.4.3	--
• Active ventilation system	SC-3	4.4.3	3
• Temperature monitoring instrumentation	[IOSR]*	4.4.3	--
• Liquid level monitoring instrumentation	[IOSR]*	4.4.3	--
• Leak detection monitoring instrumentation	SC-3	4.4.3	3
Compressed air	SC-3	4.4.4	3
• Instrument air supply to monitoring instrumentation	SC-3	4.4.4	3

Table 4-2. Existing Systems List and Interim Safety Classifications for Tank 241-C-106 (2 sheets)

Existing system descriptions	Safety class (SC)	Justifications	
		Section of SST ISEL[a]	WHC-CM-1-3, Table 1[b]
Raw water supply	SC-3	4.4.5	3
Fire protection system	SC-3	4.5	22

[a]Kidder, R. J., 1993, Single-Shell Waste Tanks Interim Safety Equipment List, WHC-SD-WM-SEL-027, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

[b]WHC-CM-1-3, 1991, Management Requirements and Procedures, MRP 5.46, "Safety Classification of Systems, Components, and Structures."

[c]ENRAF is a trademark of the ENRAF Corporation.

[d]The AC power is classified according to its safety support function and not according to its source or distribution. Classifications provided are only applicable to the tank farm fence line. Classification of offsite sources and distribution networks is beyond the scope of this document.

AC = alternating current.
HEPA = high-efficiency particulate air.
IOSR = interim operational safety requirement.
SC = safety class.

[IOSR]' The notation [IOSR]' has been designated for those systems, components, and structures important to health, safety, and environmental protection but for which current analyses are not sufficient to establish the safety classification. Such items shall be treated as safety class 3, with additional designation as operational safety requirement (OSR) related. The additional OSR designation will ensure the priority and funding for continued operation and maintenance of these items consistent with OSR requirements (IOSR where applicable).

The [IOSR]' safety classification will be replaced to be consistent with the requirements of WHC-CM-1-3, MRP 5.46, "Safety Classification of Systems, Components, and Structures," as analyses are completed to establish definite safety classifications. In the interim, approval requirements shall include Nuclear Safety and Quality Assurance, as a minimum, and Environmental Assurance where deemed appropriate.

Table 4-3. Existing Systems List and Interim Safety Classifications for Tank 241-AY-102. (2 sheets)

Existing system descriptions	Safety class (SC)	Justifications	
		Section of AWF ISEL[a]	WHC-CM-1-3, Table 1[b]
Tank	SC-1	--	10
• Primary tank	SC-1	4.2.1	10
• Secondary tank, refractory support pad, concrete structure	SC-1	4.2.2	23
• Secondary tank leak detection system	SC-3	4.3.6	--
Waste transfer system	SC-1	4.2.3	--
• Primary tank and secondary intertank transfer pipes	SC-1	4.2.3.2	10
• Waste transfer system pits/boxes	SC-1	4.2.3.3	1, 12
• Waste transfer system pits/boxes equipment (e.g., pumps, valves, pipes, flanges, leak detectors)	SC-3	4.2.3.3	3
Primary tank ventilation system (A-702 Building)[c]	SC-2	4.1.3	2
• Ventilation duct work	SC-2	4.1.3	2
• Seal loops	SC-2	4.1.3	2
• Deentrainers, condensers, heaters	SC-2	4.1.3	2
• Exhaust fans	SC-2	4.1.3	2
Backup ventilation system (A-702 Building)[c]	SC-2	4.1.4	2
• Exhauster, 112-m^3/s (4,000 ft^3/min)	SC-2	4.1.4	2
• Ventilation duct work	SC-2	4.1.4	2
Annulus ventilation system	SC-2	4.1.5, 4.8	24
Instrumentation (for various systems)			
• Primary tank instrumentation system			
- Temperature measurement system	[IOSR]*	4.3.2	--
- Liquid-level measuring system	[IOSR]*	4.3.7	--
- Pressure/vacuum measuring system	[IOSR]*	4.3.1	--
• Primary tank leak detection systems			
- Liquid-level detector element	SC-2	4.3.5, 4.8	2
- Continuous air monitors	SC-2	4.3.5, 4.8	2
• Ventilation system radiation monitors			
- Primary ventilation exhaust radiation monitoring system	SC-2	4.3.8, 4.8	19
- Annulus ventilation exhaust radiation monitoring system	SC-3	4.3.9	14
• Secondary tank instrumentation			
- Tank concrete structure thermocouples	SC-3	4.3.3	3
- Pressure/vacuum measuring system	SC-2	4.3.4, 4.8	24

Table 4-3. Existing Systems List and Interim Safety Classifications for Tank 241-AY-102. (2 sheets)

Existing system descriptions	Safety class (SC)	Justifications	
		Section of AWF ISEL[a]	WHC-CM-1-3, Table 1[b]
Compressed air system (A-701 Building)	SC-2	4.4.7, 4.8	24
• Process air	SC-2	4.4.7, 4.8	24
• Instrument air	SC-2	4.4.7, 4.8	24
• Balance of plant	SC-3	4.4.7, 4.8	--
AC power system (AWF boundaries)	[IOSR]*	--	--
• Normal AC power for primary tank instrumentation	[IOSR]*	4.4.3	--
• Caterpillar[d] diesel generator	[IOSR]*	4.4.3.1	--
• Normal AC power for ventilation	SC-2	4.4.5, 4.4.6	24
• Detroit[e] diesel generator	SC-2	4.4.5.1	24
Raw water system (AWF boundaries)	SC-2	4.4.9, 4.8	24
Raw water system (service pits and boxes)	SC-3	4.4.9	3
Emergency cooling water system[c]	SC-2	4.4.10, 4.8	24
Steam supply system (AWF boundaries)[c]	SC-2	4.4.2, 4.8	24
Steam supply system (balance of plant)	SC-3	--	3
Fire protection system	SC-3	4.5	22
Air-lift circulators	[IOSR]*	4.4.1	--
• Compressed air system – process air		4.4.1	--
• Raw water system		4.4.1	--

[a]Kidder, R. J., 1993, Aging Waste Facility Interim Safety Equipment List, WHC-SD-WM-SEL-020, Rev. 2, Westinghouse Hanford Company, Richland, Washington.
[b]WHC-CM-1-3, 1991, Management Requirements and Procedures, MRP 5.46, "Safety Classification of Systems, Components, and Structures."
[c]May be replaced by Project W-030 ventilation system.
[d]Caterpillar is a trademark of the Caterpillar Corporation.
[e]Detroit is a trademark of the Detroit Corporation.

AC = alternating current.
AWF = Aging Waste Facility.
IOSR = interim operational safety requirement.
ISEL = interim safety equipment list.
SC = safety class.

[IOSR]*: The notation [IOSR]* has been designated for those systems, components, and structures important to health, safety, and environmental protection but for which current analyses are not sufficient to establish the safety classification. Such items shall be treated as safety class 3, with additional designation as operational safety requirement (OSR) related. The additional OSR designation will ensure the priority and funding for continued operation and maintenance of these items consistent with OSR requirements (IOSR where applicable).

The [IOSR]* safety classification will be replaced to be consistent with the requirements of WHC-CM-1-3, MRP 5.46, "Safety Classification of Systems, Components, and Structures," as analyses are completed to establish definite safety classifications. In the interim, approval requirements shall include Nuclear Safety and Quality Assurance, as a minimum, and Environmental Assurance where deemed appropriate.

4.1 SLUICING WASTE TRANSFER SYSTEM — SAFETY CLASS 1

The sluicing waste transfer system consists of redundant seismic switches; primary and secondary transfer pipes between tanks 241-C-106 and 241-AY-102; a slurry distributor; syphon protection; pit cover blocks; seal loops; waste transfer equipment in pits, including a combination of a submersible slurry pump and a slurry booster pump, a combination of a submersible sluice pump and a sluice booster pump, combination of a submersible heel pump and an eductor, sluicers, and valves; raw water supply and transfer line flushing system; and a compressed air system. Brief descriptions of these components and their functions are provided in the following sections.

The high-heat waste solids in tank 241-C-106 will be transferred to tank 241-AY-102 using an updated form of past-practice sluicing. The sluicing will be a continuous process with the supernatant in tank 241-AY-102 serving as the sluicing fluid. Sluicer action will mix this sluicing fluid with the solids in tank 241-C-106 to produce a slurry. The slurry will be transferred to tank 241-AY-102 by way of a submersible slurry pump, in series with a variable-speed slurry booster pump, through an encased slurry transfer pipe and a distributor located in tank 241-AY-102. The slurry pumps have a maximum capacity of 1,300 L/min (350 gal/min). The variable-speed slurry booster pump is installed in pump pit 241-C-06A.

The submersible sluice pump in series with the variable-speed sluice booster pump in tank 241-AY-102 will transfer the supernatant (or inhibited water) by way of two sluicers with nozzles located in tank 241-C-106. The sluice pumps will deliver a maximum of 1,300 L/min (350 gal/min) of supernatant to the sluicer nozzle at about 82 °C (180 °F). The variable-speed sluice booster pump is installed in pump pit 241-AY-02E. (See process and instrumentation diagrams H-2-818559 and H-2-818560.)

One sluicer is installed in pit 241-C-06A, and the other sluicer will be installed in the future, if required, in pit 241-C-06C. The slurry distributor is located in pit 241-AY-02A. The distributor will distribute the solids in tank 241-AY-102 as evenly as possible. A majority of the solids will settle in tank 241-AY-102; unsettled solids will be recirculated along with the supernatant (or inhibited water) to tank 241-C-106. Thus, a continuous process of sluicing will be maintained until at least 75% of the high-heat solids are transferred into tank 241-AY-102. The routing of the transfer pipes is shown on drawings H-2-818520 and H-2-818540.

4.1.1 Seismic Switch — Safety Class 1

Based on evaluation of the WRSS design and the EDE dose consequences of a postulated break of both the supply and return transfer lines during a seismic event, redundant seismic switches will be installed to shut down the WRSS sluicing transfer system at the onset of such an event (see drawings H-2-818559 and H-2-818560). This will significantly reduce the impact to personnel safety and health caused by the dose consequences and

reduce the impact to the environment caused by the soil contamination. (See Section 4.1.2 for the accident analysis.) The standalone seismic switch enclosures will be located outside the 241-C-106 and 241-AY-102 facilities in two independent compartments, one for each of the redundant switches. The two compartments have been designed for missile protection in accordance with the safety class 1 requirements of *Standard Architectural Civil Design Criteria: Design Loads for Facilities*, HPS-SDC-4.1 (DOE-RL 1989). Based on the safety function of the seismic switches and on WHC-CM-4-46, Section 9.0, Table 1, criterion 2, the seismic switches have been classified as safety class 1.

4.1.2 Primary Transfer Pipes — Safety Class 2

The two primary transfer lines are of an all welded construction with the 4-in. schedule 40 stainless steel primary pipe within a 6-in. schedule 40 carbon steel encasement pipe (see drawings H-2-818520, H-2-818540, H-2-818559, and H-2-818560).

The safety function of the tank 241-C-106 sluicing transfer system's primary (inner) piping is to provide confinement of hazardous liquid wastes. Failure and leaking of the primary piping could result in an unmitigated leak of hazardous liquids to the soil column and/or release of aerosols to the environment. A radioactive aerosol release will cause potential onsite and offsite personnel exposures.

Supply line and return line failures will be detected by a material balance discrepancy. The maximum postulated leak is calculated to be 328,000 L (86,600 gal) for both supply line and return line breaks (Chapter 5.0, scenarios 1a and 1b). The offsite and onsite EDE values are 2.0×10^{-2} mSv (2 mrem) and 1.6×10^{-2} Sv (1.6 rem).

As noted in Section 4.1.1, redundant seismic switches will be installed to shut down the WRSS transfer system at the onset of a seismic event. This will significantly reduce the dose consequences to offsite and onsite individuals as well as reduce the impact to the environment from soil contamination. With the seismic switches operating and a postulated release of waste of approximately 10 seconds (Chapter 5.0, scenarios 1c and 1d), the calculated offsite and onsite EDE values are reduced to 8.4×10^{-4} mSv (8.4×10^{-2} mrem) and 1.6×10^{-3} Sv (1.6×10^{-1} rem).

Based on the safety function of the sluicing transfer system's primary piping, which is to provide confinement of hazardous liquid wastes, and on WHC-CM-4-46, Section 9.0, Table 1, criterion 9, the primary transfer lines (inner pipes) are classified as safety class 2.

4.1.3 Secondary Transfer Pipes — Safety Class 3

The 6-in. secondary transfer (encasement or outer) pipes are provided for leak detection and secondary confinement, draining any liquid leaked from the 4-in. primary transfer lines to the appropriate tank (see drawings H-2-818520, H-2-818540, H-2-818559, and H-2-818560.)

The safety function of the sluicer pumping system's secondary piping is to ensure the transfer of liquid waste from tank 241-C-106 to tank 241-AY-102 without leaking. The primary pipe (inner 4-in. pipe) is designed for safety class 2 requirements with all welded construction. The secondary transfer pipe includes leak detection capability. Any leaks confined within the encasement pipe will drain to the appropriate tank, and once this leak is detected, an immediate action will be taken, such as stopping the transfer operation. Extra radiation protection would be required to repair a leak caused by a primary pipe failure, which would adversely impact as low as reasonably achievable (ALARA) principles. Based on WHC-CM-4-46, Section 9.0, Table 1, criterion 16, the secondary transfer piping system is classified as safety class 3.

4.1.4 Slurry Distributor — Safety Class 3

The slurry distributor (see drawing H-2-818560) is designed to maximize solids settling and to provide distribution of solids as evenly as possible within tank 241-AY-102. According to the FDC (Bailey 1995), the design intent is to transfer slurry containing 30% solids from tank 241-C-106 to tank 241-AY-102. Failure to distribute solids as evenly as possible may result in extended operation of the WRSS because more unsettled solids will have to be transferred back and forth by the waste retrieval system. According to the FDC (Bailey 1995), it is estimated that about 10% unsettled solids will be returned to tank 241-C-106 by way of the supernatant line. According to *CSER 94-001: Criticality Safety of Single-Shell Waste Storage Tanks*, WHC-SD-SQA-CSA-20363 (Rogers 1994), no mechanism has been found that is capable of causing a criticality concern during the transfer and distribution of solids in tank 241-AY-102. Based on WHC-CM-4-46, Section 9.0, Table 1, criterion 16, the slurry distributor is classified as safety class 3.

4.1.5 Syphon Protection — Safety Class 3

The design of the supernatant line incorporates antisyphon holes on the submersible sluice pump's discharge line located inside tank 241-AY-102 in order to prevent syphoning of tank 241-AY-102 through the supernatant line. Similarly, antisyphon holes also are provided on the slurry distributor line located inside tank 241-AY-102 to prevent syphoning of tank 241-AY-102 through the slurry line. The piping hydraulic diagram (drawing H-2-818536) shows elevations for the two tanks, pump pits, and piping (the elevations or liquid levels noted in this section are the elevations or levels above mean sea level).

If a line breaks or the system is shut down or stopped, the antisyphon holes will prevent the draining of tank 241-AY-102 to tank 241-C-106 and a consequent overflow of tank 241-C-106. Failure of these antisyphon holes to function as a syphon breaker would allow a syphon to be established upon shutdown of the pumps or a line break. The flow rate of the syphon may be conservatively calculated by using the following equation from *Flow of Fluids through Values, Fittings, and Pipes*, Technical Paper 410 (Crane 1982).

$$Q = 19.65\, d^2 \sqrt{\frac{h_L}{K}}$$

where

Q = flow rate in gallons per minute
d = internal pipe diameter in inches
h_L = head loss in feet
K = resistance coefficient f(L/D)

where

f = friction factor
L = pipe length in feet
D = pipe diameter in feet.

The primary transfer piping is 4-in., schedule 40 stainless steel with an internal diameter (d) of 8.283 cm (3.458 in.). The head loss (h_L) is the difference in height between the maximum liquid level in tank 241-AY-102 (elevation 199.14 m [653.36 ft]) and the initial height of the liquid in tank 241-C-106 (elevation 187.63 m [615.58 ft]), shown on drawing H-2-818536 as equal to 11.51 m (37.78 ft). The friction factor (f), taken from Crane Technical Paper 410 (Crane 1982), is 0.017 for clean commercial steel pipe, and the pipe length (L) is assumed to be 610 m (2,000 ft), which yields a resistance coefficient (K) of 118. Therefore, substituting these data into the above equation, the flow rate (Q) of the syphon would be 503 L/min (133 gal/min).

The following also were assumed in determining a conservative flow rate.

- Additional friction losses caused by valves and fittings, such as elbows and reducers, are not to be considered.
- Head is constant (however, actual head will approach zero as the liquid levels in tanks 241-AY-102 and 241-C-106 equalize).
- Data for commercial steel pipe is to be used in lieu of data for stainless steel (the material of construction for the primary line), which is smoother and would provide less friction.
- The cascade line between tanks 241-C-105 and 241-C-106 is not available.

Based on these assumptions, a conservative flow rate of 378 L/min (100 gal/min) has been used to determine the time needed to fill tank 241-C-106.

The total volume of liquid estimated to be available for transfer from tank 241-AY-102 to tank 241-C-106 is about 2,233,000 L (590,000 gal). The time needed to transfer this volume at 100 gal/min is about 98 hours. This is based on the volume of liquid between the maximum liquid height in tank 241-AY-102 at 199.14 m (653.36 ft), and the height of the distributor nozzles (or the suction of the submersible sluice pump) at 193.7 m (635.5 ft), and on an estimated volume of 4,100 L/cm (2,750 gal/in.) in a 22.9-m- (75-ft-) diameter tank.

The volume necessary to fill tank 241-C-106 is about 1,135,000 L (300,000 gal) based on the maximum allowable level of 189.7 m (622.4 ft), which is 470 cm (185 in.) above the inside bottom elevation of tank 241-C-106, at 185 m (607 ft) according to *Operating Specifications for Single-Shell Waste Storage Tanks*, OSD-T-151-00013 (Boyles 1993), and an initial starting tank volume of 746,000 L (197,000 gal). The time needed to transfer 1,135,000 L (300,000 gal) would be about 50 hours at a flow rate of 378 L/min (100 gal/min).

A number of instruments are available to alert the operator to a syphoning situation, including tank level monitoring, which is automatically recorded daily according to WHC-SD-WM-ISB-001, Table 1-25 (Leach and Stahl 1993). In addition, routine operator surveillance of system operations will detect a failure of the syphon protection. Release of tank contents to the environment will not occur before discovery and mitigation by the operator. In addition, there are a sufficient number of redundant holes available for a syphon break, so it is inconceivable to assume that all the holes will be plugged at the same time. Based on WHC-CM-4-46, Section 9.0, Table 1, criterion 3, the syphon protection will provide a safety class 3 function.

4.1.6 Pit Cover Blocks — Safety Class 3

The waste transfer pits for tank 241-AY-102 have been classified as safety class 1 and perform a safety class 1 function according to WHC-SD-WM-SEL-020, Section 4.2.3.3 (Kidder 1993a). During waste transfer or recirculation of liquid waste within the 241-C-106 pits, a spray leak scenario could be postulated that would lead to safety class 1 consequences. Such an accident scenario could consist of the following events:

1. An initiating event in which a spray leak occurs in a pit because jumpers, connections, or flanges fail

2. A single failure in which a pit cover block is left off

3. The spray oriented in such away that it sprays out of the pit opening

4. Failure of the leak detectors to activate because of most of the spray is directed out of the pit and because too little liquid is lost to be detected by material balance discrepancy analysis.

Calculations performed for the above scenario resulted in an offsite EDE value for a jumper or connector failure with the pit cover blocks off that exceeded the risk acceptance guideline.

Based on evaluation of the WRSS design and the dose consequences of a postulated break of both supply and return transfer lines during a seismic event, redundant seismic switches will be installed to shut down the sluicing transfer system at the onset of such an event. With the seismic switches operating and a postulated waste release of approximately 10 seconds (the seismic switches will terminate operation of the pumps, and allowing for pump coast down, the liquid release to the environment will stop within 10 seconds), the calculated offsite and onsite EDE values are 1.0×10^{-3} mSv (1.0×10^{-1} mrem) and 1.0×10^{-3} Sv (1.0×10^{-1} rem), respectively. For a connector break inside the pit with the cover block on, with all openings closed, and a release time of 8 hours, the offsite EDE value of 3.8×10^{-6} mSv (3.8×10^{-4} mrem) is well within the allowable limit of 5 mSv (500 mrem), and the onsite dose value of 3.6×10^{-6} Sv (3.6×10^{-4} rem) is well within the allowable limit of 50 Sv (5.0×10^{3} rem) based on WHC-CM-4-46, Section 9.0. Therefore, if the pit covers are installed before any transfer operation using the jumpers or connectors within the pit, there will be no impact to the health and safety of personnel or to the environment. The pit covers are required to be installed and to remain in place while performing the transfer according to *Single-Shell Rank Interim Operational Safety Requirements*, WHC-SD-WM-OSR-005, Section 3.6.1 (Dougherty 1993).

The seismic switches have been classified as safety class 1 (Section 4.1.1).

The safety function of the cover blocks to be provided by Project W-320 is to confine any spill and resulting aerosols. If the cover blocks are properly installed and the seismic switches, which have been classified as safety class 1, perform their safety function, only safety class 3 consequences could occur. Therefore, the cover blocks to be provided by Project W-320 are classified as a safety class 3.

4.1.7 Seal Loop — Safety Class 1

A seal loop is provided to mitigate tank under- or overpressurization, and is designed to limit differential pressure between the tank 241-C-106 vapor space and the external atmosphere. Redundant seal loops are provided to maintain the structural integrity of tank 241-C-106 by relieving the differential pressure if it exceeds 14.7 cm (5.8 in.) w.g.

The seal loop is a passive design consisting of a pipe formed into a loop and filled with a nonfreezing fluid (see drawing H-2-818561 for details of the seal loop system.) Based on the safety function this system performs and on WHC-CM-4-46, Section 9.0, Table 1, criterion 2, the seal loop system is classified as safety class 1.

4.1.8 Waste Transfer Equipment in Pits — Safety Class 3

Tank 241-C-106 WRSS provides new and modified waste transfer piping, pumps, valves, flanges, and jumpers located in pits (drawings H-2-818559 and H-2-818560). With properly installed pit cover blocks, the pumps, pipe, gaskets, flanges, jumpers, or valves could leak, spray, or burst with little consequence to the environment (Section 4.1.6).

The WRSS transfer or recirculation of liquid waste will occur by way the of the pits. The pit enclosure will perform the function of a distributor box that will have jumper capabilities for additional piping connections if needed. Spare piping system jumper connections (in the pump pit) will be capped. Pit drains will be sized to accept flow from both transfer lines and to drain the liquid to tank 241-C-106 should there be a guillotine-type pipe failure.

A primary piping leak, caused by a jumper or connector failure within the pit, can result in an unmitigated release of hazardous liquid aerosols to the environment leading to potential onsite and offsite personnel exposures. With the pit cover performing a safety class 1 confinement function, as evaluated and confirmed in Section 4.1.6, the equipment within the pit (e.g., pumps, jumpers, valves) can be considered safety class 3 although some aerosols may come out of cover block penetrations or around an ungasketed cover block. Based on engineering judgement, such dispersions are considered to result in safety class 3 ALARA consequences. Therefore, equipment, including jumpers, within the pits can be considered as safety class 3 based on WHC-CM-4-46, Section 9.0, Table 1, criterion 16.

4.1.9 Raw Water Supply and Transfer Line Flushing System — Safety Class 3

The WRSS systems will be designed to flush all components with raw water (drawings H-2-818559, H-2-818560, H-2-818561, and H-2-818562). Treated water is presently required for cooling tank 241-C-106 (intermittent addition of cooling water, provided by tanker truck, is required at a predetermined level in tank 241-C-106). Treated water used for flushing the transfer lines will be supplied by the 200 Area Power Plants and transported by tanker truck. Based on WHC-CM-4-46, Section 9.0, Table 1, criterion 16, this system is classified as safety class 3.

4.1.10 Compressed Air System — Safety Class 3

The compressed air system (drawing H-2-818562) will provide a source of instrument air to various components of the WRSS, such as pneumatically operated valves, and the purge air supply to the high-efficiency metal filter (HEMF) and other components (drawings H-2-818559, H-2-818560, H-2-818561, and H-2-818562). Based on the safety function this system performs and on WHC-CM-4-46, Section 9.0, Table 1, criterion 16, the compressed air system is classified as safety class 3.

4.2 VENTILATION SYSTEM — SAFETY CLASS 3

The WRSS ventilation system will control temperature and humidity and confine hazardous aerosols and vapors within the tank 241-C-106 tank vapor space using recirculation and an exhauster system (drawings H-2-818470 and H-2-818561). During maintenance of the WRSS ventilation system (or when the system is inoperative), the existing air inlet with a prefilter, high-efficiency particulate air (HEPA) filter, and a new cooling coil (drawing H-2-818561) will be used to cool the tank 241-C-106 waste and headspace. The ventilation system for tank 241-C-106 includes gas bleeding from tank 241-C-105 by way of the cascade line connecting the two tanks. Gases will be monitored to ensure that the exhaust at the stack meets ALARA principles. Leaving the existing cascade line in place avoids the personnel exposure associated with isolating or removing this line.

The ventilation system consists of a process building skid, chiller skid, and an exhaust skid. The raw water and compressed air systems provide necessary support for operation of the HVAC system. Based on the safety function that the ventilation system performs, as described in Sections 4.2.1, 4.2.2, and 4.2.3, and on WHC-CM-4-46, Section 9.0, Table 1, criterion 16, the ventilation system is classified as safety class 3.

4.2.1 Process Building Skid — Safety Class 3

The components of the process building skid are located within Process Building 241-C-91. A seal pot is located in the building to collect condenser and other equipment drains from the ventilation system. The overflow from the seal pot and the water used for flushing the high-efficiency moisture eliminator (HEME) and the HEMF are drained to tank 241-C-106 through riser R4. The HEME and HEMF are flushed, as required, at a predetermined contact dose reading of these components.

Failure of the ventilation duct in the recirculation line can result in an unmitigated or partially mitigated leak of hazardous aerosols to the environment. A radioactive aerosol release for 1 hour will cause potential onsite and offsite personnel exposures. As analyzed in Chapter 5.0, scenario 2, the offsite EDE value is 5.3×10^{-3} mSv (5.3×10^{-1} mrem) from an unfiltered release caused by a failure of the recirculation line duct. This radiological consequence is within the 5.0 mSv (500 mrem) requirement of WHC-CM-4-46, Section 9.0, Table 1, criterion 2. The onsite EDE value is 5.0×10^{-3} Sv (5.0×10^{-1} rem), which is within the 5.0×10^{-2} Sv (5 rem) requirement of WHC-CM-4-46, Section 9.0, Table 1, criterion 9. The time needed to reach safety class 2 criterion 9 of Table 1 is 10 hours. Based on the function this system performs and on WHC-CM-4-46, Section 9.0, Table 1, criterion 16, the process building skid is classified as safety class 3.

4.2.2 Chiller Skid — Safety Class 3

The chiller skid consists of an air-cooled chiller and a glycol cooling system, which consists of a make-up storage tank, air separator, expansion tank, and circulating pumps. The propylene glycol solution is cooled by the air-cooled chiller and then used to cool the ventilation recirculation and

exhaust gases in the condenser (Section 4.2.3). Based on the function this skid performs and on WHC-CM-4-46, Section 9.0, Table 1, criterion 16, the chiller system is classified as safety class 3.

4.2.3 Exhaust Skid — Safety Class 3

This skid directs exhaust air from the prefiltration system through an electric heating coil, two HEPA filters with a test section for each filter, an exhaust fan, and a stack that includes a VERMS (described in Section 4.3). Failure of the exhaust skid may allow a release of radioactivity to go without detection. However, the onsite EDE consequence for an unfiltered release from the exhaust skid (assuming malfunction of the HEPA filters) will be equivalent to 2.0×10^{-3} Sv (2.0×10^{-1} rem, derived from Section 4.2.2 as follows: 5.0×10^{-1} rem x 360 ft^3/min [flow in exhaust duct]/860 ft^3/min [flow in recirculation duct]). The time needed to reach the safety class 2 criterion of WHC-CM-4-46, Section 9.0, Table 1, is 24.6 hours. The HEPA filter is changed when there is a high differential across the filter or when the radiation measurement on the housing is about 5.0×10^{-1} mSv/h (50 mrem/h). If the HEPA filter is assumed to function as designed, then the consequence of the release through the stack will be minimal. Based on the function of the skid and on WHC-CM-4-46, Section 9.0, Table 1, criterion 16, the exhaust skid is classified as safety class 3.

4.3 VENTILATION EXHAUST RADIATION MONITORING SYSTEM — SAFETY CLASS 3

The VERMS consists of a flow sensor along with a temperature sensor, particulate and iodine filters, and a CAM and record samplers. The safety function of the VERMS is to monitor and record the airborne radionuclide discharge from the tank 241-C-106 ventilation system and alarm when limits are exceeded (drawing H-2-818561). This is accomplished by continuous monitoring of the ventilation exhaust. The VERMS has the potential to detect and partially mitigate (by system shutdown) a radioactive aerosol leak resulting from a HEPA filter failure.

The CAM will provide an alarm upon its failure to function or upon failure of normal AC power to the CAM. The HVAC is shut down if the CAM detects high radiation, which potentially could occur during failure of HEPA filters. In addition, the HVAC is shut down automatically by the seismic switches at the onset of a seismic event. Therefore, no monitoring is required after a seismic event.

The failure of the VERMS would prevent detection of an accidental release of radioactivity. However, the onsite EDE consequence for an unfiltered release from the exhaust skid (assuming malfunction of the HEPA filters) will be 2.0×10^{-3} Sv (2.0×10^{-1} rem, derived from Section 4.2.2 as follows: 5.0×10^{-1} rem x 360 ft^3/min [flow in exhaust duct]/860 ft^3/min [flow in recirculation duct]). The time needed to reach the safety class 2 criterion in WHC-CM-4-46, Section 9.0, Table 1, is 24.6 hours. If the HEPA filter is assumed to function as designed, then the consequence of the release through the stack will be minimal. The operator will take necessary action based upon the CAM failure alarm, either to shut down the HVAC system or to repair the

CAM. Based on the safety function that this system performs and on WHC-CM-4-46, Section 9.0, Table 1, criterion 16, the VERMS is classified as safety class 3.

4.4 IN-TANK IMAGING SYSTEM — SAFETY CLASS 3

An in-tank imaging system will be used in tank 241-C-106 to locate tank sludge accumulations during the sludge removal process (Drawing H-2-818559). The imaging system also will facilitate maintaining the minimum possible liquid level by enabling operators to aim the sluicer at the remaining waste while controlling the liquid level. The imaging system will provide operations personnel in the control room with near-real-time (within 5 minutes of real time) views inside the tank. This imaging system will be capable of providing images (through the fog caused by sluicing) with a resolution of 5.1 cm (2 in.) at the maximum in-tank range of 21.3 m (70 ft).

An in-pit closed circuit television imaging system will periodically monitor the integrity of the interior of process pits through the valve handle holes in the cover blocks. The system will be used to determine pit conditions before opening for maintenance, for leak verifications, or for inspecting equipment conditions.

Failure of the imaging system would impact ALARA principles; therefore, based on WHC-CM-4-46, Section 9.0, Table 1, criterion 16, this system is classified as safety class 3.

4.5 AC POWER SYSTEMS — SAFETY CLASS 3

Electrical systems providing AC power for tanks 241-C-106 and 241-AY-102 are described in the following sections.

4.5.1 AC Power for Tank 241-C-106 — Safety Class 3

The Hanford Site Power Grid will provide 480 V AC power through a portable substation skid-mounted on a concrete slab outside the fence near the C Tank Farm (drawings H-2-818680 and H-2-818681). The existing 13.8 kV pole line C8-L6 will be extended from the pole line north of the C Tank Farm to the east side of the C Tank Farm. The new portable substation will include a transformer, switchgear, and two motor control centers.

The AC power system provides electrical power to components of the tank 241-C-106 systems, instrumentation, and controls. Failure of normal power will secure the slurry pumps, heel pump, and HVAC, including instrumentation and controls, and will place these components in a safe shutdown condition. The AC power system for tank 241-C-106 is classified as safety class 3 based on the safety function this system performs and on of WHC-CM-4-46, Section 9.0, Table 1, criterion 16.

4.5.2 AC Power for Tank 241-AY-102 — Safety Class 3

Normal 480 V AC power will be provided by using the existing 13.8 kV pole line C8-L6. This line will be tapped to supply a new 13.8 kV to 480 V transformer. A 480 V line will be used to supply power to the sluice pumps located in tank 241-AY-102. The power panel will be located in a new skid-mounted enclosure located outside the fenced area of the AY Tank Farm and tank 241-AY-102 (Drawings H-2-818693 and H-2-818694).

The AC power system provides electrical power to components of the tank 241-AY-102 systems, instrumentation, and controls. Failure of normal power will secure the sluice pumps, including instrumentation and controls, and will place these components in a safe shutdown condition. The AC power system for tank 241-AY-102 is classified as safety class 3 based on the safety function that this system performs and on of WHC-CM-4-46, Section 9.0, Table 1, criterion 16.

4.5.3 AC Power for the Control Station — Safety Class 3

Power for the control station is supplied from an existing motor control center, MCC 241-AN-271, through an underground 480 V, 1-phase, 60 Hz feeder and a 75 KVA 480-240/120 V transformer. The AC power system for the control station is classified as safety class 3 based on the safety function that this system performs and on of WHC-CM-4-46, Section 9.0, Table 1, criterion 16.

4.6 INSTRUMENTATION CONTROL SYSTEMS — SAFETY CLASS 3

This section discusses existing and new instrumentation systems required for monitoring and control of the WRSS (drawings H-2-818559, H-2-818560, H-2-818561, and H-2-818562). Existing instrumentation for tank liquid-level (ENRAF and manual tapes), temperature, pressure and/or vacuum, and leak detection (such as dry wells) will be used as required to monitor operating conditions in tanks 241-C-106 and 241-AY-102 during the WRSS operation. The existing tank monitoring systems will be extended to the WRSS control station for operator convenience. Safety classifications for these existing systems are based on the AWF and SST SELs (Kidder 1993a and 1993b) and are summarized in Tables 4-2 and 4-3.

Instrumentation will monitor and control facility retrieval and transfer operations, HVAC, and the support systems necessary to perform all functions required to mobilize, retrieve, and transport tank 241-C-106 waste. Instrumentation will be designed for its intended service and will be qualified for the environmental conditions in which it is required to function. The following paragraphs provide brief descriptions of instrumentation and control for the sluicing waste transfer system, ventilation system, and VERMS described in Sections 4.1, 4.2, and 4.4. Instrumentation and control descriptions for the transfer system interlocks, leak detection system, and sluicing control station also are provided in the following sections. Justification for safety classification of instrumentation and control is provided in Section 4.6.8, "Instrumentation Failure Modes and Effects."

4.6.1 Raw Water System — Safety Class 3

Treated water to flush the transfer piping system will be provided by truck and supplied through hose connections. Raw water will be used to flush equipment and other components. (See drawings H-2-818559, H-2-818560, H-2-818561, and H-2-818562.) Flushing of the transfer piping will be controlled by the operator through the use of jumper changes in the AY Tank Farm.

4.6.2 Compressed Air System — Safety Class 3

The compressed air system (drawing H-2-818562) will provide a source of instrument air to various components of the WRSS, such as pneumatically operated valves, and the purge air supply to the HEMF and other components (drawings H-2-818559, H-2-818560, H-2-818561, and H-2-818562). Controls and indication for the compressed air system are located in the WRSS Air and Water Services Building. The air compressor is a vendor-supplied package.

4.6.3 Waste Retrieval Sluicing System Leak Detection System — Safety Class 3

New leak detection sensors (drawings H-2-818559 and H-2-818560) will be provided for pump pit 241-C-06A, heel pit 241-C-06B, sluice pit 241-C-06C, and sluice pit 241-AY-02E. These sensors will annunciate in the control station so the operator can shut down the WRSS pumps upon detection of leaks in the pits.

The transfer encasement piping is provided with a leak detection system that will annunciate in the control station and the operator will shut down the WRSS pumps upon detection of leakage collected in the encasement piping after a primary piping failure. The leakage that is collected in the encasement piping will drain by gravity to the pit connected to that piping and be returned to tank 241-C-106. A valve will be located in the encasement drain line for each pit to permit the operator to isolate the encasement line from the pit for leak containment or pressure testing.

4.6.4 Transfer System Interlocks — Safety Class 3

The interlocks are shown on drawing H-2-818558. Seismic detectors in the C and AY Tank Farms will shut down the WRSS at the onset of seismic activity.

4.6.5 Heating, Ventilating, and Air Conditioning System — Safety Class 3

The HVAC system will consist of a process building skid, a chiller skid, an exhauster skid, and system controller and interlocks (drawings H-2-818470 and H-2-818561).

4.6.5.1 Process Building Skid. The process building skid is described in Section 4.2.1. Instrumentation will monitor the condenser differential pressure, condenser inlet temperature, condenser outlet temperature, heater outlet temperature, fan differential pressure, and fan motor current. Instruments also will monitor HEME differential pressure, HEME outlet temperature, and HEMF differential pressure.

Heater controls will regulate air flow to maintain the entering airstream temperature between 6 °C and 33 °C (43 °F and 92 °F). The heater will be equipped with an internal high-high temperature cutout switch and a manual cutout switch. The condenser cooling system controls will allow the ventilation gas stream to be cooled from 35 °C to 4.5 °C (95 °F to 40 °F) by use of a 40% propylene glycol solution.

4.6.5.2 Chiller Skid. The chiller skid is described in Section 4.2.2. Instrumentation will monitor and control the air-cooled chiller, chilled water circulation pumps, flow, pump suction and discharge pressures, supply and return header temperatures. The supply header flow sensor provides a signal to shut down the air-cooled chiller upon sensing a low flow condition.

4.6.5.3 Exhaust System. The exhaust skid is described in Section 4.2.3. The exhaust skid consists of an electric heater, two HEPA filters with a test section for each filter, a variable speed exhaust fan, and an exhaust stack (drawing H-2-818561). The VERMS is part of the stack and is discussed in Section 4.6.6.

The instruments provided with this system will monitor heater inlet and outlet temperature, HEPA filter differential pressure, fan inlet temperature, and fan inlet damper position. The heater controls will increase the 4.5 °C (40 °F) air stream temperature to 21.1 °C (70 °F) and reduce the relative humidity to 34%. An internal high-high temperature switch and a manual cutout switch also will be furnished. Variable speed fan controls will be used to control tank pressure to about -3.8 cm (-1.5 in.) w.g.

4.6.5.4 Heating, Ventilating, and Air Conditioning System Controller and Interlocks. The HVAC system controller will, at a minimum, provide and perform the following functions:

- Differential pressure indication and alarm for process-related HEPA and adsorption filtration units
- Vacuum monitoring and control capable of throttling adjustments
- Isokinetic radiation monitoring at HVAC exhaust stack
- Emissions monitoring at HVAC exhaust stack to meet 40 CFR 61 "National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities," Subpart H, and referenced requirements.

An interlock will be provided to cause shutdown of the exhaust fan when a high radiation condition is detected by the VERMS.

4.6.6 Ventilation Exhaust Radiation Monitoring System — Safety Class 3

Instrumentation and controls for the VERMS are shown on drawing H-2-818561. The exhaust flow, temperature, and radiation monitoring instrumentation are provided as part of the VERMS. The interlock that shuts down the exhaust fan upon detection of high radiation is shown on drawings H-2-818558 and H-2-818561.

4.6.7 Sluicing Control Station — Safety Class 3

The WRSS control station contains control panels for the monitoring and control instrumentation associated with the WRSS, a sluicing panel with sluicer controls and display, and an in-tank imaging panel with the in-tank remote imaging system monitor and controls. Panel-mounted annunciators provide the operator with visual and audible indications of abnormal occurrences.

Selected alarms and indications are provided for leak detection in the transfer lines and pits, anomalous pressure conditions in the tank and HVAC filtration system, anomalous radiation levels, and HVAC ventilation system shutdown. These will alarm in the WRSS control station through panel-mounted annunciators and also through the Tank Monitor and Control System (TMACS) located in the 2750-E Building.

Indications and alarms from instrumentation on existing systems required for WRSS operation, such as tank 241-AY-102 pressure, temperature, weight factor, levels, and pit leak detectors, will be extended to the WRSS control station. Existing indications and alarms for the Aging Waste Ventilation System, 241-A-702, also will be extended as required to the WRSS control station to allow the operator to determine the status of the tank 241-AY-102 ventilation system. All indications and alarms that are extended to the WRSS control station from existing safety related instrumentation loops will be electrically isolated by double fuses installed between the safety related and non-safety related devices to prevent any WRSS-induced fault from compromising any safety related function, indication, or alarm.

4.6.8 Instrumentation Failure Modes and Effects

A failure modes and effects analysis was performed to determine safety classifications for the instrumentation (primary elements). The analysis was based on the functions of the system and associated instrumentation using available information from system descriptions and drawings. The effects of the failure modes were determined, consequences of the failure on system safety functions were evaluated, and the safety class determined.

Safety classification of the instruments was determined based on failure caused by loss of monitoring, indicating, transmitting, control, or similar functions. Cross-damage effects of instruments have been performed to the extent possible with available documentation. In cases where the available documentation does not permit detailed analysis of cross damages, instruments

have been classified based on operational functions and engineering judgement. Final cross-damage analyses will be required in the future based on system walkdowns and/or as-built documentation.

Safety class 1 instrumentation and controls associated with the seismic switch safety class 1 system are described in Sections 4.1.1. Based on WHC-CM-4-46, Section 9.0, Table 1, criterion 16, the other instrumentation described in Section 4.6 has been determined to be safety class 3.

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5.0 EFFECTIVE DOSE EQUIVALENT VALUES FOR SLUICING SYSTEM ACCIDENT SCENARIOS

The dose calculations in Appendix B are based on the radioactive inventory data presented in WHC-SD-WM-SARR-016 (Savino 1995). Validation of the tank 241-C-106 data was made as detailed in WHC-SD-WM-SARR-016 (Savino 1995) and in Internal Memorandum 8M110-JCC-95002 (Conner 1995). As noted in WHC-SD-WM-ER-200 (Bander 1993a), WHC-SD-WM-ER-217 (Bander 1993b), and WHC-SD-WM-ER-427 (Bander 1995), the current estimated radiogenic heat load of the waste in tank 241-C-106 is 32.2 kW (110,000 Btu/h). Based on data from WHC-SD-WM-SARR-016 (Savino 1995), the calculated heat load is dominated by decay of ^{90}Sr and ^{137}Cs, with negligible contribution from other radionuclides, and is the equivalent of 16.4 kW. This discrepancy between estimated radiogenic heat load (Bander 1993a, 1993b, and 1995) and the calculated heat load from the current radioactive inventory in tank 241-C-106 (Savino 1995) introduces a scaling factor of 2.0.

- **Scenarios 1a and 1b: Waste transfer supply line and return line breaks, release time of 2 hours.**

  The simultaneous postulated failures of both supply and return lines during a seismic event are assumed to be detected by a material balance discrepancy. The maximum postulated leak is calculated to be 3.28×10^5 L (8.66×10^4 gal). The resulting offsite and onsite EDE values are 8.4×10^{-3} mSv x 2.0 = 2.0×10^{-2} mSv (8.4×10^{-1} mrem x 2.0 = 2 mrem) and 8.1×10^{-3} Sv x 2.0 = 1.6×10^{-2} Sv (8.1×10^{-1} rem x 2.0 = 1.6 rem), respectively.

- **Scenarios 1c and 1d: Waste transfer supply line and return line breaks, seismic switch shuts down, release time of 10 seconds.**

  As noted in Section 4.1.1, redundant seismic switches will be installed to shut down the WRSS transfer system at the onset of a seismic event. This will significantly reduce the dose consequences to offsite and onsite individuals as well as reduce the impact to the environment caused by soil contamination. However, the dose consequences were determined assuming that the seismic switches did not function at the onset of the seismic event, that no appropriate action was taken by the operator to shut down the WRSS, and that the waste fluid was released to the environment for at least 30 minutes from a breach in both supply and return lines. The calculated offsite and onsite EDE values are 8.8×10^{-3} mSv (8.8×10^{-1} mrem) and 1.6×10^{-2} Sv (1.6×10 rem), respectively.

  With the operation of the seismic switches and a postulated release of waste for approximately 10 seconds, the calculated offsite and onsite EDE values, are reduced to 8.4×10^{-4} mSv (8.4×10^{-2} mrem) and 1.6×10^{-3} Sv (1.6×10^{-1} rem), respectively.

  Based on the half-hour release scenario noted above, the failure of the transfer lines will result in an EDE in excess of 5.0 mSv (500 mrem) (safety class 1 criterion) to the offsite individual within an estimated time of 283 hours (5.0 mSv/[$8.8 \times 1-^{-3}$ mSv x 2]

[500 mrem/{0.883 mrem x 2}]), and an EDE in excess of 5.0×10^{-2} Sv (5 rem) (safety class 2 criterion) to the onsite individual within an estimated time of 1.5 hours (5.0×10^{-2} Sv/[1.65×10^{-2} Sv x 2] [5 rem/{1.65 rem x 2}]). The time to reach the safety class 1 or 2 criteria will be higher if the plume meander effect is applied for a release time equal to or greater than 1 hour.

The safety function of the sluicing transfer system's primary piping is to provide confinement of hazardous liquid wastes. Based on the safety function and on WHC-CM-4-46, Section 9.0, Table 1, criterion 9, the primary transfer lines (inner pipes) are classified as safety class 2.

- **Scenario 2: Unfiltered release caused by recirculation duct failure.**

  The HVAC system for tank 241-C-106 will be classified as safety class 3 because the calculated offsite EDE value of 2.2×10^{-3} mSv x 2.0 = 4.4×10^{-3} mSv (2.2×10^{-1} mrem x 2.0 = 4.4×10^{-1} mrem), based on an unfiltered release of 1 hour, is within the allowable limit of 5.0 mSv (500 mrem) according to WHC-CM-4-46, Section 9.0, Table 1, criterion 2, and the calculated onsite EDE dose value of 2.1×10^{-3} Sv x 2.0 = 4.2×10^{-3} Sv (2.1×10^{-1} rem x 2.0 = 4.2×10^{-1} rem) is within the allowable limit of 5.0×10^{-2} Sv (5 rem) from WHC-CM-4-46, Section 9.0, Table 1, criterion 9.

- **Scenario 3a: Jumper or connector break inside the pit, cover block off, release time of 2 hours.**

  The calculated offsite EDE value of 3.1×10^{1} mSv x 2.0 = 6.2×10^{1} mSv (3.1×10^{3} x 2.0 = 6.2×10^{3} mrem) exceeds the allowable limit of 5 mSv (500 mrem) based on WHC-CM-4-46, Section 9.0, Table 1, criterion 2. The calculated onsite EDE value of 2.9×10^{1} Sv x 2.0 = 5.8×10^{1} Sv (2.9×10^{3} rem x 2.0 = 5.8×10^{3} rem) exceeds the allowable limit of 5.0×10^{-2} Sv (5 rem) based on WHC-CM-4-46, Section 9.0, Table 1, criterion 9.

- **Scenario 3b: Jumper or connector break inside the pit, cover block on, all openings closed, release time of 8 hours.**

  The calculated offsite EDE value of 1.6×10^{-6} mSv x 2.0 = 3.2×10^{-6} mSv (1.6×10^{-4} mrem x 2.0 = 3.2×10^{-4} mrem) is well within the allowable limit of 5 mSv (500 mrem) based on WHC-CM-4-46, Section 9.0, Table 1, criterion 2. Also, the calculated onsite EDE dose value of 1.5×10^{-6} Sv x 2.0 = 3.0×10^{-6} Sv (1.5×10^{-4} rem x 2.0 = 3.0×10^{-4} rem) is well within the allowable limit of 5.0×10^{-2} Sv (5 rem) based on WHC-CM-4-46, Section 9.0, Table 1, criterion 9. Therefore, if the pit covers are installed before any transfer operation through the jumpers and/or connectors within the pit, there is no impact to health and safety of personnel or to the environment. In order to ensure safety of personnel and to prevent any impact to the environment, the pit covers are required to be installed and remain in place while performing the transfer (Dougherty 1993).

- **Scenario 3c: Jumper or connector break inside the pit, cover block on, 2-in. valve handle hole open, release time of 8 hours.**

  The calculated offsite EDE value of 6.5×10^{-4} mSv x 2.0 = 1.3×10^{-3} mSv (6.5×10^{-2} mrem x 2.0 = 1.3×10^{-1} mrem) is well within the allowable limit of 5 mSv (500 mrem based on WHC-CM-4-46, Section 9.0, Table 1, criterion 2. Also, the calculated onsite EDE value of 6.2×10^{-4} Sv x 2.0 = 1.3×10^{-3} Sv (6.2×10^{-2} rem x 2.0 = 1.3×10^{-1} rem) is less than the allowable limit of 5.0 x $1-^{-2}$ Sv (5 rem) based on WHC-CM-4-46, Section 9.0, Table 1, criterion 9.

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APPENDIX A

SOURCE TERMS

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TABLE OF CONTENTS

A-1 Tank 241-C-106 Radionuclide Inventory Data A-5

A-2 Tank 241-AY-102 Radionuclide Inventory Data A-6

A-3 Tank 241-C-106 Chemical Inventory Data A-7

A-4 Tank 241-AY-102 Chemical Inventory Data A-8

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Table A-1. Tank 241-C-106 Radionuclide Inventory Data.

Sample type	Drainable interstitial liquid			Sludge/slurry solids			Tank inventory
Sample date	05/19/86			05/19/86			05/19/86
Density g/ml				1.43			
Volume (1 E+03 gal)	16			197			213
Volume (L)	6.06 E+04			7.46 E+05			8.06 E+05
Units	µCi/L	Bq/L	Bq	µCi/g	Bq/L	Bq	Bq
^{14}C	3.51 E-01	1.30 E+04	7.87 E+8	2.32 E-04	1.23 E+04	9.12 E+09	9.94 E+09
^{60}Co	<1.27 E+01	4.70 E+05	2.85 E+10	8.88 E-01	4.50 E+07	3.51 E+13	3.51 E+13
$^{89/90}Sr$	1.65 E+03	6.11 E+07	3.70 E+12	1.98 E+03	1.05 E+11	7.82 E+16	7.82 E+16
^{99}Tc	1.41 E+02	5.22 E+06	3.16 E+11	2.19 E-01	1.16 E+07	8.64 E+12	8.96 E+12
^{129}I	1.40 E-02	5.18 E+02	3.14 E+07	8.10 E-05	4.29 E+03	3.20 E+09	3.23 E+09
^{137}Cs	2.78 E+04	1.03 E+09	6.23 E+13	3.30 E+02	1.75 E+10	1.30 E+16	1.30 E+16
U-Nat	9.58 E-01 µg/l	2.50 E+01	1.52 E+06	4.09 E+02 µg/g	1.53 E+04	1.14 E+10	1.14 E+10
$^{239/240}Pu$	9.78 E+02	3.62 E+07	2.20 E+12	2.69 E+00	1.42 E+08	1.06 E+14	1.08 E+14
^{241}Am	<1.39 E+01	5.14 E+05	3.12 E+10	1.05 E+00	5.56 E+07	4.15 E+13	4.15 E+13
Total α							
Total β							
Total γ	2.78 E+04	1.03 E+09	6.23 E+13	3.63 E+02	1.92 E+10	1.43 E+16	1.44 E+16

Note: Information in this table is from the following documents:

Conner, J. C., 1995, Source Term for Safety Analysis Support of the Waste Retrieval of Tank 241-C-106 (Internal Memorandum 8M110-JCC-95002, to J. W. Bailey, February 6), Westinghouse Hanford Company, Richland, Washington.

Savino, A. V., 1995, Tank Waste Compositions and Atmospheric Dispersion Coefficients for Use in Accelerated Safety Analysis Consequence Assessments, WHC-SD-WM-SARR-016, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

Table A-2. Tank 241-AY-102 Radionuclide Laboratory Data.

Sample			Core		
Sample date	November 1984		January 1988	February 1990	
Reference no.	65453-84-348		PNL log	PNL report	
Sample no.	R-3214	R-3215	PNL 12988	Supernatant	Washed Solids
Density g/ml	--	--	--	≈1.0	≈1.4
^{14}C	--	--	--	NA	<1.40 E+00
^{60}Co	--	--	--	ND	2.02 E+03
$^{89/90}Sr$	2.32 E+04	IS	--	6.58 E+03	4.13 E+07
^{90}Y	--	--	--	--	--
^{99}Tc	--	--	--	NA	3.50 E+01
^{129}I	--	--	--	NA	<1.68 E+00
^{134}Cs	--	--	--	4.95 E+00	ND
^{137}Cs	5.925 E+05	7.525 E-01	--	4.32 E+03	1.60 E+03
^{147}Pm	--	--	--	--	--
^{154}Eu	--	--	--	ND	7.20 E+04
U-Nat	--	--	--	5.71 E-01	1.46 E+01
^{237}Np	--	--	5.29 E+01	--	--
^{238}Pu	--	--	1.59 E+01	ND	1.60 E+03
$^{239/240}Pu$	--	--	3.18 E+01	2.34 E-01	5.05 E+03
^{241}Pu	--	--	1.90 E+02	--	--
^{241}Am	--	--	2.91 E+02	1.50 E-03	2.55 E+04
^{242m}Am	--	--	--	--	--
^{243}Am	--	--	--	--	--
^{242}Cm	--	--	--	ND	8.83 E+02
^{244}Cm	--	--	7.41	--	--
Total α	--	--	--	--	--
Total β	--	--	--	--	--

Note: Information in this table is from the following documents:

Conner, J. C., 1995, Source Term for Safety Analysis Support of the Waste Retrieval of Tank 241-C-106 (Internal Memorandum 8M110-JCC-95002, to J. W. Bailey, February 6), Westinghouse Hanford Company, Richland, Washington.

Savino, A. V., 1995, Tank Waste Compositions and Atmospheric Dispersion Coefficients for Use in Accelerated Safety Analysis Consequence Assessments, WHC-SD-WM-SARR-016, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

IS = insufficient sample.
NA = not analyzed.
ND = not detected.
All units are in μCi/L unless otherwise indicated.

Table A-3. Tank 241-C-106 Chemical Inventory Data (Van Vleet 1993b)

Sample type	Sludge			Supernatant			Tank inventory[a]
Sample date	4/1/90[b]						
Sample ID	RAT-C106-4A						
Density g/ml	1.75						
Volume (1 E+03 gal)	181			32			213
Volume (L)	6.85 E+05			1.21 E+05			8.06 E+05
Units	ug/g	g/L	g		g/L	g	g
Ag	2.10 E+03	3.68 E+00	2.52 E+06				2.58 E+06
Al	1.15 E+05	2.01 E+02	1.38 E+08				1.38 E+08
As	3.90 E+02	6.83 E-01	4.68 E+05				4.68 E+05
B	3.50 E+02	6.13 E-01	4.20 E+05				4.20 E+05
Ba	3.50 E+02	6.13 E-01	4.20 E+05				4.20 E+05
Ca	1.90 E+03	3.33 E+00	2.28 E+06				2.28 E+06
Ce	4.90 E+02	8.58 E-01	5.88 E+05				5.88 E+05
Cr	1.75 E+03	3.06 E+00	2.10 E+06				2.10 E+06
Cu	3.00 E+02	5.25 E-01	3.60 E+05				3.60 E+05
Fe	8.24 E+04	1.44 E+02	9.88 E+07				9.88 E+07
Mg	4.20 E+02	7.35 E-01	5.04 E+05				5.04 E+05
Mn	4.50 E+03	7.88 E+00	5.40 E+06				5.40 E+06
Na	1.56 E+05	2.73 E+02	1.87 E+08				1.87 E+08
Nd	5.60 E+02	9.80 E-01	6.71 E+05				6.71 E+05
P	7.30 E+03	1.28 E+01	8.75 E+06				8.75 E+06
Pb	2.50 E+03	4.38 E+00	3.00 E+06				3.00 E+06
Sb	2.90 E+03	5.08 E+00	3.48 E+06				3.48 E+06
Se	1.40 E+03	2.45 E+00	1.68 E+06				1.68 E+06
Si	2.60 E+04	4.55 E+01	3.12 E+07				3.12 E+07
Sr	1.10 E+02	1.93 E-01	1.32 E+05				1.32 E+05
Ti	3.30 E+02	5.78 E-01	3.96 E+05				3.96 E+05
Tl	1.20 E+03	2.10 E+00	1.44 E+06				1.44 E+06
Zr	6.00 E+02	1.05 E+00	7.19 E+05				7.19 E+05

Note: Information in this table is from the following documents:

Conner, J. C., 1995, Source Term for Safety Analysis Support of the Waste Retrieval of Tank 241-C-106 (Internal Memorandum 8M110-JCC-95002, to J. W. Bailey, February 6), Westinghouse Hanford Company, Richland, Washington.

Savino, A. V., 1995, Tank Waste Compositions and Atmospheric Dispersion Coefficients for Use in Accelerated Safety Analysis Consequence Assessments, WHC-SD-WM-SARR-016, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

[a]Sludge volume only.
[b]Date of document.

Table A-4. Tank 241-AY-102 Chemical Inventory Data. (2 sheets)

Sample type	Supernatant			Comp solids/sludge			Tank inventory
Sample date	2nd quarter 1988			2nd quarter 1988			2nd quarter 1988
Sample ID	102-AY Seg 1			102-AY Comp			--
Reference	PNL letter report 9000855 (2/12/90)			PNL letter report 9000855 (2/12/90)			--
Density g/ml	1.0			1.4			--
Volume (1 E+03 gal)	818 (June 1988)			32 (June 1988)			850
Volume (L)	3.10 E+06			1.21 E+05			3.22 E+06
Units	M	g/L	g	mmol/g	g/L	g	g
Ag	6.40 E-05	6.90 E-03	2.14 E+04	6.70 E-02	1.01 E+01	1.23 E+06	1.25 E+06
Al	5.90 E-05	1.59 E-03	4.93 E+03	1.60 E+00	6.04 E+01	7.32 E+06	7.33 E+06
B	7.70 E-04	8.33 E-03	2.58 E+04	4.40 E-01	6.67 E+00	8.07 E+05	8.33 E+05
Ba	2.90 E-06	3.98 E-04	1.23 E+03	1.50 E-02	2.88 E+00	3.49 E+05	3.51 E+05
Ca	1.10 E-04	4.41 E-03	1.37 E+04	4.20 E-01	2.36 E+01	2.85 E+06	2.87 E+06
Cd	<1.00 E-06	<1.12 E-04	<3.48 E+02	4.00 E-03	6.29 E-01	7.63 E+04	7.66 E+04
Ce	<4.00 E-06	<5.61 E-04	<1.74 E+03	8.60 E-03	1.69 E+00	2.04 E+05	2.06 E+05
Cl-	1.70 E-02	6.03 E-01	1.87 E+06	2.40 E-01	1.19 E+01	1.44 E+06	3.31 E+06
Cr	2.50 E-04	1.30 E-02	4.03 E+04	7.20 E-02	5.24 E+00	6.35 E+05	6.75 E+05
Dy	<1.00 E-07	<1.63 E-05	<5.03 E+01				<5.03 E+01
F-	9.30 E-03	1.77 E-01	5.47 E+05	1.80 E-01	4.79 E+00	5.80 E+05	1.13 E+06
Fe	7.20 E-06	4.02 E-04	1.25 E+03	1.60 E+00	1.25 E+02	1.52 E+07	1.52 E+07
Hg				3.80 E-04	1.07 E-01	1.29 E+04	1.29 E+04
K	1.10 E-03	4.30 E-02	1.33 E+05	5.90 E-02	3.23 E+00	3.91 E+05	5.24 E+05
La	<4.00 E-07	<5.56 E-05	<1.72 E+02	3.00 E-02	5.83 E+00	7.07 E+05	7.07 E+05
Li	<1.00 E-05	<6.94 E-05	<2.15 E+02				<2.15 E+02
Mg	2.30 E-05	5.59 E-04	1.73 E+03	3.00 E-01	1.02 E+01	1.24 E+06	1.24 E+06
Mn	<2.00 E-07	<1.10 E-05	<3.40 E+01	1.70 E-01	1.31 E+01	1.58 E+06	1.58 E+06
Mo	4.30 E-06	4.13 E-04	1.28 E+03	2.00 E-03	2.69 E-01	3.25 E+04	3.38 E+04
NO2-	2.50 E-02	1.15 E+00	3.56 E+06	1.10 E-01	7.09 E+00	8.58 E+05	4.42 E+06
NO3-	4.40 E-03	2.73 E-01	8.45 E+05	1.70 E-02	1.48 E+00	1.79 E+05	1.02 E+06
Na	9.60 E-02	2.21 E+00	6.86 E+06	1.80 E+00	5.79 E+01	7.02 E+06	1.39 E+07
Nd	<7.00 E-07	<1.01 E-04	<3.13 E+02	1.90 E-02	3.84 E+00	4.65 E+05	4.65 E+05
Ni	<2.00 E-06	<1.17 E-04	<3.64 E+02	5.60 E-02	4.60 E+00	5.58 E+05	5.58 E+05
P	1.00 E-04	3.10 E-03	9.59 E+03	2.30 E-01	9.97 E+00	1.21 E+06	1.22 E+06
PO4---	5.50 E-04	5.22 E-02	1.62 E+05	2.40 E-02	3.19 E+00	3.87 E+05	5.48 E+05

Table A-4. Tank 241-AY-102 Chemical Inventory Data. (2 sheets)

Sample type	Supernatant			Comp solids/sludge			Tank inventory
Sample date	2nd quarter 1988			2nd quarter 1988			2nd quarter 1988
Sample ID	102-AY Seg 1			102-AY Comp			--
Reference	PNL letter report 9000855 (2/12/90)			PNL letter report 9000855 (2/12/90)			--
Density g/ml	1.0			1.4			--
Volume (1 E+03 gal)	818 (June 1988)			32 (June 1988)			850
Volume (L)	3.10 E+06			1.21 E+05			3.22 E+06
Units	M	g/L	g	mmol/g	g/L	g	g
Rh	<2.00 E-06	<2.06 E-04	<6.37 E+02				<6.37 E+02
Ru	<1.00 E-06	<1.01 E-04	<3.13 E+02				<3.13 E+02
SO4--	1.10 E-03	1.06 E-01	3.27 E+05	8.10 E-03	1.09 E+00	1.32 E+05	4.59 E+05
Si	5.90 E-03	1.66 E-01	5.13 E+05	4.30 E-01	1.69 E+01	2.05 E-06	2.56 E-06
Sr	2.60 E-06	2.28 E-04	7.05 E+02	9.00 E-03	1.10 E+00	1.34 E+05	1.34 E+05
TOC	2.40 E-02	2.88 E-01	8.92 E+05	3.82 E+00	6.42 E+01	7.78 E+06	8.67 E+06
Te	<2.00 E-06	<2.55 E-04	<7.90 E+02	4.00 E-03	7.15 E-01	8.66 E+04	8.74 E+04
Ti	<4.00 E-07	<1.92 E-05	<5.93 E+01	7.10 E-03	4.76 E-01	5.77 E+04	5.77 E+04
U	3.50 E-03	8.33 E-01	2.58 E+06	6.50 E-02	2.17 E+01	2.62 E+06	5.20 E+06
Zn	5.00 E-06	3.27 E-04	1.01 E+03	8.10 E-03	7.41 E-01	8.98 E+04	9.08 E+04
Zr	7.60 E-07	6.93 E-05	2.15 E+02	6.30 E-03	8.05 E-01	9.75 E+04	9.77 E+04

Note: Information in this table is from the following documents:

Conner, J. C., 1995, Source Term for Safety Analysis Support of the Waste Retrieval of Tank 241-C-106 (Internal Memorandum 8M110-JCC-95002, to J. W. Bailey, February 6), Westinghouse Hanford Company, Richland, Washington.

Savino, A. V., 1995, Tank Waste Compositions and Atmospheric Dispersion Coefficients for Use in Accelerated Safety Analysis Consequence Assessments, WHC-SD-WM-SARR-016, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

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APPENDIX B

DOSE CALCULATIONS

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FORM 5810 REV. 4/91

Raytheon
Engineers & Constructors
A Consolidation of Stearns and UEAC

CALCULATION SUMMARY
& CONTROL SHEET
Page 1 of 2

CALCULATION SET NO. 7362-H-006

PRELIM.	FINAL	VOID	REVISION
	X		0

PROJECT TITLE 241-C-106 Waste Retrieval

DISCIPLINE Mech-Nuclear

J.O. 7362.007

STRUCTURE OF SYSTEM N/A DESIGN CLASSIFICATION Varies

SUBJECT EDE Dose Consequences and EHSC Calculations

COMPLETED BY Nagaraj S Vembar DATE 04/22/94

CHECKED BY Donnie Harrison (Jason Associates) DATE 4/22/94

APPROVED BY [signature] DATE 4/26/94

REASON FOR REVISION:

Not applicable

TOTAL NUMBER OF SHEETS IN THIS ISSUE 48

SHEETS REVISED, ADDED OR DELETED OR DELETED

Not applicable

PROBLEM STATEMENT:

To provide conservative estimate of the dose consequences and offsite ground contamination from airborne releases for various accident scenarios for the WHC Project W320, 241-C-106 Waste Retrieval, and Environmental Hazard Safety Classification calculations per EP-1.4. The results will also be used to determine the safety classification of systems that are associated with C-106 Waste Retrieval operation.

SUMMARY/CONCLUSIONS:

See Page 44 of General Computation Sheets for Summary and Conclusions

FORM 5810 REV. 4/91

CALCULATION SUMMARY & CONTROL SHEET Page 2 of 2	CALCULATION SET NO. 7362-H-006			
	PRELIM.	FINAL X	VOID	REVISION 0
PROJECT TITLE 241-C-106 Waste Tank Retrieval System	DISCIPLINE Mech-Nuclear			
	J.O. 7362.007			

DESIGN BASIS

See Page 1 of General Computation Sheets

UNVERIFIED ASSUMPTIONS/OPEN ITEMS:

NONE

REFERENCES: (SPECIFICATIONS, DRAWINGS, CODES, CALCULATIONS, TEXTS, REPORTS, COMPUTER DATA, FSAR, ETC.)

See Page 6 of General Computation Sheets

Form 5007 (Rev. 4/83)

Raytheon Engineers & Constructors A Consolidation of Badger and UEAC — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL X	VOID	0	NJY DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 1 OF 48				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

DESIGN BASIS

1. A conservative estimate of the radionuclide inventories for the C-106 and AY-102 tanks used in the C-106 waste retrieval is taken from Appendix B, Hanford Site Tank Farm Facilities Interim Basis, WHC-SD-WM-ISB-001 (Ref. 13). Analysis in Appendix C (Ref. 13) was performed for unit liter respirable releases of selected Hanford high level waste tanks which included 241-C-106, 241-AY-101 and 241-AY-102 tanks. The unit liter release calculations were performed using the GENII dosimetry code (Ref. 2) for both laboratory sample data and Track Radioactive Components (TRAC) data. Per FDC (Ref. 12), the supernatant in AY-101 will be transferred to AY-102 prior to WRSS operation. The calculations will be based on unit liter release source term values for laboratory data (conservative values) of C-106 solids and supernatant from AY-101 in AY-102. The source term values have been taken from Table C-7 for AY-101 and Table C-9 for C-106, Appendix C of Ref. 13 and are listed in Table A-1. The individual is assumed to be located at the Hanford site boundary in the direction which provides the highest 99.5% (sector normalized) atmospheric dispersion coefficient. The individual is also assumed to remain on the centerline of the plume during its entire passage. The exposure pathways for the offsite individual include inhalation, submersion, and ground shine. Internal dose from inhalation is calculated as a 50 year committed effective dose equivalent (EDE).

   The unit liter inhalation EDE to the bounding offsite individual for solids in C-106 (per Table C-9, Appendix C, Ref. 13) is: 2.30E-2 rem (per liter)

   The unit liter inhalation EDE to the bounding offsite individual for supernatant in C-106 (transferred from AY-102 with AY-101 supernatant (see Criterion 14 on Sheet 5 and per Table C-7, Appendix C, Ref. 13) is: 1.80E-5 rem (per liter)

   Similarly, the unit liter submersion EDE to the bounding offsite individual for C-106 solids (per Table C-9, Appendix C, Ref. 13) is: 9.50E-7 rem (per liter)

   The unit liter submersion EDE to the bounding offsite individual for C-106 supernatant (transferred from AY-102 with AY-101 supernatant, see Criterion 14 on Sheet 5 and per Appendix C, Rev. 14)is: 2.10E-7 rem (per liter)

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL X	VOID	0	NJY DATE 6-22-94	DATE J-23-94
PROJECT 241-C-106 Waste Retrieval	SHEET 2 OF 48				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

It is concluded from the above that the submersion doses are negligible compared to the inhalation doses, and therefore, are not included in the calculations. In addition, per Criterion 15 below, ground shine doses have not been included in the calculations.

Since all of the radionuclides of concern have long half-lives, doses to the receptors at other locations are proportional to the maximum doses calculated for the offsite individual. The atmospheric dispersion coefficients used to derive these conversions are provided in Table C-5 of Appendix C of Ref. 13.

To convert from the offsite individual maximum dose to doses for other receptors, the plume meander (PM) conversion factors given in Table C-10 of Appendix C of Ref. 13 are used. For the purpose of this evaluation and as recommended in Appendix C of Ref. 13, the most conservative multiplication factors (CF) with or without plume meander (PM) have been used as follows: CF = 1 for maximum doses to offsite individual without plume meander (PM); CF = 0.64 for maximum doses to offsite individual with PM; CF = 610 for maximum doses to onsite individual with PM; and CF = 1900 for maximum doses to onsite individual without PM.

The unit dose calculations for C-106 waste retrieval are listed in Table A-1 for offsite individual without/with PM, Table A-2 for onsite individual without PM, and Table A-3 for onsite individual with PM.

Table A-1. Unit Liter Release Dose Data for Offsite Individual without/with PM

Offsite	EDE, rem/liter (solids)	EDE, rem/liter (supernatant)
Inhalation without PM (CF = 1)	2.30E-2	1.80E-5
Inhalation with PM (CF = 0.64)	1.47E-2	1.15E-5

Form 5007 (Rev. 4/83)

Raytheon Engineers & Constructors A Combination of Badger and UEAC — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL X	VOID	0	NJY DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 3 OF 46				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

Table A-2. Unit Liter Release Dose Calculation for Onsite Individual Without Plume Meander

Onsite	EDE, rem/liter (solids)	EDE, rem/liter (supernatant)
Inhalation	4.37E+1	3.42E-2

Table A-3. Unit Liter Release Dose Calculation for Onsite Individual With Plume Meander

Onsite	EDE, rem/liter (solids)	EDE, rem/liter (supernatant)
Inhalation	1.40E+1	1.10E-2

2. Per Section 4.2 of Onsite/Offsite Worker Definition (Ref. 4), a two hour evaluation period is recommended for all offsite calculations to the general public. This is also in conformance with the guidelines of Regulatory Guide 1.145 (Ref.5).

3. Per Items 9 and 10 of Section 4.2.1, Chapter 4.0 of *Nonreactor Facility Safety Analysis Manual*, WHC-CM-4-46 (Ref. 7), only inhalation and submersion pathways are considered for determining the offsite individual EDE values, as well as for onsite individual EDE values. Per *Safety Classification of Systems, Components, and Structures,* MRP 5.46 (Ref. 8), only EDE values are needed to determine the safety classification of systems, equipment and components.

4. Design data for process systems that are considered for the accident analyses are taken from WHC-SD-W320-FDC-001, Rev. 2, Ref. 12.

5. The solids/sludge within the Tank AY-102 are presumed not to be disturbed during sluicing from C-106 to AY-102.

Form 5007 (Rev. 4/83)

Raytheon Engineers & Constructors A Consortium of Bechtel and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006	REV.	COMP. BY	CHK'D BY
	PRELIM. / FINAL X / VOID	0	NJV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 4 OF 46		DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007			

6. A ground level point source release is used for all the accident scenarios.

7. The radioactive inventories included in Appendix B of Ref. 13 for C-106 and AY-102 (with AY-101 supernatant, see Criteria 1 and 14) are best available representative laboratory samples as stated in Appendix C of Ref. 13.

8. Transfer lines are buried 1 ft. below grade with a berm. A minimum of 3 ft cover over the pipe will be provided for freeze protection and shielding. Transfer lines are pipe in a pipe design, i. e., inner pipe with an outer pipe encasement. From Ref. 17, the failure probability of a pipe is 1E-9 hr/ft. Based on 2000 ft. pipe (Ref. 11), an operating period of 8 hours per day for one year, the probability is estimated to be 5.8E-3/yr. Therefore, failure probability of both pipes is estimated to be 3.4E-5. From Ref. 16, the annual probability (frequency) of a design basis earthquake at Hanford is 7E-4/yr. For the purposes of the analysis in this calculation, seismic event is considered for the worst case accident scenario.

9. HVAC design data is as shown on drawing H-2-818470 (see Ref. 11). HVAC is not required for safe shutdown of WRSS, i.e., if HVAC is shutdown or otherwise, tank will be on passive mode with no forced cooling.

10. Per FDC Rev. 2 (Ref. 12), air characterization for vapor space within C-106 is based on 100 mg/cu.m and vapor specific gravity of 1.0 (assumed for calculations purposes since the tank vapor space will be 100% humid and will consist of 90 % liquid per Ref. 12). Per Appendix D of Ref. 12, the vapor space will consist of 10% C-106 solids and 90% AY-101 supernatant in AY-102.

11. Radioactive leak from a transfer line break with 3 ft. cover (see Criterion 1 above), will reach the above grade level surface and will form a pool near the break. The quantity of leak that forms in to a pool at the surface is estimated to be 10 percent of the total quantity that is postulated to leak during the stated release time. This is based on a buried line break incidence at 242-S evaporator and its accident evaluation as noted in Section 9.1 of WHC-SD-WM-SAR-023 Rev. 1 (Ref. 14). A similar approach will be utilized for estimating leak for C-106 waste retrieval project, i.e., 10 percent will leak to form a pool at the surface from a total quantity of the liquid that is postulated to leak into soil during the entire release time period. Further, the buried piping configuration and the process conditions for the

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consortium of Bechtel and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006	REV.	COMP. BY	CHK'D BY
	PRELIM. / FINAL X / VOID	0	NBV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 5 OF 48		DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007			

W320 project is similar in configuration and/or less severe in process conditions as compared to the 242-S buried lines.

12. Release fraction is equal to 1.0E-5 (0.00001) per DOE-HDBK-0013-93, Mishima, Ref 15.

13. Based on a preliminary evaluation of the system design and EDE dose consequences due to transfer line break, Project W320 has decided to install a seismic switch to mitigate the impact to the personnel safety and health due to dose consequences, and to the environment due to soil contamination. A 10 seconds time is used for calculations purposes as the release time period for pump coast down before the pump completely shuts down. This time period will be used for calculating the dose consequences from the waste released to the environment during the line break scenario.

14. Per Appendix D of FDC, Ref. 12, the supernatant from AY-101 will be transferred to AY-102. This supernatant will be transferred to C-106 for sluicing out the solid contents in C-106 to form slurry. This slurry will be transferred to AY-102.

15. For supply transfer line break calculations, 30 percent solids (SP. Gr. of 1.2) from C-106 and 70 percent supernatant (Sp. Gr. of 1.0) from AY-102 (AY-101 supernatant) source term values have been used per FDC Rev. 2 (Ref. 12). For return transfer line break calculations, 10 percent solids (Sp. Gr. of 1.0) from C-106 and 90 percent supernatant (Sp. Gr. of 1.0) have been used per FDC Rev. 2 (Ref. 12).

16. Both transfer lines will break during a seismic event since they are buried in the same trench and bermed as noted in Criterion No. 8 above.

17. Syphon breakers are provided to prevent syphoning of AY-102 tank contents into C-106 since AY-102 tank is located at higher elevation than C-106.

UNVERIFIED ASSUMPTIONS/OPEN ITEMS

None

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL X	VOID	0	NTV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 8 OF 46				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

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Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consortium of Bechtel and UEAC — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL X	VOID	0	NSV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 7 OF 46				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

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Form 5007 (Rev. 4/83)

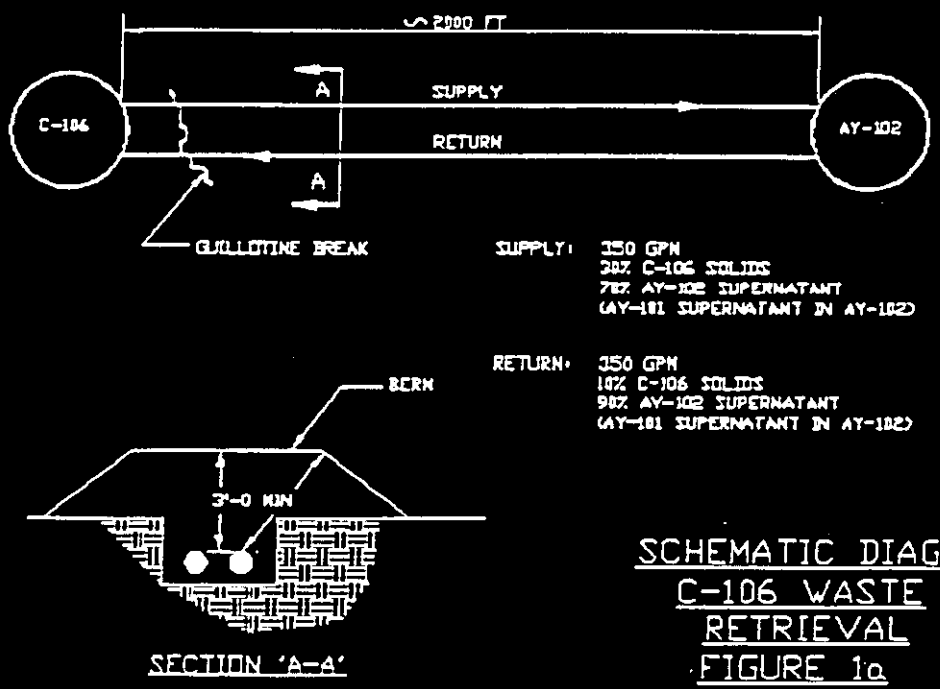
Raytheon Engineers & Constructors, A Combination of Badger and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006	REV.	COMP. BY	CHK'D BY
	PRELIM. / FINAL X / VOID	0	NJV DATE 6-22-94	NJH DATE 6-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 8 OF 46		DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007			

CALCULATIONS

A. ONSITE AND OFFSITE DOSE CONSEQUENCE CALCULATIONS

1. SCENARIO NO. 1: WASTE TRANSFER LINES BREAK

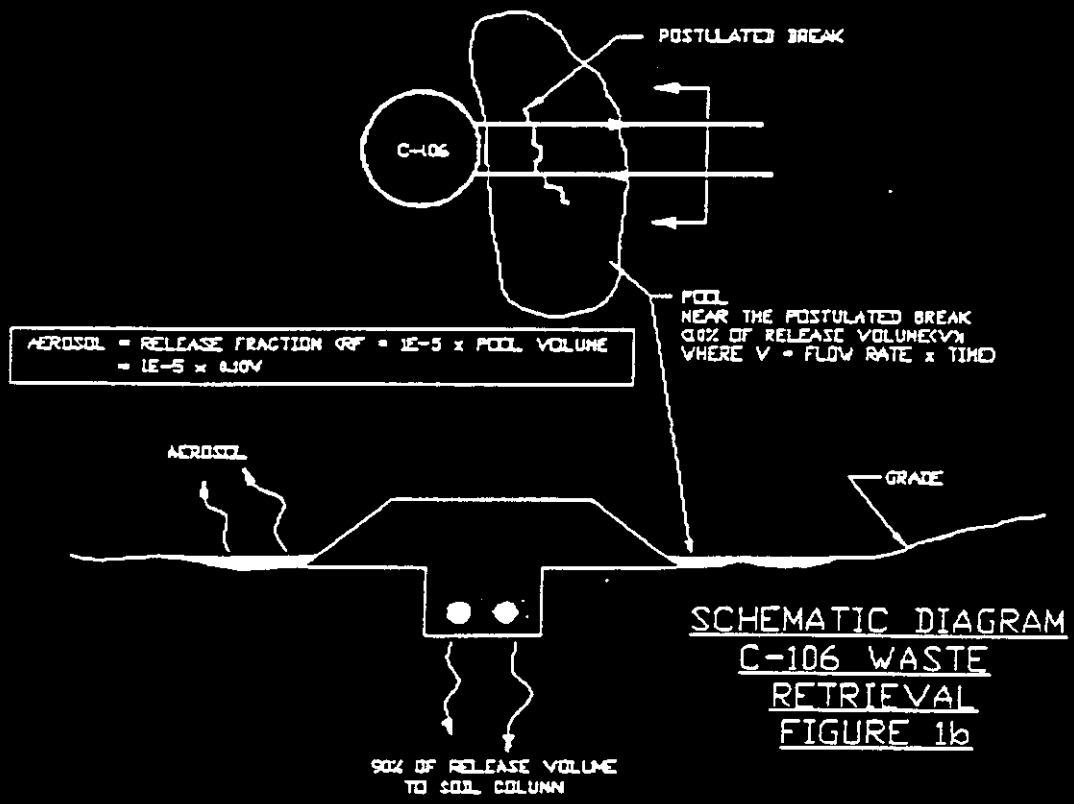
Waste transfer line break scenarios are shown schematically in Figures 1a and 1b.



SCHEMATIC DIAGRAM
C-106 WASTE
RETRIEVAL
FIGURE 1a

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UE&C	GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
		PRELIM.	FINAL X	VOID	0	NSV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval		SHEET 8 OF 48				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations		J.O. 7362.007					



SCHEMATIC DIAGRAM
C-106 WASTE
RETRIEVAL
FIGURE 1b

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL X	VOID	0	NJV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 10 OF 48				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

1.a SCENARIO NO. 1a: WASTE TRANSFER SUPPLY LINE BREAK (2 Hours Release Time)

At a pump flow rate of 350 gpm (Para 2.2.2 of Ref 12) at the time of the accident and 2 hours release time per Criterion 2 on Sheet 3,

Volume release is = 2 hrs x 60 min/hr x 350 gpm

= 4.20E+4 gallons

It is assumed that the accident occurs at C-106 tank farm. Then the volume (due to gravity) for the portion of approximately 2000 ft. 4 inch Sch. 40 piping (Ref. 11) is calculated as follows:

Volume of 2000 ft of piping = Π x $(4.026\ in)^2/4$ x 2000 ft x 12 in/ft

= 3.06E+5 in^3

Per Appendix B-11 of Ref. 1, 231 in^3 volume = 1 gallon

Therefore, volume of liquid in the pipe = 3.06E+5 in^3 / 231 in^3 /gal

= 1.32E+3 gallons

Total volume release = 4.20E+4 + 1.32E+3

= 4.33E+4 gallons

At 3.785 liters per gallon, per Ref. 1,
Effective radioactive volume release = 4.33E+4 gal x 3.785 liters/gal

= 1.64E+5 liters

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UEAC	GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
		PRELIM.	FINAL X	VOID	0	DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval		SHEET 11 OF 46				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations		J.O. 7362.007					

Per Criteria No. 11 on Sheet 4, the release volume to the surface (forming a pool) is equivalent to 10 per cent of the total release,
which is equal to = 1.64E+5 x 0.1

= 1.64E+4 liter

Per Criterion 12 on Sheet 5, the release fraction for liquid release aerosol (from the pool surface) is 1.0E-5.

Therefore, the amount of hazardous material suspended is = 1.0E-5 x 1.64E+4

= 1.64E-1 liters

Solids Radioactive Release calculation

Based on 30 percent solids (per Criterion 15 on Sheet 5)

Effective radioactive volume release = 1.64E-1 x 0.30 / 1.2

= 4.10E-2 liters

From Table A-1, offsite unit liter release EDE inhalation dose for C-106 solids is equal to 1.47E-2 rem/liter with PM.

Therefore, for a total volume release of 4.10E-2 liters,
the offsite EDE = 1.47E-2 rem/liter x 4.10E-2 liter
= 6.03E-4 rem

Similarly from Table A-3, onsite unit liter release EDE inhalation dose for C-106 solids is equal to 1.40E+1 rem/liter.

Therefore, for a total volume release of 4.10E-2 liters,
the onsite EDE = 1.40E+1 rem/liter x 4.10E-2 liter
= 5.75E-1 rem

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors, A Consolidation of Badger and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL X	VOID	0	NSV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 12 OF 46				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

Liquid Radioactive Release calculation

Based on 70 percent supernatant liquid
(per Criterion 15, Sh. 5),
Effective radioactive volume release = 1.64E-1 x 0.70

= 1.15E-1 liters

From Table A-1, offsite unit liter release EDE inhalation dose for AY-102 (with AY-101 supernatant) is equal to 1.15E-5 rem/liter with PM.

Therefore, for a total volume release of 1.15E-1 liters,
the offsite EDE = 1.15E-5 rem/liter x 1.15E-1 liter
= 1.32E-6 rem

Similarly from Table A-3, onsite unit liter release EDE inhalation dose for AY-102 with AY-101 supernatant is equal to 1.10E-2 rem/liter.

Therefore, for a total volume release of 1.15E-1 liters,
the onsite EDE = 1.10E-2 rem/liter x 1.15E-1 liter
= 1.26E-3 rem

EDE dose consequence for Offsite Individual for both solids and liquid,
Scenario No. 1a = 6.0E-4 rem

EDE dose consequence for Onsite Individual for both solids and liquid,
Scenario No. 1a = 5.8E-1 rem

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UEAC — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL X	VOID	0	NJV DATE 6-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 13 OF 44				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

1.b SCENARIO NO. 1b: WASTE TRANSFER RETURN LINE BREAK (2 Hours Release Time)

Based on Scenario 1a calculations, Sheet 9, the amount of hazardous material suspended is = 1.64E-1 liters

Solids Radioactive Release Calculation

The return line has 10 percent C-106 solids (per Criterion 15, Sh. 5)

Effective radioactive volume release = 1.64E-1 x 0.10
= 1.64E-2 liters

From Table A-1, offsite unit liter release EDE inhalation dose for C-106 solids is equal to 1.47E-2 rem/liter with PM.

Therefore, for a total volume release of 1.64E-2 liters,
the offsite EDE = 1.47E-2 rem/liter x 1.64E-2 liter
= 2.41E-4 rem

Similarly from Table A-3, onsite unit liter release EDE inhalation dose for C-106 solids is equal to 1.40E+1 rem/liter.

Therefore, for a total volume release of 1.64E-2 liters,
the onsite EDE = 1.40E+1 rem/liter x 1.64E-2 liter
= 2.30E-1 rem

Liquid Radioactive Release Calculation

The return line has 90 percent supernatant liquid (per Criterion 15, Sh. 5)

Effective radioactive volume release = 1.64E-1 x 0.90
= 1.48E-1 liters

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006	REV.	COMP. BY	CHK'D BY
	PRELIM. / FINAL X / VOID	0	NJV DATE 6-22-94	DATE 6-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 14 OF 48		DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007			

From Table A-1, offsite unit liter release EDE inhalation dose for AY-102 with AY-101 supernatant is equal to 1.15E-5 rem/liter with PM.

Therefore, for a total volume release of 1.48E-1 liters,
the offsite EDE = 1.15E-5 rem/liter x 1.48E-1 liter
= 1.70E-6 rem

Similarly from Table A-3, onsite unit liter release EDE inhalation dose for AY-102 with AY-101 supernatant is equal to 1.10E-2 rem/liter.

Therefore, for a total volume release of 1.48E-1 liters,
the onsite EDE = 1.10E-2 rem/liter x 1.48E-1 liter
= 1.62E-3 rem

EDE dose consequence for Offsite Individual for both solids and liquid,
Scenario No. 1b = 2.4E-4 rem

EDE dose consequence for Onsite Individual for both solids and liquid,
Scenario No. 1b = 2.3E-1 rem

EVALUATION OF BOTH SUPPLY AND RETURN LINE BREAK

EDE dose consequence for Offsite Individual for both solids and liquid,
Scenarios 1a and 1b = (6.0E-4) + (2.4E-4) rem
= 8.4E-4 rem

EDE dose consequence for Onsite Individual for both solids and liquid,
Scenarios 1a and 1b = (5.8E-1) + (2.3E-1) rem
= 8.1E-1 rem

From above, the EDE dose consequence values are < 500 mrem for offsite individual and < 5 rem for onsite individual doses. Therefore, the waste transfer return line should be classified as SC-3, per Ref. 9. Further confirmation is needed via Environmental Hazard Safety Classification (EHSC) per EP 1.4 (Ref. 9) to determine the safety classification. See Step B.1 for EHSC calculation for Scenarios 1a and 1b.

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UE&C	GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
		PRELIM.	FINAL X	VOID	0	NJV DATE 4-22-94	DAH DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval		SHEET 15 OF 46				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations		J.O. 7362.007					

1.c SCENARIO NO. 1c: WASTE TRANSFER SUPPLY LINE BREAK (Seismic Switch Shutoff and 10 Seconds Release Time)

Per Criterion No. 13 on Sheet 4, the seismic switch will terminate operation of the pumps, and the liquid release to the environment will stop within 10 seconds allowing for pump coast down, etc. In addition, release of the waste contents within the pipeline to the environment due to gravity flow has been included in the calculations.

At a pump flow rate of 350 gpm (Para 2.2.2 of Ref. 12) at the time of the accident and 10 seconds release time,

Volume release = 10 sec x 350 gpm / 60 sec/min

= 5.83E+1 gallons

It is assumed that the accident occurs at C-106 tank farm. Then the volume (due to gravity) for the portion of approximately 2000 ft. 4 inch Sch. 40 piping (Ref. 11) is calculated as follows:

Volume of 2000 ft of pipe = Π x $(4.026\ in)^2/4$ x 2000 ft x 12 in/ft
= 3.06E+5 in^3

Per Appendix B-11 of Ref. 1, 231 in^3 volume = 1 gallon

Therefore, volume of liquid in the pipe = 3.06E+5 in^3 / 231 in^3 /gal

= 1.32E+3 gallons

Total volume release = (5.83E+1) + (1.32E+3)
= 1.38E+3 gallons

At 3.785 liters per gallon, per Ref. 1,
Effective radioactive volume release = 1.38E+3 gal x 3.785 liters/gal
= 5.22E+3 liters

Form 3007 (Rev. 4/93)

Raytheon Engineers & Constructors, A Consolidation of Badger and UEAC — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL	VOID	0	NJY DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 16 OF 46	X			DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

Per Criterion No. 11 on Sh. 4, the release volume to the surface (forming a pool) is equivalent to 10 percent of the total release, which is equal to = 5.22E+3 x 0.1
= 5.22E+2 liter

Per Criterion 12 on Sh. 5, the release fraction for liquid release aerosol (from the pool surface) is 1.0E-5.

Therefore, the amount of hazardous material suspended is = 1.0E-5 x 5.22E+2

= 5.22E-3 liters

Solids Radioactive Release Calculation

Based on 30 percent solids (per Criterion 15, Sh. 5)

Effective radioactive volume release = 5.22E-3 x 0.30 /1.2
= 1.31E-3 liters

From Table A-1, offsite unit liter release EDE inhalation dose for C-106 solids is equal to 2.30E-2 rem/liter without PM.

Therefore, for a total volume release of 1.31E-3 liters, the offsite EDE = 2.30E-2 rem/liter x 1.31E-3 liter
= 3.01E-5 rem

Similarly from Table A-2, onsite unit liter release EDE inhalation dose for C-106 solids is equal to 4.37E+1 rem/liter.

Therefore, for a total volume release of 1.31E-3 liters, the onsite EDE = 4.37E+1 rem/liter x 1.31E-3 liter
= 5.72E-2 rem

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UEAC — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL X	VOID	0	NTV DATE 4-22-94	NHA DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 17 OF 48				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

Liquid Radioactive Release Calculation

Based on 70 percent supernatant liquid
(per Criterion 15, Sh. 5),
Effective radioactive volume release = 5.22E-3 x 0.70
= 3.65E-3 liters

From Table A-1, offsite unit liter release EDE inhalation dose for AY-102 (with AY-101 supernatant) is equal to 1.80E-5 rem/liter without PM.

Therefore, for a total volume release of 3.65E-3 liters,
the offsite EDE = 1.80E-5 rem/liter x 3.65E-3 liter
= 6.57E-8 rem

Similarly from Table A-2, onsite unit liter release EDE inhalation dose for AY-102 (with AY-101 supernatant) is equal to 3.42E-2 rem/liter.

Therefore, for a total volume release of 3.65E-3 liters,
the onsite EDE = 3.42E-2 rem/liter x 3.65E-3 liter
= 1.25E-4 rem

EDE dose consequence for Offsite Individual for both solids and liquid,
Scenario No. 1c = 3.0E-5 rem

EDE dose consequence for Onsite Individual for both solids and liquid,
Scenario No. 1c = 5.7E-2 rem

Form 5007 (Rev. 4/83)

Raytheon Engineers & Constructors A Consolidation of Badger and UEAC — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL X	VOID	0	DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 18 OF 48				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

1.d SCENARIO NO. 1d: WASTE TRANSFER RETURN LINE BREAK (Seismic Switch Shutoff and 10 Seconds Release Time)

From Scenario 1c calculations, Sheet 14, the amount of hazardous material suspended is = 5.22E-3 liters

Solids Radioactive Release Calculation

The return line has 10 percent solids (per Criterion 15, Sh. 5)

Effective radioactive volume release = 5.22E-3 x 0.10

= 5.22E-4 liters

From Table A-1, offsite unit liter release EDE inhalation dose for C-106 solids is equal to 2.30E-2 rem/liter without PM.

Therefore, for a total volume release of 5.22E-4 liter,
the offsite EDE = 2.30E-2 rem/liter x 5.22E-4 liter
= 1.20E-5 rem

Similarly from Table A-2, onsite unit liter release EDE inhalation dose for C-106 solids is equal to 4.37E+1 rem/liter.

Therefore, for a total volume release of 5.22E-4 liter,
the onsite EDE = 4.37E+1 rem/liter x 5.22E-4 liter
= 2.28E-2 rem

Liquid Radioactive Release Calculation

Based on 90 percent supernatant liquid
(per Criterion 15 on Sheet 5),
Effective radioactive volume release = 5.22E-3 x 0.90
= 4.70E-3 liters

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consortium of Bechtel and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL X	VOID	0	NS DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 19 OF 46				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

From Table A-1, offsite unit liter release EDE inhalation dose for AY-102 with AY-101 supernatant is equal to 1.80E-5 rem/liter without PM.

Therefore, for a total volume release of 4.70E-3 liters,
the offsite EDE = 1.80E-5 rem/liter x 4.70E-3 liter
= 8.46E-8 rem

Similarly from Table A-3, onsite unit liter release EDE inhalation dose for AY-102 (with AY-101 supernatant) is equal to 3.42E-2 rem/liter.

Therefore, for a total volume release of 4.70E-3 liters,
the onsite EDE = 3.42E-2 rem/liter x 4.70E-3 liter
= 1.61E-4 rem

EDE dose consequence for Offsite Individual for both solids and liquid,
Scenario No. 1d = 1.2E-5 rem

EDE dose consequence for Onsite Individual for both solids and liquid,
Scenario No. 1d = 2.3E-2 rem

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL X	VOID	0	NSV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 20 OF 46				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

EVALUATION OF BOTH SUPPLY AND RETURN LINE BREAK WITH SEISMIC SWITCH SHUTOFF

EDE dose consequence for Offsite Individual for both solids and liquid, Scenarios 1c and 1d = (3.0E-5) + (1.2E-5) rem
= 4.2E-5 rem

EDE dose consequence for Onsite Individual for both solids and liquid, Scenarios 1c and 1d = (5.7E-2) + (2.3E-2) rem
= 8.0E-2 rem

From above, the EDE dose consequence values are < 500 mrem for offsite individual and < 5 rem for onsite individual doses. Therefore, the waste transfer lines can be classified as SC-3, per Ref. 9. Further confirmation is needed via Environmental Hazard Safety Classification (EHSC) per EP 1.4 (Ref. 9) to determine the safety classification. See Step B.2 for EHSC calculation for Scenarios 1c and 1d.

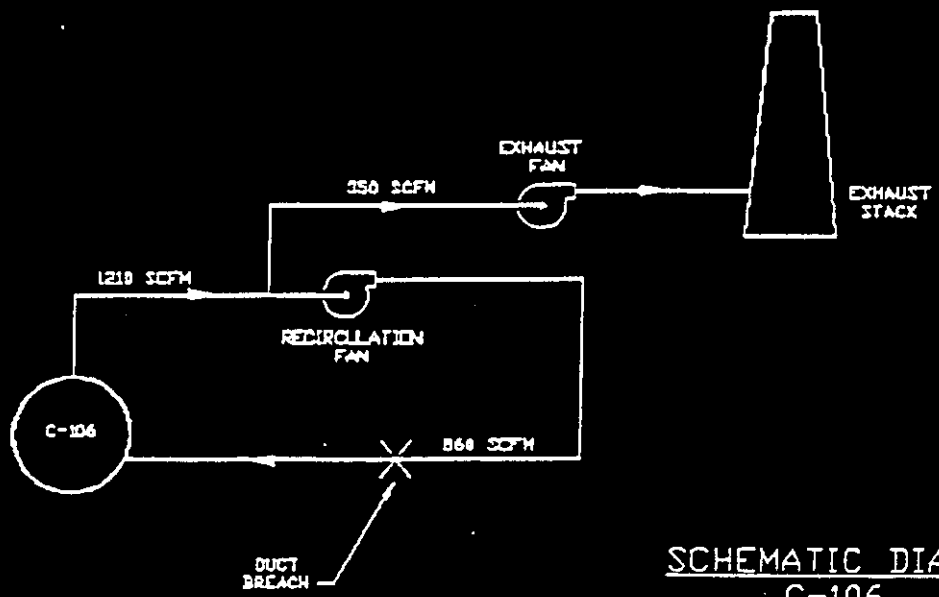
Based on the onsite EDE values (using release time of 10 seconds), the time to reach the SC-1, Criterion 1 of Ref. 9 (500 mrem for offsite individual), will be equal to 33 hours [500 mrem / (4.2E-5 rem x 1000 mrem/rem x (3600 sec/hr /10 sec)], and the time to reach the SC-2, Criterion 2 of Ref. 9 (5 rem for onsite individual), will be equal to 10.4 minutes [5 rem / (8.02E-2 rem x (60 sec/min /10 sec)]. Since the estimated time (10.4 minutes) to reach SC-2 criterion does not provide sufficient time to implement recovery actions, the waste transfer lines should be classified as SC-2.

Form 5007 (Rev. 4/83)

Raytheon Engineers & Constructors, A Consolidation of Badger and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006	REV.	COMP. BY	CHK'D BY
	PRELIM. / FINAL X / VOID	0	NSV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 21 OF 48		DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007			

2. SCENARIO NO. 2: UNFILTERED RELEASE THROUGH HVAC RECIRCULATION DUCT BREAK

Unfiltered release through the HVAC recirculation duct break scenario is schematically shown in Figure 2 below.



SCHEMATIC DIAGRAM
C-106
VENTILATION SYSTEM
FIGURE 2

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consortium of Badger and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006	REV.	COMP. BY	CHK'D BY
	PRELIM. / FINAL X / VOID	0	NSV DATE 4-22-94	DJH DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 22 OF 48		DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007			

Per Criterion 9 on Sheet 4, recirculation ventilation flow is 860 scfm. Per Appendix D of FDC (Ref. 12) the vapor space capacity is 100 mg/m^3. The vapor specific gravity has been taken as equivalent to 1.0 for calculation purposes since vapor space is 100 percent humid and 90 percent supernatant is in the vapor space per FDC.

Assumed that recirculation duct has breached, and the unfiltered vapor from C-106 exhaust ventilation is flowing through the break into the environment.

30 Minutes Release

Therefore, the volume release will be

$= 100\ mg/m^3 \times (1g/1000mg) \times 860\ ft^3/min \times 30\ min \times (1m^3/35.3\ ft^3) \times 1cc/1g \times 1\ L/1000cc \times 1/1.0$

$= \underline{0.073\ liter}$

Using this value in Tables A-1 and A-2, the offsite and onsite EDE dose consequences without PM are calculated as follows:

EDE dose consequence for Offsite Individual for
Tank C-106,
Scenario No. 2 $= (2.30E\text{-}2) \times 0.10 \times 0.073 + (1.80E\text{-}5) \times 0.90 \times 0.073$
$= \underline{1.7E\text{-}4\ rem}$

EDE dose consequence for Onsite Individual for
Tank C-106 (without plume meander effect),
Scenario No. 2 $= (4.37E+1) \times 0.10 \times 0.073 + (3.42E\text{-}2) \times 0.90 \times 0.073$
$= \underline{3.2E\text{-}1\ rem}$

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UEAC — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL X	VOID	0	NJV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 23 OF 48				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

Following evaluations are made for 1 and 2 hour release times for determining the impact on safety classification of HVAC:

1 Hour Release

EDE dose consequence for Offsite Individual for
Tank C-106 with PM,
Scenario No. 2 = (1.7E-4) x (0.64) / 0.5
= 2.2E-4 rem

EDE dose consequence for Onsite Individual for
Tank C-106 (Table A-3, with plume meander effect),
Scenario No. 2 = (1.40E+1) x 0.10 x 0.073 x 2 + (1.10E-2) x 0.90 x 0.073 x 2
= 2.1E-1 rem

2 Hour Release, plume meander effect will be considered per Appendix C, Ref. 13

Per Tables A-1 and A-3, offsite and onsite EDE doses are calculated as follows:

EDE dose consequence for Offsite Individual for
Tank C-106, Scenario No. 2 = (2.2E-4) x 2
= 4.4E-4 rem

EDE dose consequence for Onsite Individual for
Tank C-106 (with plume meander effect,
Table A-3 data used),
Scenario No. 2 = 2.1E-1 x 2
= 4.2E-1 rem

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Stone and UEAC — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL	VOID	0	NJV DATE 4-22-94	DLH DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 24 OF 48				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

Based on the onsite individual EDE value with plume meander effect, the time to reach SC-2, Criterion No. 2 per Ref. 9 (5 rem for onsite individual), will be equal to 24 hours.

From the Scenario 2 calculations, the EDE dose consequence values are < 500 mrem for offsite individual and < 5 rem for onsite individual doses. The active new HVAC system shall be classified as SC-3, per Ref. 8 and Ref. 9 based on dose rates. Further confirmation is needed via Environmental Hazard Safety Classification (EHSC) calculation per EP-1.4 (Ref. 9) to determine the safety classification of the new HVAC. See step B.3 for EHSC calculation for this Scenario No. 2.

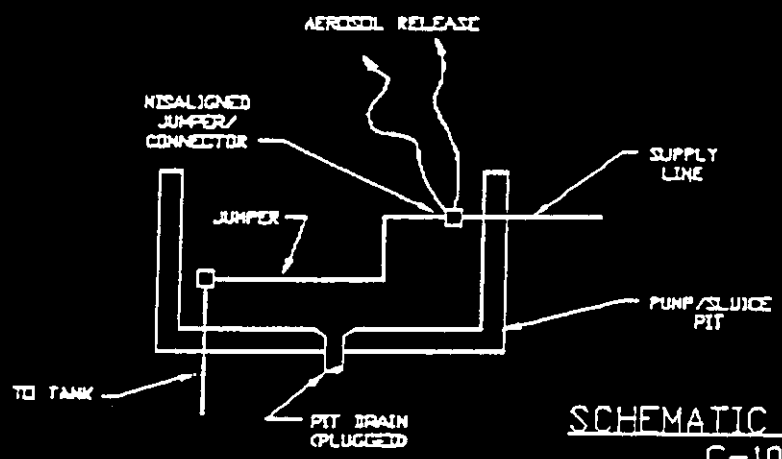
Form 5007 (Rev. 4/83)

Raytheon Engineers & Constructors A Consortium of Bechtel and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL X	VOID	0	NJY DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 25 OF 48				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

3. SPRAY LEAK FROM A JUMPER OR CONNECTOR INSIDE THE PIT

3a. SCENARIO NO. 3a: SPRAY LEAK FROM A JUMPER OR CONNECTOR INSIDE THE PIT WITH COVER BLOCK OFF

Aerosol leak due to a spray leak from a jumper or connector misalignment inside the pit with pit cover block off is schematically shown in Figure 3a.



SCHEMATIC DIAGRAM
C-106
JUMPER LEAK
FIGURE 3a
(COVER BLOCK REMOVED)

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consortium of Badger and UEAC	GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
		PRELIM.	FINAL X	VOID	0	NJV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval		SHEET 28 OF 48				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations		J.O. 7362.007					

Assumed that the jumper or connector is breached, and the waste liquid is postulated to leak as an atomizing spray with the pit cover off and the release time is assumed to be 2 hours per Criterion 2 on Sheet 3.

From Table 3 of Ref. 10, the respirable liquid aerosol generation for droplets of < 50 microns is interpolated as noted below. Viscosity, density, surface tension, and temperature of liquid have already been considered in Ref. 10. The leak is modeled as the discharge from a sharp-edged orifice of size 0.1 mm wide and 5 cm long. The width of the leak is assumed to be 0.1 mm which is the worst case opening for producing droplets. The length is assumed to be 5 cm which is a typical circumference of an opening for a valve stem.

At 150 psi, value is 9.94E-5 m^3/sec
At 200 psi, value is 1.26E-4 m^3/sec

Therefore, for a 50 psi differential, the interpolated value is 2.66E-5 m^3/sec

Therefore, for 180 psi system/pump pressure (without any significant error due to interpolation method noted above),
the aerosol generation rate = 9.94E-5 + (2.66E-5 x 30/50)

= <u>1.15E-4 m^3/sec</u>

Therefore, volume of material suspended
in 2 hours = 1.15E-4m^3/sec x 2 hours x3600 sec/hr x 1000 L/m^3

= <u>8.31E+2 liters</u>

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Stone and UEAC — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL X	VOID	0	NJV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 27 OF 46				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

Solids Radioactive Release Calculations

Based on 30 percent solids criteria per Criterion 15, Sh. 5, the effective volume of material suspended that will be released to the environment will be = 8.31E+2 x 0.3 / 1.2
= 2.08E+2 liters

Therefore, substituting this value in Tables A-1 and A-3, the EDE dose consequences are calculated as noted below for the Scenario No. 3a:

EDE dose consequence for Offsite Individual with PM for C-106 solids = 3.1E+0 rem

EDE dose consequence for Onsite Individual for C-106 solids = 2.9E+3 rem

Liquid Radioactive Release Calculations

Based on 70 percent liquid criteria per Criterion 15, Sh. 5, the effective volume of material suspended that will be released to the environment will be = 8.31E+2 x 0.7
= 5.81E+2 liters

Therefore, substituting this value in Tables A-1 and A-3, the EDE dose consequences are calculated as noted below for the Scenario No. 3a:

EDE dose consequence for Offsite Individual with PM for liquid = 6.7E-3 rem

EDE dose consequence for Onsite Individual for liquid = 6.4E+0 rem

EDE dose consequence for Offsite Individual for solids and liquid, Scenario No. 3a = 3.1E+0 rem

EDE dose consequence for Onsite Individual for solids and liquid, Scenario No. 3a = 2.9E+3 rem

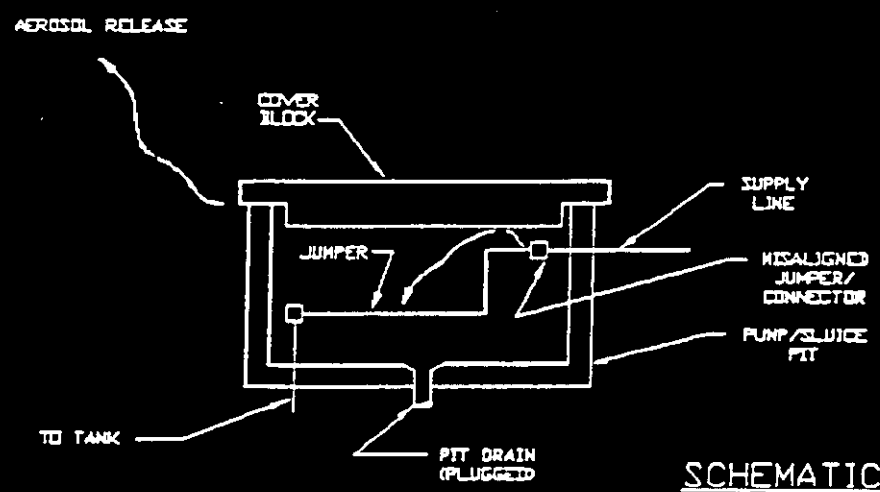
From the above, the EDE dose consequence values are > 500 mrem for offsite individual and > 5 rem for onsite individual doses. Therefore, the pit covers shall be classified as SC-1, per Ref. 7.

Form 5007 (Rev. 4/83)

Raytheon Engineers & Constructors A Consolidation of Badger and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL X	VOID	0	DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 28 OF 48				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

3b. SCENARIO NO. 3b: SPRAY LEAK FROM A JUMPER OR CONNECTOR INSIDE THE PIT WITH COVER BLOCK ON (WITH ALL OPENINGS CLOSED)

Aerosol leak due to a spray leak from a jumper or connector misalignment inside the pit with pit cover block on with all openings closed is schematically shown in Figure 3b.



SCHEMATIC DIAGRAM
C-106
JUMPER LEAK
FIGURE 3b
(COVER BLOCK INSTALLED)

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UEAC — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL X	VOID	0	NJV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 29 OF 48				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

Assumed that the jumper or connector is breached, and the waste liquid is postulated to leak as an atomizing spray with the pit cover on with all openings closed, and the release time is assumed to be 8 hours, which is equivalent to one shift.

The mechanism for dispersing the aerosol from the pit to the environment is through the leak paths around the cover blocks. The volume of waste is calculated as the basis that the pit drains are plugged and the leak detection system has failed to detect leaks accumulated in the pit for approximately 8 hours.

The leak is modeled as the discharge from a sharp-edged orifice of size 0.1 mm wide and 5 cm long. The width of the leak is assumed to be 0.1 mm which is the worst case opening for producing droplets. The length is assumed to be 5 cm which is typical circumference of an opening for a valve stem. The discharge rate through the orifice is calculated, per Ref. 1, as follows:

$$Q = 0.61\ A \sqrt{2\ g\ h}$$

Where

- Q = Discharge rate, m^3/sec
- 0.61 = Discharge coefficient for a sharp edged orifice
- A = Area of opening, m^2
- g = Gravitational acceleration, 9.8 m/sec^2
- h = system pressure (pumping pressure) expressed as water head, m

From Appendix B-11 of Ref. 1, 1 psig = 27.7 inches of water.

Therefore, h = 180 psig x 27.7 inches/psig x 2.54 cm/inch x 1 m/100 cm
= 1.27E+2 m

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Combination of Badger and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL	VOID	0	NJV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 30 OF 46				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

and slit area, A = (0.1 mm x 1m/1000 mm) x (5 cm x 1 m/100 cm)

= 5.0E-6 m^2

Substituting in the above equation,

Q = 1.52E-4 m^3/sec

The displacement rate of moist air from the pit is taken to be equal to the discharge rate from the leak. With the release time of 8 hours, which is equivalent to length of one shift,

The amount of waste volume released to the environment is

= 1.52E-4 m^3/sec x 8 hrs x 3600 sec/hr

= 4.38 m^3

Solids Radioactive Release Calculation

At 30 percent solids content per Criterion 15 on Sheet 5, the volume released to the environment is = 4.38 m^3 x 0.30 x 1/1.2

= 1.1 m^3

Assuming the aerosol capacity is equivalent to 10 mg/m^3 per Ref. 3, the amount of aerosol released to the environment = 1.1 m^3 x 10 mg/m^3 x 1E-6 L/mg

= 1.10E-5 liters

Therefore, substituting this value in Tables A-1 and A-3, the EDE dose consequences are calculated as noted below for the Scenario No. 3b:

EDE dose consequence for Offsite Individual with PM for C-106 solids = 1.6E-7 rem

EDE dose consequence for Onsite Individual for C-106 solids = 1.5E-4 rem

Form 5007 (Rev. 4/83)

Raytheon Engineers & Constructors A Consolidation of Badger and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006	REV.	COMP. BY	CHK'D BY
	PRELIM. / FINAL X / VOID	0	NJY DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 31 OF 48		DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007			

Liquid Radioactive Release Calculation

At 70 percent liquid content per Criteria 15, the volume released to the environment is $= 4.38\ m^3 \times 0.70$
$= \underline{3.07\ m^3}$

Assuming the aerosol capacity is equivalent to 10 mg/m^3 per Ref. 3, the amount of aerosol released to the environment $= 3.07\ m^3 \times 10\ mg/m^3 \times 1E\text{-}6\ L/mg$
$= \underline{3.07E\text{-}5\ liters}$

Therefore, substituting this value in Table A-1 and A-3, the EDE dose consequences are calculated as noted below for the Scenario No. 3b:

EDE dose consequence for Offsite Individual with PM for liquid = 3.5E-10 rem

EDE dose consequence for Onsite Individual for liquid = 3.4E-7 rem

EDE dose consequence for Offsite Individual for solids and liquid, Scenario No. 3b = 1.6E-7 rem

EDE dose consequence for Onsite Individual for solids and liquid, Scenario No. 3b = 1.5E-4 rem

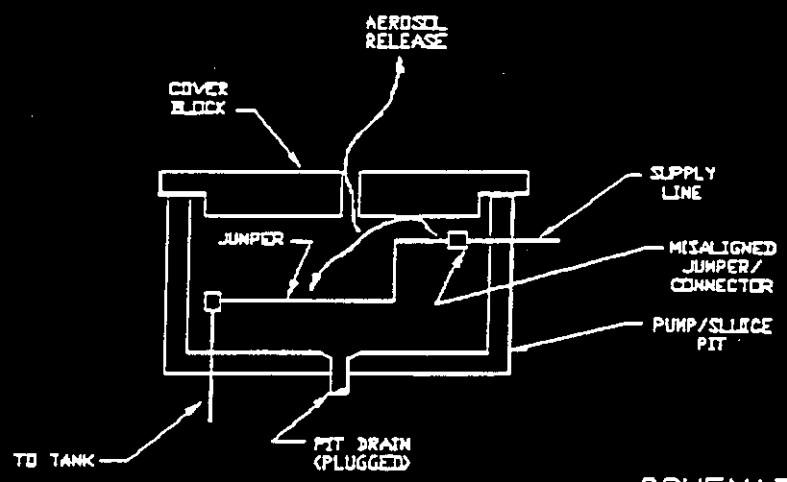
From the above, based on 8 hour release, the dose consequence values are < 500 mrem for offsite individual and < 5 rem for onsite individual doses. Therefore, the pit covers should always be covered prior to any transfer operation via the jumpers/connectors within the pit.

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL X	VOID	0	NJV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 32 OF 46				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

3c. SCENARIO NO. 3c: SPRAY LEAK FROM A JUMPER OR CONNECTOR INSIDE THE PIT WITH COVER BLOCK ON (WITH 2 INCH VALVE HANDLE HOLE OPEN)

Aerosol leak due to a spray leak from a jumper or connector misalingnment inside the pit with pit cover block on with 2 in valve handle hole open is schematically shown in Figure 3c.



SCHEMATIC DIAGRAM
C-106
JUMPER LEAK
FIGURE 3c
(COVER BLOCK INSTALLED AND 2" INSPECTION PLUG REMOVED)

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors, A Consortium of Bechtel and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006	REV.	COMP. BY	CHK'D BY
	PRELIM. / FINAL X / VOID	0	DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 33 OF 48		DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007			

Assumed that the jumper or connector is breached, and the waste liquid is postulated to leak as an atomizing spray with the pit cover on with 2 inch valve handle hole open for portable imaging system, and the release time is assumed to be 8 hours which is equivalent to one shift.

The mechanism for dispersing the aerosol from the pit to the environment is through the leak paths around the cover blocks. The volume of waste is calculated on the basis that the pit drains are plugged and the leak detection system has failed to detect leaks accumulated in the pit for approximately 8 hours.

The leak is modeled as the discharge from a sharp-edged orifice of size 0.1 mm wide and 5 cm long. The width of the leak is assumed to be 0.1 mm which is the worst case opening for producing droplets. The length is assumed to be 5 cm which is typical circumference of an opening for a valve stem. The discharge rate through the orifice is calculated, per Ref. 1, as follows:

$$Q = 0.61\ A \sqrt{2\ g\ h}$$

Where

- Q = Discharge rate, m^3/sec
- 0.61 = Discharge coefficient for a sharp edged orifice
- A = Area of opening, m^2
- g = Gravitational acceleration, 9.8 m/sec^2
- h = system pressure (pumping pressure) expressed as water head, m

From Appendix B-11 of Ref. 1, 1 psig = 27.7 inches of water.

Therefore, h = 180 psig x 27.7 inches/psig x 2.54 cm/inch x 1 m/100 cm
= 1.27E+2 m

Form 5007 (Rev. 4/83)

Raytheon Engineers & Constructors A Consolidation of Badger and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
PROJECT 241-C-106 Waste Retrieval	PRELIM.	FINAL X	VOID	0	NJY DATE 4-22-94	DATE 4-22-94
SUBJECT Dose Consequences and EHSC Calculations	SHEET 34 OF 46				DATE	DATE
	J.O. 7362.007					

and 2 inch square edged
opening area, A $= \Pi \times \{(2.0 \text{ inch} \times 2.54 \text{ cm/inch})^2 / 4\} \times (1 \text{ m}/100 \text{ cm})^2$
$= \underline{2.03E\text{-}3 \text{ m}^2}$

Substituting in the above equation,

$$Q = \underline{0.062 \text{ m}^3/\text{sec}}$$

The displacement rate of moist air from the pit is taken to be equal to the discharge rate from the leak. With the release time of 8 hours, which is equivalent to the length of one shift,

The amount of waste volume released
to the environment is $= 0.062 \text{ m}^3/\text{sec} \times 8 \text{ hrs} \times 3600 \text{ sec/hr}$
$= \underline{1.77E+3 \text{ m}^3}$

Solids Radioactive Release Calculation

At 30 percent solids content per Criterion 15 on Sheet 5,
the volume released to
the environment is $= 1.77E+3 \text{ m}^3 \times 0.30 \times 1/1.2$
$= \underline{4.44E+2 \text{ m}^3}$

Assuming the aerosol capacity is equivalent to 10 mg/m³ per Ref. 3,
the amount of aerosol released to
the environment $= 4.44E+2 \text{ m}^3 \times 10 \text{ mg/m}^3 \times 1E\text{-}6 \text{ L/mg}$
$= \underline{4.44E\text{-}3 \text{ liters}}$

Therefore, substituting this value in Table A-1 and A-3, the EDE dose consequences are calculated as noted below for the Scenario No. 3c:

EDE dose consequence for Offsite Individual with PM for C-106 solids = 6.5E-5 rem

EDE dose consequence for Onsite Individual for C-106 solids = 6.2E-2 rem

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UEAC — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL X	VOID	0	NJV DATE 4-22-94	DAH DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 38 OF 48				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

Liquid Radioactive Release Calculation

At 70 percent liquid content per Criterion 15 on Sheet 5, the volume released to the environment is = 1.77E+3 m^3 x 0.70
= 1.24E+3 m^3

Assuming the aerosol capacity is equivalent to 10 mg/m^3 per Ref. 3, the amount of aerosol released to the environment = 1.24E+3 m^3 x 10 mg/m^3 x 1E-6 L/mg
= 1.24E-2 liters

Therefore, substituting this value in Tables A-1 and A-3, the EDE dose consequences are calculated as noted below for the Scenario No. 3c:

EDE dose consequence for Offsite Individual with PM for liquid = 1.4E-7 rem

EDE dose consequence for Onsite Individual for liquid = 1.4E-4 rem

EDE dose consequence for Offsite Individual for solids and liquid, Scenario No. 3c = 6.5E-5 rem

EDE dose consequence for Onsite Individual for solids and liquid, Scenario No. 3c = 6.2E-2 rem

From the above, based on a release time of 8 hours, the dose consequence values are < 500 mrem for offsite individual and < 5 rem for onsite individual doses. However, in order to be within the ALARA guidelines of Ref. 6, it is recommended that the valve handle opening shall be opened with necessary precautions and proper procedures, and pits/boxes monitored for leaks.

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UEAC	GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
		PRELIM.	FINAL X	VOID	0	NJV DATE 4-22-94	DAH DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval		SHEET 36 OF 48				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations		J.O. 7362.007					

B. EHSC CALCULATIONS

1. EHSC CALCULATIONS FOR SCENARIOs 1a and 1b

Following work sheets from EP-1.4 (Ref. 9) determine the EHSC for both Waste Transfer Supply Line and Return Line Break scenarios with liquid release time of 2 Hours at 350 gpm flow plus line gravity flow.

RADIOACTIVE MATERIAL EHSC CALCULATION

COMPONENT/SYSTEM: Supply and Return Transfer Line Break DATE: 04/27/94 Sheet 1 of 2
DRAWING: _____ LOCATION: _____

1. MATERIAL FORM

Is the radioactive material dispersible (i.e., other than a consolidated or vitrified solid)? Dispersible materials include: liquids, sludges, gases, powders, and unconsolidated solids.

[ ] No Stop. Associated items are safety class 3, other criteria permitting.

[X] Yes Proceed.

2. QUANTITY OF MATERIALS RELEASED — MF(2.) = 11,000

The following matrix provides multiplying factors which are a function of the total estimated curie content postulated to be released to the environment from the system(s), component(s), and/or structure(s) of interest.

From Tables B-2 and B-3, Group radionuclides by half-life ($T_{½}$) category and show total amount in Curies (Ci) for each category for release time of 8 hours:

$T_{½}$ < 1 yr: Amount = 0.00 Ci $T_{½}$ = 1 to 100 yrs: Amount = 2.46E+5 Ci

$T_{½}$ > 100 yrs: Amount = 3.71E+2 Ci

Mark the applicable multiplying factors below.

	Half-life		
Amount (Ci)	< 1 yr.	1-100 yrs.	> 100 yrs.
< 1	MF = 1	MF = 10	MF = 100
1-1000	MF = 10	MF = 100	MF = 1,000
> 1000-10^6	MF = 100	MF = 1,000	MF = 10,000
> 10^6	MF = 1,00	MF = 10,000	MF = 100,000

MF(2.) = SUM of underlined MFs = 1000 + 10000 = 11000

Form 6007 (Rev. 4/93)

Raytheon Engineers & Constructors, A Consolidation of Badger and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006	REV.	COMP. BY	CHK'D BY
	PRELIM. / FINAL X / VOID	0	NJV DATE 4-22-94	DOH DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 37 OF 48		DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007			

RADIOACTIVE MATERIAL EHSC CALCULATION

COMPONENT/SYSTEM: Supply and Return Transfer Lines Break DATE: 04/22/94 Sheet 2 of 2
DRAWING: _____ LOCATION: _____

3. TOTAL QUANTITY OF MATERIAL RELEASED[1] = 3.78E+5 liter (9.68E+4 gallon) — MF(3.) = 100

≤ 100 gal ..... MF = 1 > 1,000-10,000 gal ... MF = 10
> 100-1,000 gal ... MF = 5 ≥ 10,000 gal ..... MF = 100

4. PROXIMITY TO ENVIRONMENTAL RECEIVERS

A. DEPTH TO AQUIFER = >150 feet — MF(4.A) = 1

> 150 feet ..... MF = 1 21-75 feet ..... MF = 5
75-150 feet ..... MF = 2 0-20 feet ..... MF = 10

B. DISTANCE TO SENSITIVE SURFACE WATER[3,4] = NA feet — MF(4.B) = NA

> 2500 feet ..... NA 100-500 feet ..... MF = 20
> 1000-2500 feet ..... MF = 5 < 100 feet ..... MF = 25
> 500-1000 feet ..... MF = 15 Direct drainage to surface water ... MF = 50

C. DISTANCE TO OFFSITE BOUNDARY[4] = NA feet — MF(4.C) = NA

> 2500 feet ... NA 1000-2500 feet ... MF = 5 < 1000 feet ... MF = 10

5. CALCULATION OF ENVIRONMENTAL IMPACT FOR SAFETY CLASSIFICATION

The EHSC is determined as follows where each term is the multiplying factor (MF) from the respective paragraphs above. Terms 4.A, 4.B, and/or 4.C are skipped where legitimate pathways to the environment exist.

EHSC = (2.)(3.)(4.A)(4.B)(4.C) = (1)(100)(1)(1)(NA)(NA) = 1,100,000

EHSC = 1,100,000, Safety Class 1

[1] Total quantity of radioactive material postulated to be released to the environment.
[2] 1 gallon = 3.785 liters, 1 gallon = 8.34 lbs (at 4°C, a specific gravity of 1, and atmospheric pressure)
[3] Examples of sensitive surface waters are the Columbia River and West Lake.
[4] Airborne pathways do not apply for this sensitive surface water or offsite boundary criterion (Table 1, Criterion 12, Ref. 9.

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UE&C	GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
		PRELIM.	FINAL X	VOID	0	NJV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval		SHEET 38 OF 46				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations		J.O. 7362.007					

2. EHSC CALCULATIONS FOR SCENARIOs 1c and 1d

Following work sheets from EP-1.4 (Ref. 9) determine the EHSC for both Waste Transfer Supply Line and Return Line Break scenarios with liquid release time for 10 seconds after a seismic shutoff plus line gravity flow.

RADIOACTIVE MATERIAL EHSC CALCULATION

COMPONENT/SYSTEM: Supply and Return Transfer Line Break DATE: 04/22/94 Sheet 1 of 2
DRAWING: _____ LOCATION: _____

1. MATERIAL FORM

Is the radioactive material dispersible (i.e., other than a consolidated or stabilized solid)? Dispersible materials include: liquids, slurries, gases, powders, and unconsolidated solids.

[ ] No Stop. Assessment frame are safety class 3, other criteria pertaining.

[X] Yes Proceed.

2. QUANTITY OF MATERIALS RELEASED MF(Z.) = 2000

The following matrix provides multiplying factors which are a function of the total estimated curie content postulated to be released to the environment from the container(s), component(s), and/or structure(s) of interest.

From Tables B-2 and B-3, Group radionuclides by half-life (T_h) category and show total amount (in Curies (Ci)) for each category for release time of 8 hours:

T_h < 1 yr: Amount = 0.00 Ci T_h = 1 to 100 yrs: Amount = 7.83E+3 Ci

T_h > 100 yrs: Amount = 1.19E+1 Ci

Mark the applicable multiplying factors below.

	Half-life		
Amount (Ci)	< 1 yr.	1-100 yrs.	> 100 yrs.
< 1	MF = 1	MF = 10	MF = 100
1-1000	MF = 10	MF = 100	MF = 1,000
> 1000-10^6	MF = 100	MF = 1,000	MF = 10,000
> 10^6	MF = 1,00	MF = 10,000	MF = 100,000

MF(Z.) = SUM of underlined MFs = 1000 + 1000 = 2000

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UE&C	GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
		PRELIM.	FINAL X	VOID	0	NJV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval		SHEET 39 OF 46				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations		J.O. 7362.007					

RADIOACTIVE MATERIAL EHSC CALCULATION

COMPONENT/SYSTEM: Supply and Return Transfer Line Break DATE: 04/22/94 Sheet 2 of 2
DRAWING: _____ LOCATION: _____

2. TOTAL QUANTITY OF MATERIAL RELEASED[1] = 1.04E-4 liter (2.76E-3 gallons) — MF(3.) = 10

≤ 100 gal ..... MF = 1 > 1,000-10,000 gal ... MF = 10
> 100-1,000 gal ... MF = 6 ≥ 10,000 gal ..... MF = 100

4. PROXIMITY TO ENVIRONMENTAL RECEIVERS

A. DEPTH TO AQUIFER = >150 feet — MF(4.A) = 1

> 150 feet ..... MF = 1 21-75 feet ..... MF = 6
76-150 feet ..... MF = 2 0-20 feet ..... MF = 10

B. DISTANCE TO SENSITIVE SURFACE WATER[3] = NA feet — MF(4.B) = NA

> 2500 feet ..... NA 100-500 feet ..... MF = 20
> 1000-2500 feet ..... MF = 6 <100 feet ..... MF = 25
> 500-1000 feet ..... MF = 16 Direct discharge to surface water ... MF = 60

C. DISTANCE TO OFFSITE BOUNDARY[4] = NA feet — MF(4.C) = NA

> 2500 feet ... NA 1000-2500 feet ... MF = 6 <1000 feet ... MF = 10

5. CALCULATION OF ENVIRONMENTAL IMPACT FOR SAFETY CLASSIFICATION

The EHSC is determined as follows where each term is the multiplying factor (MF) from the respective paragraphs above. Terms 4.A, 4.B, and/or 4.C are applied where legitimate pathways to the environment exist.

EHSC = (2.)(3.)(4.A)(4.B)(4.C) = (2000)(10)(1)(NA)(NA) = 20,000

EHSC = 20,000, Safety Class 3

[1] Total quantity of radioactive material postulated to be released to the environment.
[2] 1 gallon = 3.785 liters, 1 gallon = 8.34 lbs (at 4°C, a specific gravity of 1, and atmospheric pressure)
[3] Examples of sensitive surface waters are the Columbia River and West Lake.
[4] Airborne pathways do not apply for this sensitive surface water or offsite boundary criterion (Table 1, Criterion 12, Ref. 9.

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006	REV.	COMP. BY	CHK'D BY
	PRELIM. / FINAL X / VOID	0	MSV DATE 4-22-94	DLHL DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 40 OF 46		DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007			

Table B-1 Radionuclide Source Term (Ref. 13)

ISOTOPE	C-106, SLUDGE (See Notes below)		AY-102, SUPERNATANT(See Notes Below)	
	Bq/L	CURIES/L	Bq/L	CURIES/L
Am-241	5.56E+7	1.50E-3		
C-14	1.23E+4	3.32E-7		
Co-60	4.50E+7	1.22E-3		
Cs-137	1.75E+10	4.73E-1	4.03E+9	1.09E-1
I-129	4.29E+3	1.16E-7		
Pu-239/240	1.42E+8	3.84E-3		
Sr-90	1.05E+11	2.84E+0		
Tc-99	1.16E+7	3.14E-4		
U-238	1.53E+4	4.14E-7		

Notes

1. Values are taken from Ref. 13, See Table C-7 for AY-102 (with AY-101 supernatant) and Table C-9 for C-106 solids

2. Per Criterion 14 on Sh. 5, C-106 will have supernatant from AY-101 via AY-102.

3. Curies/ L = (Bq/ L) / (3.7E + 10)

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Raytheon Engineers & Constructors A Consolidation of Badger and UEAC — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL X	VOID	0	NJV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 41 OF 48				DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

Table B-2. Release Curies (data from Table B-1) Scenarios 1a and 1c (Supply Line)

Isotope	Half-life Yrs.	Total Release, Curies	
		2 hr (Scenario 1a, See Note 1)	Seismic shutoff (Scenario 1c, See Note 2)
Am-241	432.2	7.38E+1	2.35E+0
C-14	5730	1.63E-2	5.20E-4
Co-60	5.27	6.00E+1	1.91E+0
Cs-137	30.17	3.58E+4	1.14E+3
I-129	1.57E+7	5.71E-3	1.82E-4
Pu-239/240	2.41E+4	1.80E+2	6.01E+0
Sr-90	28.8	1.40E+5	4.45E+3
Tc-99	2.13E+5	1.54E+1	4.92E-1
U-238	4.47E+9	2.04E-2	6.48E-4

Notes:

1. Based on Release Volume of 1.64E+5 Liters (4.33E+4 gallons, from Scenario 1a and Criterion 15)

2. Based on Release Volume of 5.22E+3 Liters (1.38E+3 gallons, from Scenario 1c and Criterion 15)

3. Example Calc. for total release in curies: Cs-137 and 2 hour release

   From Table B-1, (4.73E-1) x 0.30 x (1.64E+5) + (1.09E-1) x 0.70 x (1.64E+5) = 3.58E+4 Curies

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Raytheon Engineers & Constructors A Consortium of Bechtel and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006	REV.	COMP. BY	CHK'D BY
	PRELIM. / FINAL X / VOID	0	NSV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 42 OF 46		DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007			

Table B-3. Release Curies (Data from Table B-1)
Scenarios 1b and 1d (Return Line)

Isotope	Half-life Yrs.	Total Release, curies	
		2 hr (Scenario 1b, See Note 1)	Seismic shutoff (Scenario 1d, See Note 2)
Am-241	432.2	2.46E+1	7.83E-1
C-14	5730	5.44E-3	1.73E-4
Co-60	5.27	2.00E+1	6.37E-1
Cs-137	30.17	2.38E+4	7.59E+2
I-129	1.57E+7	1.90E-3	6.06E-5
Pu-239/240	2.41E+4	6.30E+1	2.00E+0
Sr-90	28.8	4.66E+4	1.48E+3
Tc-99	2.13E+5	5.15E+0	1.64E-1
U-238	4.47E+9	6.79E-3	2.16E-4

Notes:

1. Based on Release Volume of 1.64E+5 Liters (4.33E+4 gallons, from Scenario 1b and Criterion 15)

2. Based on Release Volume of 5.22E+3 Liters (1.38E+3 gallons, from Scenario 1d and Criterion 15)

3. Example Calc. for total release in curies: Cs-137 and 2 hour release

   From Table B-1, (4.73E-1) x 0.10 x (1.64E+5) + (1.09E-1) x 0.90 x (1.64E+5)

   = 2.38E+4 Curies

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UEAC — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006			REV.	COMP. BY	CHK'D BY
	PRELIM.	FINAL	VOID	0	NSV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 43 OF 48	X			DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007					

3. EHSC CALCULATIONS FOR SCENARIO NO. 2, UNFILTERED RELEASE DUE TO HVAC RECIRCULATION LINE BREAK

From Tables B-2 and B-3, the curies per liter values are low for 10 % C-106 solids and 90 % AY-102 supernatant (from AY-101). When these numbers are multiplied by the release volume of (0.073 X 4) liter, release curies will be insignificant and do not warrant any further calculations. Therefore, HVAC should be classified as SC-3, as determined per the dose calculations under Scenario 2.

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Raytheon Engineers & Constructors A Consolidation of Badger and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006	REV.	COMP. BY	CHK'D BY
	PRELIM. / FINAL X / VOID	0	DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 44 OF 48		DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007			

SUMMARY AND CONCLUSIONS

Scenario 1: WASTE TRANSFER SUPPLY AND RETURN LINES BREAK

Scenarios 1a and 1b: Waste Transfer Supply and Return Lines Break, 2 hour Release Time

The calculated offsite EDE dose value for both supply and return lines break, Scenarios 1a and 1b, is 8.4E-1 mrem. This is within the allowable limit of 500 mrem of Ref. 9. Similarly, the calculated onsite EDE dose value is 8.1E-1 rem which is within the allowable limit of 5 rem per Ref. 9. SC-3 classification is required based on the dose calculations per Criterion 3 of Ref. 9

EHSC calculation was performed in Step B.1, and the calculated EHSC value of 1,100,000 is greater than the value of 1,000,000. SC-1 classification is required to be specified for both supply and return transfer lines per Criterion 10 of Ref. 9. Project W320 decided to install a seismic switch in order to reduce the impact on the personnel safety and health hazards due to dose consequences, and the environment via soil contamination due to large quantity of waste spill on to the ground during transfer lines break, especially if the system continues to operate for a longer periods of time for lack of necessary instrumentation before the system is shutdown. See summary and conclusions for Scenarios 1c and 1d for line breaks with seismic shutoff.

Scenarios 1c and 1d: Waste Transfer Supply and Return Lines Break, 10 Seconds Release Time With Seismic Shutoff

The calculated offsite EDE dose value for both supply and return lines break, Scenarios 1c and 1d, is 4.2E-2 mrem. This is within the allowable limit of 500 mrem of Ref. 9. Similarly, the calculated onsite EDE dose value is 8.0E-2 rem which is within the allowable limit of 5 rem per Ref. 9. SC-3 classification is required based on the dose calculations per Criterion 3 of Ref. 9

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006	REV.	COMP. BY	CHK'D BY
	PRELIM. / FINAL X / VOID	0	NJV DATE 4-22-94	DHH DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 46 OF 46		DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007			

EHSC calculation was performed in Step B.2, and the calculated EHSC value of 20,000 is less than the value of 500,000. SC-3 classification is acceptable based on EHSC calculations per Criterion 13 of Ref. 9

Based on the onsite EDE values (using release time of 10 seconds), the time to reach the SC-1, Criterion 1 of Ref. 9 (500 mrem for offsite individual), will be equal to 33 hours [500 mrem / (4.2E-5 rem x 1000 mrem/rem x (3600 sec/hr /10 sec)], and the time to reach the SC-2, Criterion 2 of Ref. 9 (5 rem for onsite individual), will be equal to 10.4 minutes [5 rem / (8.02E-2 rem x (60 sec/min /10 sec)]. Since the estimated time (10.4 minutes) to reach SC-2 criterion does not provide sufficient time to implement recovery actions, the waste transfer lines should be classified as SC-2.

Scenario 2: UNFILTERED RELEASE DUE TO HVAC RECIRCULATION DUCT BREAK

The calculated offsite EDE dose value of 4.4E-1 mrem is within the allowable limit of 500 mrem, and the calculated onsite EDE dose value of 4.2E-1 rem is also within the allowable limit of 5 rem per Ref. 9 for a 2 hour air borne release to the environment. EHSC calculation was not performed as noted in Step B-3 due to very low release volume to the environment. Based on the onsite EDE values, the time to reach SC-2 per Criterion 2 of Ref. 2, will be equal to 24 hours.

Therefore, the new ventilation system should be classified as SC-3 per Ref. 8 and Ref. 9.

Scenario 3: SPRAY LEAK FROM A JUMPER OR CONNECTOR INSIDE THE PIT

Scenario No. 3a: Spray leak from a Jumper or Connector inside the pit with cover block off, and a release time of 2 hours

The calculated offsite EDE dose value of 3.1E+3 mrem exceeds the allowable limit of 500 mrem, and also, the calculated onsite EDE dose value of 2.9E+3 rem exceeds the allowable limit of 5 rem per Ref. 9. This calculation confirms that waste transfer pit covers provide confinement of aerosol release to the

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Raytheon Engineers & Constructors, A Consolidation of Badger and UE&C — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 7362-H-006	REV.	COMP. BY	CHK'D BY
	PRELIM. / FINAL X / VOID	0	NSV DATE 4-22-94	DATE 4-22-94
PROJECT 241-C-106 Waste Retrieval	SHEET 46 OF 46		DATE	DATE
SUBJECT Dose Consequences and EHSC Calculations	J.O. 7362.007			

environment, and therefore, should remain in place prior to transfer operation. See evaluation for Scenarios 3b and 3c.

Scenario No. 3b: Spray leak from a Jumper or Connector inside the pit/box with cover block on with all the openings closed, and a release time of 8 hours

The calculated offsite EDE dose value of 1.6E-4 mrem is well within the allowable limit of 500 mrem, and also, the calculated onsite EDE dose value of 1.5E-4 rem is well within the allowable limit of 5 rem per Ref. 9.

Therefore, the pit covers should always be installed prior to any transfer operation via the jumpers/connectors within the pit.

Scenario No. 3c: Spray leak from a Jumper or Connector inside the pit/box with cover block on and 2 inch valve handle hole open, and a release time of 8 hours

The calculated offsite EDE dose value of 6.5E-2 mrem is well within the allowable limit of 500 mrem, and also, the calculated onsite EDE dose value of 6.2E-2 rem is less than the allowable limit of 5 rem per Ref. 9.

However, in order to be within the ALARA guidelines of Ref. 6, it is recommended that the valve handle hole shall be opened with necessary precautions and proper procedures, and pits/boxes monitored for leaks.

APPENDIX C

EQUIPMENT SAFETY CLASSIFICATION

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LIST OF TABLES

C-1 SWTS SEISMIC SWITCH C-5
C-2 SWTS PRIMARY TRANSFER LINES C-7
C-3 SWTS SECONDARY TRANSFER LINES C-8
C-4 SLURRY DISTRIBUTOR C-10
C-5 SWTS WASTE TRANSFER PITS C-11
C-6 SWTS SEAL LOOP C-12
C-7 SWTS EQUIPMENT (PUMPS, VALVES, ETC.) C-13
C-8 SWTS RAW WATER SYSTEM C-15
C-9 SWTS COMPRESSED AIR SYSTEM C-24
C-10 VENTILATION SYSTEM C-27
C-11 VENTILATION EXHAUST RADIATION MONITORING SYSTEM C-48
C-12 IN-TANK IMAGING SYSTEM C-51
C-13 AC POWER SYSTEM FOR C-106 . . . . . C-52
C-14 AC POWER SYSTEM FOR AY-102 . . . . . C-53
C-15 INSTRUMENTATION AND CONTROL C-54
C-15-1 SEISMIC SWITCH C-55
C-15-2 SEAL LOOP C-71
C-15-3 SWTS EQUIPMENT (PUMP, VALVES, ETC.) C-72
C-15-4 SWTS RAW WATER SYSTEM C-85
C-15-5 COMPRESSED AIR SYSTEM C-89
C-15-6 LEAK DETECTION SYSTEM C-91
C-15-7 VENTILATION SYSTEM C-93
C-15-8 VENTILATION EXHAUST RADIATION MONITORING C-116

LEGEND FOR APPENDIX C TABLES

1. Facility: Waste Retrieval Sluicing System

2. System (corresponds to systems in Table 4-1)

   ENC Secondary transfer lines; these lines are identified as encasement (ENC) pipes on piping and instrumentation drawings.

   EQ Equipment such as pumps, valves

   LDS Leak Detection System

   PL Primary transfer lines; includes SL (slurry) and SN (supernatant) lines shown on piping and instrumentation drawings.

   RW Raw Water System

   DIST Slurry distributor

   SWTS Sluicing Waste Transfer System

3. System safety class justification: Number 4.x.x refers to the section numbers in Section 4.0 of the text.

TABLE C-1. SWTS SEISMIC SWITCH (2 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SEISMIC SWITCH

SYSTEM SAFETY FUNCTION: SHUTDOWN WRSS SLUICING SYSTEM DURING SEISMIC EVENT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.1

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
C FARM SEISMIC DETECTION SYSTEM ENCLOSURE	PROTECTS REDUNDANT SEISMIC DETECTION SYSTEM COMPONENTS FROM MISSILE HAZARDS TWO INDEPENDENT COMPARTMENTS ARE PROVIDED WITHIN EACH SEISMIC UNIT SEE TABLE C-15-1 FOR FURTHER DETAILS	H-2-818559 1 P27 B4	ENCLOSURE FAILS UNDER MISSILE IMPACT	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED. REDUNDANT SWITCHES ENSURE A SAFE CONDITION OF THE WRSS	PRECLUDES PLACING WRSS IN SAFE CONDITION; REDUNDANT SEISMIC SWITCHES ARE REQUIRED SINCE THEY PERFORM AN SC-1 FUNCTION; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 2, 4	1
C FARM SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 AIR CONDITIONING/ HEATING UNIT	PROVIDES HEATING/COOLING FOR COMPARTMENT	H-2-818559 1 P27 B5	FAILS TO COOL	LOSS OF COMPARTMENT COOLING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
C FARM SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 AIR CONDITIONING UNIT	PROVIDES COOLING FOR COMPARTMENT	H-2-818559 1 P27 B4	FAILS TO COOL	LOSS OF COMPARTMENT COOLING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
C FARM SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 UNIT HEATER	PROVIDES HEATING FOR COMPARTMENT	H-2-818559 1 P27 C6	FAILS TO HEAT	LOSS OF COMPARTMENT HEATING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
C FARM SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 UNIT HEATER	PROVIDES HEATING FOR COMPARTMENT	H-2-818559 1 P27 C3	FAILS TO HEAT	LOSS OF COMPARTMENT HEATING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-1. SWTS SEISMIC SWITCH (2 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SEISMIC SWITCH

SYSTEM SAFETY FUNCTION: SHUTDOWN WRSS SLUICING SYSTEM DURING SEISMIC EVENT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.1

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
AY FARM SEISMIC DETECTION SYSTEM ENCLOSURE	PROTECTS REDUNDANT SEISMIC DETECTION SYSTEM COMPONENTS FROM MISSILE HAZARDS. TWO INDEPENDENT COMPARTMENTS ARE PROVIDED WITHIN ENCLOSURE, EACH CONTAINS ONE SEISMIC UNIT. SEE TABLE C-15-1 FOR FURTHER DETAILS	H-2-818560 7 P25 B4	ENCLOSURE FAILS UNDER MISSILE IMPACT	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED. REDUNDANT SWITCHES ENSURE A SAFE CONDITION OF THE WRSS	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; REDUNDANT SEISMIC SWITCHES ARE REQUIRED SINCE THEY PERFORM AN SC-1 FUNCTION; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 2,4	1
AY FARM SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 AIR CONDITIONING UNIT	PROVIDES COOLING FOR COMPARTMENT	H-2-818560 7 P25 B5	FAILS TO COOL	LOSS OF COMPARTMENT COOLING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AY FARM SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 AIR CONDITIONING UNIT	PROVIDES COOLING FOR COMPARTMENT	H-2-818560 7 P25 B4	FAILS TO COOL	LOSS OF COMPARTMENT COOLING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AY FARM SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 UNIT HEATER	PROVIDES HEATING FOR COMPARTMENT	H-2-818560 7 P25 B6	FAILS TO HEAT	LOSS OF COMPARTMENT HEATING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AY FARM SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 UNIT HEATER	PROVIDES HEATING FOR COMPARTMENT	H-2-818560 7 P25 B3	FAILS TO HEAT	LOSS OF COMPARTMENT COOLING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-2. SWTS PRIMARY TRANSFER LINES

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: SWTS-PL

SYSTEM SAFETY FUNCTION: PROVIDE PRIMARY CONFINEMENT OF HAZARDOUS LIQUID WASTE

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.2

SYSTEM SAFETY CLASS: 2

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SLURRY PUMP DISCHARGE PIPING (EXTERNAL TO PITS)	TRANSPORTS SLURRIED SLUDGE FROM C106 PUMP PIT 241-C-06A TO AY102 PUMP PIT 241-AY-02A	H-2-818559 5 P20 E2	FAILURE OF PRESSURE BOUNDARY	RELEASE OF HAZARDOUS MATERIAL TO THE ENVIRONMENT	POTENTIAL TO EXCEED ONSITE EDE DOSE; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 13	2
SLUICE PUMP DISCHARGE LINE	TRANSPORTS SLUICING FLUID FROM TANK AY102 SLUICE PIT 241-AY-02E TO TANK C-106 PUMP PIT 241-C-06A	H-2-818560 2 P21 D8	FAILURE OF PRESSURE BOUNDARY	RELEASE OF HAZARDOUS MATERIAL TO THE ENVIRONMENT	POTENTIAL TO EXCEED ONSITE EDE DOSE; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 13	2

TABLE C-3. SWTS SECONDARY TRANSFER LINES (2 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: SWTS-ENC

SYSTEM SAFETY FUNCTION: SECONDARY CONFINEMENT AND LEAK DETECTION

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.3

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SLUICE PUMP DISCHARGE LINE ENCASEMENT TEST CONNECTION	PROVIDES TEST PORT CONNECTION ON ENCASEMENT	H-2-818559 2 P21 D4	LOSS OF CONFINEMENT INTEGRITY	LOSS OF ENCAPSULATION LINE TEST CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP DISCHARGE LINE ENCASEMENT	PROVIDES SECONDARY BARRIER FOR SLUICE PUMP DISCHARGE LINE FROM 241-C-06A TO 241-C-06C	H-2-818559 2 P21 D4	LOSS OF CONFINEMENT INTEGRITY	LOSS OF ENCAPSULATION LINE LEAK DETECTION CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP DISCHARGE LINE ENCASEMENT DRAIN LINE	ENCASEMENT DRAIN LINE	H-2-818559 5 P20 D5	LOSS OF CONFINEMENT INTEGRITY	LOSS OF ENCAPSULATION LINE LEAK DETECTION CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP DISCHARGE LINE ENCASEMENT DRAIN	ENCASEMENT DRAIN LINE	H-2-818559 5 P20 D4	LOSS OF CONFINEMENT INTEGRITY	LOSS OF ENCAPSULATION LINE LEAK DETECTION CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP DISCHARGE LINE ENCASEMENT TEST CONNECTION	PROVIDES TEST PORT CONNECTION ON ENCASEMENT	H-2-818559 5 P20 E4	LOSS OF CONFINEMENT INTEGRITY	LOSS OF ENCAPSULATION LINE TEST CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP DISCHARGE PIPING ENCASEMENT FROM 241-C-06A TO 241-AY-02A	PROVIDES SECONDARY BARRIER FOR DISCHARGE PIPING	H-2-818559 5 P20 E1	LOSS OF CONFINEMENT INTEGRITY	LOSS OF ENCAPSULATION LINE LEAK DETECTION CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
DRAIN VALVE 6" ENC-100-M26a	DRAINS ENC-100-M26a TO PUMP PIT 241-C-06A	H-2-818559 5 P20 D5	FAILS TO OPEN	LOSS OF ENCAPSULATION LINE LEAK DETECTION CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP DISCHARGE LINE ENCASEMENT SHUTOFF VALVE	ISOLATES TEST PORT CONNECTION ON ENCASEMENT	H-2-818559 5 P20 E4	LOSS OF CONFINEMENT INTEGRITY	LOSS OF ENCAPSULATION LINE TEST CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP DISCHARGE LINE ENCASEMENT TEST CONNECTION	PROVIDES TEST PORT CONNECTION ON ENCASEMENT	H-2-818559 6 P21 E7	LOSS OF CONFINEMENT INTEGRITY	LOSS OF ENCAPSULATION LINE TEST CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-3. SWTS SECONDARY TRANSFER LINES (2 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: SWTS-ENC

SYSTEM SAFETY FUNCTION: SECONDARY CONFINEMENT AND LEAK DETECTION

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.3

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
DRAIN LINE 6" ENC-200-M26a	DRAINS ENC-200-M26a TO PUMP PIT 241-C-06A	H-2-818559 6 P21 D8	LOSS OF CONFINEMENT INTEGRITY	LOSS OF ENCAPSULATION LINE LEAK DETECTION CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP DISCHARGE LINE ENCASEMENT TEST CONNECTION SHUTOFF VALVE	ISOLATES TEST CONNECTION ON ENCASEMENT	H-2-818559 6 P21 E7	LOSS OF CONFINEMENT INTEGRITY	LOSS OF ENCAPSULATION LINE TEST CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
DRAIN VALVE 6" ENC-200-M26a	DRAINS ENC-200-M26a TO PUMP PIT 241-C-06A	H-2-818559 6 P21 D8	FAILS TO OPEN	LOSS OF ENCAPSULATION LINE LEAK DETECTION CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP DISCHARGE LINE ENCASEMENT TEST CONNECTION	ALLOWS TESTING OF SECONDARY ENCASEMENT LINE	H-2-818560 2 P21 D7	LOSS OF CONFINEMENT INTEGRITY	LOSS OF ENCAPSULATION LINE LEAK DETECTION CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP DISCHARGE LINE ENCASEMENT	PROVIDES SECONDARY BARRIER FOR SLUICE PUMP DISCHARGE LINE FROM 241-AY-02E TO 241-C-06A	H-2-818560 2 P21 D7	LOSS OF CONFINEMENT INTEGRITY	LOSS OF ENCAPSULATION LINE LEAK DETECTION CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP DISCHARGE LINE ENCASEMENT TEST CONNECTION	PROVIDES TEST PORT CONNECTION ON ENCASEMENT	H-2-818560 3 P20 D8	LOSS OF CONFINEMENT INTEGRITY	LOSS OF ENCAPSULATION LINE TEST CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-4. SWTS SLURRY DISTRIBUTOR

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-AY

SYSTEM: SWTS-DIST

SYSTEM SAFETY FUNCTION: SLURRY DISTRIBUTOR AND SYPHON BREAKER

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.4

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SLURRY DISTRIBUTOR	DISTRIBUTES TANK C106 SLURRY IN TANK AY102 AS EVENLY AS POSSIBLE	H-2-818560 3 P20 B7	FAILURE TO DISTRIBUTE SLURRY IN AY-102 AS EVENLY AS POSSIBLE	PER WHC-SD-SQA-CSA-20363, CSER 94-001, (WHC 1994C), NO MECHANISM HAS BEEN FOUND THAT IS CAPABLE OF CAUSING CRITICALITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-5. SWTS WASTE TRANSFER PITS

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: SWTS-PITS

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS LIQUIDS AND AEROSOLS

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SLUICE PIT	CONTAINS AEROSOL AND LIQUID RELEASE	H-2-818559 2 P21 C7	LEAK	RELEASE OF RADIOACTIVE AEROSOL AND/OR LIQUID TO THE ENVIRONS	RELEASE WOULD EXCEED ALLOWABLE OFFSITE DOSE EQUIVALENT	1
HEEL PIT	CONTAINS AEROSOL AND LIQUID RELEASE	H-2-818559 3 P23 C8	LEAK	RELEASE OF RADIOACTIVE AEROSOL AND/OR LIQUID TO THE ENVIRONS	RELEASE WOULD EXCEED ALLOWABLE OFFSITE EFFECTIVE DOSE EQUIVALENT	1
PUMP PIT	CONTAINS AEROSOL AND LIQUID RELEASE	H-2-818559 6 P21 C2	LEAK	RELEASE OF RADIOACTIVE AEROSOL AND/OR LIQUID TO ENVIRONS	RELEASE WOULD EXCEED ALLOWABLE OFFSITE EFFECTIVE DOSE EQUIVALENT	1

TABLE C-6. SWTS SEAL LOOP

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: SWTS-SEAL LOOP

SYSTEM SAFETY FUNCTION: PROVIDE TANK UNDER/OVER PRESSURE PROTECTION

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.7

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
PRESSURE RELIEF LOOP SEAL A	PREVENTS UNDER/OVERPRESSURE OF TANK C106	H-2-818559 7 P2 D6	PLUGGED	LOSS OF TANK PRESSURE PROTECTION	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-46, SECTION 9 TABLE 1 CRITERION 15	1
PRESSURE RELIEF LOOP SEAL B	PREVENTS UNDER/OVERPRESSURE OF TANK C106	H-2-818559 7 P2 D4	PLUGGED	LOSS OF TANK PRESSURE PROTECTION	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-46, SECTION 9 TABLE 1 CRITERION 15	1

TABLE C-7. SWTS EQUIPMENT (PUMPS, VALVES, ETC.) (2 SHEETS)
FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-EQ

SYSTEM SAFETY FUNCTION: WASTE MOBILIZATION AND TRANSPORT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.7

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
C-106 PRESSURE TRANSMITTER SENSING LINE	CONNECTS PRESSURE TRANSMITTER TO C-106	H-2-818559 2 P21 D2	LEAK	LOSS OF TANK PRESSURE MONITORING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICING PIT 241-C-06C SLUICE MAST JUMPER	ALLOWS REMOVAL OF SLUICE MAST	H-2-818559 2 P21 C5	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
DRAIN JUMPER, SLUICE PIT 241-C-06C	ROUTES EQUIPMENT DRAINS TO C-106 RISER R-4	H-2-818559 2 P21 C7	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
C-106 PRESSURE TRANSMITTER ISOLATION VALVE	ISOLATES PRESSURE TRANSMITTER FROM TANK	H-2-818559 2 P21 D2	FAILS CLOSED	LOSS OF C-106 PRESSURE CONTROL AND INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICING PIT 241-C-06C SLUICER	DIRECTS SLUICING SPRAY INTO SLUDGE	H-2-818559 2 P21 B6	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP WINCH	RAISES AND LOWERS SLURRY PUMP	H-2-818559 4 P23 C7	FAILS AS IS	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP FLEXIBLE DISCHARGE LINE	ALLOWS POSITIONING OF SLURRY PUMP WITHIN TANK	H-2-818559 4 P23 B6	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP DISCHARGE JUMPER	ALLOWS REMOVAL OF SLURRY PUMP	H-2-818559 4 P23 C6	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP DISCHARGE SHUTOFF VALVE	ISOLATES SLURRY PUMP DISCHARGE	H-2-818559 4 P23 C2	FAILS OPEN	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-7. SWTS EQUIPMENT (PUMPS, VALVES, ETC.) (2 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-EQ

SYSTEM SAFETY FUNCTION: WASTE MOBILIZATION AND TRANSPORT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.7

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SLURRY PUMP	TRANSFERS SLURRIED WASTE FROM C-106 TO AY-102	H-2-818559 4 P23 B5	FAILURE TO PUMP SLURRY	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PUMP PIT 241-C-06A SLUICE MAST JUMPER	ALLOWS REMOVAL OF SLUICE MAST	H-2-818559 5 P20 C3	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PUMP PIT 241-C-06A SLUICER	DIRECTS SLUICING SPRAY INTO SLUDGE	H-2-818559 6 P21 B4	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP WINCH	RAISES AND LOWERS SLUICE PUMP	H-2-818560 2 P21 C4	FAIL AS IS	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP	TRANSPORTS SUPERNATE FROM AY102 TO SLUICING NOZZLES IN C106	H-2-818560 2 P21 B3	FAILURE TO PUMP SUPERNATANT	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PUMP PIT 241-AY-02A SLURRY LINE JUMPER	ALLOWS REMOVAL OF DISTRIBUTOR	H-2-818560 3 P20 C8	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PUMP PIT 241-AY-02A DRAIN LINE JUMPER	ALLOWS REMOVAL OF DISTRIBUTOR	H-2-818560 3 P20 C8	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PUMP PIT 241-AY-02A DRAIN LINE JUMPER DRAIN VALVE	ALLOWS DRAINING OF DRAIN JUMPER FOR REMOVAL	H-2-818560 3 P20 C7	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-8. SWTS RAW WATER SYSTEM (9 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-RW

SYSTEM SAFETY FUNCTION: PROVIDE RAW WATER FLUSHING OF ALL COMPONENTS

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.8

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SLUICER PIT 241-C-06C RAW WATER HOSE CONNECTION	RAW WATER SPRAY FOR PIT DECONTAMINATION	H-2-818559 2 P21 D7	PLUGGED NOZZLE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
FILTERED WATER FLUSH TO IMAGING SYSTEM RISER R-7	MINIMIZES CONTAMINATION	H-2-818559 3 P23 E2	PLUGGED NOZZLE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
FILTERED WATER FLUSH TO IMAGING SYSTEM RISER R-7 SHUTOFF VALVE	ISOLATES FLUSH WATER SUPPLY	H-2-818559 3 P23 E1	FAIL CLOSED	LOSS OF FLUSH WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PUMP PIT 241-C-06A RAW WATER HOSE CONNECTION	RAW WATER SPRAY FOR PIT DECONTAMINATION	H-2-818559 4 P23 D4	PLUGGED NOZZLE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PUMP PIT 241-C-06A RW WASHDOWN JUMPER	ALLOWS FOR REMOVAL OF SLURRY PUMP	H-2-818559 6 P21 C2	LEAK	LOSS OF RW FLUSH	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HMF-1361 FILTERED WATER FLUSH SHUTOFF VALVE	ALLOWS FLUSHING OF HEMF	H-2-818561 4 P27 D4	FAILS CLOSED	INCREASE IN OPERATOR EXPOSURES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
FILTER F-1361 OUTLET	PROVIDES FILTERED FLUSH WATER TO HEME/HEMF	H-2-818561 5 P20 D6	LEAK	LOSS OF FLUSH WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
FILTERED WATER TO HMF-1361	PROVIDES FILTERED FLUSH WATER TO HEMF	H-2-818561 5 P20 D8	LEAK	LOSS OF FLUSH WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
FILTERED WATER TO HV-13669	PROVIDES FILTERED FLUSH WATER TO HEME	H-2-818561 5 P20 E7	LEAK	LOSS OF FLUSH WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-8. SWTS RAW WATER SYSTEM (9 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-RW

SYSTEM SAFETY FUNCTION: PROVIDE RAW WATER FLUSHING OF ALL COMPONENTS

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.8

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
FILTERED WATER TO HME-1361	PROVIDES FILTERED FLUSH WATER TO HEME	H-2-818561 5 P20 E8	LEAK	LOSS OF FLUSH WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PI-13631 SENSING LINE	PRESSURE INDICATOR IMPULSE LINE	H-2-818561 5 P20 E8	LEAK	LOSS OF HEME FILTERED WATER PRESSURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RAW WATER SUPPLY TO FILTER F-1361	FILTERED WATER SOURCE	H-2-818561 5 P20 D4	LEAK	LOSS OF WRSS RAW/FILTERED WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RAW WATER HOSE CONNECTION	BACK UP WATER SUPPLY	H-2-818561 5 P20 D4	LEAK	LOSS OF WRSS RAW/FILTERED WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDISH-13615 HP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818561 5 P20 E4	LEAK	LOSS OF PDISH-13615	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDISH-13615 LP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818561 5 P20 E5	LEAK	LOSS OF PDISH-13615	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDISH-13614 HP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818561 5 P20 E6	LEAK	LOSS OF PDISH-13614	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDISH-13614 LP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818561 5 P20 E7	LEAK	LOSS OF PDISH-13614	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
FILTERED FLUSH WATER TO IMAGING SYSTEM	FLUSHES IMAGING SYSTEM	H-2-818561 5 P20 D6	LEAK	LOSS OF IMAGING SYSTEM FLUSH WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-8. SWTS RAW WATER SYSTEM (9 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-RW

SYSTEM SAFETY FUNCTION: PROVIDE RAW WATER FLUSHING OF ALL COMPONENTS

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.8

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
FILTERED WATER CHEMICAL ADDITION LINE	ALLOWS CHEMICAL ADDITIONS TO BE MADE TO FILTERED WATER	H-2-818561 5 P20 E6	LEAK	LOSS OF FILTERED WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDISH-13615 HP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818561 5 P20 E4	LEAK	LOSS OF PDISH-13615	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDISH-13615 LP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818561 5 P20 E5	LEAK	LOSS OF PDISH-13615	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDISH-13614 HP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818561 5 P20 E6	LEAK	LOSS OF PDISH-13614	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDISH-13614 LP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818561 5 P20 E7	LEAK	LOSS OF PDISH-13614	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
WRSS RAW WATER SUPPLY HEADER DRAIN LINE	ALLOWS DRAINING OF RW SUPPLY HEADER	H-2-818561 5 P20 C5	LEAK	LOSS OF RW TO WRSS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RAW WATER TO SEAL POT FILL LINE	FILLS SEAL POT	H-2-818561 5 P20 D4	LEAK	LOSS OF RW TO WRSS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PIT-13616 SENSING LINE	SENSES RW PRESSURE	H-2-818561 5 P20 B3	LEAK	LOSS OF PIT-13616	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
DRAIN LINE FROM BP-1362 DRIP PAN	ROUTES DRAIN TO PROCESS BUILDING SEAL POT	H-2-818561 5 P20 B4	LEAK	DRAINS TO FLOOR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-8. SWTS RAW WATER SYSTEM (9 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-RW

SYSTEM SAFETY FUNCTION: PROVIDE RAW WATER FLUSHING OF ALL COMPONENTS

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.8

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
RAW WATER ENCASEMENT TEST CONNECTION	ALLOWS TESTING OF ENCASEMENT	H-2-818561 5 P20 B3	LEAK	LOSS OF CONFINEMENT INTEGRITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RAW WATER SUPPLY LINE TO WRSS	WRSS RAW WATER SOURCE	H-2-818561 5 P20 C5	LEAK	LOSS OF WRSS RAW/FILTERED WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
TRANSFER PIPING RAW WATER FLUSH LINE ENCASEMENT	COLLECTS LEAKAGE AND DRAIN TO PUMP PIT	H-2-818561 5 P20 B3	LEAK	LOSS OF CONFINEMENT INTEGRITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
OUTLET CHECK VALVE FILTER F-1361	PREVENTS BACKFLOW THRU FILTER	H-2-818561 5 P20 D5	FAILS TO OPERATE	UNABLE TO FLUSH HEME/HEMF	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEME FILTERED FLUSH WATER CHECK VALVE	PREVENTS BACKFLOW INTO RAW WATER SYSTEM	H-2-818561 5 P20 E6	FAILS TO OPERATE	POTENTIAL TO CONTAMINATE RAW WATER SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEMF FILTERED FLUSH WATER CHECK VALVE	PREVENTS BACKFLOW INTO RAW WATER SYSTEM	H-2-818561 5 P20 D8	FAILS TO OPERATE	POTENTIAL TO CONTAMINATE RAW WATER SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RAW WATER RADIATION MONITOR SHIELDING PIG	SHEILDS RADIATION DETECTOR FROM BACKGROUND RADIATION	H-2-818561 5 P20 C4	FAILS TO FUNCTION AS INTENDED	POTENTIAL TO CONTAMINATE RAW WATER SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RAW WATER FLUSH BACKFLOW PREVENTOR	PREVENTS CONTAMINATION OF RAW WATER SYSTEM IN PROCESS BLDG	H-2-818561 5 P20 C4	FAILS TO OPERATE	INCREASE POTENTIAL TO CONTAMINATE RW SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
FILTERED WATER ROUGHING FILTER	PROVIDES FIRST STAGE FILTRATION TO HEME/HEMF FLUSH WATER	H-2-818561 5 P20 D5	PLUGS	LOSS OF FILTERED WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-8. SWTS RAW WATER SYSTEM (9 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-RW

SYSTEM SAFETY FUNCTION: PROVIDE RAW WATER FLUSHING OF ALL COMPONENTS

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.8

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
FILTERED WATER FINAL FILTER	PROVIDES SECOND STAGE FILTRATION TO HEME/HEMF FLUSH WATER	H-2-818561 5 P20 D6	PLUGS	LOSS OF FILTERED WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HOSE CONNECTION	BACK UP FLUSH WATER SUPPLY	H-2-818561 5 P20 D4	FAILS TO OPERATE	LOSS OF BACK UP FLUSH WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEAL POT RAW WATER FILL ISOLATION VALVE	SHUTS OFF RAW WATER TO SEAL POT	H-2-818561 5 P20 D5	FAILS TO OPERATE	LOSS OF SEAL POT FILL	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
FILTERED WATER SUPPLY TO IMAGING SYSTEM SHUT OFF VALVE	SHUTS OFF FW TO IMAGING SYSTEM	H-2-818561 5 P20 D6	FAILS TO INDICATE	UNABLE TO FLUSH IMAGING SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEME FILTERED WATER FLUSH SHUT OFF VALVE	SHUTS OFF FILTERED WATER FLUSH TO HEME	H-2-818561 5 P20 E7	FAILS TO OPERATE	UNABLE TO FLUSH HEME	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RW HEADER TO WRSS EQUIPMENT ISOLATION	SHUTS OFF RW TO WRSS EQUIPMENT	H-2-818561 5 P20 C5	FAILS TO OPERATE	UNABLE TO FLUSH WRSS EQUIPMENT	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
BP-1362 UPSTREAM ISOLATION VALVE	ISOLATES BP-1362	H-2-818561 5 P20 C4	FAILS TO OPERATE	LOSS OF RW TO WRSS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
BP-1362 DOWNSTREAM ISOLATION VALVE	ISOLATES BP-1362	H-2-818561 5 P20 C4	FAILS TO OPERATE	LOSS OF RW TO WRSS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
INLET ISOLATION VALVE FILTER F-1361	ISOLATES FILTER INLET	H-2-818561 5 P20 D4	FAILS TO OPERATE	UNABLE TO FLUSH HEME/HEMF	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-8. SWTS RAW WATER SYSTEM (9 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-RW

SYSTEM SAFETY FUNCTION: PROVIDE RAW WATER FLUSHING OF ALL COMPONENTS

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.8

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT. REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
OUTLET ISOLATION VALVE FILTER F-1361	ISOLATES FILTER OUTLET	H-2-818561 5 P20 D5	FAILS TO OPERATE	UNABLE TO FLUSH HEME/HEMF	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
INLET ISOLATION VALVE FILTER F-1362	ISOLATES FILTER INLET	H-2-818561 5 P20 D6	FAILS TO OPERATE	UNABLE TO FLUSH HEME/HEMF	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HMF-1361 FILTERED WATER FLUSH SHUTOFF VALVE	ISOLATES FLUSH WATER TO HEMF	H-2-818561 5 P20 D7	FAILS TO OPERATE	UNABLE TO FLUSH HEMF	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PI-13631 ISOLATION VALVE	ISOLATES PI-13631	H-2-818561 5 P20 E8	LEAK	LOSS OF FILTERED WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CHEMICAL ADDITION HOSE CONNECTION TO FILTERED WATER SHUT OFF VALVE	ISOLATES CHEMICAL ADDITION FROM FLUSH WATER	H-2-818561 5 P20 E6	FAILS TO OPERATE	UNABLE TO ADD CHEMICALS TO FLUSH WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
REMOTE OPERATED HEME FILTERED WATER FLUSH SHUT OFF VALVE	SHUTS OFF FILTERED WATER FLUSH TO HEME	H-2-818561 5 P20 E7	FAILS TO OPERATE	UNABLE TO FLUSH HEME	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RAW WATER SUPPLY HEADER DRAIN VALVE	DRAINS RW SYSTEM UPSTREAM BP-1362	H-2-818561 5 P20 C5	FAILS TO OPERATE	UNABLE TO FLUSH WRSS EQUIPMENT	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
ISOLATION VALVE PIT-13616	ISOLATES PIT-13616	H-2-818561 5 P20 B3	FAILS TO OPERATE	LOSS OF RAW WATER PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
LP ISOLATION VALVE PDISH-13614	ISOLATES PDISH-13614	H-2-818561 5 P20 E7	FAILS TO OPERATE	LOSS OF DIFFERENTIAL PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-8. SWTS RAW WATER SYSTEM (9 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-RW

SYSTEM SAFETY FUNCTION: PROVIDE RAW WATER FLUSHING OF ALL COMPONENTS

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.8

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HP ISOLATION VALVE PDISH-13614	ISOLATES PDISH-13614	H-2-818561 5 P20 E6	FAILS TO OPERATE	LOSS OF DIFFERENTIAL PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
LP ISOLATION VALVE PDISH-13615	ISOLATES PDISH-13615	H-2-818561 5 P20 E5	FAILS TO OPERATE	LOSS OF LEVEL INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HP ISOLATION VALVE PDISH-13615	ISOLATES PDISH-13615	H-2-818561 5 P20 E5	FAILS TO OPERATE	LOSS OF LEVEL INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HME-1361 FILTERED FLUSH WATER PRESSURE REGULATOR	REGULATES HEME FLUSH WATER PRESSURE	H-2-818561 5 P20 E7	FAILS TO OPERATE	LOSS OF HEME FLUSH WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
WRSS RAW WATER LOW POINT DRAIN LINE	ALLOWS DRAINING SERVICE BUILDING 241-C-73 RAW WATER SYSTEM	H-2-818562 1 P26 B7	LEAK	LOSS OF RAW WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
WRSS RAW WATER SAMPLE LINE	ALLOWS SAMPLING OF RAW WATER	H-2-818562 1 P26 C3	LEAK	LOSS OF RAW WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
WRSS RAW WATER CHEMICAL ADDITION LINE	ALLOWS CHEMICAL ADDITION TO RAW WATER	H-2-818562 1 P26 C5	LEAK	LOSS OF RAW WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDISH-1365 HP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818562 1 P26 D3	LEAK	LOSS OF TRANSMITTER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDISH-1365 HP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818562 1 P26 C3	LEAK	LOSS OF TRANSMITTER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-8. SWTS RAW WATER SYSTEM (9 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-RW

SYSTEM SAFETY FUNCTION: PROVIDE RAW WATER FLUSHING OF ALL COMPONENTS

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.8

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
PDISH-1365 LP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818562 1 P26 D4	LEAK	LOSS OF TRANSMITTER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDISH-1365 LP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818562 1 P26 C4	LEAK	LOSS OF TRANSMITTER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
WRSS RAW WATER SUPPLY LINE	RAW WATER TO WRSS COMPONENTS	H-2-818562 1 P26 B2	LEAK	LOSS OF RAW WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
WRSS RAW WATER SUPPLY LINE	PROVIDES RAW WATER TO WRSS COMPONENTS	H-2-818562 1 P26 C4	LEAK	LOSS OF RAW WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
BACKFLOW BP-1361 PREVENTER OUTLET CHECK VALVE	PREVENTS BACKFLOW TO BACKFLOW PREVENTER	H-2-818562 1 P26 C4	FAILS TO OPERATE	LOSS OF RAW WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RAW WATER FLUSH BACKFLOW PREVENTER	PREVENTS CONTAMINATION OF RAW WATER SYSTEM IN SERVICE BLDG	H-2-818562 1 P26 C4	FAILS TO OPERATE	INCREASE POTENTIAL TO CONTAMINATE RW SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
DUPLEX BASKET STRAINER	FILTERS RAW WATER USED FOR FLUSHING	H-2-818562 1 P26 C3	STRAINER FAILS	PLUGGING OF SPRAY NOZZLES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SERVICE BUILDING 241-C-73 EXHAUST FAN	PROVIDES AIR EXHAUST FOR SERVICE BUILDING	H-2-818562 1 P26 D2	FAILS TO OPERATE	SERVICE BUILDING OVERHEATS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SERVICE BUILDING 241-C-73 HEATING COIL	SOURCE OF HEAT FOR SERVICE BUILDING	H-2-818562 1 P26 D3	FAILS TO OPERATE	LOSS OF TEMPERATURE CONTROL OF BUILDING 241-C-73	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-8. SWTS RAW WATER SYSTEM (9 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-RW

SYSTEM SAFETY FUNCTION: PROVIDE RAW WATER FLUSHING OF ALL COMPONENTS

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.8

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
RAW WATER CHEMICAL ADDITION ISOLATION VALVE	ISOLATES CHEMICAL ADDITION LINE	H-2-818562 1 P26 C5	FAILS TO OPERATE	LOSS OF CHEMICAL ADDITION ABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
LP ISOLATION VALVE PDISH-1365	ISOLATES PDISH-1365	H-2-818562 1 P26 C4	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HP ISOLATION VALVE PDISH-1365	ISOLATES PDISH-1365	H-2-818562 1 P26 C3	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HOSE CONNECTION SHUTOFF VALVE	ISOLATES SERVICE BUILDING RW SAMPLE	H-2-818562 1 P26 C3	FAILS TO OPERATE	UNABLE TO VERIFY RW QUALITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SERVICE BUILDING 241-C-73 RAW WATER DRAIN VALVE	ISOLATES SERVICE BUILDING RW DRAIN	H-2-818562 1 P26 B8	FAILS TO OPERATE	UNABLE TO DRAIN SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RAW WATER SHUTOFF VALVE	ISOLATES WRSS RAW WATER SUPPLY	H-2-818562 1 P26 B2	FAILS TO OPERATE	LOSS OF RAW WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
DUPLEX STRAINER F-1363 INLET VALVE	ISOLATES STRAINER	H-2-818562 1 P26 C3	FAILS TO OPERATE	LOSS OF RAW WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
BACKFLOW BP-1361 PREVENTER INLET VALVE	ISOLATES BACK FLOW PREVENTER	H-2-818562 1 P26 C4	FAILS TO OPERATE	LOSS OF RAW WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
BACKFLOW BP-1361 PREVENTER OUTLET VALVE	ISOLATES BACK FLOW PREVENTER	H-2-818562 1 P26 C4	FAILS TO OPERATE	LOSS OF RAW WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-9. SWTS COMPRESSED AIR SYSTEM (3 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-1A

SYSTEM SAFETY FUNCTION: PROVIDE AIR PURGE AND VALVE POSITIONING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.9

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
INSTRUMENT AIR SUPPLY TO C-106 PRESSURE SENSING LINE	REDUCES CONTAMINATION OF SENSING LINE	H-2-818559 2 P21 E1	LEAK	LOSS OF TANK PRESSURE MONITORING	PASSIVE TANK OVER/UNDER PRESSURE PROTECTION PROVIDED BY REDUNDANT SEAL LOOPS; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SHUTOFF VALVE INSTRUMENT AIR TO C-106 PRESSURE SENSING LINE	ISOLATES INSTRUMENT AIR FROM PRESSURE TRANSMITTER	H-2-818559 2 P21 D1	FAILS CLOSED	LOSS OF TANK PRESSURE MONITORING	PASSIVE TANK OVER/UNDER PRESSURE PROTECTION PROVIDED BY REDUNDANT SEAL LOOPS; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PURGE AIR TO IMAGING SYSTEM RISER R-7	AIR PURGE OF RISER; MOTIVE POWER FOR POSITIONER	H-2-818559 2 P23 E2	FAILS TO OPERATE	LOSS OF PURGE AIR; LOSS OF POSITIONER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PURGE AIR TO IMAGING SYSTEM RISER R-7 SHUTOFF VALVE	ISOLATES INSTRUMENT AIR SUPPLY	H-2-818559 3 P23 E1	FAIL CLOSED	LOSS OF PURGE AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
BLOW DOWN AIR FROM AIR ACCUMULATOR TANK TO HEMF	REMOVES FLUSH WATER FROM HEMF	H-2-818561 4 P27 C1	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
INSTRUMENT AIR SUPPLY LINE TO PCV-13628	PROVIDES INSTRUMENT AIR TO PCVHV-13628	H-2-818561 5 P20 C7	LEAK	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PURGE AIR TO IMAGING SYSTEM	PROVIDES PURGE AIR TO IMAGING SYSTEM	H-2-818561 5 P20 B8	LEAK	LOSS OF PURGE AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
INSTRUMENT AIR TO ACCUMULATOR TK-1361 SHUT OFF VALVE	ISOLATES ACCUMULATOR	H-2-818561 5 P20 C7	FAILS TO OPERATE	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-9. SWTS COMPRESSED AIR SYSTEM (3 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-1A

SYSTEM SAFETY FUNCTION: PROVIDE AIR PURGE AND VALVE POSITIONING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.9

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
INSTRUMENT PURGE AIR PRESSURE REGULATOR	REGULATES PURGE AIR PRESSURE TO WRSS INSTRUMENTATION	H-2-818561 5 P20 B7	LEAK	LOSS OF INSTRUMENTATION ACCURACY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
20# INSTRUMENT AIR RELIEF VALVE	PROTECTS 20# INSTRUMENT AIR HEADER FROM OVER PRESSURE	H-2-818561 5 P20 C8	FAILS TO OPERATE	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
WRSS INSTRUMENT AIR DISTRIBUTION HEADER	SUPPLIES WRSS INSTRUMENT AIR	H-2-818562 1 P26 C7	LEAK	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AIR RECEIVER DRAIN LINE	ALLOWS DRAINING MOISTURE FROM RECEIVER	H-2-818562 1 P26 C5	LEAK	LOSS OF COMPRESSED AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AIR COMPRESSOR DISCHARGE LINE	ROUTES COMPRESSED AIR TO SYSTEM	H-2-818562 1 P26 C5	LEAK	LOSS OF COMPRESSED AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PIT-1364 SENSING LINE	PRESSURE TRANSMITTER IMPULSE LINE	H-2-818562 1 P26 C7	LEAK	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AIR DRYER D-1361 INLET FILTER	FILTERS COMPRESSED AIR BEFORE DRYER	H-2-818562 1 P26 C5	FAILS TO OPERATE	LOSS OF COMPRESSED AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AIR DRYER D-1361 OUTLET FILTER	FILTERS COMPRESSED AIR AFTER DRYER	H-2-818562 1 P26 C6	FAILS TO OPERATE	LOSS OF COMPRESSED AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AIR DRYER D-1361 OUTLET FILTER DRAIN VALVE	DRAINS MOISTURE FROM FILTER	H-2-818562 1 P26 C6	FAILS TO OPERATE	LOSS OF COMPRESSED AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-9. SWTS COMPRESSED AIR SYSTEM (3 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-IA

SYSTEM SAFETY FUNCTION: PROVIDE AIR PURGE AND VALVE POSITIONING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.1.9

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
AIR COMPRESSOR AND RECEIVER	PROVIDES COMPRESSED AIR TO WRSS EQUIPMENT	H-2-818562 1 P26 D5	FAILS TO OPERATE	LOSS OF COMPRESSED AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AIR DRYER	REMOVES MOISTURE FROM COMPRESSED AIR	H-2-818562 1 P26 D6	FAILS TO OPERATE	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
DRAIN VALVE COMPRESSED AIR RECEIVER	ISOLATES RECEIVER DRAIN	H-2-818562 1 P26 C5	FAILS TO OPERATE	INCREASE IN COMPRESSED AIR MOISTURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SHUTOFF DAMPER FROM EXISTING AIR INTAKE	ISOLATES EXISTING AIR INTAKE FROM TANK	H-2-818559 2 P21 D2	FAILS OPEN	LOSS OF TANK PRESSURE CONTROL	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PRESSURE SENSING PIPING	PROVIDES CONNECTION FOR PRESSURE INSTRUMENTATION	H-2-818561 1 P27 E3	LEAK	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RELIEF VALVE INLET PIPING	PROTECTS PIPING DOWNSTREAM OF PRESSURE REGULATOR	H-2-818561 1 P27 B7	LEAK	LOSS OF TANK PRESSURE PROTECTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PRESSURE RELIEF LOOP SEAL	PREVENTS UNDER/OVER PRESSURE OF TANK C106	H-2-818561 1 P27 B7	PLUGGED	LOSS OF TANK PRESSURE PROTECTION	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4	3
PRESSURE RELIEF LOOP SEAL	PREVENTS UNDER/OVER PRESSURE OF TANK C106	H-2-818561 1 P27 B5	PLUGGED	LOSS OF TANK PRESSURE PROTECTION	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4	3
PRESSURE INSTRUMENTATION SHUTOFF VALVE	ISOLATE PRESSURE INSTRUMENTATION	H-2-818561 1 P27 E3	FAILS AS IS	LOSS OF PRESSURE INSTRUMENTATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CHILLER RETURN HEADER DRAIN LINE	DRAINS RETURN HEADER	H-2-818561 2 P23 D2	LEAK	DECREASED EFFICIENCY OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CHILLER SUPPLY HEADER DRAIN LINE	DRAINS SUPPLY HEADER	H-2-818561 2 P23 C2	LEAK	DECREASED EFFICIENCY OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AIR SEPARATOR VENT LINE	VENTS AIR FROM SYSTEM	H-2-818561 2 P23 C6	LEAK	LOSS OF CIRC PUMP SUCTION PRESSURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
BYPASS LINE AROUND PCV-1368	ALLOWS PRESSURE REGULATING VALVE TO BE BYPASSED	H-2-818561 2 P23 B7	LEAK	LOSS OF CHILLER MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
INLET LINE TO PCV-1368	MAKE UP TO PRESSURE REGULATING VALVE	H-2-818561 2 P23 C6	LEAK	LOSS OF CHILLER MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
OUTLET LINE FROM PCV-1368	OUTLET OF PRESSURE REGULATOR	H-2-818561 2 P23 C6	LEAK	LOSS OF CHILLER MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PI-1368 SENSING LINE	PRESSURE INDICATOR IMPULSE LINE	H-2-818561 2 P23 C7	LEAK	LOSS OF CHILLER MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
OUTLET LINE FROM EXPANSION TANK TK-1362	CONNECTS EXPANSION TANK TO CIRC PUMP SUCTION LINE	H-2-818561 2 P23 C6	LEAK	LOSS OF CHILLER MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PI-1367 SENSING LINE	PRESSURE INDICATOR IMPULSE LINE	H-2-818561 2 P23 C7	LEAK	LOSS OF CHILLER MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PI-1366 SENSING LINE	PRESSURE INDICATOR IMPULSE LINE	H-2-818561 2 P23 B6	LEAK	LOSS OF CHILLER MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDISH-1369 HP SENSING LINE	PRESSURE INDICATING SWITCH IMPULSE TUBE	H-2-818561 2 P23 D6	LEAK	LOSS OF HIGH PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDISH-1369 LP SENSING LINE	PRESSURE INDICATING SWITCH IMPULSE TUBE	H-2-818561 2 P23 D5	LEAK	LOSS OF HIGH PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
PISL-13610 SENSING LINE	PRESSURE INDICATING SWITCH IMPULSE TUBE	H-2-818561 2 P23 D3	LEAK	LOSS OF LOW PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDISH-1369 HP SENSING LINE	PRESSURE INDICATING SWITCH IMPULSE LINE	H-2-818561 2 P23 C6	LEAK	LOSS OF HIGH PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDISH-1369 LP SENSING LINE	PRESSURE INDICATING SWITCH IMPULSE LINE	H-2-818561 2 P23 C5	LEAK	LOSS OF HIGH PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PISL-13610 SENSING LINE	PRESSURE INDICATING SWITCH IMPULSE LINE	H-2-818561 2 P23 C3	LEAK	LOSS OF LOW PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CHILLER RETURN HEADER	ROUTES CHILLER FLUID BACK TO CHILLER	H-2-818561 2 P23 D7	LEAK	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PSV-1362 INLET LINE	CONNECTS RELIEF VALVE TO RETURN HEADER	H-2-818561 2 P23 D7	LEAK	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CHILLER PIPING TO AIR SEPARATOR	SENDS CHILLER FLUID TO AIR SEPARATOR	H-2-818561 2 P23 C7	LEAK	DECREASE EFFICIENCY OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CHILLER PIPING TO DUPLEX STRAINER	ROUTES CHILLER FLUID TO CIRC PUMPS	H-2-818561 2 P23 C6	LEAK	DECREASE EFFICIENCY OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMPS SUCTION LINE	ROUTES CHILLER FLUID TO CIRC PUMPS	H-2-818561 2 P23 C5	LEAK	DECREASE EFFICIENCY OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
CIRC PUMPS DISCHARGE HEADER	ROUTES CHILLER FLUID TO HEAT EXCHANGER	H-2-818561 2 P23 C4	LEAK	DECREASE EFFICIENCY OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP P1365 SUCTION LINE	ROUTES CHILLER FLUID TO CIRC PUMP	H-2-818561 2 P23 C5	LEAK	DECREASE EFFICIENCY OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP P1365 DISCHARGE LINE	ROUTES CHILLER FLUID TO DISCHARGE HEADER	H-2-818561 2 P23 C4	LEAK	DECREASE EFFICIENCY OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AIR VENT VALVE	RELEASES AIR FROM CHILLER SYSTEM	H-2-818561 2 P23 D6	FAILS TO OPERATE	POTENTIAL TO AIR BIND CIRC PUMP(S)	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMPS DUPLEX SUCTION STRAINER	PREVENTS DEBRIS FROM ENTERING CIRC PUMPS	H-2-818561 2 P23 C5	PLUG	LOSS OF CIRC PUMPS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
MAKE UP TANK TK-1361 OUTLET STRAINER	PREVENTS DEBRIS FROM ENTERING CHILLER SYSTEM	H-2-818561 2 P23 C7	PLUG	LOSS OF CIRC PUMPS SUCTION PRESSURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
DRAIN VALVE GLYCOL SUPPLY HEADER	DRAIN VALVE GLYCOL SUPPLY HEADER	H-2-818561 2 P23 C2	LEAK	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
DRAIN VALVE GLYCOL RETURN HEADER	DRAIN GLYCOL RETURN HEADER	H-2-818561 2 P23 D2	LEAK	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PI-1367 ISOLATION VALVE	ISOLATES PI-1367	H-2-818561 2 P23 B8	LEAK	LOSS OF CHILLER SYSTEM MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
PI-1366 ISOLATION VALVE	ISOLATES PI-1366	H-2-818561 2 P23 B6	LEAK	LOSS OF CHILLER SYSTEM MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HP ISOLATION VALVE PDISH-1369	ISOLATES PDISH-1369	H-2-818561 2 P23 D5	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
LP ISOLATION VALVE PDISH-1369	ISOLATES PDISH-1369	H-2-818561 2 P23 D5	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CHILLER OUTLET ISOLATION VALVE	ISOLATES CHILLER FROM CIRC PUMPS	H-2-818561 2 P23 C7	LEAK	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP P-1364 SUCTION VALVE	ISOLATES CIRC PUMP SUCTION	H-2-818561 2 P23 C4	FAILS TO OPERATE	BACK UP CIRC PUMP AVAILABLE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP P-1364 DISCHARGE CHECK/SHUTOFF VALVE	ISOLATES CIRC PUMP DISCHARGE	H-2-818561 2 P23 C3	FAILS TO OPERATE	BACK UP CIRC PUMP AVAILABLE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP P-1365 SUCTION VALVE	ISOLATES CIRC PUMP SUCTION	H-2-818561 2 P23 B4	FAILS TO OPERATE	BACK UP CIRC PUMP AVAILABLE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP P-1365 DISCHARGE CHECK/SHUTOFF VALVE	ISOLATES CIRC PUMP DISCHARGE	H-2-818561 2 P23 B3	FAILS TO OPERATE	BACK UP CIRC PUMP AVAILABLE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CHILLER INLET ISOLATION VALVE	ISOLATES CHILLER FROM SYSTEM	H-2-818561 2 P23 D7	LEAK	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
PCV-1368 OUTLET ISOLATION VALVE	ISOLATES PCV-1368	H-2-818561 2 P23 C6	LEAK	LOSS OF CHILLER SYSTEM MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PCV-1368 BYPASS VALVE	BYPASSES PCV-1368	H-2-818561 2 P23 B7	LEAK	LOSS OF CHILLER SYSTEM MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXPANSION TANK TK-1362 ISOLATION VALVE	ISOLATES EXPANSION TANK	H-2-818561 2 P23 B6	LEAK	LOSS OF CHILLER SYSTEM MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AIR SEPARATOR TK-1363 VENT VALVE	VENTS AIR SEPARATOR TO ATMOSPHERE	H-2-818561 2 P23 D6	FAILS TO VENT	POTENTIAL TO AIR BIND CIRC PUMPS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
STRAINER F-1365 BLOWDOWN VALVE	BLOWDOWN STRAINER	H-2-818561 2 P23 C7	FAILS TO OPERATE; STRAINER PLUGS	LOSS OF CHILLER SYSTEM MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PI-1368 ISOLATION VALVE	ISOLATES PI-1368	H-2-818561 2 P23 C6	LEAK	LOSS OF CHILLER SYSTEM MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PISL-13610 ISOLATION VALVE	ISOLATES PISL-13610	H-2-818561 2 P23 C3	LEAK	LOSS OF LOW PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PCV-1368 INLET ISOLATION VALVE	ISOLATES PCV-1368	H-2-818561 2 P23 C7	LEAK	LOSS OF CHILLER SYSTEM MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CHILLER SYSTEM CIRC PUMP	RECIRCULATES GLYCOL SOLUTION THROUGH CHILLER SYSTEM	H-2-818561 2 P23 C4	FAILS TO OPERATE	BACK UP CIRC PUMP AVAILABLE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
CHILLER SYSTEM CIRC PUMP	RECIRCULATES GLYCOL SOLUTION THROUGH CHILLER SYSTEM	H-2-818561 2 P23 B4	FAILS TO OPERATE	BACK UP CIRC PUMP AVAILABLE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
MAKE UP TANK TK-1361 PRESSURE REGULATOR	MAINTAINS SUCTION PRESSURE OF CIRC PUMPS	H-2-818561 2 P23 C7	FAILS TO OPERATE	LOSS OF CIRC PUMP SUCTION PRESSURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CHILLER RETURN HEADER RELIEF VALVE	PROTECTS CHILLER FROM OVER PRESSURE	H-2-818561 2 P23 D7	FAILS TO OPERATE	OVERPRESSURIZE CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AIR COOLED CHILLER	PROVIDES VENTILATION SYSTEM HEAT REMOVAL	H-2-818561 2 P23 D8	LOSS OF CHILLER	FAILURE OF DOWNSTREAM EQUIPMENT DUE TO INCREASE IN MOISTURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
MAKE UP STORAGE TANK	PROVIDES PREMIXED GLYCOL SOLUTION FOR SYSTEM MAKE UP	H-2-818561 2 P23 B7	LEAK; LOSS OF MAKEUP GLYCOL SOLUTION	POTENTIAL TO AIR BIND CIRC PUMPS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXPANSION TANK	PROVIDES ADDITIONAL SYSTEM VOLUME FOR HEAT UP AND COOL DOWN	H-2-818561 2 P23 B6	LEAK	POTENTIAL OF FAILURE OF CIRC PUMPS DUE TO LOSS OF SUCTION HEAD	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AIR SEPARATOR	REMOVES AIR FROM CHILLER SYSTEM	H-2-818561 2 P23 C6	DECREASE IN CHILLER EFFICIENCY	POTENTIAL TO AIR BIND CIRC PUMP(S)	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
MOISTURE SEPARATOR DRAIN LINE	DRAINS CONDENSATE TO SEAL POT	H-2-818561 3 P30 C5	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN DRAIN LINE	DRAINS CONDENSATE TO SEAL POT	H-2-818561 3 P30 C2	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HEATING COIL DRAIN LINE	DRAINS CONDENSATE TO SEAL POT	H-2-818561 3 P30 C5	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEAT EXCHANGER SHELL SIDE DRAIN	DRAINS CONDENSATE TO SEAL POT	H-2-818561 3 P30 C6	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEAT EXCHANGER SHELL SIDE CLEANING CONNECTION	ALLOWS CHEMICAL CLEANING OF HEAT EXCHANGER SHELL SIDE	H-2-818561 3 P30 D7	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEAT EXCHANGER SHELL SIDE CLEANING CONNECTION	ALLOWS CHEMICAL CLEANING OF HEAT EXCHANGER SHELL SIDE	H-2-818561 3 P30 D7	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PT-13611/PDT-13611 HP SENSING TUBE	PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818561 3 P30 D7	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDT-13611 LP SENSING TUBE	PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818561 3 P30 D6	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEAT EXCHANGER HX-1361 INLET DUCT	TRANSMITS AIR FROM TANK C-106 TO CONDENSER HX-1361	H-2-818561 3 P30 B7	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEAT EXCHANGER HX-1361 OUTLET DUCT	TRANSMITS AIR FROM HEAT EXCHANGER TO RECIRCULATION FAN	H-2-818561 3 P30 D6	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEAL POT TEST CONNECTION	ALLOWS TESTING OF SEAL POT DOUBLE CONFINEMENT	H-2-818561 3 P30 B4	LEAK	LOSS OF SEAL POT DOUBLE CONFINEMENT	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SEAL POT DRAIN TO C-106 RISER "R-4"	DRAINS SEAL POT TO C-106	H-2-818561 3 P30 A4	LEAK	POTENTIAL RELEASE OF RADIOACTIVE MATERIAL TO THE ENVIRONMENT	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEAL POT DRAIN ENCAPSULATION LINE	PROVIDES SECONDARY CONFINEMENT FOR SEAL POT DRAIN	H-2-818561 3 P30 A4	LEAK	LOSS OF SEAL POT DOUBLE CONFINEMENT	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
MOISTURE SEPARATOR MS-1361 INLET DUCT	CONVEYS EXHAUST AIR FROM HEAT EXCHANGER TO MOISTURE SEPARATOR	H-2-818561 3 P30 C6	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
MOISTURE SEPARATOR MS-1361 OUTLET DUCT	CONVEYS EXHAUST AIR FROM MOISTURE SEPARATOR TO HEATING COIL	H-2-818561 3 P30 C6	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEME INLET DUCT	CONVEYS EXHAUST AIR FROM CONDENSER TO HEME	H-2-818561 3 P30 C4	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PORTABLE EXHAUSTER CONNECTION	ALLOWS USE OF PORTABLE EXHAUSTER	H-2-818561 3 P30 C6	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL INLET DUCT	CONVEYS EXHAUST AIR FROM MOISTURE SEPARATOR TO HEATING COIL	H-2-818561 3 P30 D5	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN INLET DUCT	RECIRCULATES TANK C-106 AIR/VAPOR	H-2-818561 3 P30 D4	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN OUTLET DUCT	RECIRCULATES TANK C-106 AIR/VAPOR	H-2-818561 3 P30 C2	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SEAL POT	COLLECTS PROCESS BUILDING DRAINS	H-2-818561 3 P30 B30	LEAK/OVERFILL	RELEASE OF CONTAMINANTS TO ENVIRONMENT	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CENTRIFUGAL RECIRCULATION FAN	PROVIDES AIR MOVEMENT FOR VENTILATION RECIRCULATION OF C-106	H-2-818561 3 P30 D2	FAILS TO OPERATE	LOSS OF TANK C-106 COOLING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
ELECTRIC DEHUMIDIFICATION HEATING COIL - RECIRCULATION FAN INLET	DECREASES RELATIVE HUMIDITY OF C-106 RECIRCULATION LOOP	H-2-818561 3 P30 C5	FAILS TO OPERATE	FAILURE OF DOWNSTREAM EQUIPMENT DUE TO INCREASE IN MOISTURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1361 DRAIN VALVE	DRAINS HEATING COIL	H-2-818561 3 P30 C4	FAILS TO OPERATE	LOSS OF HEATING COIL	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEAT EXCHANGER HX-1361 DRAIN VALVE	DRAINS CONDENSER	H-2-818561 3 P30 B4	FAILS TO OPERATE	FAILURE OF DOWNSTREAM EQUIPMENT DUE TO INCREASE IN MOISTURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEME, HME-1361 DRAIN VALVE	DRAINS HEME	H-2-818561 3 P30 B3	FAILS TO OPERATE	FAILURE OF DOWNSTREAM EQUIPMENT DUE TO INCREASE IN MOISTURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
MOISTURE SEPARATOR MS-1361 DRAIN VALVE	DRAINS MOISTURE SEPARATOR	H-2-818561 3 P30 C4	FAILS TO OPERATE	FAILURE OF DOWNSTREAM EQUIPMENT DUE TO INCREASE IN MOISTURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN DRAIN VALVE	DRAINS RECIRCULATION FAN	H-2-818561 3 P30 C3	FAILS TO OPERATE	LOSS OF FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEAT EXCHANGER HX-1361 SHELL SIDE INLET DAMPER	ISOLATES HEAT EXCHANGER FROM C-106	H-2-818561 3 P30 D7	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
PORTABLE EXHAUSTER CONNECTION SHUT OFF DAMPER	ISOLATES PORTABLE EXHAUSTER CONNECTION	H-2-818561 3 P30 B8	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEAT EXCHANGER HX-1361 TUBE SIDE OUTLET VALVE	RETURNS GLYCOL SOLUTION FROM HEAT EXCHANGER TO CHILLER	H-2-818561 3 P30 D7	LEAK	DECREASE EFFICIENCY OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEAT EXCHANGER HX-1361 TUBE SIDE INLET VALVE	SUPPLIES GLYCOL SOLUTION TO HEAT EXCHANGER TO CHILLER	H-2-818561 3 P30 C7	LEAK	DECREASE EFFICIENCY OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEAT EXCHANGER HX-1361 SHELL SIDE OUTLET DAMPER	ISOLATES HEAT EXCHANGER FROM RECIRCULATION FAN	H-2-818561 3 P30 D7	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PT-13611/PDT-13611 HP ISOLATION VALVE	ISOLATES PT-13611/PDT-13611 HP	H-2-818561 3 P30 E7	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDT-13611 LP ISOLATION VALVE	ISOLATES PDT-13611 LP	H-2-818561 3 P30 E6	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN DISCHARGE DAMPER	SHUTS OFF RECIRCULATION FAN DISCHARGE	H-2-818561 3 P30 B1	FAILS TO OPERATE	LOSS OF RECIRC FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEAT EXCHANGER (TUBE SIDE - GLYCOL SOLUTION, SHELL SIDE - AIR)	COOLS AND CONDENSES MOISTURE FROM C-106 EXHAUST AIR	H-2-818561 3 P30 C7	FAILS TO COOL	FAILURE OF DOWNSTREAM EQUIPMENT DUE TO INCREASE IN MOISTURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
MOISTURE SEPARATOR	REMOVES MOISTURE FROM RECIRCULATION FAN SUCTION	H-2-818561 3 P30 D6	FAILS TO REMOVE MOISTURE	FAILURE OF DOWNSTREAM EQUIPMENT DUE TO INCREASE IN MOISTURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HME-1361 DRAIN LINE	ROUTES HEME DRAINS TO SEAL POT	H-2-818561 4 P27 C7	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDT-13612 HP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818561 4 P27 D7	LEAK	LOSS OF HEME DIFFERENTIAL PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDT-13612 LP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818561 4 P27 D7	LEAK	LOSS OF HEME DIFFERENTIAL PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDT-13613 HP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818561 4 P27 D3	LEAK	LOSS OF HEME DIFFERENTIAL PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDT-13613 LP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818561 4 P27 D3	LEAK	LOSS OF HEME DIFFERENTIAL PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEMF DRAIN ENCASEMENT TEST CONNECTION	ALLOWS TESTING OF ENCASEMENT LINE	H-2-818561 4 P27 A4	LEAK	LOSS OF CONFINEMENT INTEGRITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HME-1361 INLET SAMPLE PORT	ALLOWS SAMPLING OF HEME INLET	H-2-818561 4 P27 B8	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HME-1361 OUTLET/ HMF-1361 INLET SAMPLE PORT	ALLOWS SAMPLING OF HEME OUTLET/HEMF INLET	H-2-818561 4 P27 B6	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HMF-1361 OUTLET SAMPLE PORT	ALLOWS SAMPLING OF HEMF OUTLET	H-2-818561 4 P27 C2	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HMF-1361 DRAIN TO SEAL POT	ROUTES HEMF DRAINS TO SEAL POT	H-2-818561 4 P27 A4	LEAK	LEAKAGE CONTAINED BY ENCASEMENT	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEMF DRAIN ENCASEMENT	ROUTES DRAIN LINE LEAKAGE TO SEAL POT	H-2-818561 4 P27 A3	LEAK	RELEASE TO SOIL COLUMN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HME-1361 OUTLET DUCT	CONVEYS EXHAUST AIR FROM HEME TO HEMF	H-2-818561 4 P27 D6	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEME BYPASS EXHAUST AIR DUCT	CONVEYS EXHAUST AIR AROUND HEME-1361	H-2-818561 4 P27 C8	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEME/HEMF BYPASS DUCT	ALLOWS EXHAUST AIR TO BYPASS HEME OR HEMF	H-2-818561 4 P27 C6	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEMF BYPASS DUCT	ALLOWS EXHAUST AIR TO BYPASS HEMF	H-2-818561 4 P27 B5	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HMF-1361 INLET DUCT	CONVEYS EXHAUST AIR FROM HEME TO HEMF	H-2-818561 4 P27 D5	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HMF-1361 OUTLET DUCT	CONVEYS EXHAUST AIR FROM HEMF	H-2-818561 4 P27 D3	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST STACK INLET	CONVEYS EXHAUST AIR FROM HEME/HEMF TO EXHAUST STACK	H-2-818561 4 P27 D2	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HEME SHIELDING	PROVIDES RADIATION PROTECTION FOR OPERATORS	H-2-818561 4 P27 C7	LOSS OF SHIELDING	INCREASE IN OPERATOR EXPOSURES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEMF SHIELDING	PROVIDES RADIATION PROTECTION FOR OPERATORS	H-2-818561 4 P27 C3	LOSS OF SHIELDING	INCREASE IN OPERATOR EXPOSURES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HIGH EFFICIENCY MIST ELIMINATOR (HEME)	REMOVES MOISTURE VAPOR FROM EXHAUST AIR	H-2-818561 4 P27 C7	FILTER BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HIGH EFFICIENCY METAL FILTER (HEMF)	REMOVES RADIONUCLIDES FROM EXHAUST AIR	H-2-818561 4 P27 C3	FILTER BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HME-1361 OUTLET/HMF-1361 INLET SAMPLE PORT ISOLATION VALVE	PROVIDES SAMPLE PORT SHUTOFF	H-2-818561 4 P27 B6	FAILS OPEN	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HMF-1361 OUTLET SAMPLE PORT ISOLATION VALVE	PROVIDES SAMPLE PORT SHUTOFF	H-2-818561 4 P27 B2	FAILS OPEN	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HME-1361 INLET SAMPLE PORT ISOLATION VALVE	PROVIDES SAMPLE PORT SHUTOFF	H-2-818561 4 P27 B8	FAILS OPEN	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HMF-1361 DRAIN SHUTOFF VALVE	ALLOWS DRAINING OF HEMF TO SEAL POT	H-2-818561 4 P27 B4	FAILS CLOSED	FAILURE OF DOWNSTREAM EQUIPMENT DUE TO INCREASED MOISTURE CONTENT	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HME-1361 BYPASS DAMPER	BYPASSES HEME	H-2-818561 4 P27 B6	FAILS OPEN	FAILURE OF DOWNSTREAM EQUIPMENT DUE TO INCREASED MOISTURE CONTENT	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HMF-1361 BYPASS DAMPER	BYPASSES HEMF	H-2-818561 4 P27 B5	FAILS OPEN	FAILURE OF DOWNSTREAM EQUIPMENT DUE TO INCREASED MOISTURE CONTENT	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HME-1361 OUTLET DAMPER	ISOLATES OUTLET FROM HEME	H-2-818561 4 P27 D6	FAILS CLOSED	LOSS OF EXHAUST SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HMF-1361 INLET DAMPER	ISOLATES INLET TO HEMF	H-2-818561 4 P27 C4	FAILS CLOSED	LOSS OF EXHAUST SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HMF-1361 OUTLET DAMPER	ISOLATES OUTLET FROM HEMF	H-2-818561 4 P27 C3	FAILS CLOSED	LOSS OF EXHAUST SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HME-1361 INLET DAMPER	ISOLATES INLET TO HEME	H-2-818561 4 P27 C8	FAILS CLOSED	LOSS OF EXHAUST SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDT-13612 HP ISOLATION VALVE	ISOLATES HP SIDE PDT-13612	H-2-818561 4 P27 E7	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDT-13612 LP ISOLATION VALVE	ISOLATES LP SIDE PDT-13612	H-2-818561 4 P27 E7	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDT-13613 HP ISOLATION VALVE	ISOLATES HP SIDE PDT-13613	H-2-818561 4 P27 E3	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDT-13613 LP ISOLATION VALVE	ISOLATES LP SIDE PDT-13613	H-2-818561 4 P27 E3	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
AIR ACCUMULATOR TANK	PROVIDES AIR VOLUME TO BLOW FLUSH WATER FROM HEMF	H-2-818561 4 P27 B1	OVERPRESSURIZE FILTER HOUSING CAUSING FILTER BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 1 UNIT HEATER	PROVIDES HEATING FOR ROOM 1	H-2-818561 4 P27 D1	LOSS OF HEATER	FAILS TO HEAT ROOM 1	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 2 UNIT HEATER	PROVIDES HEATING FOR ROOM 2	H-2-818561 5 P20 E1	LOSS OF HEATER	FAILS TO HEAT ROOM 2	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDIT-13620 HP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818561 6 P25 D5	LEAK	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDIT-13620 HP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818561 6 P25 D5	LEAK	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDIT-13618 HP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818561 6 P25 D5	LEAK	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDIT-13618 HP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818561 6 P25 D5	LEAK	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDIT-13618 LP/ PDIT-13619 HP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818561 6 P25 D4	LEAK	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDIT-13618 LP/ PDIT-13619 HP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818561 6 P25 D4	LEAK	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
PDIT-13619 LP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818561 6 P25 D4	LEAK	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDIT-13619 LP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818561 6 P25 D4	LEAK	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDIT-13620 LP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818561 6 P25 D4	LEAK	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PDIT-13620 LP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818561 6 P25 D4	LEAK	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST FAN FN-1362 DRAIN LINE	ROUTES DRAINS TO SAMPLE PORT	H-2-818561 6 P25 B2	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1362 DRAIN LINE	ROUTES DRAINS TO SAMPLE PORT	H-2-818561 6 P25 B6	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEPA FILTER HEP-1362 DRAIN LINE	ROUTES DRAINS TO SAMPLE PORT	H-2-818561 6 P25 B3	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEPA FILTER HEP-1361 DRAIN LINE	ROUTES DRAINS TO SAMPLE PORT	H-2-818561 6 P25 B5	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST FAN INLET DUCT	TRANSMITS AIR FROM HEPA FILTER TO EXHAUST FAN	H-2-818561 6 P25 C3	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY GLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
EXHAUST FAN OUTLET DUCT	TRANSMITS AIR FROM EXHAUST FAN TO STACK	H-2-818561 6 P25 C2	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1362 INLET DUCT	TRANSMITS EXHAUST AIR TO HEATING COIL	H-2-818561 6 P25 C7	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEPA FILTER HEP-1361 INLET DUCT	TRANSMITS EXHAUST AIR FROM HEATING COIL TO HEPA FILTER	H-2-818561 6 P25 C5	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST SKID	PROVIDES STRUCTURAL SUPPORT FOR AIR CLEANUP AND STACK EQUIPMENT	H-2-818561 6 P25 A4	LOSS OF EXHAUST EQUIPMENT; DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CENTRIFUGAL EXHAUST FAN	TRANSMITS EXHAUST AIR FROM HEPA FILTER TO STACK	H-2-818561 6 P25 C2	FAILS TO OPERATE	LOSS OF TANK C-106 PRESSURE CONTROL	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
ELECTRIC HEATING COIL - EXHAUST SKID	PREVENTS MOISTURE CONDENSATION ON HEPA FILTERS	H-2-818561 6 P25 C6	FAILS TO OPERATE	FAILURE OF DOWNSTREAM EQUIPMENT DUE TO INCREASE IN MOISTURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEPA FILTER - 1ST STAGE; EXHAUST SKID	REMOVES PARTICULATE MATERIAL FROM EXHAUST AIR	H-2-818561 6 P25 C5	FILTER BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEPA FILTER - 2ND STAGE; EXHAUST SKID	REMOVES PARTICULATE MATERIAL FROM EXHAUST AIR	H-2-818561 6 P25 C4	FILTER BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
DRAIN VALVE HEATING COIL HC-1362	ISOLATES HEATER DRAIN	H-2-818561 6 P25 C6	FAILS TO OPERATE	FAILURE OF HEATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
LG-1361 OUTLET VALVE	ISOLATES SIGHT GLASS	H-2-818561 6 P25 C6	FAILS TO OPERATE	FAILURE OF HEATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
LG-1362 OUTLET VALVE	ISOLATES SIGHT GLASS	H-2-818561 6 P25 C5	FAILS TO OPERATE	FAILURE OF HEPA FILTER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
DRAIN VALVE HEPA FILTER HEP-1361	ISOLATES FILTER DRAIN	H-2-818561 6 P25 C5	FAILS TO OPERATE	FAILURE OF HEPA FILTER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
DRAIN VALVE HEPA FILTER HEP-1362	ISOLATES FILTER DRAIN	H-2-818561 6 P25 C4	FAILS TO OPERATE	FAILURE OF HEPA FILTER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
LG-1363 OUTLET VALVE	ISOLATES SIGHT GLASS	H-2-818561 6 P25 C3	FAILS TO OPERATE	FAILURE OF HEPA FILTER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
DRAIN VALVE EXHAUST FAN FN-1362	ISOLATES FILTER DRAIN	H-2-818561 6 P25 C2	FAILS TO OPERATE	FAILURE OF FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
LG-1364 OUTLET VALVE	ISOLATES SIGHT GLASS	H-2-818561 6 P25 B2	FAILS TO OPERATE	FAILURE OF FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST SKID SAMPLE PORT SHUT OFF VALVE	ISOLATES DRAIN SAMPLE PORT	H-2-818561 6 P25 B4	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HP ISOLATION VALVE PDIT-13620	ISOLATES PDIT-13620	H-2-818561 6 P25 D5	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HP ISOLATION VALVE PDIT-13618	ISOLATES PDIT-13618	H-2-818561 6 P25 D5	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
LP ISOLATION VALVE PDIT-13618; HP ISOLATION PDIT-13619	ISOLATES PDIT-13618/ PDIT-13619	H-2-818561 6 P25 D4	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
LP ISOLATION VALVE PDIT-13619	ISOLATES PDIT-13619	H-2-818561 6 P25 D4	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
LP ISOLATION VALVE PDIT-13620	ISOLATES PDIT-13620	H-2-818561 6 P25 D4	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST SKID INLET DAMPER	ISOLATES EXHAUST INLET SKID	H-2-818561 6 P25 C7	FAILS CLOSED	LOSS OF EXHAUST SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST FAN INLET DAMPER	ISOLATES EXHAUST FAN	H-2-818561 6 P25 C2	FAILS CLOSED	LOSS OF EXHAUST SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST STACK DRAIN LINE	ROUTES DRAINS TO SAMPLE PORT	H-2-818561 6 P22 B8	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST STACK	TRANSMITS AIR FROM EXHAUST FAN TO ATMOSPHERE	H-2-818561 7 P22 A8	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
LG-1365 OUTLET VALVE	ISOLATES SIGHT GLASS	H-2-818561 7 P22 B8	FAILS TO OPERATE	LOSS OF STACK DRAIN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-10. VENTILATION SYSTEM (21 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS, TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.2

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
DRAIN VALVE EXHAUST STACK	ISOLATES STACK DRAIN	H-2-818561 7 P22 B8	FAILS TO OPERATE	INCREASE IN STACK MOISTURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SERVICE BUILDING 241-C-73 INLET AIR FILTER	FILTERS BUILDING INLET AIR	H-2-818562 1 P26 D7	PLUG	LOSS OF FRESH AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-11. VENTILATION EXHAUST RADIATION MONITORING SYSTEM (3 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENT RAD MON

SYSTEM SAFETY FUNCTION: TANK C-106 EXHAUST RADIATION MONITORING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.3

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
BETA/GAMMA PARTICULATE SAMPLE LINE	ROUTES SAMPLE TO VACUUM PUMPS	H-2-818561 7 P22 C6	LEAK	LOSS OF VENTILATION EXHAUST SAMPLE	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BYSC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECORD SAMPLE LINE	ROUTES SAMPLE TO VACUUM PUMPS	H-2-818561 7 P22 B4	LEAK	LOSS OF VENTILATION EXHAUST SAMPLE	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BYSC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
VACUUM PUMP P-1366 DISCHARGE LINE	ROUTES SAMPLE FROM VACUUM PUMP TO COMMON LINE	H-2-818561 7 P22 C1	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
VACUUM PUMP P-1367 SUCTION LINE	ROUTES SAMPLE TO VACUUM PUMP	H-2-818561 7 P22 B2	LEAK	LOSS OF EXHAUST SAMPLE	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BYSC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
VACUUM PUMP P-1367 DISCHARGE LINE	ROUTES SAMPLE FROM VACUUM PUMP TO COMMON LINE	H-2-818561 7 P22 B1	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
VACUUM PUMP RETURN LINE	ROUTES VACUUM PUMP DISCHARGE TO EXHAUST STACK	H-2-818561 7 P22 B4	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
VACUUM PUMP P-1366 DISCHARGE CHECK VALVE	PREVENTS BACKFLOW	H-2-818561 7 P22 C1	LEAK	LOSS OF EXHAUST SAMPLE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-11. VENTILATION EXHAUST RADIATION MONITORING SYSTEM (3 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENT RAD MON

SYSTEM SAFETY FUNCTION: TANK C-106 EXHAUST RADIATION MONITORING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.3

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
VACUUM PUMP P-1367 DISCHARGE CHECK VALVE	PREVENTS BACKFLOW	H-2-818561 7 P22 B1	LEAK	LOSS OF EXHAUST SAMPLE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECORD SAMPLE PARTICULATE FILTER	PARTICULATE RECORD SAMPLE	H-2-818561 7 P22 B6	PLUG	LOSS OF EXHAUST SAMPLE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECORD SAMPLE IODINE FILTER	IODINE RECORD SAMPLE	H-2-818561 7 P22 B6	PLUG	LOSS OF EXHAUST SAMPLE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECORD SAMPLE FLOW REGULATOR ASSEMBLY	REGULATES RECORD SAMPLE FLOW	H-2-818561 7 P22 B5	FAIL CLOSED	PREVENT RECORD SAMPLE FROM BEING DRAWN FROM EXHAUST STACK	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
BETA/GAMMA PARTICULATE SAMPLE FLOW REGULATOR ASSEMBLY	REGULATES BETA-GAMMA SAMPLE FLOW	H-2-818561 7 P22 C3	FAIL CLOSED	PREVENT BETA-GAMMA SAMPLE FROM BEING DRAWN FROM EXHAUST STREAM	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
VACUUM PUMP (PRIMARY)	DRAWS SAMPLE FROM EXHAUST STACK	H-2-818561 7 P22 C2	FAIL TO OPERATE	PREVENT SAMPLE FROM BEING DRAWN FROM EXHAUST STREAM	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-11. VENTILATION EXHAUST RADIATION MONITORING SYSTEM (3 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENT RAD MON

SYSTEM SAFETY FUNCTION: TANK C-106 EXHAUST RADIATION MONITORING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.3

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
VACUUM PUMP (STANDBY)	DRAWS SAMPLE FROM EXHAUST STACK	H-2-818561 7 P22 B2	FAIL TO OPERATE	PREVENT SAMPLE FROM BEING DRAWN FROM EXHAUST STACK	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
VACUUM PUMP SUCTION PRESSURE CONTROL VALVE	REGULATES VACUUM PUMP SUCTION	H-2-818561 7 P22 B2	FAIL TO OPERATE	PREVENTS SAMPLE FROM BEING DRAWN	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
VACUUM PUMP SUCTION VALVE	ROUTES SUCTION TO SELECTED VACUUM PUMP	H-2-818561 7 P22 B2	FAIL TO OPERATE	PREVENTS SAMPLE FROM BEING DRAWN	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
VACUUM PUMP DISCHARGE VALVE	ROUTES DISCHARGE FROM SELECTED VACUUM PUMP	H-2-818561 7 P22 B2	FAIL TO OPERATE	PREVENTS SAMPLE FROM BEING DRAWN	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-12. IN-TANK IMAGING SYSTEM

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: IN-TK IMAGE SYS

SYSTEM SAFETY FUNCTION: PROVIDE IN TANK VISUAL MONITORING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.4

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
VISUAL REMOTE MONITOR	PROVIDES REAL TIME IN-TANK VISUAL MONITORING	H-2-818559 3 P23 B1	FAILS TO OPERATE	LOSS OF IN TANK VISUAL MONITORING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-13. AC POWER SYSTEM FOR C-106

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: AC PWR SYS C-106

SYSTEM SAFETY FUNCTION: PROVIDE AC POWER TO C-106 SLUICING EQUIPMENT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.5.1

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
ELECTRICAL EQUIPMENT SKID	CONTAINS MOTOR CONTROL CENTERS MCC N1 AND MCC N2	H-2-818680 1 P22 D8	SHORT CIRCUIT TRIPS FEEDER BREAKER	PREVENTS POWER DISTRIBUTION TO MCCs; LOSS OF POWER TO WRSS EQUIPMENT	LOSS OF ELECTRICAL POWER PLACES TRANSFER AND HVAC SYSTEMS IN A SAFE CONDITION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 14	3
AIR COMPRESSOR SKID PANELBOARD	PROVIDES POWER TO COMPRESSOR AND SERVICE BUILDING	H-2-818680 1 P22 B4	SHORT CIRCUIT TRIPS FEEDER BREAKER	PREVENTS POWER DISTRIBUTION TO MCCs; LOSS OF POWER TO SERVICE BUILDING EQUIPMENT	LOSS OF COMPRESSED AIR	3
CHILLER SKID PANELBOARD	PROVIDES POWER TO CHILLER EQUIPMENT	H-2-818680 1 P22 B5	SHORT CIRCUIT TRIPS FEEDER BREAKER	LOSS OF POWER TO CHILLER EQUIPMENT	LOSS OF CHILLER	3
EXHAUST SKID PANELBOARD	PROVIDES POWER TO EXHAUST SKID EQUIPMENT	H-2-818680 1 P22 B6	SHORT CIRCUIT TRIPS FEEDER BREAKER	LOSS OF POWER TO EXHAUST SKID EQUIPMENT	LOSS OF VENTILATION EXHAUST	3
PROCESS BUILDING PANELBOARD	PROVIDES POWER TO PROCESS BUILDING EQUIPMENT	H-2-818680 1 P22 B3	SHORT CIRCUIT TRIPS FEEDER BREAKER	LOSS OF POWER TO WRSS EQUIPMENT	LOSS OF WRSS	3
SLUICER HYDRAULIC UNIT PANEL BOARD	PROVIDES POWER TO SLUICER HYDRAULIC EQUIPMENT	H-2-818680 1 P22 B8	SHORT CIRCUIT TRIPS FEEDER BREAKER	LOSS OF POWER TO SLUICER EQUIPMENT	LOSS OF SLUICER	3
MOTOR CONTROL CENTER, WRSS EQUIPMENT AND UTILITIES	DISTRIBUTES POWER TO WRSS EQUIPMENT AND UTILITIES	H-2-818680 1 P22 D8	SHORT CIRCUIT TRIPS FEEDER BREAKER	PREVENTS POWER DISTRIBUTION TO EQUIPMENT; LOSS OF POWER TO WRSS EQUIPMENT	LOSS OF ELECTRICAL POWER PLACES TRANSFER AND HVAC SYSTEMS IN A SAFE CONDITION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 14	3

TABLE C-14. AC POWER SYSTEM FOR AY-102

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-AY

SYSTEM: AC PWR SYS AY-102

SYSTEM SAFETY FUNCTION: PROVIDE AC POWER TO AY-102 SLUICING EQUIPMENT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.5.2

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
ELECTRICAL EQUIPMENT SKID, BUILDING 241-AY-51	DISTRIBUTES POWER TO AY FARM WRSS EQUIPMENT	H-2-818693 1 P26 C5	FAILS TO OPERATE	LOSS OF SLUICE PUMP	FAILURE OF SLUICE PUMPS PLACES SYSTEM IN A SAFE CONDITION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

C-15. INSTRUMENTATION AND CONTROL
(8 TABLES)

TABLE C-15-1. SEISMIC SWITCH (16 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SEISMIC SWITCH

SYSTEM SAFETY FUNCTION: SHUTDOWN WRSS SLUICING SYSTEM DURING SEISMIC EVENT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SEISMIC ALARM C-106 DIV A	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818559 1 P27 F7	FAILS TO OPERATE	NONE - PROVIDES ALARM FUNCTION ONLY	PRELUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC ALARM C-106 DIV B	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818559 1 P27 F2	FAILS TO OPERATE	NONE - PROVIDES ALARM FUNCTION ONLY	PRELUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC SENSOR, HORIZONTAL TRANSVERSE, DIV A	SHUTDOWN SLUICE, SLURRY, AND PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818559 1 P27 C7	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRELUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SENSOR, HORIZONTAL LONGITUDINAL, DIV A	SHUTDOWN SLUICE, SLURRY, AND PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818559 1 P27 C7	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRELUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SENSOR, VERTICAL, DIV A	SHUTDOWN SLUICE, SLURRY, AND PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818559 1 P27 C7	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRELUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SENSOR, HORIZONTAL TRANSVERSE, DIV B	SHUTDOWN SLUICE, SLURRY, AND PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818559 1 P27 C2	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1

TABLE C-15-1. SEISMIC SWITCH (16 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SEISMIC SWITCH

SYSTEM SAFETY FUNCTION: SHUTDOWN WRSS SLUICING SYSTEM DURING SEISMIC EVENT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SEISMIC SENSOR HORIZONTAL LONGITUDINAL, DIV B	SHUTDOWN SLUICE, SLURRY, AND PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818559 1 P27 C2	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SENSOR, VERTICAL, DIV B	SHUTDOWN SLUICE, SLURRY, AND PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818559 1 P27 C2	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH, HORIZONTAL TRANSVERSE, DIV A	SHUTDOWN SLUICE, SLURRY, AND PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818559 1 P27 C7	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH, HORIZONTAL LONGITUDINAL, DIV A	SHUTDOWN SLUICE, SLURRY, AND PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818559 1 P27 C7	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH, VERTICAL, DIV A	SHUTDOWN SLUICE, SLURRY, AND PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818559 1 P27 C7	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1

TABLE C-15-1. SEISMIC SWITCH (16 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SEISMIC SWITCH

SYSTEM SAFETY FUNCTION: SHUTDOWN WRSS SLUICING SYSTEM DURING SEISMIC EVENT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SEISMIC SWITCH, HORIZONTAL TRANSVERSE, DIV B	SHUTDOWN SLUICE, SLURRY, AND PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818559 1 P27 C2	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH, HORIZONTAL LONGITUDINAL, DIV B	SHUTDOWN SLUICE, SLURRY, AND PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818559 1 P27 C2	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH, VERTICAL, DIV B	SHUTDOWN SLUICE, SLURRY, AND PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818559 1 P27 C2	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH RELAY, DIV A	SHUTDOWN SLUICE, SLURRY, AND PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818559 1 P27 D7	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH ISOLATION RELAY, DIV A	PROVIDES ISOLATED SIGNAL TO ALARM, PREVENTS ALARM FAULT FROM DISABLING SAFETY RELATED SHUTDOWN	H-2-818559 1 P27 D7	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH RELAY, DIV B	SHUTDOWN SLUICE, SLURRY, AND PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818559 1 P27 D2	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1

TABLE C-15-1. SEISMIC SWITCH (16 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SEISMIC SWITCH

SYSTEM SAFETY FUNCTION: SHUTDOWN WRSS SLUICING SYSTEM DURING SEISMIC EVENT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SEISMIC SWITCH ISOLATION RELAY, DIV B	PROVIDES ISOLATED SIGNAL TO ALARM, PREVENTS ALARM FAULT FROM DISABLING SAFETY RELATED SHUTDOWN	H-2-818559 1 P27 D2	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH TRIP REMOTE HAND SWITCH	INITIATE MANUAL ACTUATION OF SEISMIC TRIP FROM CONTROL ROOM	H-2-818559 1 P27 F5	FAILS TO OPERATE	LOSS OF REMOTE HAND SWITCH	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC SWITCH TRIP LOCAL HAND SWITCH, DIV A	INITIATE MANUAL ACTUATION OF SEISMIC TRIP FROM THE SEISMIC DETECTION SYSTEM ENCLOSURE	H-2-818559 1 P27 D5	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH SET HAND SWITCH, DIV A	INITIATE MANUAL ACTUATION OF SEISMIC TRIP FROM THE SEISMIC DETECTION SYSTEM ENCLOSURE	H-2-818559 1 P27 D7	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH TRIP LOCAL HAND SWITCH, DIV B	INITIATE MANUAL ACTUATION OF SEISMIC TRIP FROM THE SEISMIC DETECTION SYSTEM ENCLOSURE	H-2-818559 1 P27 D3	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH SET HAND SWITCH, DIV B	INITIATE MANUAL ACTUATION OF SEISMIC TRIP FROM THE SEISMIC DETECTION SYSTEM ENCLOSURE	H-2-818559 1 P27 D3	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH POWER SUPPLY, DIV A	PROVIDE POWER TO SEISMIC SWITCH COMPONENTS	H-2-818559 1 P27 D7	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1

TABLE C-15-1. SEISMIC SWITCH (16 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SEISMIC SWITCH

SYSTEM SAFETY FUNCTION: SHUTDOWN WRSS SLUICING SYSTEM DURING SEISMIC EVENT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SEISMIC SWITCH POWER SUPPLY, DIV B	PROVIDE POWER TO SEISMIC SWITCH COMPONENTS	H-2-818559 1 P27 D2	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH DIV A POWER FAILURE REMOTE ALARM	PROVIDE REMOTE SEISMIC DETECTION SYSTEM DIV A POWER FAILURE	H-2-818559 1 P27 F6	FAILS TO INDICATE	LOSS OF REMOTE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC SWITCH DIV B POWER FAILURE REMOTE ALARM	PROVIDE REMOTE SEISMIC DETECTION SYSTEM DIV B POWER FAILURE	H-2-818559 1 P27 F3	FAILS TO INDICATE	LOSS OF REMOTE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC SWITCH DIV A POWER FAILURE RELAY	PROVIDES ISOLATED SIGNAL TO REMOTE ALARMS	H-2-818559 1 P27 D6	FAILS TO OPERATE	PRECLUDE IMPLEMENTING ALARA PRINCIPLES; WHC 1991b, TABLE 1, CRITERION 3	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH DIV B POWER FAILURE RELAY	PROVIDES ISOLATED SIGNAL TO REMOTE ALARMS	H-2-818559 1 P27 D3	FAILS TO OPERATE	PRECLUDE IMPLEMENTING ALARA PRINCIPLES; WHC 1991b, TABLE 1, CRITERION 3	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 AMBIENT TEMPERATURE HIGH-LOW ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818559 1 P27 F4	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 1 HIGH-LOW TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 AMBIENT TEMPERATURE HIGH-LOW ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818559 1 P27 F4	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 2 HIGH-LOW TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 HEATER TEMPERATURE CONTROLLER	CONTROLS ENCLOSURE COMPARTMENT 1 HEATER	H-2-818559 1 P27 C6	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 1 HEATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-1. SEISMIC SWITCH (16 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SEISMIC SWITCH

SYSTEM SAFETY FUNCTION: SHUTDOWN WRSS SLUICING SYSTEM DURING SEISMIC EVENT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 AIR CONDITIONER TEMPERATURE CONTROLLER	CONTROLS ENCLOSURE COMPARTMENT 1 AIR CONDITIONER	H-2-818559 1 P27 C5	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 1 AIR CONDITIONER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 AIR CONDITIONER TEMPERATURE CONTROLLER	CONTROLS ENCLOSURE COMPARTMENT 2 AIR CONDITIONER	H-2-818559 1 P27 C4	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 2 AIR CONDITIONER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 HEATER TEMPERATURE CONTROLLER	CONTROLS ENCLOSURE COMPARTMENT 2 HEATER	H-2-818559 1 P27 C3	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 2 HEATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 AMBIENT TEMPERATURE SENSOR	MONITORS ENCLOSURE COMPARTMENT TEMPERATURE	H-2-818559 1 P27 D5	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 1 HIGH-LOW TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 AMBIENT TEMPERATURE SENSOR	MONITORS ENCLOSURE COMPARTMENT TEMPERATURE	H-2-818559 1 P27 D4	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 2 HIGH-LOW TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 HEATER TEMPERATURE SENSOR	CONTROLS ENCLOSURE COMPARTMENT 1 HEATER	H-2-818559 1 P27 C6	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 1 HEATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 AIR CONDITIONER TEMPERATURE SENSOR	CONTROLS ENCLOSURE COMPARTMENT 1 AIR CONDITIONER	H-2-818559 1 P27 C5	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 1 AIR CONDITIONER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-1. SEISMIC SWITCH (16 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SEISMIC SWITCH

SYSTEM SAFETY FUNCTION: SHUTDOWN WRSS SLUICING SYSTEM DURING SEISMIC EVENT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 AIR CONDITIONER TEMPERATURE SENSOR	CONTROLS ENCLOSURE COMPARTMENT 2 AIR CONDITIONER	H-2-818559 1 P27 C4	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 2 AIR CONDITIONER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 HEATER TEMPERATURE SENSOR	CONTROLS ENCLOSURE COMPARTMENT 2 HEATER	H-2-818559 1 P27 C3	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 2 HEATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 AMBIENT TEMPERATURE HIGH-LOW SWITCH	PROVIDES SIGNAL TO HIGH-LOW ALARM	H-2-818559 1 P27 D5	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 1 HIGH-LOW TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 AMBIENT TEMPERATURE HIGH-LOW SWITCH	PROVIDES SIGNAL TO HIGH/LOW ALARMS	H-2-818559 1 P27 D4	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 2 HIGH-LOW TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC SWITCH DIV A AND DIV B COMMON TRIP REMOTE INDICATING LIGHT	PROVIDES REMOTE INDICATION OF DIV A SEISMIC SWITCH TRIP	H-2-818559 1 P27 F5	FAILS TO INDICATE	LOSS OF REMOTE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC SWITCH DIV A TRIP LOCAL INDICATING LIGHT	PROVIDES LOCAL INDICATION OF DIV A SEISMIC SWITCH TRIP	H-2-818559 1 P27 D5	FAILS TO INDICATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH SET REMOTE INDICATING LIGHT, DIV A	PROVIDES REMOTE INDICATION OF SET HAND SWITCH POSITION	H-2-818559 1 P27 F6	FAILS TO INDICATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-1. SEISMIC SWITCH (16 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SEISMIC SWITCH

SYSTEM SAFETY FUNCTION: SHUTDOWN WRSS SLUICING SYSTEM DURING SEISMIC EVENT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SEISMIC SWITCH SET LOCAL INDICATING LIGHT, DIV A	PROVIDES LOCAL INDICATION OF SET HAND SWITCH POSITION	H-2-818559 1 P27 D6	FAILS TO INDICATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH DIV B TRIP LOCAL INDICATING LIGHT	PROVIDES LOCAL INDICATION OF DIV B SEISMIC SWITCH TRIP	H-2-818559 1 P27 D3	FAILS TO INDICATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH SET REMOTE INDICATING LIGHT, DIV B	PROVIDES REMOTE INDICATION OF SET HAND SWITCH HS-13653 POSITION	H-2-818559 1 P27 F4	FAILS TO INDICATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC SWITCH SET LOCAL INDICATING LIGHT, DIV B	PROVIDES LOCAL INDICATION OF SET HAND SWITCH POSITION	H-2-818559 1 P27 D4	FAILS TO INDICATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH DIV A TRIP REMOTE INDICATING LIGHT ISOLATION RELAY	PROVIDES ISOLATED SIGNAL TO REMOTE INDICATION OF DIV A SEISMIC SWITCH TRIP	H-2-818559 1 P27 D5	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH SET REMOTE INDICATING LIGHT ISOLATION RELAY, DIV A	PROVIDES ISOLATED REMOTE INDICATION SIGNAL OF SET HAND SWITCH POSITION	H-2-818559 1 P27 D6	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH DIV B TRIP REMOTE INDICATING LIGHT ISOLATION RELAY	PROVIDES ISOLATED SIGNAL TO REMOTE INDICATION OF DIV B SEISMIC SWITCH TRIP	H-2-818559 1 P27 D3	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1

TABLE C-15-1. SEISMIC SWITCH (16 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SEISMIC SWITCH

SYSTEM SAFETY FUNCTION: SHUTDOWN WRSS SLUICING SYSTEM DURING SEISMIC EVENT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SEISMIC SWITCH SET REMOTE INDICATING LIGHT ISOLATION RELAY, DIV B	PROVIDES ISOLATED REMOTE INDICATION SIGNAL OF SET HAND SWITCH POSITION	H-2-818559 1 P27 D4	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC ALARM, AY-102, DIV A	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818560 7 P25 E7	FAILS TO OPERATE	NONE - PROVIDES ALARM FUNCTION ONLY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC ALARM, AY-102, DIV B	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818560 7 P25 E2	FAILS TO OPERATE	NONE - PROVIDES ALARM FUNCTION ONLY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC SENSOR, HORIZONTAL TRANSVERSE, DIV A	SHUTDOWN SLUICE, SLURRY, AND HEEL PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818560 7 P25 B7	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SENSOR HORIZONTAL LONGITUDINAL, DIV A	SHUTDOWN SLUICE, SLURRY, AND HEEL PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818560 7 P25 B7	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SENSOR, VERTICAL, DIV A	SHUTDOWN SLUICE, SLURRY, AND HEEL PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818560 7 P25 B7	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1

TABLE C-15-1. SEISMIC SWITCH (16 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SEISMIC SWITCH

SYSTEM SAFETY FUNCTION: SHUTDOWN WRSS SLUICING SYSTEM DURING SEISMIC EVENT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SEISMIC SENSOR, HORIZONTAL TRANSVERSE, DIV A	SHUTDOWN SLUICE, SLURRY, AND HEEL PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818560 7 P25 B7	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH, HORIZONTAL LONGITUDINAL, DIV A	SHUTDOWN SLUICE, SLURRY, AND HEEL PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818560 7 P25 B7	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH, VERTICAL, DIV A	SHUTDOWN SLUICE, SLURRY, AND HEEL PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818560 7 P25 B7	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH, HORIZONTAL TRANSVERSE, DIV B	SHUTDOWN SLUICE, SLURRY, AND HEEL PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818560 7 P25 B2	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH, HORIZONTAL LONGITUDINAL, DIV B	SHUTDOWN SLUICE, SLURRY, AND HEEL PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818560 7 P25 B2	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1

TABLE C-15-1. SEISMIC SWITCH (16 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SEISMIC SWITCH

SYSTEM SAFETY FUNCTION: SHUTDOWN WRSS SLUICING SYSTEM DURING SEISMIC EVENT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SEISMIC SWITCH, VERTICAL, DIV B	SHUTDOWN SLUICE, SLURRY, AND HEEL PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818560 7 P25 B2	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH RELAY, DIV A	SHUTDOWN SLUICE, SLURRY, AND HEEL PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818560 7 P25 C7	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH ISOLATION RELAY, DIV A	PROVIDES ISOLATED SIGNAL TO ALARM, PREVENTS ALARM FAULT FROM DISABLING SAFETY RELATED SHUTDOWN	H-2-818560 7 P25 C7	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH RELAY, DIV B	SHUTDOWN SLUICE, SLURRY, AND HEEL PUMPS DURING SEISMIC EVENT TO LIMIT RELEASE TO SOIL COLUMN; SHUTDOWN VENTILATION EQUIPMENT TO LIMIT RELEASE TO ATMOSPHERE	H-2-818560 7 P25 C2	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH ISOLATION RELAY, DIV B	PROVIDES ISOLATED SIGNAL TO ALARM, PREVENTS ALARM FAULT FROM DISABLING SAFETY RELATED SHUTDOWN	H-2-818560 7 P25 C2	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH SET HAND SWITCH, DIV A	LATER	H-2-818560 7 P25 C6	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1

TABLE C-15-1. SEISMIC SWITCH (16 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SEISMIC SWITCH

SYSTEM SAFETY FUNCTION: SHUTDOWN WRSS SLUICING SYSTEM DURING SEISMIC EVENT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SEISMIC SWITCH TRIP REMOTE HAND SWITCH	INITIATE MANUAL ACTUATION OF SEISMIC TRIP FROM CONTROL ROOM	H-2-818560 7 P25 E5	FAILS TO OPERATE	LOSS OF REMOTE HAND SWITCH	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC SWITCH TRIP LOCAL HAND SWITCH, DIV A	INITIATE MANUAL ACTUATION OF SEISMIC TRIP FROM THE SEISMIC DETECTION SYSTEM ENCLOSURE	H-2-818560 7 P25 C5	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH SET HAND SWITCH, DIV B	LATER	H-2-818560 7 P25 C4	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH TRIP LOCAL HAND SWITCH, DIV B	INITIATE MANUAL ACTUATION OF SEISMIC TRIP FROM THE SEISMIC DETECTION SYSTEM ENCLOSURE	H-2-818560 7 P25 C3	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH POWER SUPPLY, DIV A	PROVIDE POWER TO SEISMIC SWITCH COMPONENTS	H-2-818560 7 P25 C7	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH POWER SUPPLY, DIV B	PROVIDE POWER TO SEISMIC SWITCH COMPONENTS	H-2-818560 7 P25 C2	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH DIV A POWER FAILURE REMOTE ALARM	PROVIDES REMOTE SEISMIC DETECTION SYSTEM DIV A POWER FAILURE	H-2-818560 7 P25 E6	FAILS TO INDICATE	LOSS OF REMOTE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-1. SEISMIC SWITCH (16 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SEISMIC SWITCH

SYSTEM SAFETY FUNCTION: SHUTDOWN WRSS SLUICING SYSTEM DURING SEISMIC EVENT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SEISMIC SWITCH DIV B POWER FAILURE REMOTE ALARM	PROVIDES REMOTE SEISMIC DETECTION SYSTEM DIV B POWER FAILURE	H-2-818560 7 P25 E3	FAILS TO INDICATE	LOSS OF REMOTE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC SWITCH DIV A POWER FAILURE RELAY	PROVIDES ISOLATED SIGNAL TO REMOTE ALARMS	H-2-818560 7 P25 C6	FAILS TO OPERATE	PRECLUDE IMPLEMENTING ALARA PRINCIPLES; WHC 1991b, TABLE 1, CRITERION 3	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH DIV B POWER FAILURE RELAY	PROVIDES ISOLATED SIGNAL TO REMOTE ALARMS	H-2-818560 7 P25 C3	FAILS TO OPERATE	PRECLUDE IMPLEMENTING ALARA PRINCIPLES; WHC 1991b, TABLE 1, CRITERION 3	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 AMBIENT TEMPERATURE HIGH-LOW ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818560 7 P25 E5	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 1 HIGH-LOW TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 AMBIENT TEMPERATURE HIGH-LOW SWITCH	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818560 7 P25 E4	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 2 HIGH-LOW TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 HEATER TEMPERATURE CONTROLLER	CONTROLS ENCLOSURE COMPARTMENT 1 HEATER	H-2-818560 7 P25 B5	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 1 HEATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 AIR CONDITIONER TEMPERATURE CONTROLLER	CONTROLS ENCLOSURE COMPARTMENT 1 AIR CONDITIONER	H-2-818560 7 P25 B4	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 1 AIR CONDITIONER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-1. SEISMIC SWITCH (16 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SEISMIC SWITCH

SYSTEM SAFETY FUNCTION: SHUTDOWN WRSS SLUICING SYSTEM DURING SEISMIC EVENT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 AIR CONDITIONER TEMPERATURE CONTROLLER	CONTROLS ENCLOSURE COMPARTMENT 2 AIR CONDITIONER	H-2-818560 7 P25 B4	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 2 AIR CONDITIONER	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4.46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 HEATER TEMPERATURE CONTROLLER	CONTROLS ENCLOSURE COMPARTMENT 2 HEATER	H-2-818560 7 P25 B3	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 2 HEATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 AMBIENT TEMPERATURE SENSOR	MONITORS ENCLOSURE COMPARTMENT TEMPERATURE	H-2-818560 7 P25 C5	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 1 HIGH/LOW TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 AMBIENT TEMPERATURE SENSOR	MONITORS ENCLOSURE COMPARTMENT TEMPERATURE	H-2-818560 7 P25 C4	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 2 HIGH/LOW TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 HEATER TEMPERATURE SENSOR	CONTROLS ENCLOSURE COMPARTMENT 1 HEATER	H-2-818560 7 P25 B5	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 1 HEATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 AIR CONDITIONER TEMPERATURE SENSOR	CONTROLS ENCLOSURE COMPARTMENT 1 AIR CONDITIONER	H2-818560 7 P25 B4	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 1 AIR CONDITIONER	PRELUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 AIR CONDITIONER TEMPERATURE SENSOR	CONTROLS ENCLOSURE COMPARTMENT 2 AIR CONDITIONER	H2-818560 7 P25 B4	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 2 AIR CONDITIONER	PRELUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-1. SEISMIC SWITCH (16 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SEISMIC SWITCH

SYSTEM SAFETY FUNCTION: SHUTDOWN WRSS SLUICING SYSTEM DURING SEISMIC EVENT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 HEATER TEMPERATURE SENSOR	CONTROLS ENCLOSURE COMPARTMENT 2 HEATER	H2-818560 7 P25 B3	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 2 HEATER	PRELUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 AMBIENT TEMPERATURE HIGH-LOW SWITCH	PROVIDES SIGNAL TO HIGH-LOW ALARM	H2-818560 7 P25 C5	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 1 HIGH-LOW TEMPERATURE ALARM	PRELUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 AMBIENT TEMPERATURE HIGH-LOW SWITCH	PROVIDES SIGNAL TO HIGH-LOW ALARM	H2-818560 7 P25 C4	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 2 HIGH-LOW TEMPERATURE ALARM	PRELUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC SWITCH SET REMOTE INDICATING LIGHT, DIV A	PROVIDES REMOTE INDICATION OF SET HAND SWITCH POSITION	H2-818560 7 P25 E6	FAILS TO OPERATE	LOSS OF REMOTE INDICATION	PRELUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC SWITCH SET LOCAL INDICATING LIGHT, DIV A	PROVIDES LOCAL INDICATION OF SET HAND SWITCH POSITION	H2-818560 7 P25 C6	FAILS TO INDICATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRELUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH DIV A AND DIV B COMMON TRIP REMOTE INDICATING LIGHT	PROVIDES REMOTE INDICATION OF DIV A SEISMIC SWITCH TRIP	H2-818560 7 P25 E5	FAILS TO INDICATE	LOSS OF REMOTE ALARM	PRELUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC SWITCH DIV A TRIP LOCAL INDICATING LIGHT	PROVIDES LOCAL INDICATION OF DIV A SEISMIC SWITCH TRIP	H-2-818560 7 P25 C5	FAILS TO INDICATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1

TABLE C-15-1. SEISMIC SWITCH (16 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SEISMIC SWITCH

SYSTEM SAFETY FUNCTION: SHUTDOWN WRSS SLUICING SYSTEM DURING SEISMIC EVENT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SEISMIC SWITCH SET REMOTE INDICATING LIGHT, DIV B	PROVIDES REMOTE INDICATION OF SET HAND SWITCH POSITION	H-2-818560 7 P25 E4	FAILS TO INDICATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEISMIC SWITCH SET LOCAL INDICATING LIGHT, DIV B	PROVIDES LOCAL INDICATION OF SET HAND SWITCH POSITION	H-2-818560 7 P25 C4	FAILS TO INDICATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH DIV B TRIP LOCAL INDICATING LIGHT	PROVIDES LOCAL INDICATION OF DIV B SEISMIC SWITCH TRIP	H-2-818560 7 P25 C3	FAILS TO INDICATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH SET REMOTE INDICATING LIGHT ISOLATION RELAY, DIV A	PROVIDES ISOLATED REMOTE INDICATION SIGNAL OF SET HAND SWITCH POSITION	H-2-818560 7 P25 C6	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH DIV A TRIP REMOTE INDICATING LIGHT ISOLATION RELAY	PROVIDES ISOLATED SIGNAL TO REMOTE INDICATION OF DIV A SEISMIC SWITCH TRIP	H-2-818560 7 P25 C5	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH SET REMOTE INDICATING LIGHT ISOLATION RELAY, DIV B	PROVIDES ISOLATED REMOTE INDICATION SIGNAL OF SET HAND SWITCH POSITION	H-2-818560 7 P25 C4	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1
SEISMIC SWITCH DIV B TRIP REMOTE INDICATING LIGHT ISOLATION RELAY	PROVIDES ISOLATED SIGNAL TO REMOTE INDICATION OF DIV A SEISMIC SWITCH TRIP	H-2-818560 7 P25 C3	FAILS TO OPERATE	TRANSFER PUMPS CONTINUE TO OPERATE AFTER SEISMIC INDUCED FAILURE OF TRANSFER LINES OCCUR; ON SITE AND OFF SITE DOSES ARE EXCEEDED	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 4,5	1

TABLE C-15-2. SEAL LOOP

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: SWTS-SEAL LOOP

SYSTEM SAFETY FUNCTION: PROVIDE TANK UNDER/OVER PRESSURE PROTECTION

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SEAL LOOP LEVEL GAUGE	PROVIDE LOCAL INDICATION OF SEAL LOOP FLUID LEVEL	H-2-818559 7 P2 E6	FAILS TO INDICATE, LEAKS	LOSS OF LOCAL INDICATION, LOSS OF SEAL LOOP FLUID	FAILURE OF LEVEL GAUGE WILL NOT COMPROMISE SAFETY FUNCTION OF SEAL LOOP; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEAL LOOP LEVEL GAUGE	PROVIDE LOCAL INDICATION OF SEAL LOOP FLUID LEVEL	H-2-818559 7 P2 E4	FAILS TO INDICATE, LEAKS	LOSS OF LOCAL INDICATION, LOSS OF SEAL LOOP FLUID	FAILURE OF LEVEL GAUGE WILL NOT COMPROMISE SAFETY FUNCTION OF SEAL LOOP; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-3. SWTS EQUIPMENT (PUMP, VALVES, ETC.) (13 SHEETS)
FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-EQ

SYSTEM SAFETY FUNCTION: WASTE MOBILIZATION AND TRANSPORT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
C-106 PRESSURE HIGH ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818559 2 P21 F2	FAILS TO INDICATE	LOSS OF C-106 HIGH PRESSURE ALARM	PASSIVE TANK OVER/UNDER PRESSURE PROTECTION PROVIDED BY REDUNDANT SEAL LOOPS; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
C-106 PRESSURE LOW ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818559 2 P21 F2	FAILS TO INDICATE	LOSS OF C-106 LOW PRESSURE ALARM	PASSIVE TANK OVER/UNDER PRESSURE PROTECTION PROVIDED BY REDUNDANT SEAL LOOPS; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
C-106 PRESSURE LOW-LOW ALARM	ALERTS OPERATOR TO ABNORMAL CONDITION	H-2-818559 2 P21 F2	FAILS TO OPERATE	LOSS OF C-106 LOW-LOW PRESSURE ALARM	PASSIVE TANK OVER/UNDER PRESSURE PROTECTION PROVIDED BY REDUNDANT SEAL LOOPS; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
C-106 PRESSURE CONTROLLER	PROVIDES PRESSURE SIGNAL TO EXHAUST FAN SPEED CONTROL	H-2-818559 2 P21 F2	FAILS TO OPERATE	LOSS OF C-106 PRESSURE CONTROL	PASSIVE TANK OVER/UNDER PRESSURE PROTECTION PROVIDED BY REDUNDANT SEAL LOOPS; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
C-106 PRESSURE TRANSMITTER	PROVIDE PRESSURE SIGNAL TO EXHAUST FAN SPEED CONTROL	H-2-818559 2 P21 E2	FAILS TO INDICATE	LOSS OF C-106 PRESSURE CONTROL AND INDICATION	PASSIVE TANK OVER/UNDER PRESSURE PROTECTION PROVIDED BY REDUNDANT SEAL LOOPS; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-3. SWTS EQUIPMENT (PUMP, VALVES, ETC.) (13 SHEETS)
FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS
TANK FARM: 241-C/AY
SYSTEM: SWTS-EQ
SYSTEM SAFETY FUNCTION: WASTE MOBILIZATION AND TRANSPORT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1
SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
C-106 PRESSURE HIGH SWITCH	PROVIDES HIGH PRESSURE SIGNAL TO ACTUATE ALARM AND INTERLOCK	H-2-818559 2 P21 E2	FAILS TO OPERATE	LOSS OF C-106 HIGH PRESSURE ALARM AND INTERLOCK	PASSIVE TANK OVER/UNDER PRESSURE PROTECTION PROVIDED BY REDUNDANT SEAL LOOPS; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
C-106 PRESSURE LOW SWITCH	PROVIDES LOW PRESSURE SIGNAL TO ACTUATE ALARM	H-2-818559 2 P21 F2	FAILS TO OPERATE	LOSS OF C-106 PRESSURE ALARM	PASSIVE TANK OVER/UNDER PRESSURE PROTECTION PROVIDED BY REDUNDANT SEAL LOOPS; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
C-106 PRESSURE LOW-LOW SWITCH	PROVIDES LOW-LOW PRESSURE SIGNAL TO ACTUATE ALARM AND INTERLOCK	H-2-818559 2 P21 F2	FAILS TO OPERATE	LOSS OF C-106 LOW-LOW PRESSURE ALARM AND INTERLOCK	PASSIVE TANK OVER/UNDER PRESSURE PROTECTION PROVIDED BY REDUNDANT SEAL LOOPS; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICER S-1361 CONTROLLER FIELD I/O	PROVIDE CONTROL SIGNALS TO SLUICER C-106-2 AND POSITIONING SIGNALS TO CONTROL ROOM CONTROLLER	H-2-818559 2 P21 E6	FAILS TO OPERATE	LOSS OF SLUICER CONTROL, SYSTEM SHUTDOWN REQUIRED FOR REPAIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICING PIT 241-C-06C SLUICE MAST S-1361 TILT CONTROLS	POSITIONS SLUICER (VERTICALLY)	H-2-818559 2 P21 E6	UNABLE TO REDIRECT SLUICER SPRAY	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICING PIT 241-C-06C SLUICE MAST S-1361 PAN CONTROLS	POSITION SLUICER (ROTATION)	H-2-818559 2 P21 E5	UNABLE TO REDIRECT SLUICER SPRAY	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICER POSITIONING CONTROLLER (JOYSTICK)	ALLOWS TILT AND PAN CONTROL OF SLUICER	H-2-818559 2 P21 F4	FAILS TO OPERATE	LOSS OF SLUICER CONTROL, SYSTEM SHUTDOWN REQUIRED FOR REPAIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-3. SWTS EQUIPMENT (PUMP, VALVES, ETC.) (13 SHEETS)
FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-EQ

SYSTEM SAFETY FUNCTION: WASTE MOBILIZATION AND TRANSPORT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
POSITION SWITCH FOR SLUICER S-1361 TILT CONTROLS	PROVIDE TILT POSITION SIGNAL TO SLUICER CONTROLS	H-2-818559 2 P21 D6	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
POSITION SWITCH FOR SLUICER S-1361 PAN CONTROLS	PROVIDE PAN POSITION SIGNAL TO SLUICER CONTROLS	H-2-818559 2 P21 D5	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICING PIT 241-C-06C SLUICE MAST S-1361 TILT POSITION	PROVIDES POSITION OF SLUICE MAST (VERTICALLY)	H-2-818559 2 P21 E6	LOSS OF CONTROL ROOM INDICATION	LOCAL INDICATION AVAILABLE UNTIL REPAIRS COMPLETED	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICING PIT 241-C-06C SLUICE MAST S-1361 PAN INDICATOR	PROVIDE POSITION OF SLUICE MAST (ROTATION)	H-2-818559 2 P21 E5	LOSS OF CONTROL ROOM INDICATION	LOCAL INDICATION AVAILABLE UNTIL REPAIRS COMPLETED	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP VOLTAGE INDICATOR	INDICATE VOLTAGE AVAILABLE TO SLURRY PUMP	H-2-818559 4 P23 E3	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP VOLTAGE TRANSMITTER	SENSE VOLTAGE AVAILABLE TO SLURRY PUMP	H-2-818559 4 P23 E3	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP RAISE/LOWER HAND SWITCH	ALLOWS POSITIONING OF SLURRY PUMP AS LIQUID LEVEL VARIES	H-2-818559 4 P23 F7	FAILS TO OPERATE	LOSS OF SLUICE PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP CONTROL ROOM START HAND SWITCH	CONTROLS SLURRY PUMP START OPERATION FROM THE CONTROL ROOM	H-2-818559 4 P23 F4	FAILS TO OPERATE	LOSS OF SLUICE PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP CONTROL ROOM STOP HAND SWITCH	CONTROLS SLURRY PUMP START OPERATIONS FROM THE CONTROL ROOM	H-2-818559 4 P23 F4	FAILS TO OPERATE	LOSS OF SLUICE PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-3. SWTS EQUIPMENT (PUMP, VALVES, ETC.) (13 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-EQ

SYSTEM SAFETY FUNCTION: WASTE MOBILIZATION AND TRANSPORT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SLURRY PUMP VSD CABINET START/STOP HAND SWITCH	CONTROLS SLURRY PUMP OPERATION FROM THE VSD CABINET	H-2-818559 4 P23 E4	FAILS TO OPERATE	LOSS OF SLUICE PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP FAULT RESET HAND SWITCH	RESET SLURRY PUMP CONTROL CIRCUIT	H-2-818559 4 P23 E3	FAILS TO RESET	LOSS OF SLUICE PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP LOCAL REMOTE SELECTOR HAND SWITCH	ALLOWS SELECTION OF LOCAL OR REMOTE SLURRY PUMP SPEED CONTROL	H-2-818559 4 P23 E5	FAILS TO OPERATE	LOSS OF SLURRY PUMP SPEED CONTROLLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP VSD CABINET CURRENT INDICATOR	INDICATED LOAD CURRENT OF SLURRY PUMP	H-2-818559 4 P23 E3	FAILS TO INDICATE	LOSS OF LOAD INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP CURRENT TRANSMITTER	SENSE LOAD CURRENT OF SLURRY PUMP	H-2-818559 4 P23 E3	FAILS TO OPERATE	LOSS OF LOAD INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP P-1361 SUCTION HEAD	PROVIDES SUCTION HEAD SIGNAL TO SLURRY PUMP CONTROL SYSTEM	H-2-818559 4 P23 B7	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP SUCTION HEAD RELAY	PROVIDES SUCTION HEAD SIGNAL TO SLURRY PUMP VARIABLE SPEED DRIVE CONTROLS	H-2-818559 4 P23 E7	FAILS TO OPERATE	LOSS OF SLURRY PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP P-1361 SPEED SENSOR	PROVIDE SLURRY PUMP MOTOR SPEED	H-2-818559 4 P23 B6	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP SPEED CONTROLLER	PROVIDES SIGNAL FOR SLURRY PUMP REMOTE SPEED CONTROL	H-2-818559 4 P23 F5	FAILS TO OPERATE	LOSS OF SLURRY PUMP SPEED CONTROLLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-3. SWTS EQUIPMENT (PUMP, VALVES, ETC.) (13 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-EQ

SYSTEM SAFETY FUNCTION: WASTE MOBILIZATION AND TRANSPORT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SLURRY PUMP SPEED TRANSMITTER	PROVIDES SIGNAL FOR SLURRY PUMP SPEED CONTROLLER	H-2-818559 4 P23 E6	FAILS TO OPERATE	LOSS OF SLURRY PUMP SPEED CONTROLLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP MOTOR BEARING AND BEARING OIL HIGH TEMPERATURE ALARM	ALERT OPERATOR OF ABNORMAL SITUATION	H-2-818559 4 P23 F6	FAILS TO OPERATE	LOSS OF MOTOR BEARING AND BEARING OIL HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP MOTOR STATOR HIGH TEMPERATURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818559 4 P23 F6	FAILS TO OPERATE	LOSS OF SLURRY PUMP STATOR HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP MOTOR STATOR HIGH-HIGH TEMPERATURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818559 4 P23 F6	FAILS TO OPERATE	LOSS OF SLURRY PUMP STATOR HIGH-HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP P-1361 MOTOR BEARING AND BEARING OIL TEMPERATURE	PROVIDE SLURRY PUMP MOTOR BEARING AND BEARING OIL TEMPERATURE	H-2-818559 4 P23 C6	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP P-1361 MOTOR STATOR TEMPERATURE	MONITOR SLURRY PUMP MOTOR TEMPERATURE	H-2-818559 4 P23 B6	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP MOTOR BEARING AND BEARING OIL TEMPERATURE TRANSMITTER	PROVIDES TEMPERATURE SIGNAL FOR INDICATION AND ALARM	H-2-818559 4 P23 E6	FAILS TO OPERATE	LOSS OF MOTOR BEARING AND BEARING OIL TEMPERATURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP MOTOR STATOR TEMPERATURE TRANSMITTER	PROVIDES SIGNAL TO ACTUATE HIGH TEMPERATURE ALARM	H-2-818559 4 P23 E6	FAILS TO OPERATE	LOSS OF SLURRY PUMP STATOR HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP MOTOR BEARING AND BEARING OIL HIGH TEMPERATURE SWITCH	PROVIDES HIGH TEMPERATURE SIGNAL TO ACTUATE ALARM	H-2-818559 4 P23 E6	FAILS TO OPERATE	LOSS OF MOTOR BEARING AND BEARING OIL HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-3. SWTS EQUIPMENT (PUMP, VALVES, ETC.) (13 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-EQ

SYSTEM SAFETY FUNCTION: WASTE MOBILIZATION AND TRANSPORT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SLURRY PUMP MOTOR STATOR HIGH TEMPERATURE SWITCH	PROVIDES SIGNAL TO ACTUATE HIGH TEMPERATURE ALARM	H-2-818559 4 P23 E6	FAILS TO OPERATE	LOSS OF SLURRY PUMP STATOR HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP MOTOR STATOR HIGH-HIGH TEMPERATURE SWITCH	PROVIDES SIGNAL TO HIGH-HIGH TEMPERATURE ALARM	H-2-818559 4 P23 E6	FAILS TO OPERATE	LOSS OF SLURRY PUMP STATOR HIGH-HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP VSD CABINET VSD FAILURE LIGHT	LOCAL INDICATION OF VARIABLE SPEED DRIVE FAILURE	H-2-818559 4 P23 E3	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP CONTROL ROOM VSD FAILURE LIGHT	REMOTE INDICATION OF VARIABLE SPEED DRIVE FAILURE	H-2-818559 4 P23 F3	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP VSD CABINET LOCAL INDICATING LIGHT	PROVIDES INDICATION OF LOCAL CONTROL AT SLURRY PUMP VSD CABINET	H-2-818559 4 P23 E5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP VSD CABINET REMOTE INDICATING LIGHT	PROVIDES INDICATION OF REMOTE CONTROL AT SLURRY PUMP VSD CABINET	H-2-818559 4 P23 E4	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP CONTROL ROOM LOCAL INDICATING LIGHT	PROVIDES INDICATION OF LOCAL CONTROL IN CONTROL ROOM	H-2-818559 4 P23 F5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP CONTROL ROOM REMOTE INDICATING LIGHT	PROVIDES INDICATION OF REMOTE CONTROL IN CONTROL ROOM	H-2-818559 4 P23 F5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP VSD CABINET START INDICATING LIGHT	PROVIDES RUN STATUS INDICATION OF SLURRY PUMP	H-2-818559 4 P23 E4	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-3. SWTS EQUIPMENT (PUMP, VALVES, ETC.) (13 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-EQ

SYSTEM SAFETY FUNCTION: WASTE MOBILIZATION AND TRANSPORT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SLURRY PUMP VSD CABINET STOP INDICATING LIGHT	PROVIDES RUN STATUS INDICATION OF SLURRY PUMP	H-2-818559 4 P23 E4	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP POSITION SENSOR	PROVIDES POSITION INDICATION SIGNAL (VERTICAL) OF SLUICE PUMP TO TRANSMITTER	H-2-818559 4 P23 D7	FAILS TO OPERATE	LOSS OF SLUICE PUMP VERTICAL POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP WINCH UPPER LIMIT INDICATING LIGHT	INDICATES SLURRY PUMP WINCH IS AT THE UPPER LIMIT	H-2-818559 4 P23 F8	FAILS TO INDICATE	LOSS OF SLURRY PUMP UPPER LIMIT INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP WINCH LOWER LIMIT INDICATING LIGHT	INDICATES SLURRY PUMP WINCH IS AT THE LOWER LIMIT	H-2-818559 4 P23 F8	FAILS TO INDICATE	LOSS OF SLURRY PUMP LOWER LIMIT INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP WINCH UPPER LIMIT SWITCH	PROVIDES INDICATION SLURRY PUMP WINCH IS AT UPPER LIMIT	H-2-818559 4 P23 C7	FAILS TO OPERATE	LOSS OF SLURRY PUMP UPPER LIMIT INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP WINCH LOWER LIMIT SWITCH	PROVIDES INDICATION SLURRY PUMP WINCH IS AT LOWER LIMIT	H-2-818559 4 P23 C7	FAILS TO INDICATE	LOSS OF SLURRY PUMP LOWER LIMIT INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP WINCH POSITION TRANSMITTER	PROVIDES POSITION INDICATION SIGNAL (VERTICAL) OF SLUICE PUMP TO TRANSMITTER	H-2-818559 4 P23 D7	FAILS TO OPERATE	PROVIDES POSITION INDICATION SIGNAL (VERTICAL) OF SLUICE PUMP TO TRANSMITTER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY DISCHARGE FLOW INDICATOR	PROVIDES INDICATION OF SLURRY FLOW	H-2-818559 5 P20 F6	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY DISCHARGE FLOW SENSOR	PROVIDES SLURRY FLOW/DENSITY MEASUREMENT	H-2-818559 5 P20 C7	FAILS TO INDICATE	LOSS OF CONTROL STATION INDICATION; INCREASED POTENTIAL TO PLUG SLURRY LINE AND/OR SLURRY PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-3. SWTS EQUIPMENT (PUMP, VALVES, ETC.) (13 SHEETS)
FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS
TANK FARM: 241-C/AY
SYSTEM: SWTS-EQ
SYSTEM SAFETY FUNCTION: WASTE MOBILIZATION AND TRANSPORT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1
SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SLURRY DISCHARGE FLOW TRANSMITTER	PROVIDES SIGNAL FOR INDICATION AND ALARMS	H-2-818559 5 P20 E7	FAILS TO OPERATE	LOSS OF SLURRY, FLOW INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PUMP PIT 241-C-06A SLUICE MAST S-1362 TILT CONTROLS	POSITIONS SLUICE MAST NOZZLE (VERTICALLY)	H-2-818559 6 P21 E4	UNABLE TO REDIRECT SLUICER SPRAY	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PUMP PIT 241-C-061A SLUICING MAST S-1362 PAN CONTROLS	POSITIONS SLUICE MAST (ROTATION)	H-2-818559 6 P21 E3	UNABLE TO REDIRECT SLUICER SPRAY	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
POSITION TRANSMITTER FOR SLUICER S-1362TILT CONTROLS	PROVIDE TILT POSITION SIGNAL TO SLUICER CONTROLS	H-2-818559 6 P21 E4	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
POSITION TRANSMITTER FOR SLUICER S-1362 PAN CONTROLS	PROVIDE PAN POSITION SIGNAL TO SLUICER CONTROLS	H-2-818559 6 P21 E3	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP VOLTAGE INDICATOR	INDICATE VOLTAGE AVAILABLE TO SLUICE PUMP	H-2-818560 2 P26 E5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP VOLTAGE TRANSMITTER	SENSE VOLTAGE AVAILABLE TO SLUICE PUMP	H-2-818560 2 P26 E5	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP FAULT RESET HAND SWITCH	RESET SLUICE PUMP CONTROL CIRCUIT	H-2-818560 2 P26 F7	FAILS TO RESET	LOSS OF SLUICE PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP VSD CABINET START/STOP HAND SWITCH	CONTROLS SLUICE PUMP OPERATION FROM THE VSD CABINET	H-2-818560 2 P26 F7	FAILS TO OPERATE	LOSS OF SLUICE PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-3. SWTS EQUIPMENT (PUMP, VALVES, ETC.) (13 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-EQ

SYSTEM SAFETY FUNCTION: WASTE MOBILIZATION AND TRANSPORT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SLUICE PUMP LOCAL/REMOTE SELECTOR HAND SWITCH	ALLOWS SELECTION OF LOCAL OR REMOTE SLUICE PUMP SPEED CONTROL	H-2-818560 2 P26 F6	FAILS TO OPERATE	LOSS OF SLUICE PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP VSD CABINET CURRENT INDICATOR	INDICATE LOAD CURRENT OF SLUICE PUMP	H-2-818560 2 P26 E5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP CURRENT TRANSMITTER	SENSE LOAD CURRENT OF SLUICE PUMP	H-2-818560 2 P26 E5	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP P-0621 SUCTION HEAD	PROVIDES SUCTION HEAD SIGNAL TO SLURRY PUMP CONTROL SYSTEM	H-2-818560 2 P26 B4	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP P=0621 LOW SUCTION HEAD SWITCH	PROVIDES LOW SUCTION HEAD SIGNAL TO SLURRY PUMP CONTROL SYSTEM	H-2-818560 2 P26 E6	FAILS TO OPERATE	LATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP DISCHARGE PRESSURE SENSOR	PROVIDES MEASUREMENT OF SLUICER PUMP DISCHARGE PRESSURE	H-2-818560 2 P26 C4	FAILS TO INDICATE	OTHER PUMP STATUS INDICATIONS AVAILABLE UNTIL REPAIRS ARE COMPLETED	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP P-0621 SPEED SENSOR	PROVIDE SIGNAL FOR SLUICER PUMP SPEED	H-2-818560 2 P26 B4	FAILS TO OPERATE	LOSS OF SLUICE PUMP SPEED CONTROLLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP SPEED TRANSMITTER	PROVIDES SIGNAL FOR SLUICE PUMP SPEED CONTROLLER	H-2-818560 2 P26 E6	FAILS TO OPERATE	LOSS OF SLUICE PUMP SPEED CONTROLLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP P-0621 MOTOR STATOR TEMPERATURE	MONITOR SLUICE PUMP MOTOR STATOR TEMPERATURE	H-2-818560 2 P26 B6	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-3. SWTS EQUIPMENT (PUMP, VALVES, ETC.) (13 SHEETS)
FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-EQ

SYSTEM SAFETY FUNCTION: WASTE MOBILIZATION AND TRANSPORT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SLUICE PUMP P-0621 MOTOR BEARING AND BEARING OIL TEMPERATURE	MONITOR SLUICE PUMP MOTOR BEARING AND BEARING OIL TEMPERATURE	H-2-818560 2 P26 B5	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP P-0621 MOTOR STATOR TEMPERATURE TRANSMITTER	PROVIDES SIGNAL TO MOTOR STATOR HIGH TEMPERATURE ALARM	H-2-818560 2 P26 E7	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP MOTOR BEARING AND BEARING OIL TEMPERATURE TRANSMITTER	PROVIDES TEMPERATURE SIGNAL FOR INDICATION AND ALARM	H-2-818560 2 P26 E5	FAILS TO OPERATE	LOSS OF MOTOR BEARING AND BEARING OIL TEMPERATURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP P-0621 MOTOR STATOR HIGH TEMPERATURE SWITCH	PROVIDES HIGH TEMPERATURE SIGNAL TO ACTUATE ALARM	H-2-818560 2 P26 E6	FAILS TO OPERATE	LOSS OF SLUICE PUMP STATOR HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP MOTOR BEARING AND BEARING OIL HIGH TEMPERATURE SWITCH	PROVIDES HIGH TEMPERATURE SIGNAL TO ACTUATE ALARM	H-2-818560 2 P26 E5	FAILS TO OPERATE	LOSS OF MOTOR BEARING AND BEARING OIL HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP P-0621 MOTOR STATOR HIGH-HIGH TEMPERATURE SWITCH	PROVIDES SIGNAL TO MOTOR STATOR HIGH-HIGH TEMPERATURE ALARM AND VARIABLE SPEED DRIVE CONTROLLER	H-2-818560 2 P26 E7	FAILS TO OPERATE	LOSS OF STATOR WINDING HIGH-HIGH TEMPERATURE ALARM AND SIGNAL TO VSD	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP DISCHARGE FLOW SENSOR	PROVIDES MEASUREMENT OF SLUICE PUMP DISCHARGE FLOW/DENSITY	H-2-818560 2 P26 C4	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICING FLUID DISCHARGE FLOW TRANSMITTER	PROVIDES SIGNAL FOR INDICATION AND ALARMS	H-2-818560 2 P26 B4	FAILS TO OPERATE	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP VSD CABINET VSD FAILURE LIGHT	LOCAL INDICATION OF VARIABLE SPEED DRIVE FAILURE	H-2-818560 2 P26 F5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-3. SWTS EQUIPMENT (PUMP, VALVES, ETC.) (13 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-EQ

SYSTEM SAFETY FUNCTION: WASTE MOBILIZATION AND TRANSPORT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SLUICE PUMP CONTROL ROOM START LIGHT	PROVIDE RUN STATUS INDICATION OF SLUICE PUMP	H-2-818560 2 P26 F7	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP VSD CABINET STOP LIGHT	PROVIDE RUN STATUS INDICATION OF SLUICE PUMP	H-2-818560 2 P26 F7	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP VSD CABINET REMOTE LIGHT	PROVIDES INDICATION OF REMOTE CONTROL AT SLUICE PUMP VSD CABINET	H-2-818560 2 P26 F7	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP VSD CABINET LOCAL LIGHT	PROVIDES INDICATION OF LOCAL CONTROL AT VSD CABINET	H-2-818560 2 P26 F6	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP POSITION INDICATOR	PROVIDE POSITION OF SLUICE PUMP (VERTICALLY)	H-2-818560 2 P26 C4	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP UPPER LIMIT POSITION SWITCH	PROVIDES INDICATION OF SLUICE PUMP AT UPPER LIMIT	H-2-818560 2 P26 C3	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP LOWER LIMIT POSITION SWITCH	PROVIDES INDICATION OF SLUICE PUMP AT UPPER LIMIT	H-2-818560 2 P26 C3	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AY-102 LIQUID LEVEL HIGH ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818560 4 P18 F2	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AY-102 VAPOR SPACE PRESSURE HIGH ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818560 4 P18 F4	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-3. SWTS EQUIPMENT (PUMP, VALVES, ETC.) (13 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-EQ

SYSTEM SAFETY FUNCTION: WASTE MOBILIZATION AND TRANSPORT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
AY-102 VAPOR SPACE PRESSURE LOW ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818560 4 P18 F3	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
LEAK DETECTION PIT 102A HIGH RADIATION ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818560 4 P18 F4	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
LEAK DETECTION PIT 102A WEIGHT FACTOR HIGH ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818560 4 P18 F6	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
LEAK DETECTION PIT 102A WEIGHT FACTOR HIGH SWITCH	PROVIDES SIGNAL FOR WEIGHT FACTOR HIGH ALARM	H-2-818560 4 P18 B6	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP WINCH RAISE/LOWER HAND SWITCH	ALLOWS POSITIONING OF SLUICE PUMP AS LIQUID LEVEL VARIES	H-2-818560 5 P17 F4	FAILS TO OPERATE	LOSS OF SLUICE PUMP WINCH	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP CONTROL ROOM START HAND SWITCH	CONTROLS SLUICE PUMP OPERATION FROM THE CONTROL ROOM	H-2-818560 5 P17 E7	FAILS TO OPERATE	LOSS OF SLUICE PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP CONTROL ROOM STOP HAND SWITCH	CONTROLS SLUICE PUMP OPERATION FROM THE CONTROL ROOM	H-2-818560 5 P17 E7	FAILS TO OPERATE	LOSS OF SLUICE PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP DISCHARGE PRESSURE TRANSMITTER	PROVIDES SIGNAL FOR INDICATION	H-2-818560 5 P17 B4	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP REMOTE MOTOR SPEED CONTROLLER	PROVIDES SIGNAL FOR REMOTE SPEED CONTROL	H-2-818560 5 P17 E6	FAILS TO OPERATE	LOSS OF SLUICE PUMP SPEED CONTROLLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-3. SWTS EQUIPMENT (PUMP, VALVES, ETC.) (13 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-EQ

SYSTEM SAFETY FUNCTION: WASTE MOBILIZATION AND TRANSPORT

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.1

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SLUICER PUMP P-AY102-1 MOTOR STATOR HIGH TEMPERATURE ALARM	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818560 5 P17 F6	FAILS TO OPERATE	LOSS OF STATOR WINDING HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP MOTOR BEARING AND BEARING OIL HIGH TEMPERATURE ALARM	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818560 5 P17 F5	FAILS TO OPERATE	LOSS OF MOTOR BEARING AND BEARING OIL HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICER PUMP P-AY102-1 MOTOR STATOR HIGH-HIGH TEMPERATURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818560 5 P17 F8	FAILS TO OPERATE	LOSS OF STATOR WINDING HIGH-HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP CONTROL ROOM VSD FAILURE LIGHT	REMOTE INDICATION OF VARIABLE SPEED DRIVE FAILURE	H-2-818560 5 P17 F5	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP CONTROL ROOM REMOTE LIGHT	PROVIDES INDICATION OF REMOTE CONTROL IN CONTROL ROOM	H-2-818560 5 P17 F6	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP CONTROL ROOM LOCAL LIGHT	PROVIDES INDICATION OF LOCAL CONTROL IN CONTROL ROOM	H-2-818560 5 P17 F6	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP WINCH UPPER LIMIT INDICATING LIGHT	PROVIDES INDICATION WINCH MOTOR IS AT UPPER LIMIT	H-2-818560 5 P17 E3	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE T, CRITERION 16	3
SLUICE PUMP WINCH LOWER LIMIT INDICATING LIGHT	PROVIDES INDICATION WINCH MOTOR IS AT LOWER LIMIT	H-2-818560 5 P17 E3	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP WINCH POSITION TRANSMITTER	PROVIDES POSITION INDICATION FOR SLUICE PUMP	H-2-818560 5 P17 B4	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-4. SWTS RAW WATER SYSTEM (4 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-RW

SYSTEM SAFETY FUNCTION: PROVIDE RAW WATER FLUSHING OF ALL COMPONENTS

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.2

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HIGH EFFICIENCY METAL FILTER HMF-1361 FILTERED WATER FLUSH SHUT OFF VALVE HV-13637 HAND SWITCH	ALLOWS FLUSHING OF HMF-1361	H-2-818561 4 P27 E3	FAILS TO OPERATE	INCREASED POTENTIAL OF PLUGGING HMF-1361	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HIGH EFFICIENCY METAL FILTER HMF-1361 FILTERED WATER FLUSH SHUT OFF VALVE HV-13637 OPEN POSITION INDICATING LIGHT	PROVIDES OPEN POSITION INDICATION FOR HV-136237	H-2-818561 4 P27 E3	FAILS TO OPERATE	LOSS OF POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HIGH EFFICIENCY METAL FILTER HMF-1361 FILTERED WATER FLUSH SHUT OFF VALVE HV-13637 CLOSED POSITION INDICATING LIGHT	PROVIDES CLOSED POSITION INDICATION FOR HV-136237	H-2-818561 4 P27 E3	FAILS TO OPERATE	LOSS OF POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HIGH EFFICIENCY METAL FILTER HMF-1361 FILTERED WATER FLUSH SHUT OFF VALVE HV-13637 OPEN POSITION SWITCH	PROVIDES CLOSED POSITION SIGNAL FOR HV-13637	H-2-818561 4 P27 D3	FAILS TO OPERATE	LOSS OF POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HIGH EFFICIENCY METAL FILTER HMF-1361 FILTERED WATER FLUSH SHUT OFF VALVE HV-13637 CLOSED POSITION SWITCH	PROVIDES CLOSED POSITION SIGNAL FOR HV-136237	H-2-818561 4 P27 D3	FAILS TO OPERATE	LOSS OF POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEMF FILTERED FLUSH WATER FLOW TOTALIZER	PROVIDES TOTAL FILTERED WATER FLOW	H-2-818561 5 P20 D7	FAILS TO INDICATE	LOSS OF TOTALIZER INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-4. SWTS RAW WATER SYSTEM (4 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-RW

SYSTEM SAFETY FUNCTION: PROVIDE RAW WATER FLUSHING OF ALL COMPONENTS

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.2

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HV-13662 HAND SWITCH	CONTROLS POSITION OF HV-13662	H-2-818561 5 P20 F2	FAILS TO OPERATE	HV-13662 FAILS AS IS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HV-13669 HAND SWITCH	CONTROLS POSITION OF HV-13669	H-2-818561 5 P20 F7	FAILS TO OPERATE	HV-13669 FAILS CLOSED	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HV-13669 TIMER RELAY	CYCLES HV-13669 FOR FLUSHING HEME ONE MINUTE PER HOUR	H-2-818561 5 P20 F7	FAILS TO OPERATE	HV-13669 FAILS CLOSED	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RAW WATER SUPPLY HIGH PRESSURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 5 P20 F2	FAILS TO OPERATE	LOSS OF HIGH PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
F-1362 HIGH PRESSURE DIFFERENTIAL ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 5 P20 F6	FAILS TO OPERATE	LOSS OF HIGH DIFFERENTIAL PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
F-1361 HIGH PRESSURE DIFFERENTIAL ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 5 P20 F5	FAILS TO OPERATE	LOSS OF HIGH DIFFERENTIAL PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
F-1362 PRESSURE DIFFERENTIAL INDICATING SWITCH	MONITOR PRESSURE ACROSS FILTER F-1362	H-2-818561 5 P20 E6	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
F-1361 PRESSURE DIFFERENTIAL INDICATING SWITCH	MONITOR PRESSURE ACROSS FILTER F-1361	G-2-818561 5 P20 E5	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RAW WATER SUPPLY PRESSURE INDICATOR	PROVIDES RW PRESSURE INDICATION	H-2-818561 5 P20 F2	FAILS TO INDICATE	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-4. SWTS RAW WATER SYSTEM (4 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-RW

SYSTEM SAFETY FUNCTION: PROVIDE RAW WATER FLUSHING OF ALL COMPONENTS

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.2

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HEME FLUSH WATER PRESSURE INDICATOR	PROVIDES FILTERED WATER PRESSURE INDICATION	H-2-818561 5 P20 E8	FAILS TO INDICATE	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RAW WATER SUPPLY PRESSURE INDICATING TRANSMITTER	PROVIDES RW PRESSURE AND ALARM DOWN STREAM OF BACKFLOW PREVENTER	H-2-818561 5 P20 B3	FAILS TO INDICATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RAW WATER SUPPLY HIGH PRESSURE SWITCH	PROVIDES RW HIGH PRESSURE DOWN STREAM OF BACKFLOW PREVENTER ALARM	H-2-818561 5 P20 F2	FAILS TO OPERATE	LOSS OF HIGH PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RAW WATER FLOW TOTALIZER SENSOR	PROVIDE SIGNAL FOR RAW WATER TOTALIZER	H-2-818562 1 P26 C4	PLUG	UNABLE TO QUANTIFY RW ADDITION UNTIL REPAIRED/REPLACED	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RAW WATER FLOW TOTALIZER SENSOR	PROVIDES INDICATION OF TOTAL WRSS RAW WATER USE	H-2-818562 1 P26 F4	FAILS TO OPERATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RAW WATER FLOW TOTALIZER TRANSMITTER	TOTALIZE WRSS RAW WATER CONSUMPTION	H-2-818562 1 P26 C4	FAILS TO OPERATE	UNABLE TO QUANTIFY RW ADDITION UNTIL REPAIRED/REPLACED	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SERVICE BUILDING 241-C-73 LEAK DETECTOR ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818562 1 P26 F2	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SERVICE BUILDING 241-C-73 LEAK DETECTOR SENSOR	MONITOR RAW WATER LEAKAGE TO SERVICE BLDG	H-2-818562 1 P26 C2	FAILS TO OPERATE	LOSS OF LEAK DETECTOR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SERVICE BUILDING 241-C-73 LEAK DETECTOR SWITCH	PROVIDES SIGNAL FOR ALARM	H-2-818562 1 P26 D2	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-4. SWTS RAW WATER SYSTEM (4 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-RW

SYSTEM SAFETY FUNCTION: PROVIDE RAW WATER FLUSHING OF ALL COMPONENTS

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.2

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
RAW WATER DUPLEX STRAINER HIGH DIFFERENTIAL PRESSURE ALARM	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818562 1 P26 F3	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RAW WATER DUPLEX STRAINER PRESSURE DIFFERENTIAL INDICATING SWITCH	MONITOR RW PRESSURE THROUGH DUPLEX STRAINER	H-2-818562 1 P26 D3	FAILS TO OPERATE	LOSS OF DP INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RAW WATER HEADER PRESSURE INDICATOR	MONITORS RW SUPPLY PRESSURE	H-2-818562 1 P26 F3	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RAW WATER HEADER PRESSURE TRANSMITTER	MONITORS RW SUPPLY PRESSURE	H-2-818562 1 P26 D3	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-5. COMPRESSED AIR SYSTEM (2 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-1A

SYSTEM SAFETY FUNCTION: PROVIDE AIR PURGE AND VALVE POSITIONING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.3

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
AIR PURGE FLOW REGULATOR TO PIT-1361	AIR PURGE OF PIT-1361	H-2-818559 2 P21 D1	FAILS TO OPERATE	LOSS OF PURGE AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEMF BLOW DOWN AIR RESTRICTING ORIFICE	LIMITS AIR FLOW TO HEMF	H-2-818561 5 P20 D7	PLUG	LOSS OF BLOW DOWN AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
80# INSTRUMENT AIR HEADER PRESSURE	PROVIDES HEADER AIR PRESSURE INDICATION	H-2-818561 5 P20 D7	FAILS TO INDICATE	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
20# INSTRUMENT AIR HEADER PRESSURE	PROVIDES HEADER AIR PRESSURE INDICATION	H-2-818561 5 P20 C7	FAILS TO INDICATE	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEMF BLOW DOWN AIR PRESSURE INDICATOR	PROVIDES AIR PRESSURE INDICATION	H-2-818561 5 P20 D7	FAILS TO INDICATE	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
INSTRUMENT AIR HEADER LOW PRESSURE ALARM	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818562 1 P26 F7	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
INSTRUMENT AIR HEADER PRESSURE INDICATOR	MONITORS INSTRUMENT AIR HEADER PRESSURE	H-2-818562 1 P26 F7	FAILS TO INDICATE	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AIR COMPRESSOR CP-1361 DISCHARGE PRESSURE INDICATOR	MONITORS COMPRESSOR DISCHARGE PRESSURE	H-2-818562 1 P26 D5	FAILS TO INDICATE	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
INSTRUMENT AIR HEADER PRESSURE INDICATING TRANSMITTER	MONITORS INSTRUMENT AIR HEADER PRESSURE	H-2-818562 1 P26 D7	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-5. COMPRESSED AIR SYSTEM (2 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: SWTS-1A

SYSTEM SAFETY FUNCTION: PROVIDE AIR PURGE AND VALVE POSITIONING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.3

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
INSTRUMENT AIR HEADER LOW PRESSURE SWITCH	PROVIDE INSTRUMENT AIR HEADER LOW PRESSURE ALARM	H-2-818562 1 P26 F7	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AIR COMPRESSOR CP-1361 TROUBLE ALARM	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818562 1 P26 F5	FAIL TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AIR COMPRESSOR CP-1361 RUN LIGHT	PROVIDE INDICATION ORF COMPRESSOR STATUS	H-2-818562 1 P26 F5	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AIR COMPRESSOR CP-1361 OFF LIGHT	PROVIDE INDICATION ORF COMPRESSOR STATUS	H-2-818562 1 P26 F5	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-6. LEAK DETECTION SYSTEM (2 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: LEAK DETECTION

SYSTEM SAFETY FUNCTION: PROVIDE LEAK DETECTION INDICATION AND INTERLOCKS

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.4

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
C-106 LEAK DETECTOR COMMON ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818559 2 P21 F7	FAILS TO ALARM	NONE - PROVIDES ALARM FUNCTION ONLY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICING PIT 241-C-06C LEAK DETECTOR	DETECT LEAKAGE INTO SLUICING PIT	H-2-818559 2 P21 D7	LOSS OF LEAK DETECTION SLUICE PIT 241-C-06C	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICING PIT 241-C-06C LEAK DETECTOR SWITCH	PROVIDE LEAKAGE SIGNAL TO INTERLOCKS AND ALARMS	H-2-818559 2 P21 E7	LOSS OF LEAK DETECTION SLUICE PIT 241-C-06C	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP P-1361 MOTOR LEAK DETECTOR	DETECT LEAKAGE INTO SLURRY PUMP MOTOR CASING	H-2-818559 4 P23 B6	LOSS OF SLURRY PUMP MOTOR LEAK DETECTION	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY PUMP MOTOR CASING LEAK DETECTOR SWITCH	PROVIDES MOTOR CASING LEAKAGE SIGNAL TO SLURRY PUMP VARIABLE SPEED DRIVE CONTROLS	H-2-818559 4 P23 E7	FAILS TO OPERATE	LOSS OF SLURRY PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
LEAK DETECTOR 6" ENC-100-M26a	LEAK DETECTOR SLURRY LINE	H-2-818559 5 P23 E4	FAIL TO DETECT	LOSS OF ENCAPSULATION LINE LEAK DETECTION CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLURRY LINE LEAK DETECTOR SWITCH	PROVIDES SIGNAL FOR ALARM AND INTERLOCK	H-2-818559 5 P20 E4	FAILS TO OPERATE	LOSS OF ALARM AND INTERLOCK	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
LEAK DETECTOR 6" ENC-200-M26a	LEAK DETECTOR SLUICE LINE	H-2-818559 6 P21 E8	FAIL TO DETECT	LOSS OF ENCAPSULATION LINE LEAK DETECTION CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PUMP PIT 241-C-06A LEAK DETECTOR	DETECT LEAKAGE INTO PUMP PIT	H-2-818559 6 P21 E2	LOSS OF LEAK DETECTION PUMP PIT 241-C-06A	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-6. LEAK DETECTION SYSTEM (2 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C/AY

SYSTEM: LEAK DETECTION

SYSTEM SAFETY FUNCTION: PROVIDE LEAK DETECTION INDICATION AND INTERLOCKS

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.4

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SLUICE LINE LEAK DETECTOR SWITCH	PROVIDES SIGNAL FOR ALARM AND INTERLOCK	H-2-818559 6 P21 F8	FAILS TO OPERATE	LOSS OF ALARM AND INTERLOCK	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PUMP PIT 241-C-06A LEAK DETECTOR SWITCH	PROVIDES SIGNAL FOR ALARM AND INTERLOCK	H-2-818559 6 P21 F2	FAILS TO OPERATE	LOSS OF ALARM AND INTERLOCK	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP P-0621 MOTOR LEAK DETECTOR	DETECT LEAKAGE INTO SLUICE PUMP MOTOR CASING	H-2-818560 2 P26 B6	LOSS OF SLUICE PUMP MOTOR LEAK DETECTION	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PUMP P-0621 MOTOR LEAK DETECTOR RELAY	PROVIDES MOTOR CASING LEAKAGE SIGNAL TO SLUICE PUMP VARIABLE SPEED DRIVE CONTROLS	H-2-818560 2 P26 E6	FAILS TO OPERATE	LOSS OF SLUICE PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SLUICE PIT 241-AY-02E/PUMP PIT 241-AY-02A LEAK DETECTOR ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818560 5 P17 F2	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
SEAL LOOP LEVEL GAUGE	PROVIDE LOCAL INDICATION OF SEAL LOOP FLUID LEVEL	H-2-818561 1 P27 C7	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	FAILURE OF LEVEL GAUGE WILL NOT COMPROMISE SAFETY FUNCTION OF SEAL LOOP; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEAL LOOP LEVEL GAUGE	PROVIDE LOCAL INDICATION OF SEAL LOOP FLUID LEVEL	H-2-818561 1 P27 C5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	FAILURE OF LEVEL GAUGE WILL NOT COMPROMISE SAFETY FUNCTION OF SEAL LOOP; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
FLOW ELEMENT	MONITOR FLOW OF GLYCOL COOLING MEDIA	H-818561 2 P23 C2	FAILS TO OPERATE	LOSS OF FLOW INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
FLOW INDICATOR	PROVIDES INDICATION OF GLYCOL FLOW	H-818561 2 P23 F2	FAILS TO INDICATE	LOSS OF FLOW INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
FLOW TRANSMITTER	PROVIDES SIGNAL TO INSTR/CONTROL BLDG FOR INDICTION AND ALARMS FOR MONITORING GLYCOL COOLING MEDIA FLOW	H-818561 2 P23 E2	FAILS TO OPERATE	LOW OF FLOW INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP DISCHARGE LOW FLOW ALARM SWITCH	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 2 P23 F2	FAILS TO OPERATE	LOSS OF LOW FLOW ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP DISCHARGE LOW-LOW FLOW ALARM SWITCH	PROVIDES LOW FLOW SIGNAL TO CHILLER SHUTDOWN INTERLOCK	H-2-818561 2 P23 F2	FAILS TO OPERATE	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP LOW DISCHARGE PRESSURE RESET HAND SWITCH	RESETS LOW PRESSURE LIGHT	H-2-818561 2 P23 E3	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
AIR COOLED CHILLER CONTROL ROOM START HAND SWITCH	REMOTE OPERATION SWITCH FOR AIR COOLED CHILLER R-1361	H-2-818561 2 P23 F8	FAILS TO OPERATE	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AIR COOLED CHILLER CONTROL ROOM STOP HAND SWITCH	REMOTE OPERATION SWITCH FOR AIR COOLED CHILLER R-1361	H-2-818561 2 P23 F7	FAILS TO OPERATE	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AIR COOLED CHILLER C-CW-R-1 ON/OFF LOCAL HAND SWITCH	PROVIDES CONTROL OF CHILLER	H-2-818561 2 P23 E7	FAILS TO OPERATE	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP P-1365 ON/OFF/REMOTE LOCAL HAND SWITCH	LOCAL/REMOTE OPERATION SWITCH FOR CIRC PUMP P-1365	H-2-818561 2 P23 E4	FAILS TO OPERATE	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP P-1364 ON/OFF/REMOTE LOCAL HAND SWITCH	LOCAL/REMOTE OPERATION SWITCH FOR CIRC PUMP P-1364	H-2-818561 2 P23 E4	FAILS TO OPERATE	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP P-1365 ON/AUTO/OFF REMOTE SELECTOR SWITCH	PROVIDES CONTROL FROM CIRC PUMP P-1365	H-2-818561 2 P23 F5	FAILS TO OPERATE	LOSS OF CIRC PUMP/CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP P-1364 ON/AUTO/OFF REMOTE SELECTOR SWITCH	PROVIDES CONTROL FROM CIRC PUMP P-1364	H-2-818561 2 P23 F4	FAILS TO OPERATE	LOSS OF CIRC PUMP/CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP LOW DISCHARGE PRESSURE ALARM	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818561 2 P23 F3	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXPANSION TANK TK1362 PRESSURE LOW ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 2 P23 F8	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
CIRC PUMP SUCTION STRAINER DIFFERENTIAL PRESSURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 2 P23 F5	FAILS TO OPERATE	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP SUCTION STRAINER DIFFERENTIAL PRESSURE INDICATING SWITCH	MONITOR PRESSURE ACROSS GLYCOL STRAINER F-1364	H-2-818561 2 P23 D5	FAILS TO OPERATE	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
MAKE UP STORAGE TANK TK 1361 PRESSURE	MONITOR MAKE UP TANK PRESSURE	H-2-818561 2 P23 C8	FAILS TO INDICATE	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PCV-1368 OUTLET PRESSURE INDICATION	MONITOR OUTLET PRESSURE OF PCV-1368	H-2-818561 2 P23 C7	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP DISCHARGE PRESSURE, INDICATING SWITCH	MONITOR DISCHARGE PRESSURE OF GLYCOL RECIRCULATION PUMPS; STARTS STANDBY PUMP	H-2-818561 2 P23 D3	FAILS TO OPERATE	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXPANSION TANK TK1362 PRESSURE INDICTION AND LOW PRESSURE SWITCH	PROVIDES INDICATION AND ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 2 P23 B6	FAILS TO OPERATE	LOSS OF INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP LOW DISCHARGE PRESSURE LIGHT	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818561 2 P23 E4	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CHILLER SUPPLY HEADER HIGH TEMPERATURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 2 P23 F3	FAILS TO OPERATE	LOSS OF COOLANT SUPPLY HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CHILLER SUPPLY HEADER TEMPERATURE SENSOR	MONITOR TEMPERATURE OF GLYCOL SUPPLY LINE	H-2-818561 2 P23 C3	FAILS TO OPERATE	LOSS OF COOLANT RETURN TEMPERATURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
CHILLER RETURN HEADER TEMPERATURE SENSOR	MONITOR TEMPERATURE OF GLYCOL RETURN LINE	H-2-818561 2 P23 E4	FAILS TO OPERATE	LOSS OF COOLANT RETURN TEMPERATURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CHILLER SUPPLY HEADER TEMPERATURE TRANSMITTER	PROVIDES TEMPERATURE SIGNAL FOR ALARM AND INDICATION	H-2-818561 2 P23 E3	FAILS TO OPERATE	LOSS OF COOLANT SUPPLY TEMPERATURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CHILLER RETURN HEADER TEMPERATURE TRANSMITTER	MONITOR TEMPERATURE OF GLYCOL RETURN LINE	H-2-818561 2 P23 E4	FAILS TO OPERATE	LOSS OF COOLANT RETURN TEMPERATURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CHILLER SUPPLY HEADER HIGH TEMPERATURE SWITCH	PROVIDES TEMPERATURE SIGNAL FOR ALARM	H-2-818561 2 P23 F3	FAILS TO OPERATE	LOSS OF COOLANT SUPPLY HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AIR COOLED CHILLER R-1361 TROUBLE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 2 P23 F8	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AIR COOLED CHILLER R-1361 RUN INDICATING LIGHT	PROVIDES INDICATION OF CHILLER RUN STATUS	H-2-818561 2 P23 F8	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
AIR COOLED CHILLER R-1361 OFF INDICATING LIGHT	PROVIDES INDICATION OF CHILLER OFF STATUS	H-2-818561 2 P23 F7	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP P-1365 LOCAL RUN INDICATING LIGHT	PROVIDES INDICATION OF PUMP RUN STATUS	H-2-818561 2 P23 E5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP P-1365 LOCAL OFF INDICATING LIGHT	PROVIDES INDICATION OF PUMP OFF STATUS	H-2-818561 2 P23 E5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
CIRC PUMP P-1365 LOCAL AUTO INDICATING LIGHT	PROVIDES INDICATION OF PUMP AUTO STATUS	H-2-818561 2 P23 E5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP P-1364 LOCAL RUN INDICATING LIGHT	PROVIDES INDICATION OF PUMP RUN STATUS	H-2-818561 2 P23 E5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP P-1364 LOCAL OFF INDICATING LIGHT	PROVIDES INDICATION OF PUMP OFF STATUS	H-2-818561 2 P23 E5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP P-1364 LOCAL AUTO INDICATING LIGHT	PROVIDES INDICATION OF PUMP AUTO STATUS	H-2-818561 2 P23 E5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP P-1365 REMOTE RUN INDICATING LIGHT	PROVIDES INDICATION OF PUMP RUN STATUS	H-2-818561 2 P23 F5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP P-1365 REMOTE OFF INDICATING LIGHT	PROVIDES INDICATION OF PUMP OFF STATUS	H-2-818561 2 P23 F5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP P-1365 REMOTE AUTO INDICATING LIGHT	PROVIDES INDICATION OF PUMP AUTO STATUS	H-2-818561 2 P23 F5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP P-1364 REMOTE RUN INDICATING LIGHT	PROVIDES INDICATION OF PUMP RUN STATUS	H-2-818561 2 P23 F4	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
CIRC PUMP P-1364 REMOTE OFF INDICATING LIGHT	PROVIDES INDICATION OF PUMP OFF STATUS	H-2-818561 2 P23 F4	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
CIRC PUMP P-1364 REMOTE AUTO INDICATING LIGHT	PROVIDES INDICATION OF PUMP AUTO STATUS	H-2-818561 2 P23 F4	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN REMOTE RUN HAND SWITCH	PROVIDES REMOTE CONTROL OF RECIRCULATION FAN	H-2-818561 3 P30 F2	FAILS TO OPERATE	LOSS OF RECIRCULATION FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN REMOTE OFF HAND SWITCH	PROVIDES REMOTE CONTROL OF RECIRCULATION FAN	H-2-818561 2 P30 F2	FAILS TO OPERATE	LOSS OF RECIRCULATION FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN LOCAL/REMOTE SELECTOR HAND SWITCH	ALLOWS LOCAL OR REMOTE CONTROL OF RECIRCULATION FAN	H-2-818561 3 P30 E2	FAILS TO OPERATE	LOSS OF RECIRCULATION FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN LOCAL RUN HAND SWITCH	PROVIDES LOCAL CONTROL OF RECIRCULATION FAN	H-2-818561 3 P30 E2	FAILS TO OPERATE	LOSS OF RECIRCULATION FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN LOCAL OFF HAND SWITCH	PROVIDES LOCAL CONTROL OF RECIRCULATION FAN	H-2-818561 3 P30 E2	FAILS TO OPERATE	LOSS OF RECIRCULATION FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN HIGH CURRENT ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 3 P30 F1	FAILS TO OPERATE	LOSS OF HIGH CURRENT ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN LOW CURRENT ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 3 P30 F1	FAILS TO OPERATE	LOSS OF LOW CURRENT ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN LOCAL CURRENT INDICATOR	PROVIDES LOCAL INDICATION OF FAN LOAD	H-2-818561 3 P30 E1	FAILS TO INDICATE	LOSS OF LOCAL CURRENT INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
RECIRCULATION FAN REMOTE CURRENT INDICATOR	PROVIDES REMOTE INDICATION OF FAN LOAD	H-2-818561 3 P30 F1	FAILS TO INDICATE	LOSS OF REMOTE CURRENT INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN HIGH CURRENT SWITCH	PROVIDES SIGNAL FOR ALARM AND INTERLOCK	H-2-818561 3 P30 F1	FAILS TO OPERATE	LOSS OF HIGH CURRENT ALARM AND INTERLOCK	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN LOW CURRENT SWITCH	PROVIDES SIGNAL FOR ALARM	H-2-818561 3 P30 F1	FAILS TO OPERATE	LOSS OF LOW CURRENT ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN CURRENT TRANSMITTER	PROVIDES CURRENT SIGNAL FOR INDICATION, ALARM AND INTERLOCK	H-2-818561 3 P30 E1	FAILS TO OPERATE	LOSS OF CURRENT INDICATION, ALARM AND HIGH CURRENT SHUTDOWN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN CURRENT CONVERTER	PROVIDES CURRENT SIGNAL FOR INDICATION, ALARM AND INTERLOCK	H-2-818561 3 P30 E1	FAILS TO OPERATE	LOSS OF CURRENT INDICATION, ALARM AND HIGH CURRENT SHUTDOWN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEAL POT HIGH LEVEL ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 3 P30 F3	FAILS TO OPERATE	LOSS OF HIGH LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91, ROOM 1 FLOOR DRAIN LOW LEVEL ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 3 P30 F4	FAILS TO OPERATE	LOSS OF LOW LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEAL POT LOW LEVEL ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 3 P30 F3	FAILS TO OPERATE	LOSS OF LOW LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 SUMP LEVEL ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 3 P30 F8	FAILS TO OPERATE	LOSS OF LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
PROCESS BUILDING 241-C-91, ROOM 1 LEVEL ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 3 P30 F4	FAILS TO OPERATE	LOSS OF LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 SUMP LEVEL SENSOR	PROCESS BUILDING 241-C-91 SUMP LEVEL SENSOR	H-2-818561 3 P30 C8	FAILS TO OPERATE	LOSS OF LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91, ROOM 1 LEVEL SENSOR	PROVIDES ROOM 1 LEVEL ALARM	H-2-818561 3 P30 B4	FAILS TO OPERATE	LOSS OF LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 SUMP LEVEL SWITCH	PROVIDES SUMP LEVEL ALARM	H-2-818561 3 P30 E8	FAILS TO OPERATE	LOSS OF LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91, ROOM 1 LEVEL SWITCH	PROVIDES ROOM 1 LEVEL ALARM	H-2-818561 3 P30 E4	FAILS TO OPERATE	LOSS OF LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91, ROOM 1 FLOOR DRAIN LEVEL SENSOR	PROVIDES ROOM 1 FLOOR DRAIN LEVEL ALARM	H-2-818561 3 P30 B4	FAILS TO OPERATE	LOSS OF LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEAL POT LEVEL ELEMENT	PROCESS BUILDING 241-C-91 SEAL POT LEVEL SENSOR	H-2-818561 3 P30 C3	FAILS TO INDICATE	LOSS OF LEVEL ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91, ROOM 1 FLOOR DRAIN LOW LEVEL SWITCH	PROVIDES ROOM 1 FLOOR DRAIN LEVEL ALARM	H-2-818561 3 P30 E4	FAILS TO OPERATE	LOSS OF LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SEAL POT HIGH/LOW LEVEL SWITCH	PROVIDES HIGH/LOW SEAL POT LEVEL ALARMS	H-2-818561 3 P30 E3	FAILS TO OPERATE	LOSS OF LEVEL ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HEAT EXCHANGER HIGH DIFFERENTIAL PRESSURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 3 P30 F7	FAILS TO OPERATE	LOSS OF HIGH DP ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEAT EXCHANGER DIFFERENTIAL PRESSURE INDICATOR	PROVIDES INDICATION OF PRESSURE DROP ACROSS HEAT EXCHANGER HX-1361	H-2-818561 3 P30 E6	FAILS TO INDICATE	LOSS OF DP INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEAT EXCHANGER HIGH DIFFERENTIAL PRESSURE SWITCH	PROVIDES HIGH DIFFERENTIAL PRESSURE ALARM	H-2-818561 3 P30 F7	FAILS TO OPERATE	LOSS OF HIGH DP ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEAT EXCHANGER DIFFERENTIAL PRESSURE TRANSMITTER	MONITOR EXHAUST DIFFERENTIAL PRESSURE ACROSS HEAT EXCHANGER HE-1361	H-2-818561 3 P30 E6	FAILS TO OPERATE	LOSS OF DP INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
C-106 LOCAL PRESSURE INDICATOR	PROVIDE LOCAL INDICATION C-106 TANK PRESSURE	H-2-818561 3 P30 E7	FAILS TO INDICATE	LOSS OF LOCAL TANK PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
C-106 LOCAL PRESSURE INDICATOR	PROVIDE LOCAL INDICATION C-106 TANK PRESSURE	H-2-818561 3 P30 F7	FAILS TO INDICATE	LOSS OF LOCAL TANK PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
C-106 PRESSURE TRANSMITTER	PROVIDE C-106 TANK PRESSURE	H-2-818561 3 P30 E7	FAILS TO OPERATE	LOSS OF TANK PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
MOISTURE SEPARATOR MS-1361 INLET HIGH TEMPERATURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 3 P30 F8	FAILS TO OPERATE	LOSS OF HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1361 OUTLET HIGH TEMPERATURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 3 P30 F5	FAILS TO OPERATE	LOSS OF HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HEAT EXCHANGER INLET TEMPERATURE SENSOR	MONITOR EXHAUST AIR TEMPERATURE FROM C-106 INLET OF CONDENSER C-K2-08-1	H-2-818561 3 P30 D7	FAILS TO OPERATE	LOSS OF HEAT EXCHANGER HX-1361 INLET TEMPERATURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
MOISTURE SEPARATOR INLET TEMPERATURE SENSOR	MONITOR EXHAUST AIR TEMPERATURE INLET TO MOISTURE SEPARATOR MS-1361	H-2-818561 3 P30 D6	FAILS TO OPERATE	LOSS OF INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1361 OUTLET TEMPERATURE SENSOR	MONITOR EXHAUST AIR TEMPERATURE OUTLET OF HEATING COIL HC-1361	H-2-818561 3 P30 D5	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1361	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1361 TEMPERATURE CONTROLLER	PROVIDE HEATER CONTROL	H-2-818561 3 P30 F5	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1361, INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEAT EXCHANGER INLET TEMPERATURE. TRANSMITTER	PROVIDE HEAT EXCHANGER INLET TEMPERATURE	H-2-818561 3 P30 E7	FAILS TO OPERATE	LOSS OF HEAT EXCHANGER HX-1361 INLET TEMPERATURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
MOISTURE SEPARATOR INLET TEMPERATURE TRANSMITTER	MONITOR EXHAUST AIR TEMPERATURE INLET TO MOISTURE SEPARATOR MS-1361	H-2-818561 3 P30 E6	FAILS TO OPERATE	LOSS OF INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1361 TEMPERATURE TRANSMITTER	PROVIDE INDICATION, ALARM, AND HEATER CONTROL	H-2-818561 3 P30 E5	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1361, INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
MOISTURE SEPARATOR INLET HIGH TEMPERATURE SWITCH	PROVIDES SIGNAL TO HIGH TEMPERATURE ALARM	H-2-818561 3 P30 F6	FAILS TO OPERATE	LOSS OF HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1361 HIGH TEMPERATURE SWITCH	PROVIDES SIGNAL TO HIGH TEMPERATURE ALARM	H-2-818561 3 P30 F5	FAILS TO OPERATE	LOSS OF HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HEATING COIL HC-1361 TEMPERATURE CONTROL RELAY	PROVIDE HEATER CONTROL	H-2-818561 3 P30 E5	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1361	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HVAC SYSTEM FAILURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 3 P30 F2	FAILS TO OPERATE	LOSS OF SYSTEM FAILURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1361 ON LOCAL INDICATING LIGHT	PROVIDE LOCAL INDICATION OF HEATER STATUS	H-2-818561 3 P30 E5	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1361 OFF LOCAL INDICATING LIGHT	PROVIDE LOCAL INDICATION OF HEATER STATUS	H-2-818561 3 P30 E5	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1361 ON REMOTE INDICATING LIGHT	PROVIDE REMOTE INDICATION OF HEATER STATUS	H-2-818561 3 P30 F4	FAILS TO OPERATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1361 OFF REMOTE INDICATING LIGHT	PROVIDE REMOTE INDICATION OF HEATER STATUS	H-2-818561 3 P30 F4	FAILS TO OPERATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN RUN REMOTE INDICATING LIGHT	PROVIDE REMOTE INDICATION OF FAN STATUS	H-2-818561 3 P30 F2	FAILS TO INDICATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN OFF REMOTE INDICATING LIGHT	PROVIDE REMOTE INDICATION OF FAN STATUS	H-2-818561 3 P30 F2	FAILS TO INDICATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN RUN LOCAL INDICATING LIGHT	PROVIDE LOCAL INDICATION OF FAN STATUS	H-2-818561 3 P30 E2	FAILS TO INDICATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
RECIRCULATION FAN LOCAL CONTROL LOCAL INDICATING LIGHT	PROVIDE LOCAL INDICATION OF FAN CONTROL STATUS	H-2-818561 3 P30 E2	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN OFF LOCAL INDICATING LIGHT	PROVIDE LOCAL INDICATION OF FAN STATUS	H-2-818561 3 P30 E2	FAILS TO INDICATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN LOCAL CONTROL LOCAL INDICATING LIGHT	PROVIDE LOCAL INDICATION OF FAN CONTROL STATUS	H-2-818561 3 P30 E1	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN REMOTE CONTROL REMOTE INDICATING LIGHT	PROVIDE REMOTE INDICATION OF FAN CONTROL STATUS	H-2-818561 3 P30 F2	FAILS TO INDICATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
RECIRCULATION FAN REMOTE CONTROL REMOTE INDICATING LIGHT	PROVIDE REMOTE INDICATION OF FAN CONTROL STATUS	H-2-818561 3 P30 F2	FAILS TO INDICATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HIGH EFFICIENCY METAL FILTER HMF-1361 DRAIN VALVE HV-13638 HAND SWITCH	ALLOWS DRAINING OF HMF-1361	H-2-818561 4 P27 E2	FAILS TO OPERATE	INCREASED MOISTURE CARRYOVER MAY DAMAGE DOWNSTREAM COMPONENTS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HIGH EFFICIENCY METAL FILTER HMF-1361 DRAIN VALVE HV-13638 POSITIONING SOLENOID	ALLOWS DRAINING OF HMF-1361	H-2-818561 4 P27 B3	FAILS TO OPERATE	INCREASED MOISTURE CARRYOVER MAY DAMAGE DOWNSTREAM COMPONENTS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HME-1361 HIGH DIFFERENTIAL PRESSURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 4 P27 F7	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HME-1361 HIGH DIFFERENTIAL PRESSURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 4 P27 F2	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HME-1361 LOCAL DIFFERENTIAL PRESSURE INDICATOR	PROVIDES LOCAL HEME DIFFERENTIAL PRESSURE	H-2-818561 4 P27 E7	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HME-1361 LOCAL DIFFERENTIAL PRESSURE INDICATOR	PROVIDES LOCAL HEMF DIFFERENTIAL PRESSURE	H-2-818561 4 P27 E2	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HME-1361 HIGH DIFFERENTIAL PRESSURE SWITCH	PROVIDES SIGNAL FOR ALARM	H-2-818561 4 P27 F7	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HME-1361 HIGH DIFFERENTIAL PRESSURE SWITCH	PROVIDES SIGNAL FOR ALARM	H-2-818561 4 P27 F2	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HME-1361 DIFFERENTIAL PRESSURE TRANSMITTER	PROVIDES SIGNAL FOR INDICATION AND ALARM	H-2-818561 4 P27 E7	FAILS TO OPERATE	LOSS OF INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HME-1361 DIFFERENTIAL PRESSURE TRANSMITTER	PROVIDES SIGNAL FOR INDICATION AND ALARM	H-2-818561 4 P27 E3	FAILS TO OPERATE	LOSS OF INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 1 REMOTE HIGH RADIATION ALARM	ALERTS OPERATORS TO ABNORMAL SITUATION	H-2-818561 4 P27 F5	FAILS TO OPERATE	LOSS OF ROOM 1 REMOTE HIGH RADIATION ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 1 RADIATION ELEMENT	MONITOR RADIATION LEVEL OF ROOM 1	H-2-818561 4 027 F5	FAILS TO OPERATE	LOSS OF ROOM 1 RADIATION MONITORING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
PROCESS BUILDING 241-C-91 ROOM 1 RADIATION INDICATOR	PROVIDE RADIATION LEVEL INDICATION OF ROOM 1	H-2-818561 4 P27 F5	FAILS TO INDICATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 1 RADIATION TRANSMITTER	PROVIDE SIGNAL FOR INDICATION AND ALARM	H-2-818561 4 P27 E5	FAILS TO OPERATE	LOSS OF ROOM 1 RADIATION MONITORING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 1 HIGH RADIATION STROBE LIGHT	ALERTS OPERATORS TO ABNORMAL SITUATION	H-2-818561 4 P27 E5	FAILS TO OPERATE	LOSS OF ROOM 1 LOCAL HIGH RADIATION ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 1 HIGH RADIATION SWITCH	PROVIDE SIGNAL FOR LOCAL ALARM LIGHT	H-2-818561 4 P27 E5	FAILS TO OPERATE	LOSS OF ROOM 1 LOCAL HIGH RADIATION ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 1 REMOTE HIGH RADIATION SWITCH	PROVIDE SIGNAL FOR REMOTE ALARM LIGHT	H-2-818561 4 P27 F5	FAILS TO OPERATE	LOSS OF ROOM 1 REMOTE HIGH RADIATION ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 1 REMOTE RADIATION TROUBLE LIGHT	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 4 P27 F5	FAILS TO OPERATE	LOSS OF ROOM 1 RADIATION DETECTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 1 RADIATION TROUBLE SWITCH	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 4 P27 E5	FAILS TO OPERATE	LOSS OF ROOM 1 RADIATION DETECTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 1 RADIATION TROUBLE SWITCH	PROVIDE SIGNAL TO LOCAL TROUBLE ALARM	H-2-818561 4 P27 E5	FAILS TO OPERATE	LOSS OF ROOM 1 RADIATION DETECTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 1 REMOTE RADIATION TROUBLE SWITCH	PROVIDE SIGNAL TO REMOTE TROUBLE ALARM	H-2-818561 4 P27 F5	FAILS TO OPERATE	LOSS OF ROOM 1 RADIATION DETECTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
PROCESS BUILDING 241-C-91 ROOM 1 HIGH TEMPERATURE ALARM	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818561 4 P27 F4	FAILS TO OPERATE	LOSS OF ROOM 1 HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 1 LOW TEMPERATURE ALARM	ALERT OPERATOR TO ABNORMAL SITUATION	G-2-818561 4 P27 F4	FAILS TO OPERATE	LOSS OF ROOM 1 LOW TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 1 TEMPERATURE CONTROLLER	CONTROLS ROOM 1 UNIT HEATER	H-2-818561 4 P27 D1	FAILS TO OPERATE	LOSS OF ROOM 1 UNIT HEATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 1 TEMPERATURE SENSOR	PROVIDE SIGNAL TO REMOTE ALARMS	H-2-818561 4 P27 D4	FAILS TO OPERATE	LOSS OF ROOM 1 TEMPERATURE ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEME AIR OUTLET TEMPERATURE SENSOR	MONITOR EXHAUST AIR TEMPERATURE OUTLET OF HME-1361	H-2-818561 4 P27 D6	FAILS TO OPERATE	LOSS OF HEME OUTLET TEMPERATURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 1 TEMPERATURE SENSOR	PROVIDE TEMPERATURE SIGNAL TO ROOM 1 HEATER CONTROLS	H-2-818561 4 P27 D1	FAILS TO OPERATE	LOSS OF ROOM 1 TEMPERATURE CONTROLS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEME AIR OUTLET TEMPERATURE TRANSMITTER	PROVIDES SIGNAL FOR INDICATION	H-2-818561 4 P27 E6	FAILS TO OPERATE	LOSS OF HEME OUTLET TEMPERATURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 1 HIGH/LOW TEMPERATURE SWITCH	PROVIDE SIGNAL TO REMOTE ALARMS	H-2-818561 4 P27 E4	FAILS TO OPERATE	LOSS OF ROOM 1 TEMPERATURE ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HIGH EFFICIENCY METAL FILTER HMF-1361 DRAIN VALVE HV-13638 OPEN POSITION INDICATING LIGHT	PROVIDES OPEN POSITION INDICATION FOR HV-13638	H-2-818561 4 P27 E2	FAILS TO OPERATE	LOSS OF POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HIGH EFFICIENCY METAL FILTER HMF-1361 DRAIN VALVE HV-13638 CLOSED POSITION INDICATING LIGHT	PROVIDES CLOSED POSITION INDICATION FOR HV-13638	H-2-818561 4 P27 E2	FAILS TO OPERATE	LOSS OF POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HIGH EFFICIENCY METAL FILTER HMF-1361 DRAIN VALVE HV-13638 OPEN POSITION SWITCH	PROVIDES OPEN POSITION SIGNAL FOR HV-13638	H-2-818561 4 P27 B3	FAILS TO OPERATE	LOSS OF POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HIGH EFFICIENCY METAL FILTER HMF-1361 DRAIN VALVE HV-13638 CLOSED POSITION SWITCH	PROVIDES CLOSED POSITION SIGNAL FOR HV-13638	H-2-818561 4 P27 B3	FAILS TO OPERATE	LOSS OF POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 2 HIGH TEMPERATURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 5 P20 F6	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 2 LOW TEMPERATURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 5 P20 F5	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 2 HEATER TEMPERATURE CONTROLLER	CONTROL ROOM 2 TEMPERATURE	H-2-818561 5 P20 E1	FAILS TO OPERATE	LOSS OF ROOM 2 HEATING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 2 HEATER TEMPERATURE SENSOR	MONITOR ROOM 2 TEMPERATURE	H-2-818561 5 P20 E1	FAILS TO OPERATE	LOSS OF ROOM 2 HEATING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PROCESS BUILDING 241-C-91 ROOM 2 TEMPERATURE SENSOR	MONITOR ROOM 2 TEMPERATURE	H-2-818561 5 P20 E5	FAILS TO OPERATE	LOSS OF ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
PROCESS BUILDING 241-C-91 ROOM 2 HIGH/LOW TEMPERATURE SWITCH	PROVIDE SIGNALS FOR ALARMS	H-2-818561 5 P20 E5	FAILS TO OPERATE	LOSS OF ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST FAN FN-1362 VSD CABINET	HOUSES FAN VARIABLE SPEED DRIVE CONTROLS AND INDICATIONS	H-2-818561 6 P25 D2	STRUCTURAL DAMAGE	LOSS OF EXHAUST FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST FAN FN-1362 LOCAL/REMOTE SELECTOR HAND SWITCH	ALLOWS LOCAL OR REMOTE FAN OPERATION	H-2-818561 6 P25 E2	FAILS TO OPERATE	LOSS OF EXHAUST FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST FAN FN-1362 LOCAL RUN HAND SWITCH	ALLOWS LOCAL FAN OPERATION	H-2-818561 6 P25 E3	FAILS TO OPERATE	LOSS OF EXHAUST FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST FAN FN-1362 LOCAL OFF HAND SWITCH	ALLOWS LOCAL FAN OPERATION	H-2-818561 6 P25 E2	FAILS TO OPERATE	LOSS OF EXHAUST FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST FAN FN-1362 REMOTE RUN HAND SWITCH	ALLOWS REMOTE FAN OPERATION	H-2-818561 6 P25 F2	FAILS TO OPERATE	LOSS OF EXHAUST FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST FAN FN-1362 REMOTE OFF HAND SWITCH	ALLOWS REMOTE FAN OPERATION	H-2-818561 6 P25 F2	FAILS TO OPERATE	LOSS OF EXHAUST FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1362 DRAIN LINE SIGHT GLASS	CHECK DRAIN LINE FLOW	H-2-818561 6 P25 C6	BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEPA FILTER HEP-1361 DRAIN LINE SIGHT GLASS	CHECK DRAIN LINE FLOW	H-2-818561 6 P25 C5	BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HEPA FILTER HEP-1362 DRAIN LINE SIGHT GLASS	CHECK DRAIN LINE FLOW	H-2-818561 6 P25 C4	BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST FAN FN-1362 DRAIN LINE SIGHT GLASS	CHECK DRAIN LINE FLOW	H-2-818561 6 P25 C2	BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PRESSURE DIFFERENTIAL HIGH ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 6 P25 F5	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PRESSURE DIFFERENTIAL HIGH ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 6 P25 F4	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PRESSURE DIFFERENTIAL HIGH ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 6 P25 F4	FAILS TO OPERATE	LOSS OF FILTER DP ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PRESSURE DIFFERENTIAL LOW ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 6 P25 F4	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PRESSURE DIFFERENTIAL INDICATOR	MONITOR EXHAUST DIFFERENTIAL ACROSS 1st STAGE HEPA FILTER HEP-1361	H-2-818561 6 P25 F5	FAILS TO INDICATE	LOSS OF FILTER DP INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PRESSURE DIFFERENTIAL INDICATOR	MONITOR EXHAUST DIFFERENTIAL ACROSS 2nd STAGE HEPA FILTER HEP-1361	H-2-818561 6 P25 F4	FAILS TO INDICATE	LOSS OF FILTER DP INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PRESSURE DIFFERENTIAL INDICATOR	MONITORS HEPA FILTER HEP-1361 AND HEP-1362 DIFFERENTIAL PRESSURE	H-2-818561 6 P25 F4	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
PRESSURE DIFFERENTIAL INDICATING TRANSMITTER	MONITORS EXHAUST ACROSS 1st STAGE HEPA FILTER HEP-1361	H-2-818561 6 P25 E4	FAILS TO OPERATE	LOSS OF FILTER DP INDICATIONS AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PRESSURE DIFFERENTIAL INDICATING TRANSMITTER	MONITORS EXHAUST DIFFERENTIAL ACROSS 2nd STAGE HEPA FILTER HEP-1362	H-2-818561 6 P25 E4	FAILS TO OPERATE	LOSS OF FILTER DP INDICATIONS AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PRESSURE DIFFERENTIAL INDICATING TRANSMITTER	MONITORS HEPA FILTER HEP-1361 AND HEP-1362 DIFFERENTIAL PRESSURE	H-2-818561 6 P25 E4	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PRESSURE DIFFERENTIAL HIGH SWITCH	PROVIDES SIGNAL FOR ALARM	H-2-818561 6 P25 F5	FAILS TO OPERATE	LOSS OF FILTER DP ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PRESSURE DIFFERENTIAL HIGH SWITCH	PROVIDES SIGNAL FOR ALARM	H-2-818561 6 P25 F4	FAILS TO OPERATE	LOSS OF FILTER DP ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
PRESSURE DIFFERENTIAL HIGH/LOW SWITCH	PROVIDES SIGNAL FOR ALARMS	H-2-818561 6 P25 F4	FAILS TO OPERATE	LOSS OF FILTER DP ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SCR CONTROL PANEL FOR HEATING COIL HC-1362	HOUSES HEATER CONTROLS	H-2-818561 6 P25 D6	STRUCTURAL DAMAGE	LOSS OF HEATING COIL	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1362 LOW DIFFERENTIAL TEMPERATURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 6 P25 F6	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1362 DIFFERENTIAL TEMPERATURE CONTROLLER	DETERMINES HEATER TEMPERATURE DIFFERENTIAL FOR HEATER CONTROL	H-2-818561 6 P25 F6	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1362 CONTROLS, INDICATIONS AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)
FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HEATING COIL HC-1362 LOW DIFFERENTIAL TEMPERATURE SWITCH	PROVIDES SIGNAL TO ALARM	H-2-818561 6 P25 F6	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1362 INLET TEMPERATURE SENSOR	MONITORS EXHAUST AIR TEMPERATURE INLET TO HEATING COIL	H-2-818561 6 P25 D7	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1362	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1362 OUTLET TEMPERATURE SENSOR	MONITORS EXHAUST AIR TEMPERATURE OUTLET OF HEATING COIL	H-2-818561 6 P25 D6	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1362	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEPA FILTER OUTLET TEMPERATURE SENSOR	MONITORS EXHAUST AIR TEMPERATURE OUTLET OF HEPA FILTERS	H-2-818561 6 P25 D4	FAILS TO OPERATE	LOSS OF ALARM AND INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1362 SET POINT CONTROLLER	PROVIDES TEMPERATURE SET POINT FOR HEATER CONTROL	H-2-818561 6 P25 E6	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1362	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1362 INLET TEMPERATURE TRANSMITTER	PROVIDES SIGNALS FOR HEATER CONTROLS, INDICATION AND ALARMS	H-2-818561 6 P25 E7	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1362 CONTROLS, INDICATIONS AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1362 OUTLET TEMPERATURE TRANSMITTER	PROVIDES SIGNALS FOR HEATER CONTROLS, INDICATION AND ALARMS	H-2-818561 6 P25 E5	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1362 CONTROLS, INDICATIONS AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEPA FILTER OUTLET TEMPERATURE TRANSMITTER	PROVIDES SIGNALS FOR HEATER CONTROLS, INDICATIONS AND ALARMS	H-2-818561 6 P25 E4	FAILS TO OPERATE	LOSS OF ALARM AND INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1362 CONTROLLER	PROVIDES HEATER CONTROL	H-2-818561 6 P25 D6	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1362	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
EXHAUST FAN FN-1362 VARIABLE SPEED DRIVE TROUBLE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 6 P25 F2	FAILS TO INDICATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1362 ON LOCAL INDICATING LIGHT	PROVIDES INDICATION OF HEATING COIL STATUS	H-2-818561 6 P25 D6	FAILS TO OPERATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1362 OFF LOCAL INDICATING LIGHT	PROVIDES INDICATION OF HEATING COIL STATUS	H-2-818561 6 P25 D6	FAILS TO OPERATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1362 ON REMOTE INDICATING LIGHT	PROVIDES INDICATION OF HEATING COIL STATUS	H-2-818561 6 P25 F6	FAILS TO OPERATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1362 OFF REMOTE INDICATING LIGHT	PROVIDES INDICATION OF HEATING COIL STATUS	H-2-818561 6 P25 F5	FAILS TO OPERATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST FAN FN-1362 LOCAL INDICATING LIGHT	PROVIDES LOCAL INDICATION OF FAN CONTROL STATUS	H-2-818561 6 P25 E3	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST FAN FN-1362 LOCAL REMOTE INDICATING LIGHT	PROVIDES LOCAL INDICATION OF FAN CONTROL STATUS	H-2-818561 6 P25 E3	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST FAN FN-1362 REMOTE LOCAL INDICATING LIGHT	PROVIDES REMOTE INDICATION OF FAN CONTROL STATUS	H-2-818561 6 P25 F3	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST FAN FN-1362 REMOTE INDICATING LIGHT	PROVIDES REMOTE INDICATION OF FAN CONTROL STATUS	H-2-818561 6 P25 F3	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
EXHAUST FAN FN-1362 LOCAL RUN INDICATING LIGHT	PROVIDES LOCAL INDICATION OF FAN STATUS	H-2-818561 6 P25 E3	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST FAN FN-1362 LOCAL OFF INDICATING LIGHT	PROVIDES LOCAL INDICATION OF FAN STATUS	H-2-818561 6 P25 E2	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST FAN-1362 REMOTE RUN INDICATING LIGHT	PROVIDES REMOTE INDICATION OF FAN STATUS	H-2-818561 6 P25 F2	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST FAN-1362 REMOTE OFF INDICATING LIGHT	PROVIDES REMOTE INDICATION OF FAN STATUS	H-2-818561 6 P25 F2	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST STACK DRAIN LINE SIGHT GLASS	CHECK DRAIN LINE FLOW	H-2-818561 7 P22 B8	BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
TEMPERATURE CONTROLLER, SERVICE BLDG HEATER HC-1363	CONTROLS SERVICE BUILDING TEMPERATURE	H-2-818562 1 P26 D4	FAILS TO OPERATE	LOSS OF SERVICE BUILDING HEATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
TEMPERATURE CONTROLLER, SERVICE BUILDING 241-C-73 EXHAUST FAN FN-1363	CONTROLS SERVICE BUILDING TEMPERATURE	H-2-818562 1 P26 D2	FAILS TO OPERATE	LOSS OF SERVICE BUILDING EXHAUST FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
HEATING COIL HC-1363 TEMPERATURE SENSOR	CONTROL HEATING COIL FOR SERVICE BUILDING	H-2-818562 1 P26 D3	FAILS TO OPERATE	LOSS OF HEATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SERVICE BUILDING AMBIENT AIR TEMPERATURE SENSOR	PROVIDES SIGNAL FOR SERVICE BUILDING TEMPERATURE ALARMS	H-2-818562 1 P26 C3	FAILS TO OPERATE	LOSS OF ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-7. VENTILATION SYSTEM (23 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENTILATION

SYSTEM SAFETY FUNCTION: PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.6

SYSTEM SAFETY CLASS: 1

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
EXHAUST FAN FN-1363 TEMPERATURE SENSOR	CONTROL EXHAUST FAN FOR SERVICE BUILDING	H-2-818562 1 P26 D2	FAILS TO OPERATE	LOSS OF EXHAUST FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
SERVICE BUILDING 241-C-73 HIGH/LOW TEMPERATURE SWITCH	PROVIDES SERVICE BUILDING HIGH/LOW TEMPERATURE ALARMS	H-2-818562 1 P26 D3	FAILS TO OPERATE	LOSS OF ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-8. VENTILATION EXHAUST RADIATION MONITORING (10 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENT RAD MON

SYSTEM SAFETY FUNCTION: TANK C-106 EXHAUST RADIATION MONITORING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.7

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
EXHAUST RADIATION MONITORING CABINET	HOUSES EXHAUST RADIATION MONITOR COMPONENTS	H-2-818561 7 P22 B3	STRUCTURAL DAMAGE	LOSS OF EXHAUST RADIATION MONITOR	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
EXHAUST AIR STACK RECORD SAMPLER ISOKINETIC PROBE	TRANSPORTS EXHAUST AIR SAMPLE FROM EXHAUST STACK TO RECORD SAMPLER	H-2-818561 7 P22 B7	PLUG/LEAK	PREVENT RECORD SAMPLE FROM BEING DRAWN FROM EXHAUST STACK	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
EXHAUST AIR STACK BETA-GAMMA ISOKINETIC PROBE	TRANSPORTS EXHAUST AIR SAMPLE FROM EXHAUST STACK TO BETA-GAMMA ASSEMBLY	H-2-818561 7 P22 B7	PLUG/LEAK	PREVENT BETA-GAMMA SAMPLE FROM BEING DRAWN FROM EXHAUST STREAM	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
EXHAUST STACK LOW FLOW ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 7 P22 F6	FAIL TO OPERATE	LOSS OF STACK LOW FLOW ALARM	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
RECORD AIR SAMPLE LOW FLOW ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 7 P22 F5	FAIL TO OPERATE	LOSS OF LOW FLOW ALARM	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3

TABLE C-15-8. VENTILATION EXHAUST RADIATION MONITORING (10 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENT RAD MON

SYSTEM SAFETY FUNCTION: TANK C-106 EXHAUST RADIATION MONITORING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.7

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
BETA/GAMMA PARTICULATE AIR SAMPLE LOW FLOW ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 7 P22 F3	FAIL TO OPERATE	LOSS OF LOW FLOW ALARM	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
RECORD AIR SAMPLE FLOW SENSOR	MONITOR AIR FLOW OF RECORD AIR SAMPLER	H-2-818561 7 P22 B5	FAIL TO OPERATE	LOSS OF FLOW SIGNAL TO OPERATOR AND TMACS	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
BETA-GAMMA SAMPLE FLOW SENSOR	MONITOR AIR FLOW OF BETA-GAMMA SAMPLER	H-2-818561 7 P22 B3	FAIL TO OPERATE	LOSS OF FLOW SIGNAL TO OPERATOR AND TMACS	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
EXHAUST STACK LOCAL FLOW INDICATOR	PROVIDES LOCAL FLOW INDICATION	H-2-818561 7 P22 D6	FAIL TO INDICATE	LOSS OF STACK LOCAL FLOW INDICATION	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
RECORD AIR SAMPLE FLOW CONTROLLER	CONTROL AIR FLOW OF RECORD AIR SAMPLE	H-2-818561 7 P22 D5	FAIL TO OPERATE	FC-1365 FAILS CLOSED	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3

TABLE C-15-8. VENTILATION EXHAUST RADIATION MONITORING (10 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENT RAD MON

SYSTEM SAFETY FUNCTION: TANK C-106 EXHAUST RADIATION MONITORING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.7

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
BETA/GAMMA PARTICULATE AIR SAMPLE FLOW CONTROLLER	CONTROL AIR FLOW OF BETA/GAMMA PARTICULATE AIR SAMPLE	H-2-818561 7 P22 D3	FAIL TO OPERATE	FC-1366 FAILS CLOSED	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
RECORD AIR SAMPLE LOW FLOW LIGHT	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 7 P22 C8	FAIL TO OPERATE	LOSS OF LOW FLOW ALARM	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
BETA/GAMMA PARTICULATE AIR SAMPLE LOW FLOW LIGHT	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 7 P22 C4	FAIL TO OPERATE	LOSS OF LOW FLOW ALARM	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
EXHAUST STACK FLOW TOTALIZER	PROVIDES TOTAL EXHAUST STACK FLOW	H-2-818561 7 P22 D6	FAIL TO OPERATE	LOSS OF STACK TOTAL FLOW INDICATION	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
EXHAUST STACK RECORD SAMPLER FLOW TOTALIZER	PROVIDES TOTAL EXHAUST STACK RECORD SAMPLER FLOW	H-2-818561 7 P22 D5	FAIL TO OPERATE	LOSS OF STACK RECORD SAMPLER TOTAL FLOW INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST STACK BETA/GAMMA PARTICULATE SAMPLER FLOW TOTALIZER	PROVIDES TOTAL EXHAUST STACK BETA/GAMMA PARTICULATE SAMPLER FLOW	H-2-818561 7 P22 D3	FAIL TO OPERATE	LOSS OF STACK BETA/GAMMA PARTICULATE SAMPLER TOTAL FLOW INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-8. VENTILATION EXHAUST RADIATION MONITORING (10 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENT RAD MON

SYSTEM SAFETY FUNCTION: TANK C-106 EXHAUST RADIATION MONITORING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.7

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
EXHAUST STACK LOW FLOW SWITCH	PROVIDE STACK EXHAUST AIR LOW FLOW ALARM	H-2-818561 7 P22 D6	FAIL TO OPERATE	LOSS OF STACK LOW FLOW ALARM	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
RECORD AIR SAMPLE LOW FLOW SWITCH	PROVIDES SIGNAL FOR LOW FLOW ALARM	H-2-818561 7 P22 C5	FAIL TO OPERATE	LOSS OF LOW FLOW ALARM	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
BETA/GAMMA PARTICULATE SAMPLE LOW FLOW SWITCH	PROVIDES SIGNAL FOR LOW FLOW ALARM	H-2-818561 7 P22 C3	FAIL TO OPERATE	LOSS OF LOW FLOW ALARM	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
EXHAUST STACK FLOW TRANSMITTER	PROVIDE STACK EXHAUST AIR FLOW FOR CONTROL, ALARM AND INDICATION	H-2-818561 7 P22 C8	FAIL TO OPERATE	LOSS OF STACK FLOW CONTROL, INDICATION AND LOW FLOW ALARM	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
RECORD AIR SAMPLE FLOW TRANSMITTER	MONITOR AIR FLOW OF RECORD AIR SAMPLER	H-2-818561 7 P22 C5	FAIL TO OPERATE	LOSS OF FLOW SIGNAL TO OPERATOR AND TMACS	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3

TABLE C-15-8. VENTILATION EXHAUST RADIATION MONITORING (10 SHEETS)

FMEA SAFETY CLASS DESIGNATION

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TANK FARM: 241-C

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SYSTEM SAFETY FUNCTION: TANK C-106 EXHAUST RADIATION MONITORING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.7

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
BETA/GAMMA PARTICULATE AIR SAMPLE FLOW TRANSMITTER	MONITOR AIR FLOW OF BETA/GAMMA PARTICULATE AIR SAMPLE	H-2-818561 7 P22 C3	FAIL TO OPERATE	LOSS OF FLOW SIGNAL TO OPERATOR AND TMACS	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
EXHAUST STACK FLOW CONVERTOR	PROVIDES LINEAR SIGNAL FOR CONTROL, INDICATION AND ALARM	H-2-818561 7 P22 C6	FAIL TO OPERATE	LOSS OF STACK FLOW CONTROL, INDICATION AND LOW FLOW ALARM	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
RECORD AIR SAMPLE FLOW CONVERTOR	PROVIDES TEMPERATURE COMPENSATED LINEAR SIGNAL FOR CONTROL, INDICATION AND ALARM	H-2-818561 7 P22 C5	FAIL TO OPERATE	LOSS OF FLOW SIGNAL TO OPERATOR AND TMACS	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
BETA/GAMMA PARTICULATE SAMPLE FLOW CONVERTOR	PROVIDES TEMPERATURE COMPENSATED LINEAR SIGNAL FOR CONTROL, INDICATION AND ALARM	H-2-818561 7 P22 C3	FAIL TO OPERATE	LOSS OF FLOW SIGNAL TO OPERATOR AND TMACS	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
VACUUM PUMP P-1366 ON/OFF/AUTO SELECTOR SWITCH	CONTROLS VACUUM PUMP AND SUCTION DISCHARGE VALVES	H-2-818561 7 P22 D2	FAIL TO OPERATE	BACKUP VACUUM PUMP AVAILABLE	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3

TABLE C-15-8. VENTILATION EXHAUST RADIATION MONITORING (10 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENT RAD MON

SYSTEM SAFETY FUNCTION: TANK C-106 EXHAUST RADIATION MONITORING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.7

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
VACUUM PUMP P-1366 RESET HAND SWITCH	RESETS VACUUM PUMP CONTROL CIRCUIT	H-2-818561 7 P22 D2	FAIL TO OPERATE	BACKUP VACUUM PUMP AVAILABLE	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
VACUUM PUMP P-1367 ON/OFF/AUTO SELECTOR SWITCH	CONTROLS VACUUM PUMP AND SUCTION DISCHARGE VALVES	H-2-818561 7 P22 D1	FAIL TO OPERATE	BACKUP VACUUM PUMP AVAILABLE	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
VACUUM PUMP P-1367 RESET HAND SWITCH	RESETS VACUUM PUMP CONTROL CIRCUIT	H-2-818561 7 P22 D1	FAIL TO OPERATE	BACKUP VACUUM PUMP AVAILABLE	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
EXHAUST STACK SAMPLE PRESSURE CONTROLLER	PROVIDE SIGNAL FOR VACUUM CONTROL VALVE PV-13621	H-2-818561 7 P22 B3	FAIL TO OPERATE	LOSS OF SAMPLE VACUUM CONTROL	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
VACUUM PUMP P-1366 HIGH SUCTION PRESSURE SWITCH	PROVIDE SIGNAL FOR INTERLOCKS AND INDICATION	H-2-818561 7 P22 C2	FAIL TO OPERATE	LOSS OF INTERLOCKS AND INDICATION	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
VACUUM PUMP P-1367 HIGH SUCTION PRESSURE SWITCH	PROVIDE SIGNAL FOR INTERLOCKS AND INDICATION	H-2-818561 7 P22 B2	FAIL TO OPERATE	LOSS OF INTERLOCKS AND INDICATION	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3

TABLE C-15-8. VENTILATION EXHAUST RADIATION MONITORING (10 SHEETS)

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS

TANK FARM: 241-C

SYSTEM: VENT RAD MON

SYSTEM SAFETY FUNCTION: TANK C-106 EXHAUST RADIATION MONITORING

SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.7

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
EXHAUST STACK SAMPLE PRESSURE TRANSMITTER	PROVIDE SIGNAL FOR VACUUM CONTROL VALVE PV-13621	H-2-818561 7 P22 B3	FAIL TO OPERATE	LOSS OF SAMPLE VACUUM CONTROL	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
BETA/GAMMA PARTICULATE MONITOR HIGH RADIATION ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 7 P22 F4	FAIL TO OPERATE	LOSS OF STACK HIGH RADIATION ALARM	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
BETA/GAMMA PARTICULATE MONITOR	MEASURES BETA/GAMMA IN EXHAUST STREAM	H-2-818561 7 P22 C5	FAIL TO DETECT	FAIL TO NOTIFY OPERATORS TO INITIATE EMERG RESPONSE PLAN ACTIONS	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
BETA/GAMMA PARTICULATE MONITOR INDICATOR	MONITORS EXHAUST AIR RADIATION LEVEL	H-2-818561 7 P22 F5	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
BETA/GAMMA PARTICULATE MONITOR TRANSMITTER	PROVIDES SIGNAL FOR ALARM AND INDICATION	H-2-818561 7 P22 C5	FAIL TO OPERATE	LOSS OF STACK RADIATION MONITOR	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
BETA/GAMMA PARTICULATE MONITOR HIGH RADIATION ALARM (LOCAL STROBE LIGHT)	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 7 P22 E4	FAIL TO OPERATE	LOSS OF STACK HIGH RADIATION ALARM	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3

TABLE C-15-8. VENTILATION EXHAUST RADIATION MONITORING (10 SHEETS)

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SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.7

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
BETA/GAMMA PARTICULATE MONITOR HIGH RADIATION ALARM (LOCAL LIGHT)	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 7 P22 D5	FAIL TO OPERATE	LOSS OF STACK HIGH RADIATION ALARM	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
BETA/GAMMA PARTICULATE MONITOR HIGH RADIATION SWITCH	PROVIDES SIGNAL FOR ALARM	H-2-818561 7 P22 C5	FAIL TO OPERATE	LOSS OF STACK HIGH RADIATION ALARM	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
BETA/GAMMA PARTICULATE MONITOR FAILURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 7 P22 F4	FAIL TO OPERATE	LOSS OF STACK MONITOR	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
BETA/GAMMA PARTICULATE MONITOR FAILURE LIGHT	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 7 P22 D4	FAIL TO OPERATE	LOSS OF STACK MONITOR	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
BETA/GAMMA PARTICULATE MONITOR FAILURE SWITCH	PROVIDES SIGNAL TO ALARM	H-2-818561 7 P22 C5	FAIL TO OPERATE	LOSS OF STACK MONITOR FAILURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST STACK SAMPLE TEMPERATURE SENSOR	PROVIDE STACK EXHAUST SAMPLE AIR FLOW TEMPERATURE COMPENSATION	H-2818561 7 P22 C3	FAIL TO OPERATE	LOSS OF SAMPLE FLOW TEMPERATURE COMPENSATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

TABLE C-15-8. VENTILATION EXHAUST RADIATION MONITORING (10 SHEETS)

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SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.7

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
EXHAUST STACK LOCAL TEMPERATURE INDICATOR	PROVIDE STACK EXHAUST AIR TEMPERATURE LOCAL INDICATION	H-2-818561 7 P22 D7	FAIL TO INDICATE	LOSS OF STACK TEMPERATURE INDICATION	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
EXHAUST STACK REMOTE TEMPERATURE INDICATOR	PROVIDE STACK EXHAUST AIR TEMPERATURE REMOTE INDICATION	H-2-818561 7 P22 F7	FAIL TO INDICATE	LOSS OF STACK TEMPERATURE INDICATION	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
EXHAUST STACK TEMPERATURE TRANSMITTER	PROVIDE STACK EXHAUST AIR TEMPERATURE INDICATION	H-2-818561 7 P22 C8	FAIL TO OPERATE	LOSS OF STACK TEMPERATURE INDICATION	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
EXHAUST STACK SAMPLE TEMPERATURE TRANSMITTER	PROVIDE STACK EXHAUST SAMPLE AIR FLOW TEMPERATURE COMPENSATION	H-2-818561 7 P22 C3	FAIL TO OPERATE	LOSS OF SAMPLE FLOW TEMPERATURE COMPENSATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
VENTILATION EXHAUST RADIATION MONITOR FAILURE BELL	LOCAL INDICATION OF MONITOR FAILURE	H-2-818561 7 P22 E6	FAIL TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
EXHAUST STACK FLOW/TEMPERATURE SENSOR	PROVIDE STACK EXHAUST AIR FLOW AND TEMPERATURE	H-2-818561 7 P22 C7	FAIL TO DETECT	LOSS OF STACK FLOW AND TEMPERATURE INDICATION AND LOW FLOW ALARM	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3

TABLE C-15-8. VENTILATION EXHAUST RADIATION MONITORING (10 SHEETS)

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SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.7

SYSTEM SAFETY CLASS: 3

EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
VACUUM PUMP TROUBLE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818561 7 P22 D2	FAIL TO OPERATE	LOSS OF ALARM	ALARMS UPON FAILURE; DETECTION OF HIGH RADIATION WILL SHUTDOWN HVAC; HVAC ALSO SHUTDOWN BY SC 1 SEISMIC SWITCHES; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 16	3
VENTILATION EXHAUST RADIATION MONITOR FAILURE ALARM	REMOTE INDICATION OF MONITOR FAILURE	H2818561 7 P22 F6	FAIL TO OPERATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3
VENTILATION EXHAUST RADIATION MONITOR FAILURE LIGHT	LOCAL INDICATION OF MONITOR FAILURE	H-2-818561 7 P22 E6	FAIL TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 16	3

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