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Project Title/Work Order Interim Safety Equipment List for Tank 241-C-106 Waste Retrieval, Project W-320		EDT No. REF 601413 ECN No. 193855			
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ENGINEERING CHANGE NOTICE

Page 1 of 31. ECN **193855**Proj.
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2. ECN Category (mark one) Supplemental ☐ Direct Revision ☒ Change ECN ☐ Temporary ☐ Standby ☐ Supersedure ☐ Cancel/Void ☐	3. Originator's Name, Organization, MSIN, and Telephone No. J. C. Conner/SA&E/H4-61/376-2058		4. Date 11/15/94
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13a. Justification (mark one) Criteria Change ☐ Design Improvement ☐ Environmental ☐ As-Found ☐ Facilitate Const. ☐ Const. Error/Omission ☐ Design Error/Omission ☒			
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1	1	Env. J. R. Robertson	<i>J.R. Robertson</i>	11/9/94	H6-30						
1	1	R. Ni (Badden)	<i>R. Ni</i>	11/9/94	SS-07						
1	1	R. A. Dodd (Alstad)	<i>R.A. Dodd</i>	11/9/94	R1-49						

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

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WHC Information Release Administration Specialist:

V. L. Birkland

11/15/94

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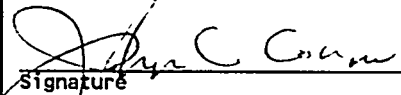
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Interim Safety Equipment List for 241-C-106 Waste Retrieval, Project W-320

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10/11/19

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

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NOVEMBER 1994

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EXECUTIVE SUMMARY

This supporting document (SD) is produced in support of WHC-SD-WM-PSE-010 (Conner 1994). According to DOE Orders and WHC procedures, Safety Classifications are required to be designated for systems, components, and structures for all nonreactor facilities for which Safety Analysis Reports (SARs) or Safety Assessment Documents (SADs) are prepared.

The C-106 Waste Retrieval Sluicing System (WRSS) components are classified on the basis of safety functions they perform and consequences of failure of a system to perform its safety function in accordance with "Safety Classification of Systems, Components, and Structures," MRP 5.46, *Management Requirements and Procedures*, WHC-CM-1-3; and Section 9.0 "Assigning Safety Classes to Systems, Structures, and Components," of *Safety Analysis Manual*, WHC-CM-4-46.

Characterization data for Tank 241-C-106 indicate that the waste contains fissionable material. Radionuclide concentrations for C-106 and Tank 241-AY-102 are reported in Appendix E. This data has been used as the basis for source-term development and accident consequence analysis. Effective Dose Equivalent (EDE) values were developed for onsite and offsite doses based on consequence analyses for various accident scenarios. These were used to produce the C-106 WRSS Safety Classifications.

The WRSS consists of two transfer lines that would connect the two tanks, one to carry the sluiced waste slurry to AY-102, and the other to return the supernatant liquid to C-106. The supernatant, or alternate fluid, will be used to mobilize waste in C-106 for the sluicing process. The equipment necessary for the WRSS include pumps in each tank, sluicers to direct the supernatant stream in C-106, a slurry distributor in AY-102, HVAC for C-106, instrumentation and control devices, and other existing components as required.

The Safety Classifications of the existing systems that are used in support of WRSS operation are based on the Safety Equipment Lists (SELs) for Single-Shell Tank (SST) systems, Aging Waste Facility (AWF) systems.

Section 4.0 of this document provides justifications for Safety Classifications of the WRSS. Safety Classifications for WRSS, and the existing C-106 and AY-102 systems are given in the following summary tables:

WRSS Systems List and Safety Classification

New Systems	Safety Class (SC)	SC Justifications	
		Section of this document	Table 1, (a)
Safety systems			
Sluicing waste transfer system	SC-1	4.1	1,10,15
• Seismic switch	SC-1	4.1.1	15
• Primary transfer pipes from and to tanks	SC-2	4.1.2	2
• Secondary transfer pipes from and to tanks (b)	SC-3	4.1.3	3
• Slurry distributor	SC-3	4.1.4	3
• Syphon protection	SC-3	4.1.5	3
• Waste transfer pits	SC-1	4.1.6	1
• Waste transfer equipment (pumps, valves, pipes, flanges, etc.) in pits	SC-3	4.1.7	3
• Raw water supply and transfer line flushing system	SC-3	4.1.8	3
• Compressed Air System	SC-3	4.1.9	3
Ventilation system	SC-1	4.2	1
• Seal loop	SC-1	4.2.1	1
• Carbon dioxide injection system	SC-3	4.2.2	3
• Recirculation and prefiltration system	SC-3	4.2.3	3
• Chiller skid	SC-3	4.2.4	3
• Exhaust skid	SC-3	4.2.5	3
Ventilation exhaust radiation monitoring system (Continuous air monitors and record samplers)	SC-3	4.3	3
In-tank imaging system	SC-3	4.4	3
Instrumentation Control System	SC-3	4.6	3
AC power	SC-3	4.5	14
Equipment Removal System	SC-3	4.7	3
• Water washing, CO ₂ decontamination equipment	SC-3	4.7	3
• Flexible receiver system	SC-3	4.7	3
• Strongback system	SC-3	4.7	3
• Equipment storage container	SC-3	4.7	3
• Container transport trailer	SC-3	4.7	3

- (a) Safety Classifications (Table 1, Section 9.0 of WHC-CM-4-46)
 (b) Secondary transfer pipe (encasement or outer pipe) will meet applicable SC-2 QA and structural/seismic requirements, similar to primary transfer pipe.

AC = Alternating current
 EP = Engineering Practice
 SC = Safety Class

Tank C-106 Existing Systems List and Interim Safety Classifications.

Existing system descriptions	Safety Class (SC)	SC Justifications	
		Section of SST ISEL(b)	Table 1, (a)
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	
• FIC	[IOSR]*	4.3.3	
• 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(c)	[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
• Raw water supply	SC-3	4.4.5	3
• Area radiation monitors(d)	SC-3	4.4.1	3
Fire protection system	SC-3	4.5	22

(a) Safety Classifications (Table 1, Section 9.0 of WHC-CM-4-46)

(b) Single-Shell Waste Tanks Interim Safety Equipment List (SEL) (Kidder 1993b)

(c) The AC power is classified according to its safety support function and not 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.

(d) ARMs are being removed

AC = Alternating current
 EP = Engineering Practice
 FIC = Food Instrument Corporation
 HEPA = High-efficiency particulate air
 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 Requirements (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 MRP 5.46, as analyses are completed to establish definite Safety Classifications. In the interim, approval requirements shall include Nuclear Safety and Quality Assurance (SQ), as a minimum, and Environmental Assurance (E) where deemed appropriate.

Tank 241-AY-102 Systems List and Interim Safety Classifications.
(Sheet 1 of 2)

Existing system descriptions	Safety Class (SC)	SC Justifications	
		Section of AWF ISEL (b)	Table 1 (a)
Tanks (241-AY-102)	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 inter tank 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 (pumps, valves, pipes, flanges, leak detectors, etc.)	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
• 112-m ³ /s (4,000 ft ³ /min) exhauster	SC-2	4.1.4	2
• Ventilation duct work	SC-2	4.1.4	2
Annulus ventilation system (tank 241-AY-102)	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
• Area radiation monitor system (d)	SC-3	4.3.10	3
• 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
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 diesel generator (e)	[IOSR]*	4.4.3.1	--
• Normal AC power for ventilation	SC-2	4.4.5, 4.4.6	24
• Detroit diesel generator (f)	SC-2	4.4.5.1	24

Tank 241-AY-102 Systems List and Interim Safety Classifications.
(Sheet 2 of 2)

Existing system descriptions	Safety Class (SC)	SC Justifications	
		Section of AWF ISEL (b)	Table 1 (a)
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) Safety Classifications (Table 1, Section 9, WHC-CM-4-46),
 (b) From WHC-SD-WM-SEL-020 (Kidder 1993a).
 (c) May be replaced by Project W-030 ventilation system.
 (d) To be removed in the future.
 (e) Caterpillar is a trademark of the Caterpillar Corporation.
 (f) Detroit is a trademark of the Detroit Corporation.

AC = Alternating current
 AWF = Aging Waste Facility
 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 requirements (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.

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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, Public Law 101-510, Section 3137 (Wyden Amendment), 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. The plan to implement remediation, WHC-SP-0697 (Wilson 1991), has identified Tank 241-C-106 (C-106) as the fourth Priority 1 safety issue.

The goals of the C-106 sluicing operation are: (1) to stabilize the tank by reducing the heat load in the tank to less than 42 MJ/hr (40,000 Btu/hour), and (2) to initiate demonstration of single-shell tank (SST) retrieval technology. This meets the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1990), also known as the Tri-Party Agreement, which includes milestones to demonstrate SST retrieval. Milestone M-45-03, "Initiate full-scale demonstration of waste retrieval technology, ... by October 1997," requires waste retrieval from Hanford SSTs as the initial phase of SST closure. Tank C-106 has been identified as the M-45-03 retrieval demonstration tank by the DOE. The Washington State Department of Ecology has concurred in this selection.

1.1 PURPOSE

The purpose of this supporting document (SD) is as follows: (1) to provide safety classifications for items (systems, structures, equipment, components, or parts) for the waste retrieval sluicing system (WRSS), and (2) to document the methodology used to develop safety classifications. Appropriate references are made with regard to use of existing systems, structures, equipments, components, and parts for C-106 single-shell transfer tank (SST) located in the C Tank Farm, and 241-AY-102 (AY-102) double shell receiver tank (DST) located in the Aging Waste Facility (AWF). The items for WRSS that were considered in this safety classification process are identified in Table 1-1.

1.2 SCOPE

The scope of this SD covers the SCs for new or modified items for the WRSS. Descriptions of existing items for AY-102 and C-106 that are used to support the WRSS operation, are outlined in the SST and AWF SELs (Kidder 1993a and 1993b).

Table 1-1. Tank C-106 WRSS: Systems and Equipment List.

Systems	Equipment
Sluicing waste transfer system	Seismic switch Primary transfer pipes Secondary transfer pipes Slurry distributor Syphon breaker Waste transfer pits Waste transfer equipment in pits Raw water supply and transfer line flushing Compressed Air System
Ventilation system	Seal loop Carbon dioxide injection system Recirculation and prefiltration system 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	AC power C-Farm - MCC-N1, ventilation system and monitoring instrumentation - MCC-N2, WRSS slurry and heel pumps and monitoring instrumentation AC power AY Farm - MCC, sluice pumps and monitoring instrumentation
Equipment Removal System	- Water washing, CO ₂ decontamination equipment - Flexible receiver system - Strongback system - Equipment storage container - Container transport trailer

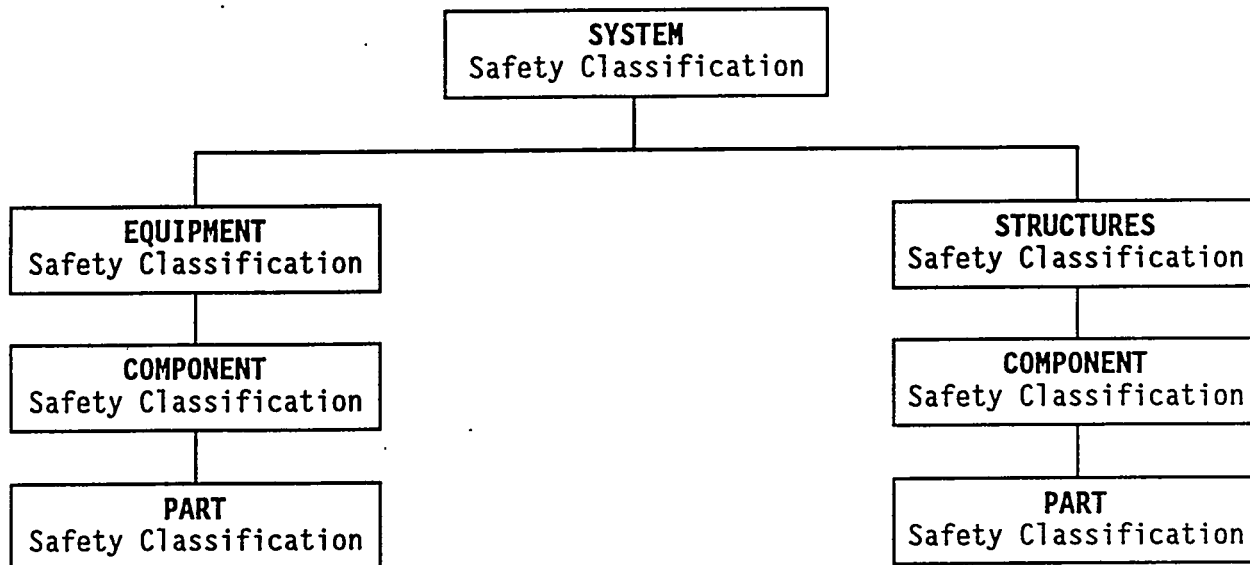
AC = Alternating current
HEPA = High-efficiency particulate air.

This SD is provided in accordance with *Management Requirements and Procedures*, WHC-CM-1-3, "Safety Classification of Systems, Components, and Structures," MRP 5.46 as implemented by *Safety Analysis Manual*, WHC-CM-4-46, Section 9, "Assigning Safety Classes to Systems, Structures, and Components," This Safety Equipment List (SEL) will be revised as additional SCs are determined.

Safety classifications for the WRSS systems are noted in the table of contents, appropriate section titles, and tables of Section 4.0. Safety

classifications for structures are given in Appendix A; for equipment in Appendix B; for components in Appendix C; and for parts in Appendix D of this SEL. The WRSS systems and areas of responsibility for tank farm engineering are designated by the Tank Farm Project program.

The relationship of safety classification criteria is diagrammed as follows.



1.3 BASIS OF ANALYSIS

The existing items interim Safety Classifications are based on AWF SEL (Kidder 1993a), SST SEL (Kidder 1993b), WHC-SD-WM-SAR-034 (Boyles 1989), WHC-SD-WM-SAR-006 (Prosk and Smith 1986), 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* (Leach and Stahl 1993)
- *Preliminary Safety Evaluation for the 241-C-106 Waste Retrieval Project W-320* (Conner 1994)
- New Analyses:
 - Discussion of source terms in Section 3.2 (constituent listing of source terms in Appendix E)
 - Dose exposure calculations (see Appendix F)
 - Offsite radioactive soil contamination analyses (see Section 3.3.2 and Appendix F).

The classifications in this document are based on the accident analyses in WHC-SD-WM-PSE-010 (1994) safety classification guidelines in WHC-CM-4-46,

and available supporting data for the WRSS. The data include drawings that are not 100% reliable; tank contents that are not fully characterized; and lack of environmental, toxicological, and radioactive source terms in the existing safety analysis reports (SARs). The classifications may change as additional analyses or studies are completed and used in developing the SEL for an approved WRSS Safety Assessment (SA).

1.4 GENERAL FACILITY DESCRIPTION

This general description of SST C tank farm, AWF AY tank farm, and WRSS includes background, monitoring systems, ventilation, and stabilization activities. Brief descriptions for the existing supporting systems of C-106 and AY-102 to monitor temperature, liquid-level, leaks and radiation for operation of the WRSS are in this SEL. Detailed descriptions of the existing supporting systems for C-106 and AY-102 that are used for operation of WRSS are in the SELs (Kidder 1993a and 1993b).

1.4.1 Background

Past fuel reprocessing operations conducted at the U.S. Department of Energy (DOE) Hanford Site have generated high-level liquid and solid wastes. One hundred forty-nine SSTs and four aging waste tanks (AY and AZ tank farms) were built between 1943 and 1964 for the storage of liquid radioactive wastes. The SSTs are located in the 200 East Area and the 200 West Area. The AWF tanks are located in the 200 East Area. Figure 1-1 depicts the Hanford Site Map which includes the C-106 Waste Retrieval project area. Figure 1-2 depicts the general locations of the SST and AWF tank farms within the 200 East area.

Tank C-106 is a 2,000,000 L (530,000 gal) capacity SST located in C tank farm in the 200 East Area of the Hanford Site. This tank has been used for radioactive waste storage since 1947. Between 1963 and 1969, tank 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.

The waste contained in C-106 is reported (Hanlon 1994) to consist 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). The bottom layer consists of 91,000 L (24,000 gal) of hardened material which, 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 C-106 (Sederburg 1994), 61,000 L (16,000 gal) are interstitial and 121,000 L (32,000 gal) are supernatant.

In 1971, temperatures exceeding 99 °C (210 °F) were measured in tank C-106. As a result of these high temperatures, 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/hr ($1.1\text{E}+5$ Btu/hr) (Bander 1993a and 1993b).

Figure 1-1. Hanford Site Map

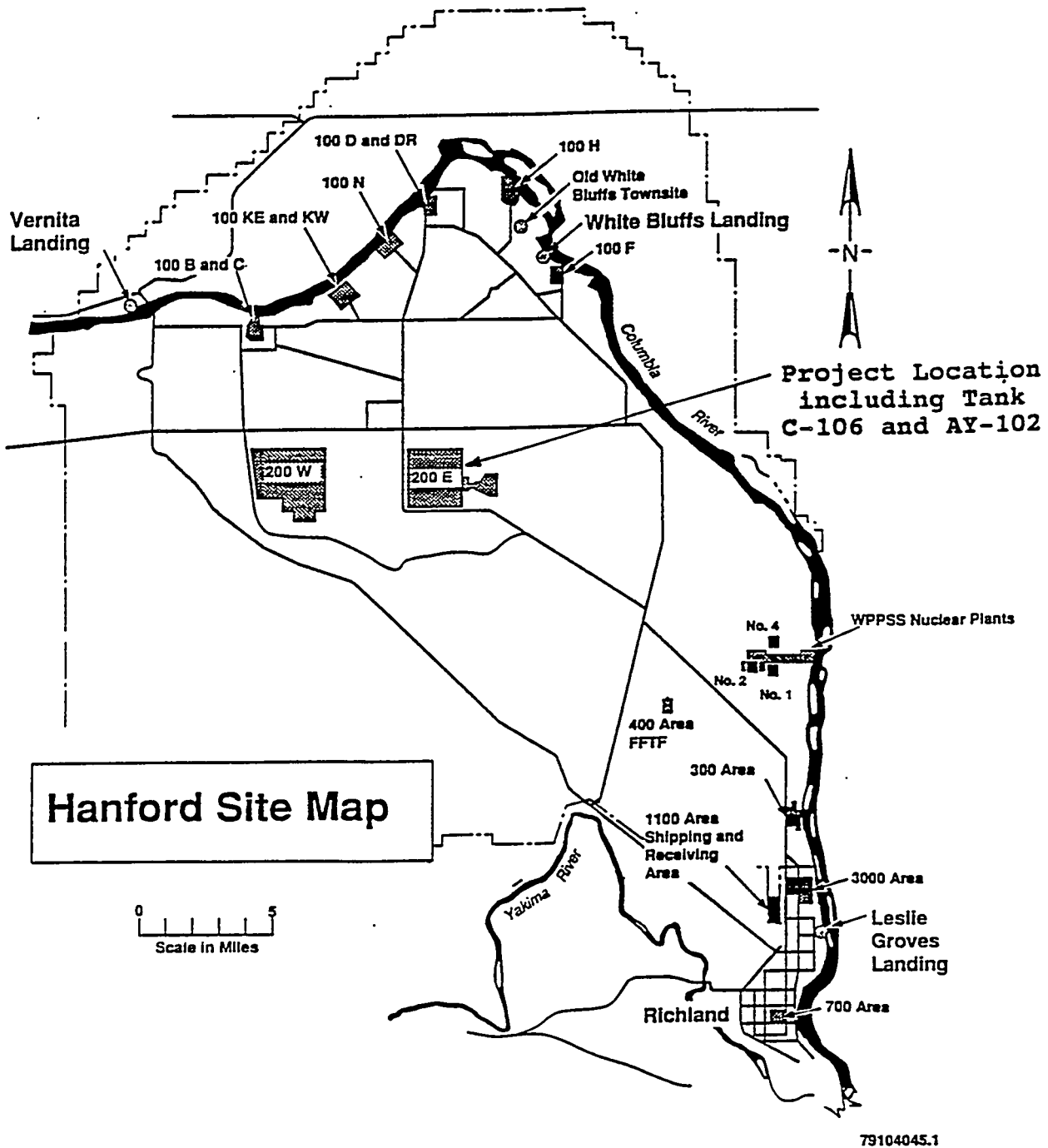
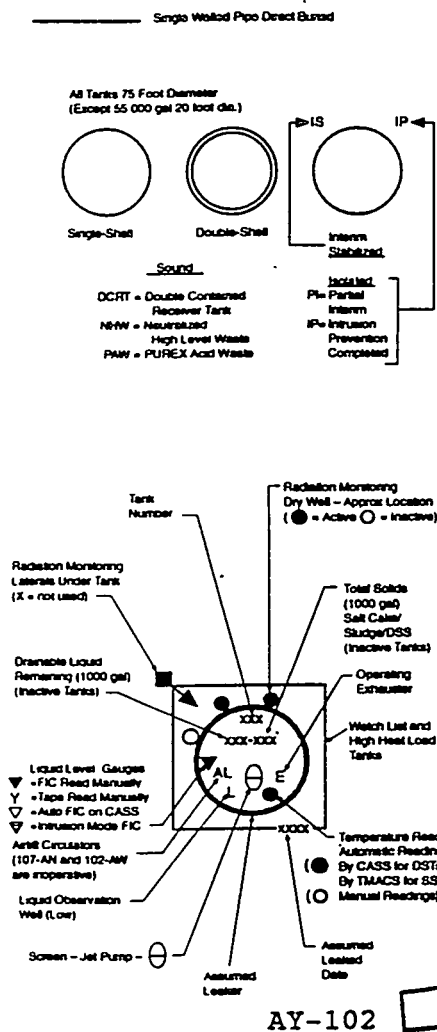


Figure 1-2. Facility General Arrangement

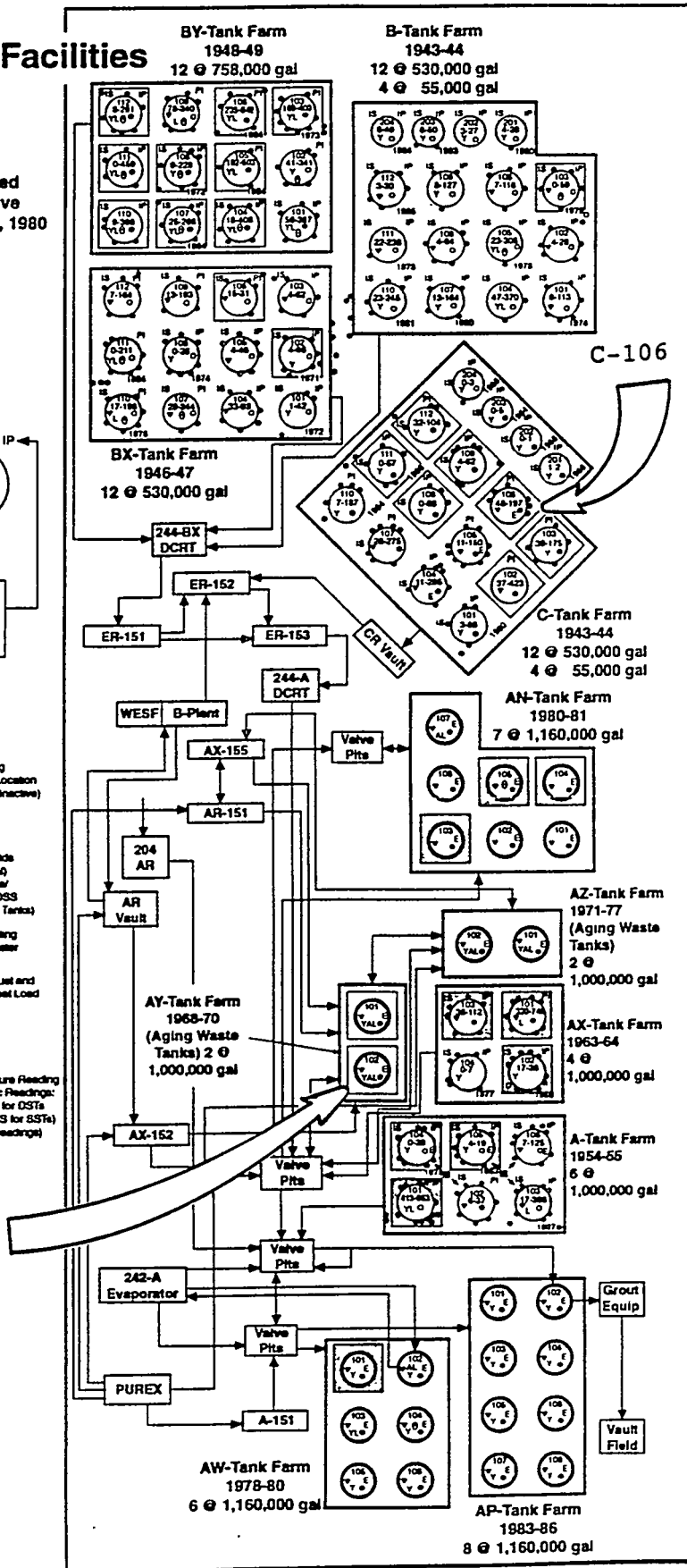
Hanford Tank Farm Facilities

200 East

Note: All single-shell tanks were removed from service (not allowed to receive waste) on or before November 21, 1980



This Figure has been excerpted from WHC-EP-0182



WHC-EP-0182-74

Tank C-106 was withdrawn from active service in 1979 and is categorized as sound (i.e., not known to be leaking).

Project W-320 is intended for mobilization and removal of the heat generating sludge from C-106 in the C Tank Farm and transferring it to 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), is given in WHC-SD-W320-FDC-001 (Bailey 1994).

1.4.2 Sluicing Waste Transfer System

The supernatant liquid (or an alternate fluid) in tank AY-102 will be transferred into tank C-106 by a sluice pump. The sludge from C-106 will be converted to a high-heat waste slurry, and the slurry transferred via a variable speed transfer pump through encased transfer pipes to AY-102. Supernatant liquid and unsettled solids within tank AY-102 are returned to C-106 for use in further sluicing operations.

The solution used to sluice out the solid contents of C-106 will be the liquid waste (supernatant) transferred into AY-102 from AY-101, or an alternate fluid as stated in ES-290 (Sederberg 1994). The mixing of this supernatant with solids in C-106 during sluicing will result in a slurry.

Chemical compatibility report (Sederburg 1994), evaluates the chemical compatibility of waste currently stored in C-106, AY-101, and AY-102. Sederburg (1994) describes the acceptability to transfer these wastes in the sequence required by the WRSS. Before transfer of AY-101 supernatant into AY-102, AY-102 contents will be removed to the maximum extent practicable. Removal of AY-102 content is beyond the scope of the Project W320, and is considered to be part of routine tank farm operations. Further, the chemical models presented in Appendix C of the chemical compatibility report demonstrate that no chemical reactions identified will result in future waste incompatibility. Thus, no chemical safety issues will be exacerbated in any way by retrieving the contents from C-106 and transferring them to AY-102. In fact, a safer overall tank farm configuration is expected.

Though the contents of AY-101 will likely be replaced with different liquid before sluicing operations begin, its contents will be of the same dilute complexed waste type at that time. The current chemical and radionuclide composition of AY-101 liquid is considered to be a bounding case for future waste receipts.

1.4.3 Leak Detection Monitoring

No release of hazardous material is expected during normal transfer operations. Small residual amounts of radioactive material are expected to be available for release during jumper change operations. Large leaks within the pits will be detected by special instrumentation and controlled as follows: pit drains will return leaked wastes to the tank which they are associated with; larger leaks that result in an accumulation of solution on the floor of the pit will be detected by a leak detection element.

If the 23,000 L (6,000 gal) cooling water additions to C-106 are stopped, the tank will dry out, sludge temperatures will rise exceeding established limits, and structural damage to the tank may result. Should the tank start to leak, continuation of the water additions required to cool the waste may increase the amount of leakage to the soil column.

Leaks located between the primary and secondary tank confinement liner in the DST system of AY-102 will be controlled by the annulus leak detection system. This system is designed to detect and recover any leakage in the event of a primary tank liner rupture.

The dry well monitoring system provides a leak detection surveillance function in the C tank farm. The wells are open-bottom mild steel casings of either 6- or 8-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 a distance 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, ventilation and air conditioning (HVAC) system will be provided for the WRSS as part of the C-106 modification (see Section 4.2) for confinement of airborne particulate. The ventilation system will perform the following functions: maintain a negative pressure; remove heat from the tank and dehumidify recirculating air; remove aerosols; exhaust the ventilation stream to the atmosphere through an exhaust stack, and monitor emissions; and provide air inlet via a breather filter when the ventilation system is inoperative. Project W-320 will also modify existing mechanical ventilation equipment, as required, to support WRSS operations.

1.4.5 Radiation Monitoring

Selected alarms will alarm to the Tank Monitoring and Control System (TMACS). Each system consists of detector assemblies, instrumentation, recorders, local alarms, and central alarms. Alarms are annunciated in the control room and to the TMACS in 2750-E Building. Alarms will be audible/visible within the tank farms. The functional detectors are checked by performing preventive maintenance. The monitoring systems require electrical power for operation.

The C-106 WRSS provides new or relocated continuous air monitors (CAMs) and record samplers in a dedicated trailer control room cabinet. These instruments will be tied into TMACS.

1.4.6 C-106 Existing Facility Description

- The C Tank Farm has 12 tanks (C-101 to C-112) rated at 2,000,000 L (530,000 gal) each and 4 smaller tanks (C-201 to C-204) rated at 207,500 L (55,000 gal) each. These tanks were constructed during 1943 and 1944. Tank C-106 is partially interim isolated.

- The tank temperature for C-106 is monitored weekly because it generates high-heat loads. All temperature readings are taken manually.
- Tank surface levels are monitored using a manual tape or automatic Food Instrument Corporation (FIC) gauge. The FIC is currently being phased out and replaced with the Enraf series 854 level gauge. The Enraf gauge is a high precision, low maintenance device that determines waste level by detecting variations in the weight of a displacer suspended in the tank waste. Manual tape readings are input to the computer automated surveillance system (CASS) the day they are taken. Manual surface-level readings are periodically taken using the manual-mode FIC gauges and automatically transfer to the CASS each hour. The CASS alarm sounds if the readings are outside of pre-set limits.
- Active ventilation is provided for C-106. A CAM monitors the exhaust flow and alarms if limits are exceeded.
- Each of the tanks in the C Tank Farm has a dry well monitoring system.

1.4.7 AY-102 Existing Facility Description

The AWF consists of four tanks (AY-101, AY-102, AZ-101, and AZ-102) and associated monitoring and control facilities. These DSTs 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 interconnected 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 241-AY and 241-AZ Aging Waste Tanks are supported by facilities located in the A tank farm complex. Buildings, systems, and components of the 241-AY and 241-AZ tank farms are listed in Table 1-1 of the AWF SEL (Kidder 1993a). The AWF is served by utility systems that provide electrical power, process and instrument air, steam, cooling water, and sanitary water.

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2.0 METHODOLOGY

This section describes the criteria, interfaces, and methodology that were used to develop the WRSS Safety Classifications.

2.1 SAFETY CLASSIFICATION CRITERIA

The systems in WRSS are classified on the basis of safety function they perform and consequences of the failure of a system to perform its safety function according to guidelines provided in Section 9 of WHC-CM-4-46, and summarized in Section 2.3 below. Safety Classifications were developed with consideration of recovery time, if appropriate. Recovery time is the time 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, Preliminary Hazard Analysis).

2.2 WASTE RETRIEVAL SLUICING SYSTEM FUNCTIONS AND INTERFACES

The information provided in the FDC (Bailey 1994), was used to determine functions and interfaces between various WRSS systems.

The existing tank farm systems for C-106 and AY-102, used to support the WRSS operation, are outlined in the SELs (Kidder 1993a and 1993b).

2.3 SYSTEM SAFETY CLASSIFICATION METHODOLOGY

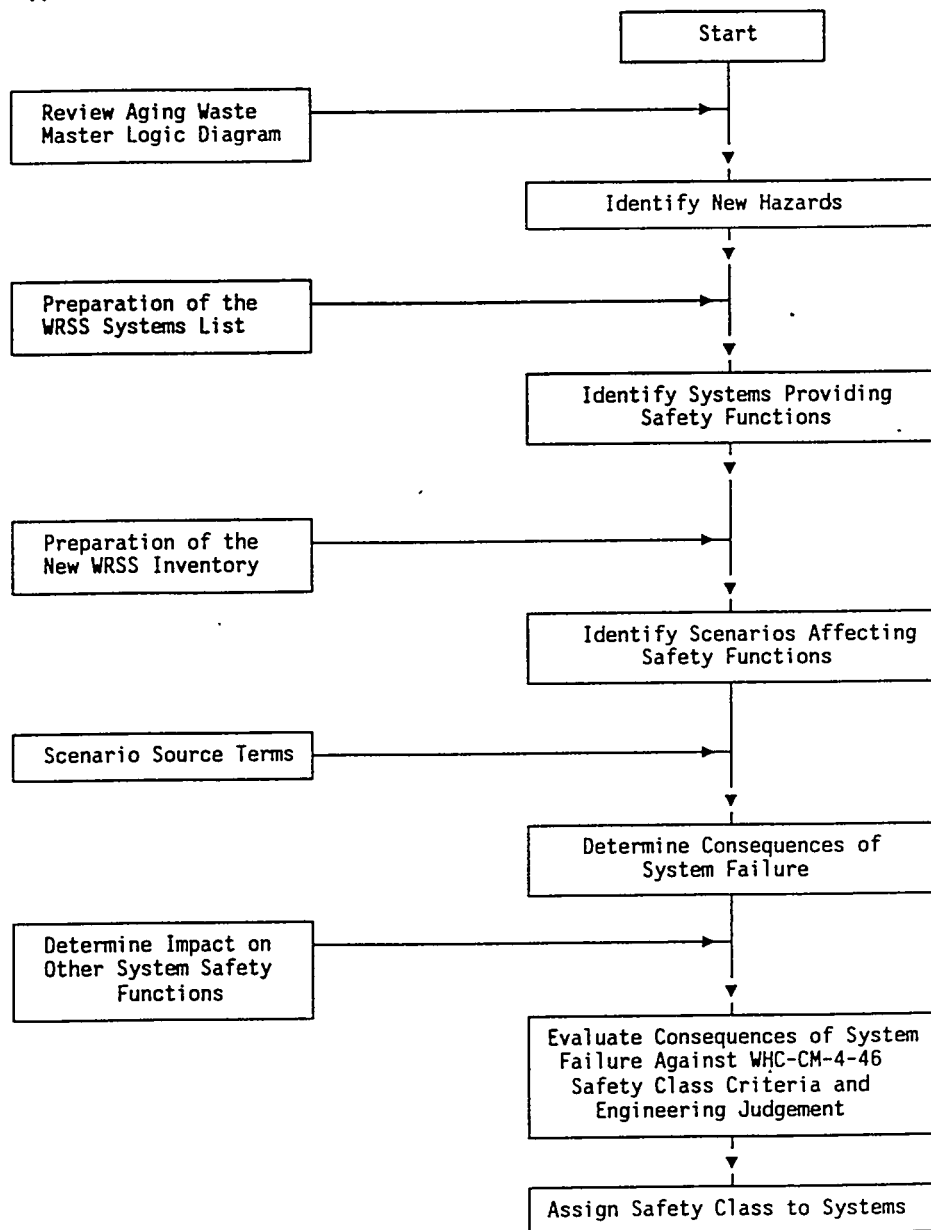
The purposes of this document are to provide safety classifications for the WRSS and its associated support systems, and to document the methodology used to develop the SCs.

Figure 2-1 illustrates the logic path used to determine safety classifications of the WRSS systems. The logical order for Safety Class (SC) determination requires the following steps:

- a. Identify hazards
- b. Identify existing safety systems (systems that mitigate radiological or toxicological releases)
- c. Identify the safety functions of each system
- d. Identify credible accidents (probability of occurrence $>1 \text{ E-06/yr}$)
- e. Determine the tank inventory (activity and volume)
- f. Determine release quantities (activity, and volume or mass of material released in the accident scenario)

Figure 2-1. Safety Class Methodology.

Support Activities



- g. Identify the consequences of system failure
- h. Determine radiological offsite and onsite doses
- i. Determine Environmental Hazard Safety Classification (EHSC) values
- j. Evaluate the consequences of system failures against SC criteria
- k. Assign appropriate SCs to the systems.

The safety classification criteria used to evaluate the consequences of each WRSS system failure are provided in WHC-CM-4-46, Section 9, Table 1.

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3.0 IDENTIFICATION OF HAZARDS AND CONSEQUENCE ANALYSES

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

3.1 PRELIMINARY HAZARD ANALYSIS

A preliminary hazards assessment was conducted to identify potential hazards for the WRSS. This assessment has been included in Table 4-1 of WHC-SD-WM-PSE-010 (Conner 1994). The potential accidents were analyzed by determining event sequence, potential consequences, mitigating features, recovery measures, and by estimating the probability of occurrence. See Section 5.0 for the analysis descriptions of waste transfer line leaks, unfiltered release to the environment because of recirculation HVAC duct break, and waste leaks from jumpers or connectors with pit covers in-place.

The Safety Classifications and justifications for the front line systems were determined based on the hazards assessment. See Table 4-1 for the WRSS interim Safety Classifications.

3.2 SOURCE TERM

The waste in C-106 contains radionuclides with greater than 100 nanoCuries/g (nCi/g) transuranic content, therefore, the sludge in C-106 qualifies as both high level waste and transuranic waste. The chemical composition of the sludge also classifies the contents as "listed waste" according to Washington Administrative Code (WAC) *Dangerous Waste Regulations*, WAC-173-303 (WAC 1989).

Conservative estimates of the radionuclide inventories for the C-106, AY-101 and AY-102 tanks used in the WRSS are shown in Appendix E, Tables E-1, E-2, and E-3 respectively.

Source Term Clarifications. An analysis in Appendix C of WHC-SD-WM-ISC-001 (Leach and Stahl 1993) was performed for unit liter respirable releases of selected Hanford high level waste tanks. The unit liter release analysis was performed using the PNL-6584 GENII dosimetry code found in PNL-6584 (Napier et al. 1988) and laboratory sample data for C-106 solids and AY-101 supernatant in AY-102 (see Section 1.4.2). The EDE values in rem/L are estimated in dose consequence calculations in Appendix F and are summarized in Table 3-1. This table represents maximum doses to the offsite individual.

Table 3-1. EDE/Unit Liter Release for Offsite Individual Without/With PM

Offsite	EDE, rem/L Solids	EDE, rem/L Liquid
Inhalation without PM (CF=1)	2.30E-2	1.80E-5
Inhalation with PM (CF=0.64)	1.47E-2	1.15E-5

Since all 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, Appendix C (Leach and Stahl 1993). To convert from the maximum offsite individual dose to doses for other receptors, the receptor location conversion factors given in Table C-10 of Appendix C (Leach and Stahl 1993) are used. For purposes of this evaluation and as recommended in Appendix C (Leach and Stahl 1993), the most conservative multiplication factors (CF) with or without plume meander (PM) have been used and are as follows: CF=1 for maximum doses to offsite individual without PM; CF=0.64 for maximum doses to offsite individual with PM; CF=610 for maximum doses to onsite individual at 100 meters with PM; and CF=1,900 for maximum doses to onsite individual at 100 meters without PM. The plume meander CF is applied for accident releases assumed to occur for one hour or more.

The unit liter release EDE values are listed in Table 3-1 for the offsite individual without and with PM; Table 3-2 for onsite individual without PM; and Table 3-3 for onsite individual with PM. It is assumed that the solids/sludge within AY-102 are not disturbed during sluicing from C-106 to AY-102.

Table 3-2. EDE/Unit Liter Release for Onsite Individual Without PM

Onsite	EDE, rem/L, solids (CF=1900)	EDE, rem/L Liquid (CF=1900)
Inhalation	4.37E+1	3.42E-2

Table 3-3. EDE/Unit Liter Release for Onsite Individual With PM

Onsite	EDE, rem/L, Solids (CF=610)	EDE, rem/L Liquid (CF=610)
Inhalation	1.40E+1	1.10E-2

3.3 CONSEQUENCE ANALYSES

The potential consequences discussed in this section include radiological, soil contamination, and chemical contamination.

3.3.1 Radiological Consequences

The personnel radiological onsite and offsite dose consequences used in determining system Safety Classifications were calculated based on the airborne release volumes as indicated in the appropriate accident scenarios in Section 5.0.

The environmental radiological consequences used in determining system Safety Classifications were calculated based on liquid release volumes as indicated in the appropriate accident scenarios in Section 5.0. A summary of offsite and onsite EDE values for each credible accident scenarios analyzed in Section 5.0 is provided in Table 3-4.

3.3.2 Soil Contamination

The inner pipe for the transfer system, pipe-in-pipe, is SC-2. A seismic switch will be used to shutdown the WRSS sluicing transfer system. The SC-2 designation for the transfer system along with the seismic switch will significantly reduce the impact to the personnel safety and health as well as soil contamination from a postulated break of both supply and return transfer lines.

3.3.3 Chemical Contamination

Chemical inventory data for C-106, AY-101, and AY-102 are in Tables E-4, E-5, and E-6 respectively. These are based on WHC-SD-WM-TI-543 (Van Vleet 1993a), and WHC-SD-WM-TI-565 (Van Vleet 1993b).

Based on the analyses performed in the SELs (Kidder 1993a and 1993b), a chemical release from the WRSS, C-106, AY-101, or AY-102 is considered inconsequential in comparison to Emergency Response Planning Guidelines, ERPG-2 and ERPG-3 limits. Therefore, the Safety Classifications of WRSS systems are not impacted by Criteria 5, 8, or 9 of WHC-CM-4-46, Section 9, Table 1.

Table 3-4. Summary of Accident Consequences

Accident scenario	EDE Offsite, mrem	EDE Onsite, rem
1a & 1b: Waste transfer supply line and return line failure (1)	2.0E+0	1.9E+0
1c & 1d: Waste transfer supply line and return line failure (2)	1.0E-1	1.9E-1
2: Unfiltered release caused by duct failure (3,4)	5.3E-1	5.0E-1
3a: Jumper/connector failure, with pit cover open (1)	7.4E+3	7.0E+3
3b: Jumper/connector failure, with pit cover closed with all openings closed (5)	3.8E-4	3.6E-4
3c: Jumper/connector failure, with pit cover closed with 2 inch valve handle open for portable imaging system (5)	1.6E-1	1.5E-1

Notes:

1. 2 hours release time, CF = 0.64 for conversion to offsite dose with PM, and CF = 610 for conversion to onsite dose with plume meander.
2. 10 seconds release time with seismic switch shutoff, and CF = 1,900 for conversion to onsite dose without plume meander.
3. 1 hour release time, CF = 0.64 for conversion to offsite dose with PM, and CF = 610 for conversion to onsite dose with plume meander.
4. Based on C-106 vapor space loading at 100 mg/m³ consisting of 10% C-106 solids and 90% AY-101 supernatant via HVAC recirculation exhaust duct.
5. 8 hours release time, CF = 0.64 for conversion to offsite dose with PM, and CF = 610 for conversion to onsite dose with plume meander.

4.0 JUSTIFICATIONS FOR SAFETY CLASSIFICATIONS

The procedure for safety classification is established in WHC-CM-1-3, MRP 5.46, Safety Classification of Systems, Structures, and Components, that is in accordance with criteria established in DOE Order 6430.1A (DOE 1989). WHC-CM-4-46, Section 9, "Assigning Safety Classes to Systems, Structures, and Components" implements the requirements of MRP 5.46 and provides the criteria in Table 1 of Section 9 that are used in determining the safety classifications for systems, structures and components in WRSS. The consequence of failure of systems, structures, and components is determined by an accident analysis in Section 5.0, and is compared to the criteria of Table 1. Depending on these criteria and the consequence of the failure analysis, the systems, structures, and components of WRSS are designated as SC-1, SC-2, SC-3, or Non-Safety Class 4 (NSC-4).

Safety Classifications of equipment associated with WRSS systems are presented in Appendix B. The following sections provide justifications for SCs of the sluicing waste transfer system, ventilation system, support systems, instrumentation and controls, and the equipment removal system. The drawings referenced in the following sections are in Appendix H. A summary of Safety Classifications for the new systems in the WRSS is given in Table 4-1. Also, the existing SST and AWF Systems Lists and Interim Safety Classifications, based on the SELs (Kidder 1993a and 1993b), are given in Tables 4-2 and 4-3. The existing systems and their components as noted in Tables 4-2 and 4-3 will be used, as required, to support WRSS operation.

The analysis in Appendix F is based on the radioactive inventory data presented in WHC-SD-WM-TI-543, *Radionuclide and Chemical Inventories for the Double Shell Tanks* (Van Vleet 1993a), and WHC-SD-WM-TI-565, *Radionuclide and Chemical Inventories for Single Shell Tanks*, (Van Vleet 1993b). As noted in Bander 1993a and 1993b, the radiogenic heat load is 32.2 kW (110,000 Btu/h). The calculated heat load due to radioactive elements in C-106 based on data from Van Vleet 1993b is dominated by decay of ^{90}Sr and ^{137}Cs with negligible contribution from other radionuclides, and is equivalent to 13.4 kW; 12 kW from ^{90}Sr and 1.4 kW from ^{137}Cs . The radioactive inventory data in Van Vleet 1993b are suspect values according to Bander 1993a and 1993b. This introduces a scaling factor of 2.4 due to the discrepancy between radiogenic heat load in the Bander reports and the estimated heat load from the current radioactive inventory in C-106. Characterization of C-106 is scheduled to be completed in the near future. Until such time as the new characterization data for C-106 is available, the 2.4 scaling factor has been applied to the estimated EDE values in Appendix F, as noted in Section 5.0. According to the guidelines in WHC-CM-4-46, the EDE values for postulated accidents are used for determination of safety classification of WRSS and radiological risk acceptance. The risk is based on the frequency of occurrence of an accident and the consequence of the accident.

4.1 SLUICING WASTE TRANSFER SYSTEM -- SC-1

The sluicing waste transfer system (SWTS) consists of: a seismic switch; primary and secondary transfer pipes between C-106 and AY-102; a slurry

Table 4-1. WRSS Systems List and Safety Classification.

New Systems	Safety Class (SC)	SC Justifications	
		Section of this document	Table 1, (a)
Safety systems			
Sluicing waste transfer system	SC-1	4.1	1,10,15
• Seismic switch	SC-1	4.1.1	15
• Primary transfer pipes from and to tanks	SC-2	4.1.2	2
• Secondary transfer pipes from and to tanks (b)	SC-3	4.1.3	3
• Slurry distributor	SC-3	4.1.4	3
• Syphon protection	SC-3	4.1.5	3
• Waste transfer pits.	SC-1	4.1.6	1
• Waste transfer equipment (pumps, valves, pipes, flanges, etc.) in pits	SC-3	4.1.7	3
• Raw water supply and transfer line flushing system	SC-3	4.1.8	3
• Compressed Air System	SC-3	4.1.9	3
Ventilation system.	SC-1	4.2	1
• Seal loop	SC-1	4.2.1	1
• Carbon dioxide injection system	SC-3	4.2.2	3
• Recirculation and prefiltration system	SC-3	4.2.3	3
• Chiller skid	SC-3	4.2.4	3
• Exhaust skid	SC-3	4.2.5	3
Ventilation exhaust radiation monitoring system (Continuous air monitors and record samplers)	SC-3	4.3	3
In-tank imaging system	SC-3	4.4	3
Instrumentation Control System	SC-3	4.6	3
AC power	SC-3	4.5	14
Equipment Removal System	SC-3	4.7	3
• Water washing, CO ₂ decontamination equipment	SC-3	4.7	3
• Flexible receiver system	SC-3	4.7	3
• Strongback system	SC-3	4.7	3
• Equipment storage container	SC-3	4.7	3
• Container transport trailer	SC-3	4.7	3

(a) Safety Classifications (Table 1, Section 9.0 of WHC-CM-4-46)

(b) Secondary transfer pipe (encasement or outer pipe) will meet applicable SC-2 QA and structural/seismic requirements, similar to primary transfer pipe.

AC = Alternating current
 EP = Engineering Practice
 SC = Safety Class

Table 4-2. Tank C-106 Existing Systems List and Interim Safety Classifications.

Existing system descriptions	Safety Class (SC)	SC Justifications	
		Section of SST ISEL(b)	Table 1, (a)
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	
• FIC	[IOSR]*	4.3.3	
• 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(c)	[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
• Raw water supply	SC-3	4.4.5	3
• Area radiation monitors(d)	SC-3	4.4.1	3
Fire protection system	SC-3	4.5	22

- (a) Safety Classifications (Table 1, Section 9.0 of WHC-CM-4-46)
- (b) Single-Shell Waste Tanks Interim Safety Equipment List (SEL) (Kidder 1993b)
- (c) The AC power is classified according to its safety support function and not 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.
- (d) ARMs are being removed
- AC = Alternating current
- EP = Engineering Practice
- FIC = Food Instrument Corporation
- HEPA = High-efficiency particulate air
- 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 Requirements (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 MRP 5.46, as analyses are completed to establish definite Safety Classifications. In the interim, approval requirements shall include Nuclear Safety and Quality Assurance (SQ), as a minimum, and Environmental Assurance (E) where deemed appropriate.

Table 4-3. Tank 241-AY-102 Systems List and Interim Safety Classifications.
(Sheet 1 of 2)

Existing system descriptions	Safety Class (SC)	SC Justifications	
		Section of AWF ISEL (b)	Table 1 (a)
Tanks (241-AY-102)	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 inter tank 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 (pumps, valves, pipes, flanges, leak detectors, etc.)	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
• 112-m ³ /s (4,000 ft ³ /min) exhauster	SC-2	4.1.4	2
• Ventilation duct work	SC-2	4.1.4	2
Annulus ventilation system (tank 241-AY-102)	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
• Area radiation monitor system (d)	SC-3	4.3.10	3
• 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
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	--

Table 4-3. Tank 241-AY-102 Systems List and Interim Safety Classifications.
(Sheet 2 of 2)

Existing system descriptions	Safety Class (SC)	SC Justifications	
		Section of AWF ISEL (b)	Table 1 (a)
AC power system (AWF boundaries)	[IOSR]*		
• Normal AC power for primary tank instrumentation	[IOSR]*	4.4.3	--
• Caterpillar diesel generator (e)	[IOSR]*	4.4.3.1	--
• Normal AC power for ventilation	SC-2	4.4.5, 4.4.6	24
• Detroit diesel generator (f)	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) Safety Classifications (Table 1, Section 9, WHC-CM-4-46),

(b) From WHC-SD-WM-SEL-020 (Kidder 1993a).

(c) May be replaced by Project W-030 ventilation system.

(d) To be removed in the future.

(e) Caterpillar is a trademark of the Caterpillar Corporation.

(f) Detroit is a trademark of the Detroit Corporation.

AC = Alternating current

AWF = Aging Waste Facility

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 requirements (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.

distributor; syphon protection; waste transfer pits; waste transfer equipment in pits that includes a slurry pump, a sluice pump, sluicers, valves, etc.; 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 C-106 will be transferred to AY-102 by using an updated form of past practice sluicing. The sluicing is a continuous process with the supernatant or alternate liquid in AY-102 serving as the sluicing fluid. This fluid is mixed with the solids by the sluicer action producing a slurry in C-106. The slurry is transferred to AY-102 via a variable speed slurry transfer pump, with a maximum capacity of 1,300 L/min (350 gpm) through an encased slurry transfer pipe, and a distributor located in AY-102. The slurry pump is installed in Pump Pit 241-C-06A.

The sluice pump in AY-102 will transfer the supernatant (or alternate fluid) via two sluicers with nozzles located in C-106. The sluice pump 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 sluice 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 in Pit 241-C-06C. The slurry distributor is located in Pit 241-AY-02A. The distributor distributes the solids in AY-102 as evenly as possible. A majority of the solids settle in AY-102. The unsettled solids in AY-102 are recirculated along with supernatant (or alternate fluid) to C-106. Thus, a continuous process of sluicing is maintained until at least 75% of high heat solids are transferred into AY-102. The routing of transfer pipes is shown on Drawings H-2-818520 and H-2-818540.

4.1.1 Seismic Switch -- SC-1

Based on evaluation of the WRSS design and the EDE dose consequences caused by a postulated break of both supply and return transfer lines during a seismic event, a seismic switch will be installed to shut down the WRSS sluicing transfer system (see Drawings H-2-818559, Sheet 1 and H-2-818560, Sheet 7). This will significantly reduce the impact to personnel safety and health caused by the dose consequences, and to the environment caused by the soil contamination. See Section 4.1.2 for the accident analysis. Based on the safety function that the seismic switch performs and based on Criterion 15 of Table 1, Section 9, WHC-CM-4-46, the seismic switch has been classified as SC-1.

4.1.2 Primary Transfer Pipes -- SC-2

The two primary transfer lines (delivering supernatant to the sluicing nozzles in C-106 and high-heat slurry waste to the receiver tank, AY-102) will be of an all welded construction of 4-in. Schedule 40 stainless steel pipe within the 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 C-106 sluicing transfer system primary piping is to provide confinement of hazardous liquid wastes. Failure and leaking of the primary piping can 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.

The accidents that characterize this failure are waste transfer supply and return lines failure - accident, Scenarios 1a through 1d in Section 5.0.

The supply line and return line failures are assumed to 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, Scenarios 1a and 1b. For safety classification purposes, it is further assumed that the entire leak is released to the environment. The resulting EHSC value is 2,640,000 for both supply line and return line failures and is based on source terms of C-106 and AY-102. The EDE offsite and onsite values are 2 mrem and 1.9 rem respectively.

As noted in Section 4.1.1, a seismic switch will shut down the WRSS sluicing transfer system during a seismic event. This will significantly reduce EDE dose consequences as well as environmental hazard because of soil contamination from transfer line breaks. The maximum postulated release with the seismic switch shutdown feature is calculated to be 10,450 L (2,760 gal), Scenarios 1c and 1d. The resulting EHSC value is 48,000. The EDE offsite and onsite values are $1.0E-1$ mrem and $1.9E-1$ rem, respectively. Using a release time of 10 sec, the time to reach the SC-1, Criterion 1, Table 1, Section 9, WHC-CM-4-46, (500 mrem for offsite individual), will be equal to 13.8 hr [$500 \text{ mrem} / 1.0E-1 \text{ mrem} \times (3,600 \text{ sec/hr} / 10 \text{ sec})$], and the time to reach the SC-2, Criterion 2 (5 rem for an onsite individual) will be equal to 4.3 min [$5 \text{ rem} / 1.9E-1 \text{ rem} \times (60 \text{ sec/min} / 10 \text{ sec})$]. Because the estimated time (4.3 min) to reach SC-2 criterion does not provide sufficient time to implement recovery actions (cover/cleanup contaminated area), the primary waste transfer line (inner pipe) provides an SC-2 safety function.

4.1.3 Secondary Transfer Pipes -- SC-3

The 6-in. secondary transfer (encasement or outer) pipes are provided for leak detection and secondary confinement to drain 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 is to transfer liquid waste from C-106 to AY-102 without leaking. The primary pipe (inner 4 in. pipe) is designed for SC-2 requirements with all welded construction. The secondary transfer pipe (encasement or outer pipe) will meet applicable SC-2 QA and structural/seismic requirements, similar to the primary transfer pipe. The secondary transfer pipe includes leak detection capability. Any potential leaks confined within the encasement will drain to the appropriate tank, and once this leak is detected an immediate action such as stopping of the transfer operation will be taken. Extra radiation work would be required to repair a potential leak caused by a primary pipe failure; this would adversely impact as low as reasonably achievable (ALARA) principles. Based on Criterion 3 of Table 1, Section 9, WHC-CM-4-46, the secondary transfer piping system is classified as SC-3.

4.1.4 Slurry Distributor -- SC-3

The slurry distributor (see Drawing H-2-818560, Sheet 3) pipe is designed to maximize solids settling and to provide distribution of solids as evenly as possible within AY-102.

According to the FDC (Bailey 1994), the design intent is to transfer slurry containing 30% solids from C-106 to AY-102. Failure to distribute solids as evenly as possible may result in a potential for an extended operation of WRSS because more unsettled solids will be transferred back and forth by the waste retrieval system. According to Bailey 1994, it is estimated that about 10% unsettled solids will be returned to C-106 via the supernatant line. As evaluated in WHC-SD-SQA-CSA-20363 (Rogers 1994), no mechanism has been found that is capable of causing a criticality concern during this transfer and distribution of solids in AY-102. Based on Criterion 3, Table 1, Section 9, WHC-CM-4-46, the slurry distributor is classified as SC-3.

4.1.5 Syphon Protection -- SC-3

The design of the supernatant line will incorporate anti-syphon holes on the sluice pump discharge line located inside AY-102 in order to prevent syphoning of AY-102 via the supernatant line. Similarly, anti-syphon holes are also provided on the slurry distributor line located inside AY-102 to prevent syphoning of AY-102 via 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 the mean sea level reference). In the event of a break in the lines or when the system is shutdown/stopped the anti-syphon holes will prevent draining of AY-102 to C-106 and a consequent overflow of C-106. If all the holes are assumed to be plugged, failure of these anti-syphon holes to function as a syphon breaker would allow a syphon to be established upon pump shutdown or a line break. The flow rate of the syphon may be conservatively calculated by the following:

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

Reference: Equation 3-19, Crane Technical Paper No. 410 (Crane 1982)

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

where f = friction factor
 L = length of pipe, in feet
 D = diameter of pipe, in feet

The 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 AY-102, El 199.14 m (653.36 ft), and the initial height of the liquid in C-106, El 187.63 m (615.58 ft), as shown on drawing H-2-818536, which is equal to 11.5 m (37.78 ft). The friction factor (f) is taken from Crane Technical Paper 410 (Crane 1982) as 0.017 for clean commercial steel pipe; and the pipe length (L) is assumed to be 610 m (2,000 ft), this yields a resistance coefficient (K) of 118. Therefore, substituting these data into the above equation, the flow rate (Q) is equal to 503 L/min (133 gpm).

The following were assumed in determining the conservative flow rate:

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

Therefore, a conservative flow rate of 378 L/min (100 gpm) has been used to determine the time to fill C-106.

The total volume of liquid estimated to be available for transfer from AY-102 to C-106 is about 2,233,000 L (590,000 gal). The time to transfer this volume at 100 gpm is about 98 h. This is based on the volume of liquid between the maximum liquid height in AY-102 at 199.14 m (653.36 ft) and the height of the distributor nozzles (or the suction of the sluice pump) at 193.7 m (635.5 ft); and 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 C-106 is about 1,135,000 L (300,000 gal) based on the maximum allowable level of 189.7 m (622.4 ft), 470 cm (185 in.) above the inside bottom elevation of C-106 at 185 m (607 ft) according to OSD-T-151-00013 (Boyles 1993), and an initial starting tank volume of 746,000 L (197,000 gal). The time to transfer this volume of 1,135,000 L (300,000 gal) would be about 50 h at 378 L/min (100 gpm) flow rate. A number of diverse instruments are available to alert the operator of this situation, monitoring of tank level which is automatically recorded daily according to Table 1-25 of WHC-SD-WM-ISB-001 (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, since there are a sufficient number of redundant holes available for a syphon break, it is inconceivable to assume that all the holes are plugged at the same time. Based on Criterion 3, Table 1, Section 9, WHC-CM-4-46, the syphon protection will provide an SC-3 function.

4.1.6 Waste Transfer Pits -- SC-1

The waste transfer pits for AY-102 have been classified as SC-1 according to Section 4.2.3.3 of WHC-SD-WM-SEL-020 (Kidder 1993a). See Table 4-3.

During waste transfer or recirculation of liquid waste within C-106 pits, a spray leak scenario could be postulated that would lead to SC-1 consequences. Such an accident scenario could consist of the following events:

- a. An initiating event where a spray leak occurs in a pit due to failure of jumpers, connection or flange
- b. A single failure where a pit cover block is left off
- c. The spray is oriented such that it sprays out of the opening in the pit
- d. The leak detectors may not activate because of most of the spray is out of the pit, and also, not enough liquid is lost that could be detected by material balance discrepancy (MBD) analysis.

Calculations were performed in Appendix F for the above scenario, and are summarized in Section 5.0, Scenario 3a. The resulting offsite EDE value for a jumper/connector failure is $7.4\text{E}+3$ mrem. The resulting onsite EDE value for a jumper/connector failure is $7.0\text{E}+3$ rem.

The above spray scenario was mitigated with a properly installed pit cover block. As noted below, and in Section 5.0 for Scenarios 3b and 3c, the offsite and the onsite EDE values were significantly reduced.

Scenario 3b: The resulting offsite EDE value for a jumper/connector failure (with all openings closed) is $3.8\text{E}-4$ mrem. The resulting onsite EDE value is $3.6\text{E}-4$ rem.

Scenario 3c: The resulting offsite EDE value for a jumper/connector failure (with cover in place and 2-in. valve handle hole open) is $1.6\text{E}-1$ mrem. The resulting onsite EDE value is $1.5\text{E}-1$ rem.

Therefore, this confirms that the pit cover provides an SC-1 function based on Criterion 1 of Table 1, Section 9, WHC-CM-4-46. Existing administrative controls, WHC-SD-WM-OSR-005 (Dougherty 1993), provide for pit covers to be in place prior to any transfer operation. Additional procedures and corresponding quality assurance inspections will be implemented to ensure procedural compliance.

4.1.7 Waste Transfer Equipment in Pits -- SC-3

The C-106 WRSS provides new and modified waste transfer piping, pumps, valves, flanges, and jumpers located in pits. See Drawings H-2-818559 and H-2-818560. With a properly installed pit cover block, the pump, pipe, gaskets, flanges, jumpers, or valves could leak, spray, or burst with little consequence to the environment as noted in Section 4.1.6.

The WRSS transfer or recirculation of liquid waste will be via 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 caused by a guillotine-type pipe failure and drain the liquid to C-106.

Leakage of the primary piping caused by a jumper or connector failure within the pit can result in an unmitigated release of hazardous liquid aerosols to the environment. This will result in potential onsite and offsite personnel exposures. With the pit cover performing an SC-1 confinement function, as evaluated and confirmed in Section 4.1.6 above, the equipment within the pit (pumps, jumpers, valves, etc.) can be considered SC-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 an SC-3 ALARA consequences. Therefore, equipment including jumpers within the pits can be considered as SC-3 based on Criterion 3, Table 1, Section 9, WHC-CM-4-46.

4.1.8 Raw Water Supply and Transfer Line Flushing -- SC-3

The WRSS systems will be designed to be capable of flushing all components with raw water. See Drawings H-2-818559, H-2-818560, H-2-818561, and H-2-818562. Treated water is presently required for C-106 cooling (an intermittent cooling water addition via truck is required at a predetermined level in C-106). Treated water will be used for flushing the transfer lines. Treated water is supplied from 200 Area Power Plants, and is transported via tanker truck. Based on Criterion 3, Table 1, Section 9, WHC-CM-4-46, this system is classified as SC-3.

4.1.9 Compressed Air System -- SC-3

The compressed air system, as shown in Drawing H-2-818562, will provide a source of instrument air to various components of WRSS such as pneumatically operated valves, and a purge air supply to HEMF and other components as required. See Drawings H-2-818559, H-2-818560, H-2-818561, and H-2-818562. Based on the safety function this system performs and Criterion 3, Table 1, Section 9, WHC-CM-4-46, the compressed air system is classified as SC-3.

4.2 VENTILATION SYSTEM -- SC-1

The ventilation system will provide control of temperature and humidity, and confinement of hazardous aerosols and vapors within the C-106 tank vapor space using a recirculation and an exhauster system (see Drawings H-2-818470 and H-2-818561, Sheets 1 through 7). The ventilation system for tank C-106 include gas bleeding from tank C-105 via 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 personnel exposure associated with isolating or removal of this line.

The ventilation system consists of seal loops, carbon dioxide injection system, recirculation and prefiltration system, 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 seal loop performs as described in Section 4.2.1, and according to the Criterion 1 of Table 1, Section 9, WHC-CM-4-46, the ventilation system is classified as SC-1.

4.2.1 Seal Loop -- SC-1

A seal loop is provided to mitigate the tank under or over pressurization scenario, and is designed to limit differential pressure between C-106 vapor space and the external atmosphere. Redundant seal loops are provided to relieve the differential pressure if it exceeds 10.3 cm (4 in.) w.g. in order to maintain the structural integrity of C-106.

The seal loop is a passive design consisting of a pipe formed into a loop and filled with a non-freezing type of fluid. See Drawing H-2-818561, Sheet 1 for details of the seal loop system. Based on the safety function this system performs, and Criterion 1, Table 1, Section 9, WHC-CM-4-46, the seal loop system is classified as SC-1.

4.2.2 Carbon Dioxide Injection System -- SC-3

The CO₂ injection system provides a method of improving visibility and control for continuity of sluicing operations in C-106. The CO₂ injection system is shown on Drawing H-2-818561, Sheet 1. Based on the function this system performs, and Criterion 3, Table 1, Section 9, WHC-CM-4-46, the CO₂ injection system is classified as SC-3.

4.2.3 Recirculation and Prefiltration System -- SC-3

This system consists of a condenser, a moisture separator, a heating coil, a recirculation fan, a high-efficiency mist eliminator (HEME) and a high-efficiency metal filter (HEMF). Gases enter from C-106 through a 10-in. duct with a capacity of 0.5 to 0.57 m³/s (1,040 to 1,220 scfm) and is cooled by the condenser. Part of the flow is directed to the exhaust skid and the balance circulates through the moisture separator, heating coil and returns to C-106 through an 8-in. duct with a flow of 0.4 m³/s (860 scfm). The condenser cools the recirculation and exhaust gases from C-106. The HEME and HEMF are part of the prefiltration system, and are considered part of the exhaust train. A portable exhaust hook-up is provided between the moisture separator and the heating coil on the recirculation line.

The compressed air and raw water supply systems are provided to support operation of the HVAC, as required, for flushing HEME, HEMF, and other equipment. See drawing H-2-818561, Sheets 4 and 5. More detailed descriptions of the support systems are provided in Sections 4.1.8 and 4.1.9.

The recirculation and prefiltration system is located in a process building. 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 HEME and HEMF are drained to C-106 through riser R4. The HEME and HEMF are flushed, as required, at a predetermined contact dose reading of these components. The HEPA filter is changed at a high differential across the filter or when the radiation measurement on the housing is about 50 mrem/h. Detailed consequence analyses for catastrophic failure of these components will be provided in the SA.

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 follows.

As analyzed in Scenario 2 of Section 5.0, the offsite EDE dose is $5.3\text{E-}1$ mrem because of an unfiltered release for one hour from a failure of the recirculation line duct. This radiological consequence is within the 500 mrem Criterion 1 of Table 1, Section 9, WHC-CM-4-46. The onsite EDE dose is $5.0\text{E-}1$ rem. This radiological consequence is within the 5 rem Criterion 2 of Table 1. The time to reach SC-2 Criterion 2 of Table 1 would be equal to 10 hr. Based on the function this system performs, and Criterion 3, Table 1, Section 9, WHC-CM-4-46, the recirculation and prefiltration system is classified as SC-3.

4.2.4 Chiller Skid -- SC-3

This skid consists of an air cooled chiller and a glycol cooling system. The glycol cooling system consists of make-up storage tank, air separator, expansion tank, and circulating pumps. The propylene glycol solution is used to cool the ventilation recirculation and exhaust gases via the condenser (see Section 4.2.3). The glycol solution is cooled by the air cooled chiller system. Based on the function this skid performs, and Criterion 3, Table 1, Section 9, WHC-CM-4-46, the chiller system is classified as SC-3.

4.2.5 Exhaust Skid -- SC-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. The stack includes a ventilation exhaust radiation monitoring system as described in Section 4.3. Failure of the exhaust skid has the potential for a release of radioactivity to the environment without detection. However, the onsite EDE consequence for an unfiltered release from the exhaust skid (assuming malfunction of HEPA filters) will be equivalent to $2.0\text{E-}1$ rem [$2.0\text{E-}1$ rem is derived from Section 4.2.2 as follows: $5.0\text{E-}1$ rem $\times$ 350 cfm (flow in exhaust duct)/860 cfm (flow in recirculation duct)]. The time to reach the SC-2 criterion of Table 1, Section 9.0, WHC-CM-4-46 will be equal to 24.6 hr. If the HEPA is assumed to function as designed, then the consequence due to the release through the stack will be minimal. Based on the function of the skid, and Criterion 3, Table 1, Section 9, WHC-CM-4-46, the exhaust skid is classified as SC-3.

4.3 VENTILATION EXHAUST RADIATION MONITORING SYSTEM -- SC-3

The ventilation exhaust radiation monitoring system (VERMS) consists of a flow sensor along with a temperature sensor, particulate and iodine filters, a continuous air monitor (CAM) and record samplers. The safety function of the VERMS is to monitor and record the airborne radionuclide discharge from the C-106 ventilation system and alarm when limits are exceeded (see Drawing H-2-818561 Sheet 7). 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 alarm upon its failure to function or upon failure of normal AC power to the CAM. HVAC is shutdown upon detection of high radiation by CAM that could potentially occur during failure of HEPA filters. In addition, HVAC is shutdown automatically by the seismic switches during 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 HEPA filters) will be equivalent to $2.0\text{E}-1$ rem [$2.0\text{E}-1$ rem is derived from Section 4.2.2 as follows: $5.0\text{E}-1$ rem $\times$ 350 cfm (flow in exhaust duct)/860 cfm (flow in recirculation duct)]. The time to reach the SC-2 criterion of Table 1, Section 9.0, WHC-CM-4-46 will be equal to 24.6 hr. If the HEPA is assumed to function as designed, then the consequence due to the release through the stack will be minimal. The operator will take necessary action based upon 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 Criterion 3 of Table 1, Section 9, WHC-CM-4-46, the VERMS is classified as SC-3.

4.4 IN-TANK IMAGING SYSTEM -- SC-3

An in-tank imaging system will be used in C-106 to locate tank sludge accumulations during the sludge removal process (see Drawing H-2-818559, Sheet 2). The imaging system will facilitate maintaining the minimum possible liquid level. The imaging system is intended to enable operators to aim the sluicer at the remaining waste while minimizing the liquid level.

The imaging system will provide operations personnel in the control room with near real time views (within 5 min. of real time) of inside the tank. This imaging system will be capable of providing images (through the fog caused by sluicing) with a resolution of 5.08 cm (2-in.) at the maximum in-tank range of 21.3 m (70 ft).

A portable imaging system will be provided to periodically monitor integrity of the interior of process pits through the valve handle holes in the cover blocks. The system will be used for determining pit conditions before opening for maintenance, leak verifications, or inspecting equipment conditions.

Failure of the imaging system would impact ALARA principles, based on Criterion 3, Table 1, Section 9, WHC-CM-4-46; therefore, this system is classified as SC-3.

4.5 AC POWER SYSTEMS -- SC-3

Electrical systems provide AC power for C-106 and AY-102 as described in the following sections.

4.5.1 AC Power for C-106 -- SC-3

Power from the Hanford Site Power Grid will be used to provide 480 V AC via a portable substation, skid-mounted on a concrete slab outside the fence, near the C farm (see 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 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 for C-106 systems, instrumentation and controls (see Table 4-1). Failure of normal power will secure the slurry pump, heel pump, and HVAC including instrumentation and controls, and will place these components in a safe shutdown condition. The AC power system for C-106 is classified as SC-3 based on the safety function that this system performs, and Criterion 14 of Table 1, Section 9, WHC-CM-4-46.

4.5.2 AC Power For AY-102 -- SC-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 pump located in AY-102. The power panel will be located in a new skid mounted enclosure located outside the fenced area of 241-AY tank farm and AY-102. See Drawings H-2-818693 and H-2-818694.

The AC power system provides electrical power to components for AY-102 systems, instrumentation and controls (see Table 4-1). Failure of normal power will secure the sluice pump including instrumentation and controls, and will place these components in a safe shutdown condition. The AC power system for AY-102 is classified as SC-3 based on the safety function that this system performs, and Criterion 14 of Table 1, Section 9, WHC-CM-4-46.

4.6 INSTRUMENTATION AND CONTROL -- SC-1

This section discusses existing and new instrumentation systems required for monitoring and control of the WRSS. See Drawings H-2-818559, H-2-818560, H-2-818561, and H-2-818562.

Existing instrumentation for tank liquid-level (FICs and manual tapes), temperature, pressure/vacuum, and leak detection systems (such as dry wells), will be used as required to monitor operating conditions in C-106 and AY-102 during the WRSS operation. The FIC is currently being phased out and replaced

with the Enraf series 854 level gauge. The Enraf gauge is a high precision, low maintenance device that determines waste level by detecting variations in the weight of a displacer suspended in the tank waste. The existing tank monitoring systems will be extended to the WRSS control room for operator convenience. Safety classifications for these systems are based on the SST and AWF SELs (Kidder 1993b and 1993a), and are summarized in Tables 4-2 and 4-3.

Instrumentation will monitor and control the facility retrieval and transfer operations, HVAC, and support systems necessary to perform all functions required to mobilize, retrieve and transport 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 SWTS, ventilation system, and VERMS described in Sections 4.1, 4.2, and 4.4. In addition, instrumentation and control descriptions for the transfer system interlocks, leak detection system, sluicing control room are also provided in the following sections. Justification for safety classification of the instrumentation and control is provided in Section 4.6.9, Instrumentation Failure Modes and Effects.

4.6.1 Sluicing Waste Transfer System -- SC-1

As noted in Section 4.1, the SWTS consists of seismic switch, primary transfer pipes, secondary transfer pipes, slurry distributor, syphon protection, waste transfer pits, waste transfer equipment in pits (pumps, valves, jumpers, etc.), raw water and compressed air supply systems. The instrumentation and control necessary for operation of SWTS and its various components are briefly described in the following subsections. Descriptions for the raw water system and compressed air system instrumentation are provided in Sections 4.6.2 and 4.6.3. There are no instrumentation and/or controls associated with the slurry distributor and syphon protection.

Seismic Switch. Two sets of redundant seismic switch modules are installed, one set at C farm and the other set at AY farm. At the onset of a seismic activity, the respective motor control centers (MCCs) supplying power to each of the farms will shut down the WRSS operation. The MCC at C farm shuts down the slurry pump, heel pump, HVAC for C-106, and WRSS slurry transfer system. The MCC at AY farm shuts down the sluice pump and the WRSS sluicing system. See Drawing H-2-818558 Sheet 4 for interlock details, and H-2-818559 Sheet 1 and H-2-818560 Sheet 7 for the details of the seismic switch modules in the respective farms. Each of the seismic switch module consists of a seismic detection unit, a magnetic contactor assembly, temperature switches, an air conditioning unit, and a unit heater. Alarms will annunciate to alert the operator of abnormal situations.

Sluice Pump. The variable speed submersible sluice pump monitoring and control instrumentation, as shown on Drawing H-2-818560, Sheet 2, will be located in the WRSS control room. A remotely operated winch will be provided for the sluice pump. This will allow operators to raise or lower the pump, from the control room, to accommodate liquid level changes in AY-102. Pump discharge pressure, viscosity, and flow/density indications will be provided

for operator information. Alarms will annunciate to alert the operator of abnormal situations.

Engineered features will be provided that will allow aiming either of the sluicers at the waste contained in the tank and prevent aiming the sluicing stream at the tank walls and in-tank equipment. Operation of the sluicer aiming control in the control room will be facilitated by the remote imaging system.

Slurry Pump. Variable speed controls will be provided for the submersible slurry pump. The heel pump will also be a variable speed submersible pump and will be provided with similar controls. See Drawing H-2-818559, Sheets 2 and 3. A remotely operated winch will be provided for each pump. This will allow the operator to raise or lower the pump from the control room, to accommodate slurry height changes. Instrumentation will be furnished to monitor pump discharge flow/density, viscosity, and pressure. Alarms will annunciate to alert the operator of abnormal conditions. The discharge of either the slurry or heel pump may be aligned by remotely operated valves to recirculate or discharge to AY-102.

4.6.2 Raw Water System -- SC-3

Treated water will be provided via trucks and supplied through hose connections to flush the transfer piping system. 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 remotely operated valves. Radiation monitoring capabilities will be provided on raw water lines that come in contact with a radioactive environment or that have potential for contamination.

4.6.3 Compressed Air System -- SC-3

The compressed air system, as shown in Drawing H-2-818562, will provide a source of instrument air to various components of WRSS such as pneumatically operated valves, and purge air supply to HEMF and other components as required. See 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 Instrument and Controls Building. The air compressor is a vendor supplied package.

4.6.4 WRSS Leak Detection System -- SC-3

New leak detection sensors shown on 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 shut down the WRSS pumps upon detection of leaks in the pits, and provide signals for alarm and interlock functions. The interlock functions are shown on Drawing H-2-818558 sheet 4, and are discussed in Section 4.6.6.

The transfer encasement piping is provided with a leak detection system that will shut down the WRSS pumps upon detection of leakage collected in the encasement piping due to a primary piping failure. The leakage that is collected in the encasement piping will drain by gravity to the respective pit connected to the piping and return to C-106. A remotely operated 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.

4.6.5 Transfer System Interlocks -- SC-3

The interlocks are shown on Drawing H-2-818558, Sheet 4. The seismic activity as detected by seismic detectors in C and AY farms will shut down the WRSS. The leak detection system and radiation monitoring system associated with transfer lines and pits will be integrated with a misrouting prevention system. The leak detection interlocks, as described in Section 4.6.5, will shut down the WRSS pumps. The misrouting prevention system interlocks will abort either slurry transfer or supernatant transfer preventing an unplanned addition of water for flushing, and preventing addition of water during sluicing operation. New and existing tank farm and sluicing interlock functions required to maintain safe operations and effect a safe shutdown are provided. The HVAC interlocks are described in Section 4.6.7.5.

4.6.6 HVAC System -- SC-3

The HVAC system will consist of seal loops, CO₂ injection system, a recirculation and prefiltration system, and an exhaustor system. See Drawings H-2-818470 and H-2-818561, Sheets 1 through 7.

4.6.6.1 Seal Loop System. Redundant seal loops are provided to mitigate the tank under or over pressurization scenario, and are designed to limit differential pressure between C-106 vapor space and the external atmosphere. The seal loops will relieve the differential pressure if it exceeds 10.3 cm (4 in.) w.g. and will maintain the structural integrity of C-106. A level gauge is provided to monitor the fluid level in each loop. Failure of the level gauge will not prevent the seal loop to perform its safety function as noted in Section 4.2.1.

4.6.6.2 Recirculation and Prefiltration System. The recirculation and prefiltration system is described in Section 4.2.3. Instrumentation will be provided to monitor the condenser differential pressure, condenser inlet temperature, condenser outlet temperature, heater outlet temperature, fan differential pressure and fan motor current. Position switches will function to provide backdraft damper position indication. Instruments are also provided for monitoring HEME differential pressure, HEME outlet temperature, and HEMF differential pressure.

Heater controls will be capable of regulating air flow from 10 °F to 60 °F above the entering airstream temperature. The heater will be equipped with an internal high-high temperature cutout switch, an internal flow 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.

4.6.6.3 Exhaust System. The exhaust system consists of an electric heater, two HEPA filters with a test section for each filter, a variable speed exhaust fan, and an exhaust stack (see Drawing H-2-818561, Sheets 6 and 7). The VERMS is part of the stack and is discussed in Section 4.6.7.

The instruments provided for monitoring this system include heater inlet and outlet temperature, HEPA filter differential pressure, fan inlet temperature and fan inlet damper position.

The heater controls will serve to increase the 40 °F air stream temperature to 70 °F and reduce the relative humidity to 34%. An internal high-high temperature switch, an internal low flow switch, and a manual cutout switch will also be furnished.

Variable speed fan controls will be used to control tank pressure to about -3.8 cm (-1.5 in.) w.g.

4.6.6.4 HVAC 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 system capable of throttling adjustments and/or HVAC shutdown on tank ventilation system failure
- Isokinetic monitoring station at HVAC exhaust stack to monitor radiation
- Emissions monitoring at HVAC exhaust stack to meet 40 CFR 61 "National Emission Standards for Hazardous Air Pollutants," Subpart H, and referenced requirements.

The HVAC system controller will provide diagnostic information relating the system performance and status. Should the operations be automatically terminated or fail to restart upon demand, the cause of the shutdown or failure will be clearly identified.

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

4.6.7 Ventilation Exhaust Radiation Monitoring System

Instrumentation and control for VERMS are shown on Drawing H-2-818561 sheet 7. The exhaust flow, temperature, and radiation monitoring instrumentation are provided as part of VERMS. The interlock that shuts down the exhaust fan upon detection of high radiation is shown on Drawings H-2-818558 Sheet 4, and H-2-818561 Sheet 7.

4.6.8 Sluicing Control Room -- SC-3

The WRSS control room will contain control panels with monitoring and control instruments associated with the WRSS. This includes graphic display depicting the sluicing and waste transfer between C-106 and AY-102, sluicing controls, an in-tank remote imaging system monitor and controls, and a surveillance system monitor and associated controls. The control room will also provide instrumentation for monitoring HVAC, electrical, raw water and compressed air systems for WRSS.

Selected alarms and interlocks for leak detection of the transfer lines and pits, anomalous pressure conditions of the tank and HVAC filtration system, anomalous radiation levels, and HVAC ventilation system shutdown will be provided, and will alarm in the sluicing control room and to the Tank Monitor and Control System (TMACS) located in 2750-E Building. The location of leak detection system failure or misrouting will be alarmed on the graphic display by the misrouting prevention system. Alarms will be audible/visible within the tank farm.

4.6.9 Instrumentation Failure Modes and Effects

The failure modes and effects analysis (FMEA) of instrumentation (primary elements) was performed to determine their safety classifications. The analysis is based on the functions of the system, and associated instrumentation, using available information from system descriptions, and drawings. The effects of the failure mode(s) are determined, consequences of the failure on system safety functions are evaluated, and the SC is determined.

Safety classification of the instruments is 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 did not permit detailed analysis of cross damages, instruments have been classified based on operational functions and engineering judgement. Final cross damage analyses are required to be performed in the future based on system walkdowns and/or as-built documentation.

SC-1 instrumentation and controls associated with the seismic switch SC-1 system is described in Sections 4.1.1 and 4.6.7.2. The safety classification of other instrumentation described in Section 4.6 has been determined to be SC-3. This is based on the classification of the systems noted in Sections 4.1.6, 4.1.7, 4.1.8, 4.2, 4.3, and 4.4, and also based upon ALARA principles of Criterion 3 of Table 1, Section 9, WHC-CM-4-46. Justification for each of the primary elements and associated instrumentation and controls is also included in Appendix B. As definitive design details are developed for the WRSS, FMEA for the additional instrumentation and/or controls will be performed. This SEL will be updated to incorporate the results of the FMEA for the additional instrumentation and controls.

4.7 EQUIPMENT REMOVAL SYSTEM -- SC-3

The Equipment Removal System (ERS) will be used to remove the existing installed equipment, such as pumps, within pits 241-C-06A, 241-C-06B, and 241-AY-02E.

The ERS will be comprised of five major systems: water washing or CO₂ decontamination system; the flexible receiver system; the strongback system; the equipment storage containers; and the container transport trailer. Other components such as equipment storage and disposal containers, shield plugs, and lifting fixtures, will also be designed and fabricated as necessary to support the equipment removal effort.

The existing pumps from each of the referenced pits will be extracted by using ERS, double bagged, and placed within a container. Containers are then transported to onsite storage facilities using a strongback. If the strongback gets contaminated during ERS operation, the container transport trailer will be used to move the container to the onsite storage facilities. Because the activities described under ERS (see Section 5.1 of the safety evaluation, Conner 1994, for more details) involve extraction, transportation and storage of contaminated equipment removed from within C-106 and AY-102 tanks, the ERS has been classified as SC-3 based on equipment packaging dose consequence analysis in Appendix G, and ALARA principles based on Criterion 3, Table 1, Section 9, WHC-CM-4-46.

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5.0 ACCIDENT SCENARIO DESCRIPTIONS

The analysis in Appendix F is based on the radioactive inventory data presented in WHC-SD-WM-TI-543, *Radionuclide and Chemical Inventories for the Double Shell Tanks* (Van Vleet 1993a); and WHC-SD-WM-TI-565, *Radionuclide and Chemical Inventories for Single Shell Tanks*, (Van Vleet 1993b). As noted in Bander 1993a and 1993b, the radiogenic heat load is 32.2 kW (110,000 Btu/h). The calculated heat load due to radioactive elements in C-106 based on data from Van Vleet 1993b is dominated by decay of ^{90}Sr and ^{137}Cs with negligible contribution from other radionuclides, and is equivalent to 13.4 kW; 12 kW from ^{90}Sr and 1.4 kW from ^{137}Cs . The radioactive inventory data in Van Vleet 1993b are suspect values according to Bander 1993a and 1993b. This introduces a scaling factor of 2.4 due to the discrepancy between radiogenic heat load in the Bander reports and the estimated heat load from the current radioactive inventory in C-106. Characterization of C-106 is scheduled to be completed in the near future. Until such time as the new characterization data for C-106 is available, the 2.4 scaling factor must be applied to the estimated EDE values in Appendix F. According to the guidelines in WHC-CM-4-46, the EDE values for postulated accidents are used for determination of safety classification of WRSS and radiological risk acceptance. The risk is based on the frequency of occurrence of accidents and the consequence. Therefore, the EDE values estimated for various accident scenarios in Appendix F are multiplied by the scaling factor of 2.4, and are summarized as follows:

Scenarios 1a and 1b: Waste transfer supply line and return line breaks with a release time of 2 hours:

The simultaneous postulated failures of both supply and return lines are assumed to be detected by a material balance discrepancy during a seismic event. The maximum postulated leak is calculated to be $3.28\text{E}+5$ L ($8.66\text{E}+4$ gal). For safety classification purposes, it is further assumed that the entire leak is released to the environment. The resulting EHSC value (Step B.1 of Appendix F) is $1,100,000 \times 2.4 = 2,640,000$ and EDE offsite and onsite dose values (Steps A.1a & A.1b) are $8.4\text{E}-1$ mrem $\times 2.4 = 2$ mrem and $8.1\text{E}-1$ rem $\times 2.4 = 1.9$ rem, respectively. See Scenarios 1c and 1d following for transfer system safety classification.

Scenarios 1c and 1d: Waste transfer supply line and return line breaks with a seismic switch shutdown and release time of 10 seconds:

The simultaneous postulated failures of both supply and return lines are assumed to be detected by a material balance discrepancy during a seismic event. The maximum postulated leak is calculated to be $1.4\text{E}+4$ L ($2.76\text{E}+3$ gal). For safety classification purposes, it is further assumed that the entire leak is released to the environment. The resulting EHSC value (Step B.2) is $20,000 \times 2.4 = 48,000$, and EDE offsite and onsite dose values (Step A.1c & A.1d) are $4.2\text{E}-2$ mrem $\times 2.4 = 1.0\text{E}-1$ mrem and $8.0\text{E}-2$ rem $\times 2.4 = 1.9\text{E}-1$ rem, respectively. Based on evaluations in scenarios 1a through 1d, and a seismic switch shutdown feature in place. Using a release time of 10 sec, the time to reach the SC-1, Criterion 1, Table 1, Section 9, WHC-CM-4-46; 500 mrem for offsite individual), will be equal to 13.8 hr [$500 \text{ mrem} / 1\text{E}-1 \text{ mrem} \times (3,600 \text{ sec/hr} / 10 \text{ sec})$], and the time to reach the

SC-2, Criterion 2, Table 1; 5 rem for an onsite individual) will be equal to 4.3 min [5 rem/1.9E-1 rem x (60 sec/min/10 sec)]. Because the estimated time (4.3 min) to reach SC-2 criterion does not provide sufficient time to implement recovery actions (cover/cleanup contaminated area), the primary waste transfer line (inner pipe) provides an SC-2 safety function.

Scenario No. 2: Unfiltered release caused by recirculation duct failure:

The HVAC System for C-106 will be classified as SC-3 because the calculated offsite EDE dose value of $2.2\text{E-}1 \text{ mrem} \times 2.4 = 5.3\text{E-}1 \text{ mrem}$, based on an unfiltered release for one hour, is within the allowable limit of 500 mrem, according to Criterion 1 of Table 1, Section 9, WHC-CM-4-46, and the calculated onsite EDE dose value of $2.1\text{E-}1 \text{ rem} \times 2.4 = 5.0\text{E-}1 \text{ rem}$ is within the allowable limit of 5 rem based on Criterion 2 of Table 1. EHSC calculation was not performed as noted in Scenario 2, Step B.2 in Appendix F because impact to soil contamination is insignificant. In addition, the time to reach SC-2 Criterion 2 of Table 1 is equal to 10 hr.

Scenario No. 3a: Jumper or connector break inside the pit with cover block off, with a release time of 2 hours:

The calculated offsite EDE dose value of $3.1\text{E+}3 \times 2.4 = 7.4\text{E+}3 \text{ mrem}$ exceeds the allowable limit of 500 mrem based on the Criterion 1 of Table 1, Section 9, WHC-CM-4-46. The calculated onsite EDE value of $2.9\text{E+}3 \times 2.4 = 7.0\text{E+}3 \text{ rem}$ exceeds the allowable limit of 5 rem based on the Criterion 2 of Table 1, Section 9, WHC-CM-4-46.

Scenario No. 3b: Jumper or connector break inside the pit with cover block on, with all openings closed, and a release time of 8 hours:

The calculated offsite EDE dose value of $1.6\text{E-}4 \text{ mrem} \times 2.4 = 3.8\text{E-}4 \text{ mrem}$ is well within the allowable limit of 500 mrem based on Criterion 1 of Table 1, Section 9, WHC-CM-4-46. Also, the calculated onsite EDE dose value of $1.5\text{E-}4 \text{ rem} \times 2.4 = 3.6\text{E-}4 \text{ rem}$ is well within the allowable limit of 5 rem based on Criterion 2 of Table 1. Therefore, if the pit covers are installed before any transfer operation via the jumpers/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 or prevent any impact to the environment, the pit covers are required to be installed and remain in place while performing the transfer per Section 3.6.1 of WHC-SD-WM-OSR-005 (Dougherty 1993). In addition, lock and tag procedures per Section G-1, "Energy Control Program (Lock and Tag)," *Industrial Safety Manual*, WHC-CM-4-3, will be implemented to ensure safety of the personnel and the environment.

Scenario No. 3c: Jumper or connector break inside the pit with cover block on, with a 2 inch valve handle hole open, and a release time of 8 hours:

The calculated offsite EDE dose value of $6.5\text{E-}2 \text{ mrem} \times 2.4 = 1.6\text{E-}1 \text{ mrem}$ is well within the allowable limit of 500 mrem based on Criterion 1 of Table 1, Section 9, WHC-CM-4-46. Also, the calculated onsite EDE dose value of $6.2\text{E-}2 \text{ rem} \times 2.4 = 1.5\text{E-}1 \text{ rem}$ is less than the allowable limit of 5 rem based on Criterion 2 of Table 1.

6.0 REFERENCES

6.1 IN-TEXT REFERENCES

- Bailey, J.W., 1994, *Functional Design Criteria for Tank 241-C-106 Sluicing*, WHC SD-W320-FDC-001, Rev. 2, Westinghouse Hanford Company, Richland, Washington.
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GLOSSARY

ABBREVIATIONS AND ACRONYMS

AC	alternating current
ALARA	as low as reasonably achievable
AWF	Waste Facility
AY-101	Tank 241-AY-101
AY-102	Tank 241-AY-102
C-106	Tank 241-C-106
CAM	continuous air monitor
CASS	computer automated surveillance system
CF	conservative multiplication factor
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy-Richland Field Office
DST	double-shell tank
EDE	effective dose equivalent
EHSC	environmental hazard Safety Classification
EP	Engineering Procedure
ERS	equipment removal system
FDC	functional design criteria
FIC	Food Instrument Corporation
FMEA	failure mode and effects analysis
GENII	a radiation dosimetry computer system
HEME	high-efficiency moisture eliminator
HEMF	high-efficiency moisture filter
HEPA	high-efficiency particulate air
HVAC	heating, ventilation and air conditioning
IOSR	interim operational safety requirement
ISB	interim safety basis
LDE	liquid-level detector element
MCC	motor control center
MJ	million joules
MRP	Management Requirements and Procedures
OSR	operational safety requirement
P&ID	pipng and instrumentation diagram
PHA	preliminary hazards analysis
PM	plume meander
PSE	preliminary safety evaluation
PUREX	plutonium-uranium extraction
SA	safety assessment
SAR	safety analysis report
SC	Safety Classification
SD	supporting document
SEL	safety equipment list
SQ	Nuclear Safety and Quality Assurance
SST	single-shell tank
SWTS	sluicing waste transfer system
TMACS	tank monitoring and control system
VERMS	ventilation exhaust radiation monitoring system
WAC	Washington Administrative Code
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	2.2046226E-6	pounds
Volume		
liters	0.26	gallons
cubic meters	35.3147	cubic feet
Temperature		
Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Joules	9.47E-4	British thermal unit
kilowatts	3412.14	British thermal unit
Pressure		
kilograms per-square-centimeter	14.223334	pounds per-square-inch
Pascal	2.952E-4	inch Mercury
Pascal	4.0147E-3	inch water gauge
Flow Rate		
meters per-second	3.2808398	feet per-second
meters per-second	2.2371364	miles per-hour

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

DEFINITIONS OF TERMS

Component--That which makes up equipment, a part of the equipment. (See example following.)

It is not always evident if a criterion is an equipment, component, or part. The examples following should help in item classification.

System	Equipment	Component	Part
Compressed air	Compressor	Fuel pump	Diaphragm
AC power	Motor control center	Circuit breaker	Contacts
Primary tank ventilation	Valve	Stem	Screw
Primary tank ventilation	Condensers	Valve	Seat
Tank	Primary tank	Penetration	Gasket

Confinement Area. An area having structures or systems from which releases of hazardous materials are controlled. The primary confinement systems are the process enclosures (glove boxes, conveyors, transfer boxes, other spaces normally containing hazardous materials), which are surrounded by one or more secondary confinement areas (operating area compartments).

Confinement System. The barrier and its associated systems (including ventilation) between areas containing hazardous material and the environment or other areas in the facility that are normally expected to have levels of hazardous materials lower than allowable concentration limits.

Equipment--That which makes up a system, a part of the system (See examples under component).

Function--The action of a part, or related actions of a system, making some desired contribution to the economy of a larger system.

Interim--The time duration between publication of this document and when Safety Classifications will be referenced in Section 4 of Safety Analysis Report.

[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 Requirements (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 MRP 5.46, as analyses are completed to establish definite Safety Classifications. In the interim, approval requirements shall include Nuclear Safety and Quality Assurance (SQ), as a minimum, and Environmental Assurance (E) where deemed appropriate.

Item--A system, structure, equipment, component, or part.

Normal AC Power--A term used in some WHC documents to denote electricity taken from the northwest power grid and reduced in voltage for use in the Hanford Site power grid.

Offsite Individual--The offsite individual is the maximally exposed offsite individual hypothetically located at the Hanford Site boundary.

Onsite Individual--The onsite individual is the maximally exposed onsite individual hypothetically located at least 100 meters from the release point.

Part--That which makes up components, typically, considered the lowest level of replacement when performing maintenance or repair (see examples under component).

Recovery Time--The time estimate for operator detection and mitigation used to calculate the consequences of accident scenarios.

Safety Classification--The process for designating the Safety Class (SC) of systems, structures, equipment, components, and parts.

Safety Equipment List (SEL)--A list that provides the Safety Classifications for specific systems, structures, equipment, components, and parts. The Safety Equipment List is published as a Supporting Document.

Structure--An enclosure that houses equipment and/or personnel, and which provides protection from external elements. Structure also includes equipment supporting components such as cross-bracing, steel members, hangers, and supports.

Supernatant--Liquid waste floating on the surface of the heavier sludge.

System--A definable collection of equipment acting together to perform a particular function(s).

APPENDIX A
STRUCTURE SAFETY CLASSIFICATION

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APPENDIX A**STRUCTURE SAFETY CLASSIFICATION**

The standalone seismic switch enclosures are located outside the C-106 and AY-102 tank farm boundaries, each containing the redundant seismic units. The enclosures have two independent compartments. Each compartment will contain an independent seismic switch unit. A barrier wall is provided between the two compartments. The enclosures are designed for missile protection in accordance with SC-1 requirements of HPS SDC 4.1 (DOE-RL 1989).

There are no other new SC-1 or SC-2 structures provided as part of the WRSS. The support structures/elements needed for the primary transfer system (inner pipe) will be designed per the respective system Safety Classification and its safety function requirements. The secondary transfer system (encasement or outer pipe) support structures/elements will meet SC-2 QA and Structural/Seismic requirements, similar to primary transfer pipe. Temporary trailers such as change room are not addressed in this document.

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APPENDIX B
EQUIPMENT SAFETY CLASSIFICATION

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LIST OF TABLES

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LEGEND FOR APPENDIX B TABLES

1. Facility: WRSS, 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 P&IDs.
 - EQ Equipment such as pumps, valves
 - ERS Equipment Removal System
 - LDS Leak Detection System
 - PL Primary Transfer Lines; includes SL (slurry) and SN (supernatant) lines shown on P&IDs.
 - RW Raw Water System
 - SD Slurry Distributor
 - SWTS Sluicing Waste Transfer System
3. System Safety Class justification: Number 4.x.x refers to the Section numbers under Section 4.0.
4. \$ (under Tag No. column): Items on hold.
5. "*" (under SC column): Safety classification of equipment/component to be determined pending resolution of Raytheon Engineering and Constructors' memo No. PM-94-095.
6. Other terms used are self-explanatory.

TABLE B-1. SWTS SEISMIC SWITCH
FMEA SAFETY CLASS DESIGNATION

FACILITY: <u>WRSS</u> TANK FARM: <u>241-CIAY</u> SYSTEM: <u>SEISMIC SWITCH</u> SYSTEM SAFETY FUNCTION: <u>SHUTDOWN WRSS SLUICING SYSTEM DURING SEISMIC EVENT</u>					SYSTEM SAFETY CLASS JUSTIFICATION: <u>4.1.1</u> SYSTEM SAFETY CLASS: <u>1</u> NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY RE&C IS FOR TRACKING PURPOSES ONLY.		
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
818559-001	C FARM SEISMIC DETECTION SYSTEM ENCLOSURE	PROTECTS REDUNDANT SEISMIC DETECTION SYSTEM COMPONENTS FROM MISSILE HAZARDS. TWO INDEPENDENT COMPARTMENTS ARE PROVIDED WITHIN ENCLOSURE. SEPARATED BY A BARRIER. EACH COMPARTMENT CONTAINS ONE SEISMIC UNIT. SEE TABLE B-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 SHUTDOWN OF THE WRSS	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION. REDUNDANT SEISMIC SWITCHES ARE REQUIRED SINCE THEY PERFORM AN SC-1 FUNCTION; WHC-CM-4-48, SECTION 9, TABLE 1 CRITERION 15	1
AC-1381	C FARM SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 AIR CONDITIONING UNIT	PROVIDES COOLING FOR COMPARTMENT	H-2-818559 1 P27 B5	FAILS TO COOL	LOSS OF COMPARTMENT COOLING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES. WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
AC-1382	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
UH-1383	C FARM SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 UNIT HEATER	PROVIDES HEATING FOR COMPARTMENT	H-2-818559 1 P27 C8	FAILS TO HEAT	LOSS OF COMPARTMENT HEATING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES. WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
UH-1384	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-1. SWTS SEISMIC SWITCH
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
818560-001	AY FARM SEISMIC DETECTION SYSTEM ENCLOSURE	PROTECTS REDUNDANT SEISMIC DETECTION SYSTEM COMPONENTS FROM MISSILE HAZARDS. TWO INDEPENDENT COMPARTMENTS ARE PROVIDED WITHIN ENCLOSURE, SEPARATED BY A BARRIER. EACH COMPARTMENT CONTAINS ONE SEISMIC UNIT. SEE TABLE B-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 SHUTDOWN OF THE WRSS	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; REDUNDANT SEISMIC SWITCHES ARE REQUIRED SINCE THEY PERFORM AN SC-1 FUNCTION; WHC-CM-4-48, SECTION 9, TABLE 1 CRITERION 15	1
AC-0621	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
AC-0622	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
UH-0621	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
UH-0622	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 HEATING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-2. SWTS PRIMARY TRANSFER LINES
FMEA SAFETY CLASS DESIGNATION

FACILITY: <u>WRSS</u> TANK FARM : <u>241-C</u> SYSTEM : <u>SWTS-PL</u> SYSTEM SAFETY FUNCTION : <u>PROVIDE PRIMARY CONFINEMENT OF HAZARDOUS LIQUID WASTE</u>					SYSTEM SAFETY CLASS JUSTIFICATION : <u>4.1.2</u> SYSTEM SAFETY CLASS : <u>2</u> NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY RE&C IS FOR TRACKING PURPOSES ONLY.		
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
4" SL-100-M9	SLURRY PUMP DISCHARGE PIPING (EXTERNAL TO PITS)	TRANSPORTS SLURRIED SLUDGE FROM C108 PUMP PIT 241-C-08A TO AY102 PUMP PIT 241-A1-02A	H-2-818559 5 P20 E2	FAILURE OF PRESSURE BOUNDARY	RELEASE OF HAZARDOUS MATERIAL TO THE ENVIRONMENT	POTENTIAL TO EXCEED OFFSITE EDE DOSE; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 2	2
4" SN-201-M9	SLUICE PUMP DISCHARGE LINE (BETWEEN PITS)	TRANSPORTS SLUICING FLUID FROM PUMP PIT 241-C-08A TO SLUICING PIT 241-C-08C	H-2-818559 5 P20 E7	FAILURE OF PRESSURE BOUNDARY	RELEASE OF HAZARDOUS MATERIAL TO THE ENVIRONMENT	POTENTIAL TO EXCEED OFFSITE EDE DOSE;WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 2	2
4" SN-200-M9	SLUICE PUMP DISCHARGE LINE	TRANSPORTS SLUICING FLUID FROM TANK AY102 SLUICE PIT 241-A1-02E TO TANK C-108 PUMP PIT 241-C-08A	H-2-818560 2 P21 D8	FAILURE OF PRESSURE BOUNDARY	RELEASE OF HAZARDOUS MATERIAL TO THE ENVIRONMENT	POTENTIAL TO EXCEED OFFSITE EDE DOSE; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 2	2

TABLE B-3. SWTS SECONDARY TRANSFER LINES

FMEA SAFETY CLASS DESIGNATION

FACILITY: <u>WRSS</u> TANK FARM: <u>241-C</u> SYSTEM: <u>SWTS-ENC</u> SYSTEM SAFETY FUNCTION: <u>SECONDARY CONFINEMENT AND LEAK DETECTION</u>					SYSTEM SAFETY CLASS JUSTIFICATION: <u>4.1.3</u> SYSTEM SAFETY CLASS: <u>3</u> NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY RE&C IS FOR TRACKING PURPOSES ONLY.		
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
2"ETR-HI-201-M28a	SLUICE PUMP DISCHARGE LINE ENCASUREMENT TEST CONNECTION	PROVIDES TEST PORT CONNECTION ON ENCASUREMENT	H-2-818559 2 P21 D4	LOSS OF CONFINEMENT INTEGRITY	LOSS OF ENCAPSULATION LINE LEAK CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
6"ENC-201-M28a	SLUICE PUMP DISCHARGE LINE ENCASUREMENT	PROVIDES SECONDARY BARRIER FOR SLUICE PUMP DISCHARGE LINE FROM 241-C-08A TO 241-C-08C	H-2-818559 2 P21 D4	LOSS OF CONFINEMENT INTEGRITY	LOSS OF ENCAPSULATION LINE LEAK DETECTION CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
2"-M28a(a)	HEEL PUMP DISCHARGE LINE ENCASUREMENT DRAIN 6"ENC-101-M28a	ENCASUREMENT DRAIN LINE	H-2-818559 3 P23 C2	LOSS OF CONFINEMENT INTEGRITY	LOSS OF ENCAPSULATION LINE LEAK DETECTION CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
2"ETR-HI-101-M28a	HEEL PUMP DISCHARGE LINE ENCASUREMENT TEST CONNECTION	PROVIDES TEST PORT CONNECTION ON ENCASUREMENT	H-2-818559 3 P23 D3	LOSS OF CONFINEMENT INTEGRITY	LOSS OF ENCAPSULATION LINE LEAK CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
6"ENC-101-M28a	HEEL PUMP DISCHARGE PIPING ENCASUREMENT	PROVIDES SECONDARY BARRIER FOR DISCHARGE PIPING	H-2-818559 3 P23 D3	LOSS OF CONFINEMENT INTEGRITY	LOSS OF ENCAPSULATION LINE LEAK DETECTION CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
2"-M28a(b)	SLUICE PUMP DISCHARGE LINE ENCASUREMENT DRAIN LINE	ENCASUREMENT 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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
2"-M28a(c)	SLURRY PUMP DISCHARGE LINE ENCASUREMENT DRAIN	ENCASUREMENT 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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
2"ETR-LO-100-M28a	SLURRY PUMP DISCHARGE LINE ENCASUREMENT TEST CONNECTION	PROVIDES TEST PORT CONNECTION ON ENCASUREMENT	H-2-818559 5 P20 E4	LOSS OF CONFINEMENT INTEGRITY	LOSS OF ENCAPSULATION LINE LEAK CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-3. SWTS SECONDARY TRANSFER LINES
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHIT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
6" ENC-100-M28a	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 3	3
HV-13812	DRAIN VALVE 6" ENC-100-M28a	DRAINS ENC-100-M28a 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 3	3
HV-13814	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 3	3
2" ETR-LO-200-M28a	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 3	3
2" M28a (d)	DRAIN LINE 6" ENC-200-M28a	DRAINS ENC-200-M28a 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 3	3
HV-13815	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 3	3
HV-13811	DRAIN VALVE 6" ENC-200-M28a	DRAINS ENC-200-M28a 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 3	3
2" ETR-HI-200-M28a	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 3	3
6" ENC-200-M28a	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 3	3

TABLE B-3. SWTS SECONDARY TRANSFER LINES

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
2ETR-HI-100-M28a	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 3	3

TABLE B-4. SWTS SLURRY DISTRIBUTOR
FMEA SAFETY CLASS DESIGNATION

FACILITY: <u>WRSS</u> TANK FARM: <u>241-AY</u> SYSTEM: <u>SWTS-DIST</u> SYSTEM SAFETY FUNCTION: <u>SLURRY DISTRIBUTOR AND SYPHON BREAKER</u>					SYSTEM SAFETY CLASS JUSTIFICATION: <u>4.1.4</u> SYSTEM SAFETY CLASS: <u>3</u> NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY RE&C IS FOR TRACKING PURPOSES ONLY.		
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
D-0621	SLURRY DISTRIBUTOR	DISTRIBUTES TANK C108 SLURRY IN TANK AY102 AS EVENLY AS POSSIBLE	H-2-818580 3 P20 B7	FAILURE TO DISTRIBUTE SLURRY IN AY-102 AS EVENLY AS POSSIBLE	PER WHC-SD-SOA-CSA-20383 CSER 84001 (WHC 1884g) NO MECHANISM HAS BEEN FOUND THAT IS CAPABLE OF CAUSING CRITICALITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-5. SWTS WASTE TRANSFER PITS
FMEA SAFETY CLASS DESIGNATION

FACILITY: <u>WRSS</u> TANK FARM: <u>241-C</u> SYSTEM: <u>SWTS-PITS</u> SYSTEM SAFETY FUNCTION: <u>PROVIDE CONFINEMENT OF HAZARDOUS LIQUIDS AND AEROSOLS</u>					SYSTEM SAFETY CLASS JUSTIFICATION: <u>4.1.8</u> SYSTEM SAFETY CLASS: <u>1</u> NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY REAC IS FOR TRACKING PURPOSES ONLY.		
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHEET REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
241-C-08C	SLUICE PIT	CONTAINS AEROSOL AND LIQUID RELEASE	H-2-818559 2 P21 C7	LEAK	RELEASE OF RADIOACTIVE AEROSOL AND/OR LIQUID RELEASE TO THE ENVIRONS	RELEASE WOULD EXCEED ALLOWABLE OFF-SITE DOSE EQUIVALENT	1
241-C-08B	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 OFF-SITE EFFECTIVE DOSE EQUIVALENT	1
241-C-08A	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 OFF-SITE EFFECTIVE DOSE EQUIVALENT	1

TABLE B-6. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

FACILITY: <u>WRSS</u> TANK FARM: <u>241-C/AY</u> SYSTEM: <u>SWTS-EQ</u> SYSTEM SAFETY FUNCTION: <u>WASTE MOBILIZATION AND TRANSPORT</u>					SYSTEM SAFETY CLASS JUSTIFICATION: <u>4.1.7</u> SYSTEM SAFETY CLASS: <u>3</u> NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY RE&C IS FOR TRACKING PURPOSES ONLY.		
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
1/2"-1.752-131	C-108 PRESSURE TRANSMITTER SENSING LINE	CONNECTS PRESSURE TRANSMITTER TO C-108	H-2-818559 2 P21 D2	LEAK	LOSS OF TANK PRESSURE MONITORING	LATER	.
818559-008	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 3	3
818559-060	DRAIN JUMPER, SLUICE PIT 241-C-06C	ROUTES EQUIPMENT DRAINS TO C-108 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 3	3
HV-13870	C-108 PRESSURE TRANSMITTER ISOLATION VALVE	ISOLATES PRESSURE TRANSMITTER FROM TANK	H-2-818559 2 P21 D2	FAILS CLOSED	LOSS OF C-108 PRESSURE CONTROL AND INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
S-1361	SLUICING PIT 241-C-06C SLUICER	DIRECTS SLUICING SPRAY INTO SLUDGE	H-2-818559 2 P21 B8	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
818559-021	HEEL PUMP WINCH	RAISES AND LOWERS HEEL PUMP	H-2-818559 3 P23 C7	FAILS AS IS	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
818559-023	HEEL PUMP FLEXIBLE DISCHARGE LINE	ALLOWS POSITIONING OF PUMP WITHIN TANK	H-2-818559 3 P23 B7	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
818559-024	HEEL PUMP DISCHARGE JUMPER	ALLOWS REMOVAL OF HEEL PUMP	H-2-818559 3 P23 C7	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-6. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
818559-030	HEEL PUMP DISCHARGE JUMPER, PUMP PIT 241-C-08A	ALLOWS REMOVAL OF SLURRY PUMP	H-2-818559 3 P23 C1	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
P-1362 (S)	HEEL PUMP	TRANSFERS RESIDUAL LIQUID TO AY102	H-2-818559 3 P23 B7	FAILURE TO PUMP RESIDUAL LIQUID	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
818559-012	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 3	3
818559-014	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 3	3
818559-015	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 3	3
HV-1368	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 3	3
HV-1387	HEEL PUMP DISCHARGE SHUTOFF VALVE	ISOLATES HEEL 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 3	3
P-1381	SLURRY PUMP	TRANSFERS SLURRIED SLUDGE 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 3	3
818559-004	PUMP PIT 241-C-08A SLURRY MAST JUMPER	ALLOWS REMOVAL OF SLURRY 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 3	3
818559-028	SLURRY RECIRC JUMPER	ALLOWS RECIRCULATION OF SLURRY FOR WARMUP	H-2-818559 5 P20 C4	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-6. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HV-1362	SLUICER S-1362 SHUTOFF VALVE	DIRECTS SLUICE PUMP DISCHARGE TO SLUICER S-1362	H-2-818559 5 P20 C3	FAILS CLOSED	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-1363	SLUICER S-1361 SHUTOFF VALVE	DIRECTS SLUICE PUMP DISCHARGE TO SLUICER S-1361	H-2-818559 5 P20 C3	FAILS CLOSED	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-1364	SUPERNATANT/SLURRY CROSS CONNECTION	ALLOWS WARM UP OF SLUICE LINE	H-2-818559 5 P20 C2	FAILS CLOSED	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-1365	SLURRY/SUPERNATANT CROSS CONNECTION	ALLOWS WARM UP OF SLURRY LINE	H-2-818559 5 P20 C1	FAILS CLOSED	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-1368	SLURRY SHUTOFF VALVE	SLURRY SHUTOFF	H-2-818559 5 P20 C4	FAILS CLOSED	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
818559-029	SLUICE RECIRC JUMPER	ALLOWS RECIRCULATION OF SLUICING FLUID FOR WARMUP	H-2-818559 6 P21 D7	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-1361	SLUICING FLUID SHUTOFF VALVE	SHUTOFF SLUICING FLUID	H-2-818559 6 P21 D7	FAILS OPEN	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
S-1362	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 3	3
818560-008	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 3	3
P-0821	SLUICE PUMP	TRANSPORTS SUPERNATANT FROM AY102 TO SLUICING NOZZLES IN C108	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 3	3

TABLE B-6. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
818580-008	PUMP PIT 241-AY-02A SLURRY LINE JUMPER	ALLOWS REMOVAL OF DISTRIBUTOR	H-2-818580 3 P20 C8	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
818580-009	PUMP PIT 241-AY-02A DRAIN LINE JUMPER	ALLOWS REMOVAL OF DISTRIBUTOR	H-2-818580 3 P20 C8	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-0621	PUMP PIT 241-AY-02A DRAIN LINE JUMPER DRAIN VALVE	ALLOWS DRAINING OF DRAIN JUMPER FOR REMOVAL	H-2-818580 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 3	3

TABLE B-7. SWTS RAW WATER SYSTEM
FMEA SAFETY CLASS DESIGNATION

FACILITY: <u>WRSS</u> TANK FARM: <u>241-CIAY</u> SYSTEM: <u>SWTS-RW</u> SYSTEM SAFETY FUNCTION: <u>PROVIDE RAW WATER FLUSHING OF ALL COMPONENTS</u>					SYSTEM SAFETY CLASS JUSTIFICATION: <u>4.1.8</u> SYSTEM SAFETY CLASS: <u>3</u> NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY RE&C IS FOR TRACKING PURPOSES ONLY.		
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
818559-063	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 3	3
1/2" FW-M9	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 3	3
818559-064	HEEL PIT 241-C-06B RAW WATER HOSE CONNECTION	RAW WATER SPRAY FOR PIT DECONTAMINATION	H-2-818559 3 P23 D8	PLUGGED NOZZLE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13657	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 3	3
818559-067	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 3	3
818559-040	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 3	3
HV-13610	TRANSFER PIPING RW FLUSH DRAIN VALVE	DRAINS RW JUMPER, PIT 241-C-06A	H-2-818559 6 P21 C8	LEAK	LOSS OF RW FLUSH	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13669	TRANSFER PIPING RW FLUSH SHUT OFF VALVE	ISOLATES RAW WATER SYSTEM FROM SLURRY/SLUICE PIPING	H-2-818559 6 P21 C8	FAIL CLOSED	LOSS OF RW FLUSH	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-7. SWTS RAW WATER SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
PSV-1381	SLURRY/SLURRY RAW WATER FLUSH RELIEF VALVE	PROTECTS RAW WATER LINE FROM OVERPRESSURE	H-2-818581 6 P21 C2	FAILS TO OPERATE	INCREASED POTENTIAL TO CONTAMINATE RAW WATER SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
V17	TRANSFER PIPING RW FLUSH CHECK VALVE	ISOLATES RAW WATER SYSTEM FROM SLURRY/SLURRY PIPING	H-2-818581 6 P21 C6	LEAK	INCREASE POTENTIAL TO CONTAMINATE RW SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13837	HMF-1381 FILTERED WATER FLUSH SHUTOFF VALVE	ALLOWS FLUSHING OF HEMF	H-2-818581 4 P27 D4	FAILS CLOSED	INCREASE IN OPERATOR EXPOSURES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1" FW-825-M9	FILTER F-1381 OUTLET	PROVIDES FILTERED FLUSH WATER TO HEMF	H-2-818581 5 P20 D6	LEAK	LOSS OF FLUSH WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1" FW-827-M9	FILTERED WATER TO HMF-1381	PROVIDES FILTERED FLUSH WATER TO HEMF	H-2-818581 5 P20 D8	LEAK	LOSS OF FLUSH WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1" FW-828-M9	FILTERED WATER TO HV-13888	PROVIDES FILTERED FLUSH WATER TO HEMF	H-2-818581 5 P20 E7	LEAK	LOSS OF FLUSH WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1" FW-829-M9	FILTERED WATER TO HME-1381	PROVIDES FILTERED FLUSH WATER TO HEMF	H-2-818581 5 P20 E8	LEAK	LOSS OF FLUSH WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1" FW-831-M9	PI-13831 SENSING LINE	PRESSURE INDICATOR IMPULSE LINE	H-2-818581 5 P20 E8	LEAK	LOSS OF HEMF FILTERED WATER PRESSURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1" RAW-806-M5	RAW WATER SUPPLY TO FILTER F-1381	FILTERED WATER SOURCE	H-2-818581 5 P20 D4	LEAK	LOSS OF WRSS RAW/FILTERED WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1" RAW-808-M5	RAW WATER HOSE CONNECTION	BACK UP WATER SUPPLY	H-2-818581 5 P20 D4	LEAK	LOSS OF WRSS RAW/FILTERED WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-7. SWTS RAW WATER SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
1/2" -M5(a)	PDISH-13815 HP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818581 5 P20 E4	LEAK	LOSS OF PDISH-13815	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" -M5(b)	PDISH-13815 LP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818581 5 P20 E5	LEAK	LOSS OF PDISH-13815	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" -M5(c)	PDISH-13814 HP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818581 5 P20 E6	LEAK	LOSS OF PDISH-13814	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" -M5(d)	PDISH-13814 LP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818581 5 P20 E7	LEAK	LOSS OF PDISH-13814	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" FW-628-M8	FILTERED FLUSH WATER TO IMAGING SYSTEM	FLUSHES IMAGING SYSTEM	H-2-818581 5 P20 D8	LEAK	LOSS OF IMAGING SYSTEM FLUSH WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" FW-630-M8	FILTERED WATER CHEMICAL ADDITION LINE	ALLOWS CHEMICAL ADDITIONS TO BE MADE TO FILTERED WATER	H-2-818581 5 P20 E6	LEAK	LOSS OF FILTERED WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" I-763-133	PDISH-13815 HP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818581 5 P20 E4	LEAK	LOSS OF PDISH-13815	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" I-764-133	PDISH-13815 LP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818581 5 P20 E5	LEAK	LOSS OF PDISH-13815	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" I-765-133	PDISH-13814 HP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818581 5 P20 E6	LEAK	LOSS OF PDISH-13814	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-7. SWTS RAW WATER SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHEET REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
1/2" RAW-805-M5	PDISH-13814 LP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818581 5 P20 E7	LEAK	LOSS OF PDISH-13814	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" RAW-805-M5	WRSS RAW WATER SUPPLY HEADER DRAIN LINE	ALLOWS DRAINING OF RW SUPPLY HEADER	H-2-818581 5 P20 C5	LEAK	LOSS OF RW TO WRSS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" RAW-807-M5	RAW WATER TO SEAL POT FILL LINE	FILLS SEAL POT	H-2-818581 5 P20 D4	LEAK	LOSS OF RW TO WRSS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" RW-608-M5	PIT-13818 SENSING LINE	SENSES RW PRESSURE	H-2-818581 5 P20 B3	LEAK	LOSS OF PIT-13818	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
2" DR-308-M24	DRAIN LINE FROM BP-1382 DRIP PAN	ROUTES DRAIN TO PROCESS BUILDING SEAL POT	H-2-818581 5 P20 B4	LEAK	DRAINS TO FLOOR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
2" ETR-HI-801-M28a	RAW WATER ENCASUREMENT TEST CONNECTION	ALLOWS TESTING OF ENCASUREMENT	H-2-818581 5 P20 B3	LEAK	LOSS OF CONFINEMENT INTEGRITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
2" RAW-801-M5	RAW WATER SUPPLY LINE TO WRSS	WRSS RAW WATER SOURCE	H-2-818581 5 P20 C5	LEAK	LOSS OF WRSS RAW/FILTERED WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
4" ENC-801-M28a	TRANSFER PIPING RAW WATER FLUSH LINE ENCASUREMENT	COLLECTS LEAKAGE AND DRAIN TO PUMP PIT	H-2-818581 5 P20 B3	LEAK	LOSS OF CONFINEMENT INTEGRITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
818581-038	OUTLET CHECK VALVE FILTER F-1381	PREVENTS BACKFLOW THRU FILTER	H-2-818581 5 P20 D5	FAILS TO OPERATE	UNABLE TO FLUSH HEME/HEMF	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
818581-039	HEME FILTERED FLUSH WATER CHECK VALVE	PREVENTS BACKFLOW INTO RAW WATER SYSTEM	H-2-818581 5 P20 E8	FAILS TO OPERATE	POTENTIAL TO CONTAMINATE RAW WATER SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-7. SWTS RAW WATER SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
818581-040	HEMF FILTERED FLUSH WATER CHECK VALVE	PREVENTS BACKFLOW INTO RAW WATER SYSTEM	H-2-818581 5 P20 D8	FAILS TO OPERATE	POTENTIAL TO CONTAMINATE RAW WATER SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
818581-042	RAW WATER RADIATION MONITOR SHIELDING PIG	SHELDS RADIATION DETECTOR FROM BACKGROUND RADIATION	H-2-818581 5 P20 C4	FAILS TO FUNCTION AS INTENDED	POTENTIAL TO CONTAMINATE RAW WATER SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
BP-1382	RAW WATER FLUSH BACKFLOW PREVENTOR	PREVENTS CONTAMINATION OF RAW WATER SYSTEM IN PROCESS BLDG	H-2-818581 5 P20 C4	FAILS TO OPERATE	INCREASE POTENTIAL TO CONTAMINATE RW SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
F-1381	FILTERED WATER ROUGHING FILTER	PROVIDES FIRST STAGE FILTRATION TO HEME/HEMF FLUSH WATER	H-2-818581 5 P20 D5	PLUGS	LOSS OF FILTERED WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
F-1382	FILTERED WATER FINAL FILTER	PROVIDES SECOND STAGE FILTRATION TO HEME/HEMF FLUSH WATER	H-2-818581 5 P20 D8	PLUGS	LOSS OF FILTERED WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-138102	HOSE CONNECTION	BACK UP FLUSH WATER SUPPLY	H-2-818581 5 P20 D4	FAILS TO OPERATE	LOSS OF BACK UP FLUSH WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-138103	SEAL POT RAW WATER FILL ISOLATION VALVE	SHUTS OFF RAW WATER TO SEAL POT	H-2-818581 5 P20 D5	FAILS TO OPERATE	LOSS OF SEAL POT FILL	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-138108	FILTERED WATER SUPPLY TO IMAGING SYSTEM SHUT OFF VALVE	SHUTS OFF FW TO IMAGING SYSTEM	H-2-818581 5 P20 D8	FAILS TO INDICATE	UNABLE TO FLUSH IMAGING SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13858	HEME FILTERED WATER FLUSH SHUT OFF VALVE	SHUTS OFF FILTERED WATER FLUSH TO HEME	H-2-818581 5 P20 E7	FAILS TO OPERATE	UNABLE TO FLUSH HEME	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-7. SWTS RAW WATER SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HV-13659	RW HEADER TO WRSS EQUIPMENT ISOLATION	SHUTS OFF RW TO WRSS EQUIPMENT	H-2-818581 5 P20 C5	FAILS TO OPERATE	UNABLE TO FLUSH WRSS EQUIPMENT	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13660	BP-1362 UPSTREAM ISOLATION VALVE	ISOLATES BP-1362	H-2-818581 5 P20 C4	FAILS TO OPERATE	LOSS OF RW TO WRSS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13661	BP-1362 DOWNSTREAM ISOLATION VALVE	ISOLATES BP-1362	H-2-818581 5 P20 C4	FAILS TO OPERATE	LOSS OF RW TO WRSS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13662	RW FLUSH ISOLATION TO PUMP PIT 241-C08A	SHUTS OFF RW TO PUMP PIT	H-2-818581 5 P20 C3	FAILS TO OPERATE	UNABLE TO FLUSH PUMP PIT	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13663	INLET ISOLATION VALVE FILTER F-1361	ISOLATES FILTER INLET	H-2-818581 5 P20 D4	FAILS TO OPERATE	UNABLE TO FLUSH HEME/HEMF	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13664	OUTLET ISOLATION VALVE FILTER F-1361	ISOLATES FILTER OUTLET	H-2-818581 5 P20 D5	FAILS TO OPERATE	UNABLE TO FLUSH HEME/HEMF	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13665	INLET ISOLATION VALVE FILTER F-1362	ISOLATES FILTER INLET	H-2-818581 5 P20 D6	FAILS TO OPERATE	UNABLE TO FLUSH HEME/HEMF	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13666	HMF-1361 FILTERED WATER FLUSH SHUTOFF VALVE	ISOLATES FLUSH WATER TO HEMF	H-2-818581 5 P20 D7	FAILS TO OPERATE	UNABLE TO FLUSH HEMF	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13667	PI-13631 ISOLATION VALVE	ISOLATES PI-13631	H-2-818581 5 P20 E6	LEAK	LOSS OF FILTERED WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13668	CHEMICAL ADDITION HOSE CONNECTION TO FILTERED WATER SHUT OFF VALVE	ISOLATES CHEMICAL ADDITION FROM FLUSH WATER	H-2-818581 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 3	3

TABLE B-7. SWTS RAW WATER SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
1" RAW-804-M5	WRSS RAW WATER CHEMICAL ADDITION LINE	ALLOWS CHEMICAL ADDITION TO RAW WATER	H-2-818562 1 P28 C5	LEAK	LOSS OF RAW WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" I-750-133	PDISH-1385 HP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818562 1 P28 D3	LEAK	LOSS OF TRANSMITTER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" I-750-M5	PDISH-1385 HP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818562 1 P28 C3	LEAK	LOSS OF TRANSMITTER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" I-751-133	PDISH-1385 LP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818562 1 P28 D4	LEAK	LOSS OF TRANSMITTER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" I-751-M5	PDISH-1385 LP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818562 1 P28 C4	LEAK	LOSS OF TRANSMITTER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
2" RAW-600-M5	WRSS RAW WATER SUPPLY LINE	RAW WATER TO WRSS COMPONENTS	H-2-818562 1 P28 B2	LEAK	LOSS OF RAW WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
2" RAW-601-M5	WRSS RAW WATER SUPPLY LINE	PROVIDES RAW WATER TO WRSS COMPONENTS	H-2-818562 1 P28 C4	LEAK	LOSS OF RAW WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
818562-004	BACKFLOW BP-1381 PREVENTER OUTLET CHECK VALVE	PREVENTS BACKFLOW TO BACKFLOW PREVENTER	H-2-818562 1 P28 C4	FAILS TO OPERATE	LOSS OF RAW WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
BP-1381	RAW WATER FLUSH BACKFLOW PREVENTER	PREVENTS CONTAMINATION OF RAW WATER SYSTEM IN SERVICE BLDG	H-2-818562 1 P28 C4	FAILS TO OPERATE	INCREASE POTENTIAL TO CONTAMINATE RW SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-7. SWTS RAW WATER SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HV-13889	REMOTE OPERATED HEME FILTERED WATER FLUSH SHUT OFF VALVE	SHUTS OFF FILTERED WATER FLUSH TO HEME	H-2-818581 5 P20 E7	FAILS TO OPERATE	UNABLE TO FLUSH HEME	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13884	RAW WATER SUPPLY HEADER DRAIN VALVE	DRAINS RW SYSTEM UPSTREAM BP-1382	H-2-818581 5 P20 C5	FAILS TO OPERATE	UNABLE TO FLUSH WRSS EQUIPMENT	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13885	ISOLATION VALVE PIT-13818	ISOLATES PIT-13818	H-2-818581 5 P20 B3	FAILS TO OPERATE	LOSS OF RAW WATER PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13886	LP ISOLATION VALVE PDISH-13814	ISOLATES PDISH-13814	H-2-818581 5 P20 E7	FAILS TO OPERATE	LOSS OF DIFFERENTIAL PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13887	HP ISOLATION VALVE PDISH-13814	ISOLATES PDISH-13814	H-2-818581 5 P20 E8	FAILS TO OPERATE	LOSS OF DIFFERENTIAL PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13888	LP ISOLATION VALVE PDISH-13815	ISOLATES PDISH-13815	H-2-818581 5 P20 E5	FAILS TO OPERATE	LOSS OF LEVEL INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13889	HP ISOLATION VALVE PDISH-13815	ISOLATES PDISH-13815	H-2-818581 5 P20 E5	FAILS TO OPERATE	LOSS OF LEVEL INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PCV-1387	HME-1381 FILTERED FLUSH WATER PRESSURE REGULATOR	REGULATES HEME FLUSH WATER PRESSURE	H-2-818581 5 P20 E7	FAILS TO OPERATE	LOSS OF HEME FLUSH WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1" RAW-802-M5	WRSS RAW WATER LOW POINT DRAIN LINE	ALLOWS DRAINING SERVICE BUILDING 241-C-73 RAW WATER SYSTEM	H-2-818582 1 P28 B7	LEAK	LOSS OF RAW WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1" RAW-803-M5	WRSS RAW WATER SAMPLE LINE	ALLOWS SAMPLING OF RAW WATER	H-2-818582 1 P28 C3	LEAK	LOSS OF RAW WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-7. SWTS RAW WATER SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT, REV, ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
F-1363	DUPLEX BASKET STRAINER	FILTERS RAW WATER USED FOR FLUSHING	H-2-818582 1 P28 C3	STRAINER FAILS	PLUGGING OF SPRAY NOZZLES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
FN-1363	SERVICE BUILDING 241-C-73 EXHAUST FAN	PROVIDES AIR EXHAUST FOR SERVICE BUILDING	H-2-818582 1 P28 D2	FAILS TO OPERATE	SERVICE BUILDING OVERHEATS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HC-1363	SERVICE BUILDING 241-C-73 HEATING COIL	SOURCE OF HEAT FOR SERVICE BUILDING	H-2-818582 1 P28 D3	FAILS TO OPERATE	LOSS OF TEMPERATURE CONTROL OF BUILDING 241-C-73	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-136101	RAW WATER CHEMICAL ADDITION ISOLATION VALVE	ISOLATES CHEMICAL ADDITION LINE	H-2-818582 1 P28 C5	FAILS TO OPERATE	LOSS OF CHEMICAL ADDITION ABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-136104	LP ISOLATION VALVE PDISH-1365	ISOLATES PDISH-1365	H-2-818582 1 P28 C4	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-136105	HP ISOLATION VALVE PDISH-1365	ISOLATES PDISH-1365	H-2-818582 1 P28 C3	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-136108	HOSE CONNECTION SHUTOFF VALVE	ISOLATES SERVICE BUILDING RW SAMPLE	H-2-818582 1 P28 C3	FAILS TO OPERATE	UNABLE TO VERIFY RW QUALITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-136107	SERVICE BUILDING 241-C-73 RAW WATER DRAIN VALVE	ISOLATES SERVICE BUILDING RW DRAIN	H-2-818582 1 P28 B8	FAILS TO OPERATE	UNABLE TO DRAIN SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13680	RAW WATER SHUTOFF VALVE	ISOLATES WRSS RAW WATER SUPPLY	H-2-818582 1 P28 B2	FAILS TO OPERATE	LOSS OF RAW WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13681	DUPLEX STRAINER F-1363 INLET VALVE	ISOLATES STRAINER	H-2-818582 1 P28 C3	FAILS TO OPERATE	LOSS OF RAW WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-7. SWTS RAW WATER SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HV-13692	BACKFLOW BP-1381 PREVENTER INLET VALVE	ISOLATES BACK FLOW PREVENTER	H-2-818592 1 P28 C4	FAILS TO OPERATE	LOSS OF RAW WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13693	BACKFLOW BP-1381 PREVENTER OUTLET VALVE	ISOLATES BACK FLOW PREVENTER	H-2-818592 1 P28 C4	FAILS TO OPERATE	LOSS OF RAW WATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-8. COMPRESSED AIR SYSTEM
FMEA SAFETY CLASS DESIGNATION

FACILITY: <u>WRSS</u> TANK FARM: <u>241-CIAY</u> SYSTEM: <u>SWTS-IA</u> SYSTEM SAFETY FUNCTION: <u>PROVIDE AIR PURGE AND VALVE POSITIONING</u>					SYSTEM SAFETY CLASS JUSTIFICATION: <u>4.1.9</u> SYSTEM SAFETY CLASS: <u>3</u> NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY RE&C IS FOR TRACKING PURPOSES ONLY.		
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
1/2" IA (204) 704-M7	INSTRUMENT AIR SUPPLY TO C-108 PRESSURE SENSING LINE	REDUCES CONTAMINATION OF SENSING LINE	H-2-818559 2 P21 E1	LEAK	LOSS OF TANK PRESSURE MONITORING	PASSIVE TANK OVERUNDER PRESSURE PROTECTION PROVIDED BY REDUNDANT SEAL LOOPS; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13873	SHUTOFF VALVE INSTRUMENT AIR TO C-108 PRESSURE SENSING LINE	ISOLATES INSTRUMENT AIR FROM PRESSURE TRANSMITTER	H-2-818559 2 P21 D1	FAILS CLOSED	LOSS OF TANK PRESSURE MONITORING	PASSIVE TANK OVERUNDER PRESSURE PROTECTION PROVIDED BY REDUNDANT SEAL LOOPS; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" IA (204) M7	PURGE AIR TO IMAGING SYSTEM RISER R-7 AND DIRECTED AIR DEFOGGING SYSTEM NOZZLE POSITIONER	AIR PURGE OF RISER; MOTIVE POWER FOR POSITIONER	H-2-818559 3 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 3	3
HV-13876	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 3	3
HV-13885	INSTRUMENT AIR SUPPLY TO DIRECTED AIR DEFOGGING SYSTEM NOZZLE POSITIONER SHUTOFF VALVE	ISOLATES INSTRUMENT AIR SUPPLY	H-2-818559 3 P23 D3	FAIL CLOSED	LOSS OF POSITIONER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" IA-(804) 707-M33a	INSTRUMENT AIR SUPPLY TO HY-1366 AND HY-1387	INSTRUMENT AIR SUPPLY	H-2-818559 4 P23 D1	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" IA-(804) 725-M33a	INSTRUMENT AIR SUPPLY TO HY-1366	INSTRUMENT AIR SUPPLY	H-2-818559 4 P23 D1	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-8. COMPRESSED AIR SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
1/2" IA- (80#)726-M33a	INSTRUMENT AIR SUPPLY TO HY-1387	INSTRUMENT AIR SUPPLY	H-2-818559 4 P23 D2	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" V-408-M33a	INSTRUMENT AIR VENT HEADER	VENTS INSTRUMENT AIR FROM VALVE OPERATORS TO PUMP PIT	H-2-818559 4 P23 D2	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" V-408-M33a	INSTRUMENT AIR VENT FROM HY-1386 TO VENT HEADER VENT VALVE	VENTS HV-1386 TO VENT HEADER	H-2-818559 4 P23 D2	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" V-408-M33a	INSTRUMENT AIR VENT FROM HY-1387 TO VENT HEADER VENT VALVE	VENTS HV-1387 TO VENT HEADER	H-2-818559 4 P23 D2	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-138141	INSTRUMENT AIR VENT HEADER VENT VALVE	ISOLATES VENT HEADER FROM PUMP PIT	H-2-818559 4 P23 D3	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" IA (80#)720-M33a	INSTRUMENT AIR SUPPLY TO HY-1385	POSITIONS HV-1385	H-2-818559 5 P20 D1	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" IA (80#)721-M33a	INSTRUMENT AIR SUPPLY LINE TO HY-1384	POSITIONS HV-1384	H-2-818559 5 P20 D2	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" IA (80#)722-M33a	INSTRUMENT AIR SUPPLY LINE TO HY-1382	POSITIONS HV-1382	H-2-818559 5 P20 D3	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" IA (80#)723-M33a	INSTRUMENT AIR SUPPLY LINE TO HY-1383	POSITIONS HV-1383	H-2-818559 5 P20 D4	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" IA (80#)724-M33a	INSTRUMENT AIR SUPPLY LINE TO HY-1388	POSITIONS HV-1388	H-2-818559 5 P20 D5	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-8. COMPRESSED AIR SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
1/2" V-403-M33a	INSTRUMENT AIR VENT LINE FROM HY-1385	POSITIONS HV-1385	H-2-818559 5 P20 D1	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" V-404-M33a	INSTRUMENT AIR VENT LINE FROM HY-1384	POSITIONS HV-1384	H-2-818559 5 P20 D2	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" V-405-M33a	INSTRUMENT AIR VENT LINE FROM HY-1382	POSITIONS HV-1382	H-2-818559 5 P20 D3	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" V-406-M33a	INSTRUMENT AIR VENT LINE FROM HY-1383	POSITIONS HV-1383	H-2-818559 5 P20 D4	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" V-407-M33a	INSTRUMENT AIR VENT LINE FROM HY-1386	POSITIONS HV-1386	H-2-818559 5 P20 D5	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" IA (804) M7	INSTRUMENT AIR SUPPLY TO PUMP PIT 241-C08A VALVE ENCLOSURE	PROVIDES MOTIVE POWER FOR C FARM VALVES	H-2-818559 6 P21 D5	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" IA (804) 717-M33a	INSTRUMENT AIR SUPPLY LINE TO HY-13810	POSITIONS HV-13810	H-2-818559 6 P21 D7	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" IA (804) 718-M33a	INSTRUMENT AIR SUPPLY LINE TO HY-1389	POSITIONS HV-1389	H-2-818559 6 P21 D6	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" IA (804) 719-M33a	INSTRUMENT AIR SUPPLY LINE TO HY-1381	POSITIONS HV-1381	H-2-818559 6 P21 D7	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" V-401M33a	INSTRUMENT AIR VENT LINE FROM HY-1389	POSITIONS HV-1389	H-2-818559 6 P21 D6	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-3. COMPRESSED AIR SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
1/2" V-402-M33a	INSTRUMENT AIR VENT LINE FROM HV-1381	POSITIONS HV-1381	H-2-818559 6 P21 D7	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13877	INSTRUMENT AIR SUPPLY TO PUMP PIT 241-C-08A VALVE ENCLOSURE SHUTOFF VALVE	ISOLATES INSTRUMENT AIR	H-2-818559 6 P21 D6	LEAK	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1"IA-(100#)-708-M7	BLOW DOWN AIR FROM AIR ACCUMULATOR TO HEMF	REMOVES FLUSH WATER FROM HEMF	H-2-818581 4 P27 C1	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1"IA-(100#)-708-M7	INSTRUMENT AIR SUPPLY LINE TO PCV-13828	PROVIDES INSTRUMENT AIR TO PCV-13828	H-2-818581 5 P20 C7	LEAK	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1"IA-(100#)-708-M7	INSTRUMENT AIR SUPPLY TO ACCUMULATOR 1K-1381	PROVIDES INSTRUMENT AIR FOR HEME BLOW DOWN	H-2-818581 5 P20 C8	LEAK	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1"IA-(100#)-712-M7	FO-1381 BYPASS LINE	ALLOWS BYPASSING RESTRICTION ORifice FOR HEME BLOWDOWN	H-2-818581 5 P20 D7	LEAK	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1"IA-(20#)-704-M7	INSTRUMENT AIR SUPPLY TO PIT-1381	MINIMIZES CONTAMINATION OF PIT-1381	H-2-818581 5 P20 C8	LEAK	LOSS OF PURGE AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1"IA-(20#)-710-M7	INSTRUMENT AIR LINE TO PSV-13829	CONNECTS PRESSURE RELIEF TO SYSTEM	H-2-818581 5 P20 C8	LEAK	LOSS OF PURGE AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" IA-(100#)-714-M7	INSTRUMENT AIR SUPPLY LINE TO HV-13838	PROVIDES INSTRUMENT AIR TO HV-13838	H-2-818581 5 P20 C7	LEAK	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" IA-(100#)-715-M7	INSTRUMENT AIR SUPPLY LINE TO HV-13882	PROVIDES INSTRUMENT AIR TO HV-13882	H-2-818581 5 P20 B5	LEAK	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-8. COMPRESSED AIR SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHEET REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
1/2" 1A(20#)-727-M7 1A(100#)-727-M7	INSTRUMENT AIR SUPPLY LINE TO HV-13869	PROVIDES INSTRUMENT AIR TO HV-13869	H-2-818581 5 P20 C8	LEAK	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" 1A(20#)-705-M7	PURGE AIR TO IMAGING SYSTEM	PROVIDES PURGE AIR TO IMAGING SYSTEM	H-2-818581 5 P20 B8	LEAK	LOSS OF PURGE AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" 1A(20#)-713-M7	PI-13828 SENSING LINE	PRESSURE INDICATOR IMPULSE LINE	H-2-818581 5 P20 C7	LEAK	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" 1A(20#)-716-M7	PI-13830 SENSING LINE	PRESSURE INDICATOR IMPULSE LINE	H-2-818581 5 P20 D7	LEAK	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" 1A(80#)-707-M7	INSTRUMENT AIR SUPPLY LINE TO WRSS VALVES	PROVIDES INSTRUMENT AIR TO WRSS TRANSFER SYSTEM VALVES	H-2-818581 5 P20 C8	LEAK	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" 1A(80#)-711-M7	PI-13828 SENSING LINE	PRESSURE INDICATOR IMPULSE LINE	H-2-818581 5 P20 C8	LEAK	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
818581-041	HEMIE BLOWDOWN AIR CHECK VALVE	PREVENTS BACKFLOW INTO INSTRUMENT AIR SYSTEM	H-2-818581 5 P20 D8	FAILS TO OPERATE	POTENTIAL TO CONTAMINATE INSTRUMENT AIR SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-138157	INSTRUMENT AIR SUPPLY TO PCV-13828	ISOLATES INSTRUMENT AIR TO PCV-13828	H-2-818581 5 P20 C7	LEAK	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-138158	INSTRUMENT AIR SUPPLY TO PCV-13829	ISOLATES INSTRUMENT AIR TO PCV-13829	H-2-818581 5 P20 B7	LEAK	LOSS OF INSTRUMENT PURGE AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13871	INSTRUMENT AIR SUPPLY TO HV-13869	ISOLATES INSTRUMENT AIR TO HV-13869	H-2-818581 5 P20 C8	LEAK	HV-13869 FAILS CLOSED	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-8. COMPRESSED AIR SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HV-13678	INSTRUMENT AIR TO ACCUMULATOR TK-1361 SHUT OFF VALVE	ISOLATES ACCUMULATOR	H-2-818581 5 P20 C7	FAILS TO OPERATE	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13679	PI-13629 ISOLATION	ISOLATES PI-13629	H-2-818581 5 P20 C7	FAILS TO OPERATE	LOSS OF PRESSURE INDICATOR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13680	PI-13628 ISOLATION	ISOLATES PI-13628	H-2-818581 5 P20 C7	FAILS TO OPERATE	LOSS OF PRESSURE INDICATOR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13681	INSTRUMENT AIR TO BLOWDOWN HME-1361 RESTRICTING ORFICE BYPASS VALVE	ALLOWS BYPASSING RESTRICTING ORFICE	H-2-818581 5 P20 D7	FAILS TO OPERATE	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13682	INSTRUMENT AIR TO BLOWDOWN HME-1361 SHUT OFF VALVE	ISOLATES HEME AIR BLOWDOWN	H-2-818581 5 P20 D7	FAILS TO OPERATE	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13684	PI-13630 ISOLATION	ISOLATES PI-13630	H-2-818581 5 P20 D7	FAILS TO OPERATE	LOSS OF PRESSURE INDICATOR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13687	INSTRUMENT AIR SUPPLY HEADER SHUT OFF VALVE	ISOLATES INSTRUMENT AIR HEADER	H-2-818581 5 P20 B8	FAILS TO OPERATE	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13688	INSTRUMENT AIR SUPPLY TO HV-13682	ISOLATES INSTRUMENT AIR TO HV-13682	H-2-818581 5 P20 B7	FAILS TO OPERATE	HV-13682 FAILS AS IS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13689	INSTRUMENT AIR SUPPLY TO HV-13638	ISOLATES INSTRUMENT AIR TO HV-13638	H-2-818581 5 P20 C8	FAILS TO OPERATE	HV-13638 FAILS CLOSED	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PCV-13628	WRSS INSTRUMENT AIR PRESSURE REGULATOR	REGULATES INSTRUMENT AIR PRESSURE TO WRSS TRANSFER VALVES	H-2-818581 5 P20 C7	LEAK	WRSS VALVES TRAVEL TO FAILED POSITIONED	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-8. COMPRESSED AIR SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
PCV-13829	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PSV-13829	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1" IA (100#) 701-M7	WRSS INSTRUMENT AIR DISTRIBUTION HEADER	SUPPLIES WRSS INSTRUMENT AIR	H-2-818562 1 P28 C7	LEAK	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" DR-303-M24	AIR RECEIVER DRAIN LINE	ALLOWS DRAINING MOISTURE FROM RECEIVER	H-2-818562 1 P28 C5	LEAK	LOSS OF COMPRESSED AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" I-752-133	PT-1384 SENSING TUBE	PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818562 1 P28 D7	LEAK	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" IA (100#) 700-M7	AIR COMPRESSOR DISCHARGE LINE	ROUTES COMPRESSED AIR TO SYSTEM	H-2-818562 1 P28 C5	LEAK	LOSS OF COMPRESSED AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" IA (100#) 702-M7	PT-1384 SENSING LINE	PRESSURE TRANSMITTER IMPULSE LINE	H-2-818562 1 P28 C7	LEAK	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
818562.001	AIR DRYER D-1381 INLET FILTER	FILTERS COMPRESSED AIR BEFORE DRYER	H-2-818562 1 P28 C5	FAILS TO OPERATE	LOSS OF COMPRESSED AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
818562.002	AIR DRYER D-1381 OUTLET FILTER	FILTERS COMPRESSED AIR AFTER DRYER	H-2-818562 1 P28 C8	FAILS TO OPERATE	LOSS OF COMPRESSED AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
818562.003	AIR DRYER D-1381 OUTLET FILTER DRAIN VALVE	DRAINS MOISTURE FROM FILTER	H-2-818562 1 P28 C8	FAILS TO OPERATE	LOSS OF COMPRESSED AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-8. COMPRESSED AIR SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
CP-1381	AIR COMPRESSOR AND RECIEVER	PROVIDES COMPRESSED AIR TO WRSS EQUIPMENT	H-2-818582 1 P28 D5	FAILS TO OPERATE	LOSS OF COMPRESSED AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
D-1381	AIR DRYER	REMOVES MOISTURE FROM COMPRESSED AIR	H-2-818582 1 P28 D6	FAILS TO OPERATE	LOSS OF INSTRUMENT AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-138100	ISOLATION VALVE PIT-1384	ISOLATES PIT-1384	H-2-818582 1 P28 D7	FAILS TO OPERATE	LOSS OF PRESSURE TRANSMITTER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-138131	DRAIN VALVE COMPRESSED AIR RECIEVER	ISOLATES RECIEVER DRAIN	H-2-818582 1 P28 C5	FAILS TO OPERATE	INCREASE IN COMPRESSED AIR MOISTURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-9. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

FACILITY: <u>WRSS</u> TANK FARM: <u>241-C</u> SYSTEM: <u>VENTILATION</u> SYSTEM SAFETY FUNCTION: <u>PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING</u>					SYSTEM SAFETY CLASS JUSTIFICATION: <u>4.2</u> SYSTEM SAFETY CLASS: <u>1</u> NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY REAC IS FOR TRACKING PURPOSES ONLY.		
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HV-130140	SHUTOFF DAMPER FROM EXISTING AIR INTAKE	ISOLATES EXISTING AIR INTAKE FROM TANK	H-2-818581 2 P21 D2	FAILS OPEN	LOSS OF TANK PRESSURE CONTROL	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
17" CO2-553-M5	PRESSURE SENSING PIPING	PROVIDES CONNECTION FOR PRESSURE INSTRUMENTATION	H-2-818581 1 P27 E3	LEAK	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
2" CO2-550-M5	CO2 PIPING FROM STORAGE TANK TO PRESSURE REGULATOR	FOG SUPPRESSION	H-2-818581 1 P27 D3	LEAK	LOSS OF FOG SUPPRESSION AND IN TANK VISUAL MONITORING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
2" CO2-551-M5	CO2 PIPING FROM PRESSURE REGULATOR TO SHUT OFF VALVE	FOG SUPPRESSION	H-2-818581 1 P27 E3	LEAK	LOSS OF FOG SUPPRESSION AND IN TANK VISUAL MONITORING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
2" CO2-552-M5	RELIEF VALVE INLET PIPING	PROTECTS PIPING DOWNSTREAM OF PRESSURE REGULATOR	H-2-818581 1 P27 E3	LEAK	LOSS OF PRESSURE PROTECTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
6" VT-1001-M42	PRESSURE RELIEF LOOP SEAL	PREVENTS UNDER/OVER PRESSURE OF TANK C108	H-2-818581 1 P27 B7	PLUGGED	LOSS OF TANK PRESSURE PROTECTION	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-48, SECTION 9 TABLE 1 CRITERION 15	1
6" VT-1002-M42	PRESSURE RELIEF LOOP SEAL	PREVENTS UNDER/OVER PRESSURE OF TANK C108	H-2-818581 1 P27 B5	PLUGGED	LOSS OF TANK PRESSURE PROTECTION	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-48, SECTION 9, TABLE 1 CRITERION 15	1
818581-028	CARBON DIOXIDE SUPPLY CHECK VALVE	PREVENTS BACKFLOW OF TANK VAPOR TO CARBON DIOXIDE SYSTEM	H-2-818581 1 P27 D2	FAILS OPEN	LOSS OF FOG SUPPRESSION AND IN TANK VISUAL MONITORING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-9. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHEET, REV, ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HV-138110	PRESSURE INSTRUMENTATION SHUTOFF VALVE	ISOLATES PRESSURE INSTRUMENTATION	H-2-818581 1 P27 E3	FAILS AS IS	LOSS OF PRESSURE INSTRUMENTATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13828	CARBON DIOXIDE SUPPLY SHUTOFF VALVE	CONTROLS FLOW OF CARBON DIOXIDE TO C108	H-2-818581 1 P27 E3	FAILS AS IS	LOSS OF FOG SUPPRESSION AND IN TANK VISUAL MONITORING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PCV-13828	CARBON DIOXIDE PRESSURE CONTROL VALVE	REGULATES SUPPLY PRESSURE OF CARBON DIOXIDE TO C108	H-2-818581 1 P27 E3	FAILS OPEN	LOSS OF FOG SUPPRESSION AND IN TANK VISUAL MONITORING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PSV-13828	CO2 PRESSURE RELIEF VALVE	PROTECTS PIPING AND COMPONENTS DOWNSTREAM OF PRESSURE REGULATOR FROM OVERPRESSURE	H-2-818581 1 P27 E3	FAILS TO OPEN	LOSS OF FOG SUPPRESSION AND IN TANK VISUAL MONITORING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TK-CO2-1381	CARBON DIOXIDE STORAGE TANK	BULK STORAGE OF CARBON DIOXIDE	H-2-818581 1 P27 D3	LEAK	LOSS OF FOG SUPPRESSION AND IN TANK VISUAL MONITORING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1" CWR-852-M4	CHILLER RETURN HEADER DRAIN LINE	DRAINS RETURN HEADER	H-2-818581 2 P23 D2	LEAK	DECREASED EFFICIENCY OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1" CWS-808-M4	CHILLER SUPPLY HEADER DRAIN LINE	DRAINS SUPPLY HEADER	H-2-818581 2 P23 C2	LEAK	DECREASED EFFICIENCY OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1" CWS-807-M4	AIR SEPARATOR VENT LINE	VENTS AIR FROM SYSTEM	H-2-818581 2 P23 C8	LEAK	LOSS OF CIRC PUMP SUCTION PRESSURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1" CWS-808-M4	BYPASS LINE AROUND PCV-1388	ALLOWS PRESSURE REGULATING VALVE TO BE BYPASSED	H-2-818581 2 P23 B7	LEAK	LOSS OF CHILLER MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1" CWS-808-M4	INLET LINE TO PCV-1388	MAKE UP TO PRESSURE REGULATING VALVE	H-2-818581 2 P23 C8	LEAK	LOSS OF CHILLER MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-9. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION.	SAFETY CLASS
1" CWS-811-M4	OUTLET LINE FROM PCV-1388	OUTLET OF PRESSURE REGULATOR	H-2-818581 2 P23 C6	LEAK	LOSS OF CHILLER MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1" CWS-812-M4	PI-1388 SENSING LINE	PRESSURE INDICATOR IMPULSE LINE	H-2-818581 2 P23 C7	LEAK	LOSS OF CHILLER MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1" CWS-813-M4	OUTLET LINE FROM EXPANSION TANK TK-1382	CONNECTS EXPANSION TANK TO CIRC PUMP SUCTION LINE	H-2-818581 2 P23 C8	LEAK	LOSS OF CHILLER MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" CWS-810-M4	PI-1387 SENSING LINE	PRESSURE INDICATOR IMPULSE LINE	H-2-818581 2 P23 C7	LEAK	LOSS OF CHILLER MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" CWS-814-M4	PI-1388 SENSING LINE	PRESSURE INDICATOR IMPULSE LINE	H-2-818581 2 P23 B8	LEAK	LOSS OF CHILLER MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" I-754-I31	PDISH-1389 HP SENSING LINE	PRESSURE INDICATING SWITCH IMPULSE TUBE	H-2-818581 2 P23 D8	LEAK	LOSS OF HIGH PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" I-755-I31	PDISH-1389 LP SENSING LINE	PRESSURE INDICATING SWITCH IMPULSE TUBE	H-2-818581 2 P23 D5	LEAK	LOSS OF HIGH PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" I-756-I31	PISL-13810 SENSING LINE	PRESSURE INDICATING SWITCH IMPULSE TUBE	H-2-818581 2 P23 D3	LEAK	LOSS OF LOW PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" M4(a)	PDISH-1389 HP SENSING LINE	PRESSURE INDICATING SWITCH IMPULSE LINE	H-2-818581 2 P23 C6	LEAK	LOSS OF HIGH PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1/2" M4(b)	PDISH-1389 LP SENSING LINE	PRESSURE INDICATING SWITCH IMPULSE LINE	H-2-818581 2 P23 C5	LEAK	LOSS OF HIGH PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-9. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHEET REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
1/2" M4(c)	PISL-13610 SENSING LINE	PRESSURE INDICATING SWITCH IMPULSE LINE	H-2-818581 2 P23 C3	LEAK	LOSS OF LOW PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
3"CWR-850-M4	CHILLER RETURN HEADER	ROUTES CHILLER FLUID BACK TO CHILLER	H-2-818581 2 P23 D7	LEAK	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
3"CWR-851-M4	PSV-1362 INLET LINE	CONNECTS RELIEF VALVE TO RETURN HEADER	H-2-818581 2 P23 D7	LEAK	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
3"CWS-800-M4	CHILLER PIPING TO AIR SEPARATOR	SENDS CHILLER FLUID TO AIR SEPARATOR	H-2-818581 2 P23 C7	LEAK	DECREASE EFFICIENCY OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
3"CWS-801-M4	CHILLER PIPING TO DUPLEX STRAINER	ROUTES CHILLER FLUID TO CIRC PUMPS	H-2-818581 2 P23 C6	LEAK	DECREASE EFFICIENCY OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
3"CWS-802-M4	CIRC PUMPS SUCTION LINE	ROUTES CHILLER FLUID TO CIRC PUMPS	H-2-818581 2 P23 C5	LEAK	DECREASE EFFICIENCY OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
3"CWS-803-M4	CIRC PUMPS DISCHARGE HEADER	ROUTES CHILLER FLUID TO HEAT EXCHANGER	H-2-818581 2 P23 C4	LEAK	DECREASE EFFICIENCY OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
3"CWS-804-M4	CIRC PUMP P1365 SUCTION LINE	ROUTES CHILLER FLUID TO CIRC PUMP	H-2-818581 2 P23 C5	LEAK	DECREASE EFFICIENCY OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
3"CWS-805-M4	CIRC PUMP P1365 DISCHARGE LINE	ROUTES CHILLER FLUID TO DISCHARGE HEADER	H-2-818581 2 P23 C4	LEAK	DECREASE EFFICIENCY OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
818581-027	AIR VENT VALVE	RELEASES AIR FROM CHILLER SYSTEM	H-2-818581 2 P23 D8	FAILS TO OPERATE	POTENTIAL TO AIR BIND CIRC PUMP(S)	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-9. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
F-1384	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 3	3
F-1385	MAKE UP TANK TK-1381 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 3	3
HV-138115	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 3	3
HV-138118	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 3	3
HV-13818	PI-1387 ISOLATION VALVE	ISOLATES PI-1387	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 3	3
HV-13817	PI-1388 ISOLATION VALVE	ISOLATES PI-1388	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 3	3
HV-13818	HP ISOLATION VALVE PDISH-1389	ISOLATES PDISH-1389	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 3	3
HV-13819	LP ISOLATION VALVE PDISH-1389	ISOLATES PDISH-1389	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 3	3
HV-13820	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 3	3
HV-13821	CIRC PUMP P-1384 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 3	3

TABLE B-9. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HV-13622	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 3	3
HV-13623	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 3	3
HV-13624	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 3	3
HV-13625	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 3	3
HV-13627	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 3	3
HV-13628	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 3	3
HV-13629	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 3	3
HV-13630	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 3	3
HV-13631	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 3	3
HV-13632	P1-1368 ISOLATION VALVE	ISOLATES P1-1368	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 3	3

TABLE B-9. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HV-13833	PISL-13810 ISOLATION VALVE	ISOLATES PISL-13810	H-2-818581 2 P23 C3	LEAK	LOSS OF LOW PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13834	PCV-1388 INLET ISOLATION VALVE	ISOLATES PCV-1388	H-2-818581 2 P23 C7	LEAK	LOSS OF CHILLER SYSTEM MAKE UP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
P-1384	CHILLER SYSTEM CIRC PUMP	RECIRCULATES GLYCOL SOLUTION THROUGH CHILLER SYSTEM	H-2-818581 2 P23 C4	FAILS TO OPERATE	BACK UP CIRC PUMP AVAILABLE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
P-1385	CHILLER SYSTEM CIRC PUMP	RECIRCULATES GLYCOL SOLUTION THROUGH CHILLER SYSTEM	H-2-818581 2 P23 B4	FAILS TO OPERATE	BACK UP CIRC PUMP AVAILABLE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PCV-1388	MAKE UP TANK TK-1381 PRESSURE REGULATOR	MAINTAINS SUCTION PRESSURE OF CIRC PUMPS	H-2-818581 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 3	3
PSV-1382	CHILLER RETURN HEADER RELIEF VALVE	PROTECTS CHILLER FROM OVER PRESSURE	H-2-818581 2 P23 D7	FAILS TO OPERATE	OVERPRESSURIZE CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
R-1381	AIR COOLED CHILLER	PROVIDES VENTILATION SYSTEM HEAT REMOVAL	H-2-818581 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 3	3
TK-1381	MAKE UP STORAGE TANK	PROVIDES PREMIXED GLYCOL SOLUTION FOR SYSTEM MAKE UP	H-2-818581 2 P23 B7	LEAK; LOSS OF MAKEUP	POTENTIAL TO AIR BIND CIRC PUMPS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TK-1382	EXPANSION TANK	PROVIDES ADDITIONAL SYSTEM VOLUME FOR HEAT UP AND COOL DOWN	H-2-818581 2 P23 B8	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 3	3
TK-1383	AIR SEPARATOR	REMOVES AIR FROM CHILLER SYSTEM	H-2-818581 2 P23 C8	DECREASE IN CHILLER EFFICIENCY	POTENTIAL TO AIR BIND CIRC PUMP(S)	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-9. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
1 1/2" DR-310-M9	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 3	3
1" DR-308-M9	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 3	3
1" DR-308-M9	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 3	3
1" DR-311-M9	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 3	3
1" FL-900-M9	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 3	3
1" FL-901-M9	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 3	3
1/2" I-757-I31	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 3	3
1/2" I-758-I31	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 3	3
10" VT-1010-M8	HEAT EXCHANGER HX-1361 INLET DUCT	TRANSMITS AIR FROM TANK C-106 TO HEAT EXCHANGER 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 3	3
10" VT-1011-M8	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 3	3

TABLE B-9. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
2" ETR-HI-301-M28a	SEAL POT TEST CONNECTION	ALLOWS TESTING OF SEAL POT DOUBLE CONFINEMENT	H-2-818581 3 P30 B4	LEAK	LOSS OF SEAL POT DOUBLE CONFINEMENT	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
3" DR-301-M9	SEAL POT DRAIN TO C-108 RISER "RL"	DRAINS SEAL POT TO C-108	H-2-818581 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 3	3
6" ENC-301-M28a	SEAL POT DRAIN ENCAPSULATION LINE	PROVIDES SECONDARY CONFINEMENT FOR SEAL POT DRAIN	H-2-818581 3 P30 A4	LEAK	LOSS OF SEAL POT DOUBLE CONFINEMENT	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
6" VT-1011-M8	MOISTURE SEPARATOR MS-1381 INLET DUCT	CONVEYS EXHAUST AIR FROM HEAT EXCHANGER TO MOISTURE SEPARATOR	H-2-818581 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 3	3
6" VT-1020-M8	MOISTURE SEPARATOR MS-1381 OUTLET DUCT	CONVEYS EXHAUST AIR FROM MOISTURE SEPARATOR TO HEATING COIL	H-2-818581 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 3	3
6" VT-1050-M8	HEME INLET DUCT	CONVEYS EXHAUST AIR FROM CONDENSER TO HEME	H-2-818581 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 3	3
8" VT-1012-M8	PORTABLE EXHAUSTER CONNECTION	ALLOWS USE OF PORTABLE EXHAUSTER	H-2-818581 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 3	3
8" VT-1020-M8	HEATING COIL INLET DUCT	CONVEYS EXHAUST AIR FROM MOISTURE SEPARATOR TO HEATING COIL	H-2-818581 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 3	3
8" VT-1021-M8	RECIRCULATION FAN INLET DUCT	RECIRCULATES TANK C-108 AIR/VAPOR	H-2-818581 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 3	3
8" VT-1022-M8	RECIRCULATION FAN OUTLET DUCT	RECIRCULATES TANK C-108 AIR/VAPOR	H-2-818581 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 3	3

TABLE B-9. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHEET REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
818561-028	SEAL POT	COLLECTS PROCESS BUILDING DRAINS	H-2-818561 3 P30 B3	LEAK/OVERFILL	RELEASE OF CONTAMINANTS TO ENVIRONMENT	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
FN-1381	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 3	3
HC-1381	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 3	3
HV-138117	HEATING COIL HC-1381 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 3	3
HV-138118	HEAT EXCHANGER HX-1381 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 3	3
HV-138119	HEME HME-1381 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 3	3
HV-138121	MOISTURE SEPARATOR MS-1381 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 3	3
HV-138134	RECIRCULATION FAN DRAIN VALVE	DRAINS RECULATION 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 3	3
HV-138142	HEAT EXCHANGER HX-1381 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 3	3

TABLE B-9. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT, REV, ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HV-138151	PORTABLE EXHAUSTER CONNECTION SHUT OFF DAMPER	ISOLATES PORTABLE EXHAUSTER CONNECTION	H-2-818581 3 P30 B8	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13835	HEAT EXCHANGER HX-1381 TUBE SIDE OUTLET VALVE	RETURNS GLYCOL SOLUTION FROM HEAT EXCHANGER TO CHILLER	H-2-818581 3 P30 D7	LEAK	DECREASE EFFICIENCY OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13838	HEAT EXCHANGER HX-1381 TUBE SIDE INLET VALVE	SUPPLIES GLYCOL SOLUTION TO HEAT EXCHANGER FROM CHILLER	H-2-818581 3 P30 C7	LEAK	DECREASE EFFICIENCY OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13839	HEAT EXCHANGER HX-1381 SHELL SIDE OUTLET DAMPER	ISOLATES HEAT EXCHANGER FROM RECIRCULATION FAN	H-2-818581 3 P30 D7	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13841	PT-1381/PDT-13811 HP ISOLATION VALVE	ISOLATES PT-1381/PDT-13811 HP	H-2-818581 3 P30 E7	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13842	PDT-13811 LP ISOLATION VALVE	ISOLATES PDT-13811 LP	H-2-818581 3 P30 E6	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13843	RECIRCULATION FAN DISCHARGE DAMPER	SHUTS OFF RECIRCULATION FAN DISCHARGE	H-2-818581 3 P30 B1	FAILS TO OPERATE	LOSS OF RECIRC FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HX-1381	HEAT EXCHANGER (TUBE SIDE - GLYCOL SOLUTION; SHELL SIDE - AIR)	COOLS AND CONDENSES MOISTURE FROM C-108 EXHAUST AIR	H-2-818581 3 P30 C7	FAILS TO COOL	FAILURE OF DOWNSTREAM EQUIPMENT DUE TO INCREASE IN MOISTURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
MS-1381	MOISTURE SEPARATOR	REMOVES MOISTURE FROM RECIRCULATION FAN SUCTION	H-2-818581 3 P30 D6	FAILS TO REMOVE MOISTURE	FAILURE OF DOWNSTREAM EQUIPMENT DUE TO INCREASE IN MOISTURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
1" DR-307-M9	HME-1381 DRAIN LINE	ROUTES HEME DRAINS TO SEAL POT	H-2-818581 4 P27 C7	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-9. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
1/2" I-759-I31	PDT-13812 HP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818581 4 P27 D7	LEAK	LOSS OF HEME DIFFERENTIAL PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" I-760-I31	PDT-13812 LP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818581 4 P27 D7	LEAK	LOSS OF HEME DIFFERENTIAL PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" I-761-I31	PDT-13813 HP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818581 4 P27 D3	LEAK	LOSS OF HEME DIFFERENTIAL PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/2" I-762-I31	PDT-13813 LP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818581 4 P27 D3	LEAK	LOSS OF HEME DIFFERENTIAL PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
2" ETR-HI-302-M28a	HEMF DRAIN ENCASUREMENT TEST CONNECTION	ALLOWS TESTING OF ENCASUREMENT LINE	H-2-818581 4 P27 A4	LEAK	LOSS OF CONFINEMENT INTEGRITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
2" VT-1051-M8	HME-1381 INLET SAMPLE PORT	ALLOWS SAMPLING OF HEME INLET	H-2-818581 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 3	3
2" VT-1058-M8	HME-1381 OUTLET/ HMF-1381 INLET SAMPLE PORT	ALLOWS SAMPLING OF HEME OUTLET/HEMF INLET	H-2-818581 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 3	3
2" VT-1059-M8	HMF-1381 OUTLET SAMPLE PORT	ALLOWS SAMPLING OF HEME OUTLET	H-2-818581 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 3	3
3" DR-302-M9	HMF-1381 DRAIN TO SEAL POT	ROUTES HEME DRAINS TO SEAL POT	H-2-818581 4 P27 A4	LEAK	LEAKAGE CONTAINED BY ENCASUREMENT	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-9. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
6" ENC-302-M28a	HEMF DRAIN ENCASMENT	ROUTES DRAIN LINE LEAKAGE TO SEAL POT	H-2-818581 4 P27 A3	LEAK	RELEASE TO SOIL COLUMN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
6" VT-1052-M8	HME-1361 OUTLET DUCT	CONVEYS EXHAUST AIR FROM HEME TO HEMF	H-2-818581 4 P27 D8	DUCT BREACH	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
6" VT-1053-M8	HEMF BYPASS EXHAUST AIR DUCT	CONVEYS EXHAUST AIR AROUND HEME-1361	H-2-818581 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 3	3
6" VT-1054-M8	HEMF/HEMF BYPASS DUCT	ALLOWS EXHAUST AIR TO BYPASS HEME OR HEMF	H-2-818581 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 3	3
6" VT-1055-M8	HEMF BYPASS DUCT	ALLOWS EXHAUST AIR TO BYPASS HEMF	H-2-818581 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 3	3
6" VT-1057-M8	HMF-1361 INLET DUCT	CONVEYS EXHAUST AIR FROM HEME TO HEMF	H-2-818581 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 3	3
6" VT-1058-M8	HMF-1361 OUTLET DUCT	CONVEYS EXHAUST AIR FROM HEMF	H-2-818581 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 3	3
6" VT-1060-M8	EXHAUST STACK INLET	CONVEYS EXHAUST AIR FROM HEME/HEMF TO EXHAUST STACK	H-2-818581 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 3	3
818581-014	HEMF SHIELDING	PROVIDES RADIATION PROTECTION FOR OPERATORS	H-2-818581 4 P27 C7	LOSS OF SHIELDING	INCREASE IN OPERATOR EXPOSURES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
818581-015	HEMF SHIELDING	PROVIDES RADIATION PROTECTION FOR OPERATORS	H-2-818581 4 P27 C3	LOSS OF SHIELDING	INCREASE IN OPERATOR EXPOSURES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-9. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HME-1381	HIGH EFFICIENCY MIST ELIMINATOR (HEME)	REMOVES MOISTURE VAPOR FROM EXHAUST AIR	H-2-818581 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 3	3
HMF-1381	HIGH EFFICIENCY METAL FILTER (HEMF)	REMOVES RADIONUCLIDES FROM EXHAUST AIR	H-2-818581 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 3	3
HV-138143	HME-1381 OUTLET/HMF-1381 INLET SAMPLE PORT ISOLATION VALVE	PROVIDES SAMPLE PORT SHUTOFF	H-2-818581 4 P27 B8	FAIL OPEN	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-138144	HMF-1381 OUTLET SAMPLE PORT ISOLATION VALVE	PROVIDES SAMPLE PORT SHUTOFF	H-2-818581 4 P27 B2	FAIL OPEN	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-138150	HME-1381 INLET SAMPLE PORT ISOLATION VALVE	PROVIDES SAMPLE PORT SHUTOFF	H-2-818581 4 P27 B8	FAIL OPEN	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13838	HMF-1381 DRAIN SHUTOFF VALVE	ALLOWS DRAINING OF HEMF TO SEAL POT	H-2-818581 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 3	3
HV-13844	HME-1381 BYPASS DAMPER	BYPASSES HEME	H-2-818581 4 P27 B8	FAILS OPEN	FAILURE OF DOWNSTREAM EQUIPMENT DUE TO INCREASED MOISTURE CONTENT	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13845	HMF-1381 BYPASS DAMPER	BYPASSES HEMF	H-2-818581 4 P27 B5	FAILS OPEN	FAILURE OF DOWNSTREAM EQUIPMENT DUE TO INCREASED MOISTURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13846	HME-1381 OUTLET DAMPER	ISOLATES OUTLET FROM HEME	H-2-818581 4 P27 D8	FAILS CLOSED	LOSS OF EXHAUST SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13847	HMF-1381 INLET DAMPER	ISOLATES INLET TO HEMF	H-2-818581 4 P27 C4	FAILS CLOSED	LOSS OF EXHAUST SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-9. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HV-13848	HMF-1381 OUTLET DAMPER	ISOLATES OUTLET FROM HEMF	H-2-818581 4 P27 C3	FAILS CLOSED	LOSS OF EXHAUST SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13849	HME-1381 INLET DAMPER	ISOLATES INLET TO HEME	H-2-818581 4 P27 C8	FAILS CLOSED	LOSS OF EXHAUST SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-13850	PDT-13812 HP ISOLATION VALVE	ISOLATES HP SIDE PDT-13812	H-2-818581 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 3	3
HV-13851	PDT-13812 LP ISOLATION VALVE	ISOLATES LP SIDE PDT-13812	H-2-818581 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 3	3
HV-13852	PDT-13813 HP ISOLATION VALVE	ISOLATES HP SIDE PDT-13813	H-2-818581 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 3	3
HV-13853	PDT-13813 LP ISOLATION VALVE	ISOLATES LP SIDE PDT-13813	H-2-818581 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 3	3
TK-1381	AIR ACCUMULATOR TANK	PROVIDES AIR VOLUME TO BLOW FLUSH WATER FROM HEMF	H-2-818581 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 3	3
UH-1381	PROCESS BUILDING 241-C-91 ROOM 1 UNIT HEATER	PROVIDES HEATING FOR ROOM 1	H-2-818581 4 P27 D1	LOSS OF HEATER	FAILS TO HEAT ROOM 1	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
UH-1382	PROCESS BUILDING 241-C-91 ROOM 2 UNIT HEATER	PROVIDES HEATING FOR ROOM 2	H-2-818581 5 P20 E1	LOSS OF HEATER	FAILS TO HEAT ROOM 2	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/4" I-787-131	PDT-13820 HP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818581 6 P25 D5	LEAK	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-9. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHEET REV. ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
1/4" I-767-M9	PDT-13620 HP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818581 6 P25 D5	LEAK	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/4" I-768-I31	PDT-13618 HP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818581 6 P25 D5	LEAK	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/4" I-768-M9	PDT-13618 HP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818581 6 P25 D5	LEAK	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/4" I-769-I31	PDT-13618 LP/PDIT-13619 HP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818581 6 P25 D4	LEAK	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/4" I-769-M9	PDT-13618 LP/PDIT-13619 HP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818581 6 P25 D4	LEAK	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/4" I-770-I31	PDT-13619 LP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818581 6 P25 D4	LEAK	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/4" I-770-M9	PDT-13619 LP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818581 6 P25 D4	LEAK	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/4" I-771-I31	PDT-13620 LP SENSING TUBE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE TUBE	H-2-818581 6 P25 D4	LEAK	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
1/4" I-771-M9	PDT-13620 LP SENSING LINE	DIFFERENTIAL PRESSURE TRANSMITTER IMPULSE LINE	H-2-818581 6 P25 D4	LEAK	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-9. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
3/4" DR-313-M8	EXHAUST FAN FN-1382 DRAIN LINE	ROUTES DRAINS TO SAMPLE PORT	H-2-818581 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 3	3
3/4" DR-314-M8	HEATING COIL HC-1382 DRAIN LINE	ROUTES DRAINS TO SAMPLE PORT	H-2-818581 6 P25 B8	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
3/4" DR-315-M8	HEPA FILTER HEP-1382 DRAIN LINE	ROUTES DRAINS TO SAMPLE PORT	H-2-818581 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 3	3
3/4" DR-318-M8	HEPA FILTER HEP-1381 DRAIN LINE	ROUTES DRAINS TO SAMPLE PORT	H-2-818581 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 3	3
6" VT-1082-D3	EXHAUST FAN INLET DUCT	TRANSMITS AIR FROM HEPA FILTER TO EXHAUST FAN	H-2-818581 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 3	3
6" VT-1083-M8	EXHAUST FAN OUTLET DUCT	TRANSMITS AIR FROM EXHAUST FAN TO STACK	H-2-818581 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 3	3
8" x 8" VT-1080-D3	HEATING COIL HC-1382 INLET DUCT	TRANSMITS EXHAUST AIR TO HEATING COIL	H-2-818581 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 3	3
8" x 8" VT-1081-D3	HEPA FILTER HEP-1381 INLET DUCT	TRANSMITS EXHAUST AIR FROM HEATING COIL TO HEPA FILTER	H-2-818581 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 3	3
818581-017	EXHAUST SKID	PROVIDES STRUCTURAL SUPPORT FOR AIR CLEANUP & STACK EQUIPMENT	H-2-818581 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 3	3
FN-1382	CENTRIFUGAL EXHAUST FAN	TRANSMITS EXHAUST AIR FROM HEPA FILTER TO STACK	H-2-818581 6 P25 C2	FAILS TO OPERATE	LOSS OF TANK C-108 PRESSURE CONTROL	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-9. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HC-1382	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 3	3
HEP-1381	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 3	3
HEP-1382	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 3	3
HV-138120	DRAIN VALVE HEATING COIL HC-1382	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 3	3
HV-138121	LG-1381 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 3	3
HV-138122	LG-1382 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 3	3
HV-138123	DRAIN VALVE HEPA FILTER HEP-1381	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 3	3
HV-138124	DRAIN VALVE HEPA FILTER HEP-1382	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 3	3
HV-138125	LG-1383 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 3	3
HV-138128	DRAIN VALVE EXHAUST FAN FN-1382	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 3	3

TABLE B-9. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HV-138127	LG-1384 OUTLET VALVE	ISOLATES SIGHT GLASS	H-2-818581 6 P25 B2	FAILS TO OPERATE	FAILURE OF FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-138128	EXHAUST SKID SAMPLE PORT SHUT OFF VALVE	ISOLATES DRAIN SAMPLE PORT	H-2-818581 6 P25 B4	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-138145	HP ISOLATION VALVE PDIT-13820	ISOLATES PDIT-13820	H-2-818581 6 P25 D5	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-138146	HP ISOLATION VALVE PDIT-13818	ISOLATES PDIT-13818	H-2-818581 6 P25 D5	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-138147	LP ISOLATION VALVE PDIT-13818, HP ISOLATION PDIT-13819	ISOLATES PDIT-13818/PDIT-13819	H-2-818581 6 P25 D4	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-138148	LP ISOLATION VALVE PDIT-13819	ISOLATES PDIT-13819	H-2-818581 6 P25 D4	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-138149	LP ISOLATION VALVE PDIT-13820	ISOLATES PDIT-13820	H-2-818581 6 P25 D4	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13854	EXHAUST SKID INLET DAMPER	ISOLATES EXHAUST INLET SKID	H-2-818581 6 P25 C7	FAILS CLOSED	LOSS OF EXHAUST SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HV-13855	EXHAUST FAN INLET DAMPER	ISOLATES EXHAUST FAN	H-2-818581 6 P25 C2	FAILS CLOSED	LOSS OF EXHAUST SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
3/4" DR-316-M8	EXHAUST STACK DRAIN LINE	ROUTES DRAINS TO SAMPLE PORT	H-2-818581 7 P22 B8	LEAK	RESULTANT DOSE CONSEQUENCES DO NOT EXCEED RISK ACCEPTANCE GUIDELINES	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-9. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
818581-019	EXHAUST STACK	TRANSMITS AIR FROM EXHAUST FAN TO ATMOSPHERE	H-2-818581 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 3	3
HV-138128	LG-1385 OUTLET VALVE	ISOLATES SIGHT GLASS	H-2-818581 7 P22 B8	FAILS TO OPERATE	LOSS OF STACK DRAIN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HV-138130	DRAIN VALVE EXHAUST STACK	ISOLATES STACK DRAIN	H-2-818581 7 P22 B8	FAILS TO OPERATE	INCREASE IN STACK MOISTURE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
F-1368	SERVICE BUILDING 241-C-73 INLET AIR FILTER	FILTERS BUILDING INLET AIR	H-2-818582 1 P28 D7	PLUG	LOSS OF FRESH AIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-10. VENTILATION EXHAUST RADIATION MONITORING SYSTEM

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS TANK FARM: 241-C SYSTEM: VENT RAD MON SYSTEM SAFETY FUNCTION: TANK C-108 EXHAUST RADIATION MONITORING					SYSTEM SAFETY CLASS JUSTIFICATION: 4.3 SYSTEM SAFETY CLASS: 3 NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY REAC IS FOR TRACKING PURPOSES ONLY.		
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
1" AM-500-M9	BETA/GAMMA PARTICULATE SAMPLE LINE	ROUTES SAMPLE TO VACUUM PUMPS	H-2-818581 7 P22 C8	LEAK	LOSS OF EXHAUST SAMPLE	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 3	3
1" AM-501-M9	RECORD SAMPLE SAMPLE LINE	ROUTES SAMPLE TO VACUUM PUMPS	H-2-818581 7 P22 B4	LEAK	LOSS OF EXHAUST SAMPLE	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 3	3
1" AM-502-M9	VACUUM PUMP P-1368 DISCHARGE LINE	ROUTES SAMPLE FROM VACUUM PUMP TO COMMON LINE	H-2-818581 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 3	3
1" AM-503-M9	VACUUM PUMP P-1367 SUCTION LINE	ROUTES SAMPLE TO VACUUM PUMP	H-2-818581 7 P22 B2	LEAK	LOSS OF EXHAUST SAMPLE	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 3	3
1" AM-504-M9	VACUUM PUMP P-1367 DISCHARGE LINE	ROUTES SAMPLE FROM VACUUM PUMP TO COMMON LINE	H-2-818581 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 3	3
1" AM-505-M9	VACUUM PUMP RETURN LINE	ROUTES VACUUM PUMP DISCHARGE TO EXHAUST STACK	H-2-818581 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 3	3
818581-021	VACUUM PUMP P-1368 DISCHARGE CHECK VALVE	PREVENTS BACKFLOW	H-2-818581 7 P22 C1	LEAK	LOSS OF EXHAUST SAMPLE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

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TABLE B-10. VENTILATION EXHAUST RADIATION MONITORING SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
818561-022	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 3	3
F-1368	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 3	3
F-1367	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 3	3
FV-1365	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 3	3
FV-1366	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 3	3
P-1366	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 3	3
P-1367	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 3	3
PV-13621	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 3	3

TABLE B-10. VENTILATION EXHAUST RADIATION MONITORING SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
UV-1387	VACUUM PUMP SUCTION VALVE	ROUTES SUCTION TO SELECTED VACUUM PUMP	H-2-818581 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-4-48, SECTION 9 TABLE 1 CRITERION 3	3
UV-1388	VACUUM PUMP DISCHARGE VALVE	ROUTES DISCHARGE FROM SELECTED VACUUM PUMP	H-2-818581 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-4-48, SECTION 9 TABLE 1 CRITERION 3	3

TABLE B-11. IN-TANK IMAGING SYSTEM
FMEA SAFETY CLASS DESIGNATION

FACILITY: <u>WRSS</u> TANK FARM: <u>241-C</u> SYSTEM: <u>IN-TK IMAGE SYS</u> SYSTEM SAFETY FUNCTION: <u>PROVIDE IN TANK VISUAL MONITORING</u>					SYSTEM SAFETY CLASS JUSTIFICATION: <u>4.4</u> SYSTEM SAFETY CLASS: <u>3</u> NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY RE&C IS FOR TRACKING PURPOSES ONLY.		
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
818559.059 (3)	VISUAL REMOTE MONITOR	PROVIDE 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-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-12. AC POWER SYSTEM FOR C-106
FMEA SAFETY CLASS DESIGNATION

FACILITY: <u>WRSS</u> TANK FARM: <u>241-C</u> SYSTEM: <u>AC PWR SYS C-106</u> SYSTEM SAFETY FUNCTION: <u>PROVIDE AC POWER TO C-106 SLUICING EQUIPMENT</u>					SYSTEM SAFETY CLASS JUSTIFICATION: <u>4.5.1</u> SYSTEM SAFETY CLASS: <u>3</u> NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY REAC IS FOR TRACKING PURPOSES ONLY.		
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
818680-005	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
818680-006	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
818680-007	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
818680-008	EXHAUST SKID PANELBOARD	PROVIDES POWER TO EXHAUST SKID EQUIPMENT	H-2-818680 1 P22 B8	SHORT CIRCUIT TRIPS FEEDER BREAKER	LOSS OF POWER TO EXHAUST SKID EQUIPMENT	LOSS OF VENTILATION EXHAUST	3
818680-009	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
818680-010	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
MCC-N1	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 B-13. AC POWER SYSTEM FOR AY-102
FMEA SAFETY CLASS DESIGNATION

FACILITY: <u>WRSS</u> TANK FARM: <u>241-AY</u> SYSTEM: <u>AC PWR SYS AY-102</u> SYSTEM SAFETY FUNCTION: <u>PROVIDE AC POWER TO AY-102 SLUICING EQUIPMENT</u>					SYSTEM SAFETY CLASS JUSTIFICATION: <u>4.5.2</u> SYSTEM SAFETY CLASS: <u>3</u> NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY RE&G IS FOR TRACKING PURPOSES ONLY.		
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
818893-001	ELECTRICAL EQUIPMENT SKID	DISTRIBUTES POWER TO AY FARM WRSS EQUIPMENT	H-2-818893 1 P13 C5	FAILS TO OPERATE	LOSS OF SLUICE PUMP	FAILURE OF SLUICE PUMPS PLACES SYSTEM IN A SAFE CONDITION; WHC-CM-4-48, SECTION 8, TABLE 1, CRITERION 14	3

TABLE B-14. EQUIPMENT REMOVAL SYSTEM

FHEA SAFETY CLASS DESIGNATION

FACILITY: <u>WRSS</u>					SYSTEM SAFETY CLASS JUSTIFICATION: <u>4.7</u>		
TANK FARM: <u>241C/AY</u>					SYSTEM SAFETY CLASS: <u>3</u>		
SYSTEM: <u>ERS</u>					NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY RE&C IS FOR TRACKING PURPOSES ONLY.		
SYSTEM SAFETY FUNCTION: <u>SUPPORT EQUIPMENT REMOVAL OPERATIONS</u>							
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
ERS-001	WATER WASHING, CO2 DECONTAMINATION EQUIPMENT	DECONTAMINATES EQUIPMENT	LATER	FAILS TO OPERATE	INCREASED DOSE TO OPERATOR	BASED ON DOSE CONSEQUENCE ANALYSIS IN APPENDX G; PRECLUDE IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ERS-002	FLEXIBLE RECIEVER SYSTEM	RECIEVES AND CONFINES CONTAMINATED EQUIPMENT	LATER	FAILS TO CONTAIN CONTAMINATION	INCREASED DOSE TO OPERATOR	BASED ON DOSE CONSEQUENCE ANALYSIS IN APPENDX G; PRECLUDE IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ERS-003	STRONGBACK	SUPPORTS EQUIPMENT CONTAINER IN HORIZONTAL POSITION	LATER	STRUCTURAL FAILURE	FAILURE OF EQUIPMENT CONTAINER	BASED ON DOSE CONSEQUENCE ANALYSIS IN APPENDX G; PRECLUDE IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ERS-004	EQUIPMENT STORAGE CONTAINER	TRANSPORTS CONTAMINATED EQUIPMENT IN CONTAINER	LATER	FAILURE OF CONFINEMENT	RELEASE OF RADIOACTIVE CONTAMINANTS TO THE ENVIRONMENT	BASED ON DOSE CONSEQUENCE ANALYSIS IN APPENDX G; PRECLUDE IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ERS-005	CONTAINER TRANSPORT TRAILER	TRANSPORTS EQUIPMENT STORAGE CONTAINER	LATER	STRUCTURAL FAILURE	RELEASE OF RADIOACTIVE CONTAMINANTS TO THE ENVIRONMENT	BASED ON DOSE CONSEQUENCE ANALYSIS IN APPENDX G; PRECLUDE IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

B-15. INSTRUMENTATION AND CONTROL

TABLE B-16-1. SEISMIC SWITCH

FMEA SAFETY CLASS DESIGNATION

FACILITY: <u>WRSS</u> TANK FARM : <u>241-CAY</u> SYSTEM : <u>SEISMIC SWITCH</u> SYSTEM SAFETY FUNCTION : <u>SHUTDOWN WRSS SLUICING SYSTEM DURING SEISMIC EVENT</u>				SYSTEM SAFETY CLASS JUSTIFICATION : <u>4.6.1</u> SYSTEM SAFETY CLASS : <u>1</u> NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY RE&C IS FOR TRACKING PURPOSES ONLY.			
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
AAH-1381A	SEISMIC ALARM, C-108 DIV A	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818559 1 P27 F7	FAILS TO OPERATE	NONE - PROVIDES ALARM FUNCTION ONLY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
AAH-1382B	SEISMIC ALARM, C-108 DIV B	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818559 1 P27 F2	FAILS TO OPERATE	NONE - PROVIDES ALARM FUNCTION ONLY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
AE-1381A	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-2-818559 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 15	1
AE-1381B	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-2-818559 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 15	1
AE-1381C	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-2-818559 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 15	1

TABLE B-16-1. SEISMIC SWITCH

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
AE-1382A	SEISMIC SENSOR, 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-2-818559 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-4-48, SECTION 9, TABLE 1, CRITERION 15	1
AE-1382B	SEISMIC SENSOR 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-2-818559 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-4-48, SECTION 9, TABLE 1, CRITERION 15	1
AE-1382C	SEISMIC SENSOR, 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-2-818559 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-4-48, SECTION 9, TABLE 1, CRITERION 15	1
ASH-1381A	SEISMIC SWITCH, 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-2-818559 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-4-48, SECTION 9, TABLE 1, CRITERION 15	1

TABLE B-16-1. SEISMIC SWITCH
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
ASH-1361B	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-2-818559 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-4-48, SECTION 9, TABLE 1, CRITERION 15	1
ASH-1361C	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-2-818559 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-4-48, SECTION 9, TABLE 1, CRITERION 15	1
ASH-1362A	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-2-818559 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-4-48, SECTION 9, TABLE 1, CRITERION 15	1
ASH-1362B	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-2-818559 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-4-48, SECTION 9, TABLE 1, CRITERION 15	1

TABLE B-16-1. SEISMIC SWITCH

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
ASH-1362C	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-2-818559 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 15	1
AY-1361A	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-2-818559 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 15	1
AY-1361B	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 15	1
AY-1362A	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-2-818559 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 15	1
AY-1362B	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 15	1
HS-13650A	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 3	3

TABLE B-16-1. SEISMIC SWITCH
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HS-13650B	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
HS-13651	SEISMIC SWITCH SET HAND SWITCH, DIV A	LATER	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
HS-13652	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
HS-13653	SEISMIC SWITCH SET HAND SWITCH, DIV B	LATER	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
JC-1381	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
JC-1382	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
JXA-1381A	SEISMIC SWITCH DIV A POWER FAILURE REMOTE ALARM	PROVIDES 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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
JXA-1382A	SEISMIC SWITCH DIV B POWER FAILURE REMOTE ALARM	PROVIDES REMOTE SEISMIC DETECTION SYSTEM DIV A POWER FAILURE	H-2-818559 1 P27 F3	FAILS TO INDICATE	LOSS OF REMOTE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
JXY-1381	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 1891b, TABLE 1, CRITERION 3	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-48, SECTION 9, TABLE 1 CRITERION 15	1

TABLE B-16-1. SEISMIC SWITCH
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
JTY-1362	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 15	1
TAHL-1361	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 3	3
TAHL-1362	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 3	3
TC-13631	SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 HEATER TEMPERATURE CONTROLLER	CONTROLS ENCLOSURE COMPARTMENT 1 HEATER	H-2-818559 1 P27 C8	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 1 HEATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TC-13632	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 3	3
TC-13633	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 3	3
TC-13634	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 3	3

TABLE B-16-1. SEISMIC SWITCH

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
TE-1361	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 3	3
TE-1362	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 3	3
TE-13631	SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 HEATER TEMPERATURE SENSOR	CONTROLS ENCLOSURE COMPARTMENT 1 HEATER	H-2-818559 1 P27 C8	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 1 HEATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TE-13632	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 3	3
TE-13633	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 3	3
TE-13634	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 3	3
TSHL-1361	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 3	3

TABLE B-15-1. SEISMIC SWITCH

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
TSHL-1382	SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 AMBIENT TEMPERATURE HIGH-LOW SWITCH	PROVIDES SIGNAL TO HIGH-LOW ALARM	H-2-818559 1 P27 D4	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 2 HIGH-LOW TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
YL-13850A	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
YL-13850B	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
YL-13851A	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
YL-13851B	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
YL-13852	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
YL-13853A	SEISMIC SWITCH SET REMOTE INDICATING LIGHT, DIV B	PROVIDES REMOTE INDICATION OF SET HAND SWITCH POSITION	H-2-818559 1 P27 F4	FAILS TO INDICATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
YL-13853B	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
YY-13850	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1

TABLE B-16-1. SEISMIC SWITCH
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT, REV, ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
YY-13851	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
YY-13852	SEISMIC SWITCH DIV B TRIP REMOTE INDICATING LIGHT ISOLATION RELAY	PROVIDES ISOLATED SIGNAL TO REMOTE INDICATION OF DIV A 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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
YY-13853	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
AAH-0821A	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
AAH-0822A	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
AE-0821A	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
AE-0821B	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1

TABLE B-16-1. SEISMIC SWITCH

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
AE-0821C	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
ASH-0821A	SEISMIC SWITCH, 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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
ASH-0821B	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
ASH-0821C	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1

TABLE B-16-1. SEISMIC SWITCH

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
ASH-0622A	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
ASH-0622B	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
ASH-0622C	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
AY-0621A	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
AY-0621B	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1

TABLE B-15-1. SEISMIC SWITCH
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
AY-0622A	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 15	1
AY-0622B	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 15	1
HS-06210	SEISMIC SWITCH SET HAND SWITCH, DIV A	LATER	H-2-818560 7 P25 C8	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 15	1
HS-06211A	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 3	3
HS-06211B	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 15	1
HS-06212	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 15	1
HS-06213	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 15	1

TABLE B-15-1. SEISMIC SWITCH

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
JC-0621	SEISMIC SWITCH POWER SUPPLY, DIV A	PROVIDE POWER TO SEISMIC SWITCH COMPONENTS	H-2-818580 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 15	1
JC-0622	SEISMIC SWITCH POWER SUPPLY, DIV B	PROVIDE POWER TO SEISMIC SWITCH COMPONENTS	H-2-818580 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 15	1
JXA-0621A	SEISMIC SWITCH DIV A POWER FAILURE REMOTE ALARM	PROVIDES REMOTE SEISMIC DETECTION SYSTEM DIV A POWER FAILURE	H-2-818580 7 P25 E6	FAILS TO INDICATE	LOSS OF REMOTE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
JXA-0622A	SEISMIC SWITCH DIV B POWER FAILURE REMOTE ALARM	PROVIDES REMOTE SEISMIC DETECTION SYSTEM DIV A POWER FAILURE	H-2-818580 7 P25 E3	FAILS TO INDICATE	LOSS OF REMOTE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
JXY-0621	SEISMIC SWITCH DIV A POWER FAILURE RELAY	PROVIDES ISOLATED SIGNAL TO REMOTE ALARMS	H-2-818580 7 P25 C6	FAILS TO OPERATE	PRECLUDE IMPLEMENTING ALARA PRINCIPLES; WHC 1001b, TABLE 1, CRITERION 3	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 15	1
JXY-0622	SEISMIC SWITCH DIV B POWER FAILURE RELAY	PROVIDES ISOLATED SIGNAL TO REMOTE ALARMS	H-2-818580 7 P25 C3	FAILS TO OPERATE	PRECLUDE IMPLEMENTING ALARA PRINCIPLES; WHC 1001b, TABLE 1, CRITERION 3	PRECLUDES PLACING WRSS IN SAFE SHUTDOWN CONFIGURATION; WHC-CM-4-46, SECTION 9, TABLE 1 CRITERION 15	1
TAHL-0621	SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 AMBIENT TEMPERATURE HIGH-LOW ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818580 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 3	3
TAHL-0622	SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 AMBIENT TEMPERATURE HIGH-LOW ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818580 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 3	3

TABLE B-16-1. SEISMIC SWITCH
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV. ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
TC-0625	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TC-0628	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TC-0627	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 IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TC-0628	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TE-0623	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TE-0624	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TE-0625	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-1. SEISMIC SWITCH

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
TE-0628	SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 AIR CONDITIONER TEMPERATURE SENSOR	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 3	3
TE-0627	SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 AIR CONDITIONER TEMPERATURE SENSOR	CONTROLS ENCLOSURE COMPARTMENT 2 AIR CONDITIONER	H-2-818560 7 P25 B4	FAILS TO OPERATE	LOSS OF ENCLOSURE COMPARTMENT 2 AIR CONDITIONER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TE-0628	SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 HEATER TEMPERATURE SENSOR	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 3	3
TSHL-0623	SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 1 AMBIENT TEMPERATURE HIGH-LOW SWITCH	PROVIDES SIGNAL TO HIGH-LOW ALARM	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 3	3
TSHL-0624	SEISMIC DETECTION SYSTEM ENCLOSURE COMPARTMENT 2 AMBIENT TEMPERATURE HIGH-LOW SWITCH	PROVIDES SIGNAL TO HIGH-LOW ALARM	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 3	3
YL-06210A	SEISMIC SWITCH SET REMOTE INDICATING LIGHT, DIV A	PROVIDES REMOTE INDICATION OF SET HAND SWITCH POSITION	H-2-818560 7 P25 E8	FAILS TO INDICATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-06210B	SEISMIC SWITCH SET LOCAL INDICATING LIGHT, DIV A	PROVIDES LOCAL INDICATION OF SET HAND SWITCH POSITION	H-2-818560 7 P25 C8	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 15	1
YL-06211A	SEISMIC SWITCH DIV A AND DIV B COMMON TRIP REMOTE INDICATING LIGHT	PROVIDES REMOTE INDICATION OF DIV A SEISMIC SWITCH TRIP	H-2-818560 7 P25 E5	FAILS TO INDICATE	LOSS OF REMOTE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-1. SEISMIC SWITCH

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
YL-08211B	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
YL-08212A	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
YL-08212B	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
YL-08213	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
YY-08210	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
YY-08211	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
YY-08212	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1
YY-08213	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-4-48, SECTION 9, TABLE 1 CRITERION 15	1

TABLE B-15-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

FACILITY: <u>WRSS</u> TANK FARM : <u>241-CIAY</u> SYSTEM : <u>SWTS-EQ</u> SYSTEM SAFETY FUNCTION : <u>WASTE MOBILIZATION AND TRANSPORT</u>					SYSTEM SAFETY CLASS JUSTIFICATION : <u>4.6.1</u> SYSTEM SAFETY CLASS : <u>3</u> NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY REAC IS FOR TRACKING PURPOSES ONLY.		
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
CCTV-1381	CLOSED CIRCUIT TV CAMERA SLUICE PIT 241-C-08C	PROVIDES METHOD TO INSPECT SLUICE PIT DURING OPERATION	H-2-818559 2 P21 D6	FAILS TO OPERATE	LOSS OF SLUICE PIT MONITORING ABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-13811	SLUICER SELECTOR HAND SWITCH	ALLOW CONTROL OF EITHER SLUICER 1 OR 2	H-2-818559 2 P21 F6	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 3	3
HS-13812A	SLUICER #1 MODE SELECTOR HAND SWITCH	ALLOWS SELECTION OF AUTO OR MANUAL CONTROL OF SLUICER	H-2-818559 2 P21 F6	FAILS TO OPERATE	LOSS OF SLUICER #1 CONTROL, SYSTEM SHUTDOWN REQUIRED FOR REPAIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-13812B	SLUICER #2 MODE SELECTOR HAND SWITCH	ALLOWS SELECTION OF AUTO OR MANUAL CONTROL OF SLUICER	H-2-818559 2 P21 F5	FAILS TO OPERATE	LOSS OF SLUICER #2 CONTROL, SYSTEM SHUTDOWN REQUIRED FOR REPAIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-13813A	SLUICER #1 CONTROL POWER HAND SWITCH	SLUICER #1 POWER ON-OFF	H-2-818559 2 P21 F5	FAILS TO OPERATE	LOSS OF SLUICER #1 CONTROL, SYSTEM SHUTDOWN REQUIRED FOR REPAIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-13813B	SLUICER #2 CONTROL POWER HAND SWITCH	SLUICER #2 POWER ON-OFF	H-2-818559 2 P21 F5	FAILS TO OPERATE	LOSS OF SLUICER #2 CONTROL, SYSTEM SHUTDOWN REQUIRED FOR REPAIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-13814	SLUICER #1 & #2 EMERGENCY STOP HAND SWITCH	PREVENTS REDIRECTION OF SLUICERS	H-2-818559 2 P21 F5	FAILS TO OPERATE	LOSS OF SLUICER #1 & #2 CONTROL, SYSTEM SHUTDOWN REQUIRED FOR REPAIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
LI-1382A	C-108 LEVEL INDICATOR	PROVIDES REMOTE LEVEL INDICATION OF TANK C-108	H-2-818559 2 P21 F4	FAILS TO INDICATE	LOSS OF C-108 LEVEL INDICATION	LATER	.
LIT-1382	TANK C-108 LEVEL TRANSMITTER	PROVIDE LEVEL INDICATION IN TANK C-108	H-2-818559 2 P21 D4	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	LATER	.

TABLE B-15-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT. REV. ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
LSH-1382	TANK C-108 LEVEL INDICATOR NOT WITHDRAWN SWITCH	PROVIDE SIGNAL TO INTERLOCK	H-2-818559 2 P21 F4	FAILS TO OPERATE	LEVEL SENSOR DAMAGED	LATER	•
PAH-1381A	C-108 PRESSURE HIGH ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818559 2 P21 F2	FAILS TO INDICATE	LOSS OF C-108 HIGH PRESSURE ALARM	PASSIVE TANK OVERUNDER PRESSURE PROTECTION PROVIDED BY REDUNDANT SEAL LOOPS; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PAL-1381A	C-108 PRESSURE LOW ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818559 2 P21 F2	FAILS TO INDICATE	LOSS OF C-108 LOW PRESSURE ALARM	PASSIVE TANK OVERUNDER PRESSURE PROTECTION PROVIDED BY REDUNDANT SEAL LOOPS; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PALL-1381A	C-108 PRESSURE LOW-LOW ALARM	ALERTS OPERATOR TO ABNORMAL CONDITION	H-2-818559 2 P21 F2	FAILS TO OPERATE	LOSS OF C-108 LOW-LOW PRESSURE ALARM	PASSIVE TANK OVERUNDER PRESSURE PROTECTION PROVIDED BY REDUNDANT SEAL LOOPS; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PIC-1381	C-108 PRESSURE CONTROLLER	PROVIDES PRESSURE SIGNAL TO EXHAUST FAN SPEED CONTROL	H-2-818559 2 P21 F2	FAILS TO OPERATE	LOSS OF C-108 PRESSURE CONTROL	PASSIVE TANK OVERUNDER PRESSURE PROTECTION PROVIDED BY REDUNDANT SEAL LOOPS; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PIT-1381	C-108 PRESSURE TRANSMITTER	PROVIDE PRESSURE SIGNAL TO EXHAUST FAN SPEED CONTROL	H-2-818559 2 P21 E2	FAILS TO INDICATE	LOSS OF C-108 PRESSURE CONTROL AN INDICATION	PASSIVE TANK OVERUNDER PRESSURE PROTECTION PROVIDED BY REDUNDANT SEAL LOOPS; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PSH-1381	C-108 PRESSURE HIGH SWITCH	PROVIDES HIGH PRESSURE SIGNAL TO ACTUATE ALARM AND INTERLOCK	H-2-818559 2 P21 F2	FAILS TO OPERATE	LOSS OF C-108 HIGH PRESSURE ALARM AND INTERLOCK	PASSIVE TANK OVERUNDER PRESSURE PROTECTION PROVIDED BY REDUNDANT SEAL LOOPS; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PSL-1381	C-108 PRESSURE LOW SWITCH	PROVIDES LOW PRESSURE SIGNAL TO ACTUATE ALARM	H-2-818559 2 P21 F2	FAILS TO OPERATE	LOSS OF C-108 LOW PRESSURE ALARM	PASSIVE TANK OVERUNDER PRESSURE PROTECTION PROVIDED BY REDUNDANT SEAL LOOPS; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-2. SWTs EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
PSLL-1381	C-108 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-108 LOW-LOW PRESSURE ALARM AND INTERLOCK	PASSIVE TANK OVERUNDER PRESSURE PROTECTION PROVIDED BY REDUNDANT SEAL LOOPS; PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
UJTC-13811	SLUICERS S-1381 AND S-1382 CONTROLLER CONTROL ROOM I/O	PROVIDE CONTROL SIGNALS TO SLUICERS S-C108-1 AND S-C108-2 AND POSITIONING SIGNALS TO FIELD CONTROLLERS	H-2-818559 2 P21 F5	FAILS TO OPERATE	LOSS OF SLUICER CONTROL, SYSTEM SHUTDOWN REQUIRED FOR REPAIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
UJTC-13812	SLUICER S-1381 CONTROLLER FIELD I/O	PROVIDE CONTROL SIGNALS TO SLUICER S-C108-2 AND POSITIONING SIGNALS TO CONTROL ROOM CONTROLLER	H-2-818559 2 P21 E8	FAILS TO OPERATE	LOSS OF SLUICER CONTROL, SYSTEM SHUTDOWN REQUIRED FOR REPAIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
UY-13813	SLUICING PIT 241-C-08C SLUICE MAST S-1381 TILT CONTROLS	POSITIONS SLUICER (VERTICALLY)	H-2-818559 2 P21 E8	UNABLE TO REDIRECT SLUICER SPRAY	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
UY-13814	SLUICING PIT 241-C-08C SLUICE MAST S-1381 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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZC-13811	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZI-13811	SLUICER POSITION INDICATOR CRT DISPLAY	PROVIDES CRT DISPLAY OF SLUICER POSITION	H-2-818559 2 P21 F4	FAILS TO OPERATE	LOSS OF SLUICER CONTROL, SYSTEM SHUTDOWN REQUIRED FOR REPAIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZS-13813	POSITION SWITCH FOR SLUICER S-1381 TILT CONTROLS	PROVIDE TILT POSITION SIGNAL TO SLUICER CONTROLS	H-2-818559 2 P21 D8	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZS-13814	POSITION SWITCH FOR SLUICER S-1381 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-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
ZT-13613	SLUICING PIT 241-C-08C 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 3	3
ZT-13614	SLUICING PIT 241-C-08C 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 3	3
CCTV-1362	CLOSED CIRCUIT TV CAMERA SLUICE PIT 241-C-08B	PROVIDES METHOD TO INSPECT SLUICE PIT DURING OPERATION	H-2-818559 3 P23 D5	FAILS TO OPERATE	LOSS OF HEEL PIT MONITORING ABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ET-1362 (\$)	HEEL PUMP VOLTAGE INDICATOR	INDICATE VOLTAGE AVAILABLE TO HEEL PUMP	H-2-818559 3 P23 E4	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ET-1362 (\$)	HEEL PUMP VOLTAGE TRANSMITTER	SENSE VOLTAGE AVAILABLE TO HEEL PUMP	H-2-818559 3 P23 E4	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-13615 (\$)	HEEL PUMP RAISE/LOWER HAND SWITCH	ALLOW POSITIONING OF HEEL PUMP AS LIQUID LEVEL VARIES	H-2-818559 3 P23 F7	FAILS TO OPERATE	LOSS OF HEEL PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-13617A (\$)	HEEL PUMP CONTROL ROOM START HAND SWITCH	STARTS HEEL PUMP FROM THE CONTROL ROOM	H-2-818559 3 P23 F5	FAILS TO OPERATE	LOSS OF HEEL PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-13617B (\$)	HEEL PUMP CONTROL ROOM STOP HAND SWITCH	STOPS HEEL PUMP FROM THE CONTROL ROOM	H-2-818559 3 P23 F5	FAILS TO OPERATE	LOSS OF HEEL PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-13618 (\$)	HEEL PUMP LOCAL REMOTE SELECTOR HAND SWITCH	ALLOWS SELECTION OF LOCAL OR REMOTE HEEL PUMP SPEED CONTROL	H-2-818559 3 P23 E5	FAILS TO OPERATE	LOSS OF HEEL PUMP SPEED CONTROLLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-13628 (\$)	HEEL PUMP VSD CABINET START/STOP HAND SWITCH	CONTROLS HEEL PUMP OPERATION FROM THE VSD CABINET	H-2-818559 3 P23 E5	FAILS TO OPERATE	LOSS OF HEEL PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HS-13658 (\$)	HEEL PUMP FAULT RESET HAND SWITCH	RESET HEEL PUMP CONTROL CIRCUIT	H-2-818559 3 P23 E4	FAILS TO RESET	LOSS OF HEEL PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
II-1362A (\$)	HEEL PUMP VSD CABINET CURRENT INDICATOR	INDICATE LOAD CURRENT OF HEEL PUMP	H-2-818559 3 P23 E4	FAILS TO INDICATE	LOSS OF LOAD INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
II-1362 (\$)	HEEL PUMP CURRENT TRANSMITTER	INDICATE LOAD CURRENT OF HEEL PUMP	H-2-818559 3 P23 E4	FAILS TO OPERATE	LOSS OF LOAD INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
SE-1362 (\$)	HEEL PUMP SPEED SENSOR	PROVIDE HEEL PUMP MOTOR SPEED SIGNAL	H-2-818559 3 P23 B8	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
SIC-1362 (\$)	HEEL PUMP REMOTE MOTOR SPEED CONTROLLER	PROVIDES SIGNAL FOR HEEL PUMP REMOTE SPEED CONTROL	H-2-818559 3 P23 F8	FAILS TO OPERATE	LOSS OF HEEL PUMP SPEED CONTROLLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
SIT-1362 (\$)	HEEL PUMP MOTOR SPEED TRANSMITTER	PROVIDES SIGNAL FOR HEEL PUMP SPEED CONTROLLER	H-2-818559 3 P23 E8	FAILS TO OPERATE	LOSS OF HEEL PUMP SPEED CONTROLLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TAH-13611A (\$)	HEEL PUMP MOTOR BEARING AND BEARING OIL HIGH TEMPERATURE ALARM	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818559 3 P23 F7	FAILS TO OPERATE	LOSS OF HEEL PUMP MOTOR BEARING AND BEARING OIL HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TAH-13612A (\$)	HEEL PUMP MOTOR STATOR HIGH TEMPERATURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818559 3 P23 F8	FAILS TO OPERATE	LOSS OF HEEL PUMP STATOR HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TAHH-13612A (\$)	HEEL PUMP MOTOR STATOR HIGH-HIGH TEMPERATURE ALARM	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818559 3 P23 F8	FAILS TO OPERATE	LOSS OF HEEL PUMP STATOR HIGH-HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TE-13611 (\$)	HEEL PUMP P-1362 MOTOR BEARING AND BEARING OIL TEMPERATURE	PROVIDE HEEL PUMP MOTOR BEARING AND OIL TEMPERATURE	H-2-818559 3 P23 C8	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
TE-13812 (\$)	HEEL PUMP P-1382 MOTOR STATOR TEMPERATURE	PROVIDE HEEL PUMP MOTOR STATOR WINDING TEMPERATURE	H-2-818559 3 P23 C6	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TE-1389 (\$)	HEEL PUMP CASING/C-108 VAPOR SPACE TEMPERATURE	PROVIDE VAPOR SPACE TEMPERATURE WHEN HEEL PUMP IS WITHDRAWN	H-2-818559 3 P23 B7	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TTT-13811 (\$)	HEEL PUMP MOTOR BEARING AND BEARING OIL TEMPERATURE TRANSMITTER	PROVIDES TEMPERATURE SIGNAL FOR ALARM	H-2-818559 3 P23 E6	FAILS TO OPERATE	LOSS OF HEEL PUMP MOTOR BEARING AND BEARING OIL TEMPERATURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TTT-13812 (\$)	HEEL PUMP MOTOR STATOR TEMPERATURE TRANSMITTER	PROVIDES SIGNAL TO HIGH AND HIGH-HIGH TEMPERATURE SWITCH	H-2-818559 3 P23 E6	FAILS TO OPERATE	LOSS OF HEEL PUMP STATOR HIGH AND HIGH-HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TTT-1389 (\$)	HEEL PUMP CASING/C-108 VAPOR SPACE TEMPERATURE TRANSMITTER	PROVIDES HEEL PUMP CASING/C-108 VAPOR SPACE TEMPERATURE SIGNAL TO DACS	H-2-818559 3 P23 E7	FAILS TO OPERATE	LOSS OF HEEL PUMP CASING/C-108 VAPOR SPACE TEMPERATURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TSH-13811 (\$)	HEEL PUMP MOTOR BEARING AND BEARING OIL HIGH TEMPERATURE SWITCH	PROVIDES HIGH TEMPERATURE SIGNAL TO ACTUATE ALARM	H-2-818559 3 P23 E7	FAILS TO OPERATE	LOSS OF HEEL PUMP MOTOR BEARING AND BEARING OIL HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TSH-13812 (\$)	HEEL PUMP MOTOR STATOR HIGH TEMPERATURE SWITCH	PROVIDES HIGH TEMPERATURE SIGNAL TO ACTUATE ALARM	H-2-818559 3 P23 E6	FAILS TO OPERATE	LOSS OF HEEL PUMP STATOR HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TSHH-13812 (\$)	HEEL PUMP MOTOR STATOR HIGH-HIGH TEMPERATURE SWITCH	PROVIDES HIGH-HIGH TEMPERATURE SIGNAL TO ACTUATE ALARM	H-2-818559 3 P23 E6	FAILS TO OPERATE	LOSS OF HEEL PUMP STATOR HIGH-HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
XL-1382 (\$)	HEEL PUMP VSD CABINET VSD FAILURE LIGHT	LOCAL INDICATION OF VARIABLE SPEED DRIVE FAILURE	H-2-818559 3 P23 E3	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
XL-1382A (\$)	HEEL PUMP CONTROL ROOM VSD FAILURE LIGHT	REMOTE INDICATION OF VARIABLE SPEED DRIVE FAILURE	H-2-818559 3 P23 F3	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13818A (\$)	HEEL PUMP VSD CABINET LOCAL LIGHT	PROVIDES INDICATION OF LOCAL CONTROL AT HEEL PUMP VSD CABINET	H-2-818559 3 P23 E5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13818B (\$)	HEEL PUMP VSD CABINET REMOTE LIGHT	PROVIDES INDICATION OF REMOTE CONTROL AT HEEL PUMP VSD CABINET	H-2-818559 3 P23 E5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13818C (\$)	HEEL PUMP CONTROL ROOM LOCAL LIGHT	PROVIDES INDICATION OF LOCAL CONTROL IN CONTROL ROOM	H-2-818559 3 P23 F5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13818D (\$)	HEEL PUMP CONTROL ROOM REMOTE LIGHT	PROVIDES INDICATION OF REMOTE CONTROL IN CONTROL ROOM	H-2-818559 3 P23 F5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13828A (\$)	HEEL PUMP VSD CABINET START LIGHT	PROVIDES RUN STATUS INDICATION OF HEEL PUMP	H-2-818559 3 P23 E4	FAILS TO INDICATE	LOSS OF START INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13828B (\$)	HEEL PUMP VSD CABINET STOP LIGHT	PROVIDES RUN STATUS INDICATION OF HEEL PUMP	H-2-818559 3 P23 E4	FAILS TO INDICATE	LOSS OF STOP INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZE-138115 (\$)	HEEL PUMP POSITION SENSOR	SENSES POSITION (VERTICAL) OF HEEL PUMP	H-2-818559 3 P23 C7	FAILS TO OPERATE	LOSS OF HEEL PUMP VERTICAL POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZL-13815A (\$)	HEEL PUMP WINCH UPPER LIMIT LIGHT	INDICATES HEEL PUMP WINCH HAS REACHED THE UPPER LIMIT	H-2-818559 3 P23 F8	FAILS TO INDICATE	LOSS OF HEEL PUMP UPPER LIMIT INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZL-13815B (\$)	HEEL PUMP WINCH LOWER LIMIT LIGHT	INDICATES HEEL PUMP WINCH HAS REACHED THE LOWER LIMIT	H-2-818559 3 P23 F8	FAILS TO INDICATE	LOSS OF HEEL PUMP LOWER LIMIT INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT, REV, ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
ZS-13815A (\$)	HEEL PUMP WINCH UPPER LIMIT SWITCH	PROVIDES INDICATION HEEL PUMP WINCH IS AT UPPER LIMIT	H-2-818559 3 P23 C7	FAILS TO INDICATE	LOSS OF HEEL PUMP WINCH UPPER LIMIT INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZS-13815B (\$)	HEEL PUMP WINCH LOWER LIMIT SWITCH	PROVIDES INDICATION HEEL PUMP WINCH IS AT LOWER LIMIT	H-2-818559 3 P23 C7	FAILS TO INDICATE	LOSS OF HEEL PUMP WINCH LOWER LIMIT INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZT-13815 (\$)	HEEL PUMP POSITION TRANSMITTER	PROVIDES POSITION OF HEEL PUMP (VERTICALLY)	H-2-818559 3 P23 D7	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
EI-1381	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ET-1381	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-13818	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-13822A	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 SLURRY PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-13822B	SLURRY PUMP CONTROL ROOM STOP HAND SWITCH	CONTROLS SLURRY PUMP STOP OPERATION FROM THE CONTROL ROOM	H-2-818559 4 P23 F4	FAILS TO OPERATE	LOSS OF SLURRY PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-13823	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 SLURRY PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-13824	SLURRY PUMP FAULT RESET HAND SWITCH	RESET SLURRY PUMP CONTROL CIRCUIT	H-2-818559 4 P23 E3	FAILS TO RESET	LOSS OF SLURRY PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT. REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HS13821	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 3	3
IL-1381A	SLURRY PUMP VSD CABINET CURRENT INDICATOR	INDICATE 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 3	3
IT-1381	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 3	3
LE-1381	SLURRY PUMP P-1381 SUCTION HEAD	PROVIDES SUCTION HEAD SIGNAL TO SLURRY PUMP CONTROL SYSTEM	H-2-818559 4 B7 P23	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
LY-1381	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 3	3
SE-1381	SLURRY PUMP P-1381 SPEED SENSOR	PROVIDE SLURRY PUMP MOTOR SPEED	H-2-818559 4 P23 B8	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
SIC-1381	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 3	3
ST-1381	SLURRY PUMP SPEED TRANSMITTER	PROVIDES SIGNAL FOR SLURRY PUMP SPEED CONTROLLER	H-2-818559 4 P23 E8	FAILS TO OPERATE	LOSS OF SLURRY PUMP SPEED CONTROLLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TAH-13814A	SLURRY PUMP MOTOR BEARING AND BEARING OIL HIGH TEMPERATURE ALARM	ALERT OPERATOR OF ABNORMAL SITUATION	H-2-818559 4 P23 F8	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 3	3

TABLE B-15-2. SWTs EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
TAH-13615A	SLURRY PUMP MOTOR STATOR HIGH TEMPERATURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818559 4 P23 F8	FAILS TO OPERATE	LOSS OF SLURRY PUMP STATOR HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TAHH-13615B	SLURRY PUMP MOTOR STATOR HIGH-HIGH TEMPERATURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818559 4 P23 F8	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 3	3
TE-13614	SLURRY PUMP P-1361 MOTOR BEARING AND BEARING OIL TEMPERATURE	PROVIDE SLURRY PUMP MOTOR BEARING AND BEARING OIL TEMPERATURE	H-2-818559 4 P23 C8	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TE-13615	SLURRY PUMP P-1361 MOTOR STATOR TEMPERATURE	MONITOR SLURRY PUMP MOTOR TEMPERATURE	H-2-818559 4 P23 E8	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TTI-13614	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 3	3
TTI-13615	SLURRY PUMP MOTOR STATOR TEMPERATURE TRANSMITTER	PROVIDES SIGNAL TO ACTUATE HIGH TEMPERATURE ALARM	H-2-818559 4 P23 E8	FAILS TO OPERATE	LOSS OF SLURRY PUMP STATOR HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TSH-13614	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 3	3
TSH-13615	SLURRY PUMP MOTOR STATOR HIGH TEMPERATURE SWITCH	PROVIDES SIGNAL TO ACTUATE HIGH TEMPERATURE ALARM	H-2-818559 4 P23 E8	FAILS TO OPERATE	LOSS OF SLURRY PUMP STATOR HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TSHH-13615	SLURRY PUMP MOTOR STATOR HIGH-HIGH TEMPERATURE SWITCH	PROVIDES SIGNAL TO ACTUATE HIGH-HIGH TEMPERATURE ALARM	H-2-818559 4 P23 E8	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 3	3

TABLE B-16-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT. REV. ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
XL-1381	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
XL-1381A	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
YL-13821A	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
YL-13821B	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
YL-13821C	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
YL-13821E	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
YL-13823A	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
YL-13823B	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZE-13818	SLURRY PUMP POSITION SENSOR	PROVIDES POSITION INDICATION SIGNAL (VERTICAL) OF SLURGE PUMP TO TRANSMITTER	H-2-818559 4 P23 D7	FAILS TO OPERATE	LOSS OF SLURGE PUMP VERTICAL POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
ZL-13816A	SLURRY PUMP WINCH UPPER LIMIT INDICATING LIGHT	INDICATES SLURRY PUMP WINCH IS AT THE UPPER LIMIT	H-2-818559 4 P23 F8	FAIL TO INDICATE	LOSS OF SLURRY PUMP UPPER LIMIT INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZL-13816B	SLURRY PUMP WINCH LOWER LIMIT INDICATING LIGHT	INDICATES SLURRY PUMP WINCH IS AT THE LOWER LIMIT	H-2-818559 4 P23 F8	FAIL TO INDICATE	LOSS OF SLURRY PUMP LOWER LIMIT INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZS-13816A	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 3	3
ZS-13816B	SLURRY PUMP WINCH LOWER LIMIT SWITCH	PROVIDES INDICATION SLURRY PUMP WINCH IS AT LOWER LIMIT	H-2-818559 4 P23 C7	FAIL TO INDICATE	LOSS OF SLURRY PUMP LOWER LIMIT INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZSH-1388	HV-1388 OPEN POSITION SWITCH	PROVIDE OPEN POSITION SIGNAL FOR HV-C108-6	H-2-818559 4 P23 C2	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZSH-1387	HV-1387 OPEN POSITION SWITCH	PROVIDE OPEN POSITION SIGNAL FOR HV-1387	H-2-818559 4 P23 D3	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZSL-1388	HV-1388 CLOSED POSITION SWITCH	PROVIDE CLOSED POSITION SIGNAL FOR HV-C108-6	H-2-818559 4 P23 C1	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZSL-1387	HV-1387 CLOSED POSITION SWITCH	PROVIDE CLOSED POSITION SIGNAL FOR HV-1387	H-2-818559 4 P23 D2	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZT-13816	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 3	3
AE-1381	SLURRY DISCHARGE VISCOSITY SENSOR	PROVIDES MEASUREMENT OF SLURRY VISCOSITY	H-2-818559 5 P20 C8	FAIL TO INDICATE	LOSS OF CONTROL ROOM INDICATION; INCREASED POTENTIAL TO PLUG SLURRY LINE AND/OR SLURRY PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
AIT-1361	SLURRY DISCHARGE FLOW VISCOSITY TRANSMITTER	PROVIDES SLURRY FLOW VISCOSITY SIGNAL	H-2-818559 5 P20 E6	FAILS TO OPERATE	LOSS OF SLURRY VISCOSITY INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
DAH-13618A	SLURRY DISCHARGE HIGH DENSITY ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818559 5 P20 F7	FAILS TO OPERATE	LOSS OF SLURRY HIGH DENSITY ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
DAH-13618A	SLURRY DISCHARGE HIGH HIGH DENSITY ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818559 5 P20 F7	FAILS TO OPERATE	LOSS OF SLURRY HIGH HIGH DENSITY ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
DAH-13618	SLURRY DISCHARGE HIGH HIGH HIGH DENSITY ALARM	PROVIDES HIGH HIGH HIGH DENSITY ALARM	H-2-818559 5 P20 F8	FAILS TO OPERATE	LOSS OF SLURRY HIGH HIGH HIGH DENSITY ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
DIT-13618	SLURRY DISCHARGE DENSITY TRANSMITTER	PROVIDES DENSITY ALARMS AND INTERLOCKS	H-2-818559 5 P20 F7	FAILS TO OPERATE	LOSS OF DENSITY ALARMS AND INTERLOCKS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
DSH-13618	SLURRY DISCHARGE HIGH DENSITY SWITCH	PROVIDE HIGH DENSITY ALARM	H-2-818559 5 P20 F7	FAILS TO OPERATE	LOSS OF SLURRY HIGH DENSITY ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
DSHH-13618	SLURRY DISCHARGE HIGH HIGH DENSITY ALARM SWITCH	PROVIDES HIGH HIGH DENSITY INTERLOCK AND ALARM	H-2-818559 5 P20 F7	FAILS TO OPERATE	LOSS OF SLURRY HIGH HIGH DENSITY ALARM; FAILURE TO SHUTDOWN SLURRYHEEL PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
DSHHH-13618	SLURRY DISCHARGE HIGH HIGH HIGH DENSITY ALARM SWITCH	PROVIDES HIGH HIGH HIGH DENSITY INTERLOCK AND ALARM	H-2-818559 5 P20 F7	FAILS TO OPERATE	LOSS OF SLURRY HIGH HIGH HIGH DENSITY ALARM; FAILURE TO SHUTDOWN SLURRYHEEL PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
FI-13618	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 3	3
FOI-13618	SLURRY DISCHARGE FLOW TOTALIZER	PROVIDES INDICATION OF TOTAL SLURRY FLOW	H-2-818559 5 P20 F6	FAILS TO INDICATE	LOSS OF QUANTITY OF SLURRY TRANSFERRED INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
FS-13618	SLURRY DISCHARGE REVERSE FLOW SWITCH	PROVIDES SIGNAL TO REVERSE FLOW CUTOFF INTERLOCK AND ALARM	H-2-818559 5 P20 E7	FAILS TO OPERATE	LOSS OF CUTOFF AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-2. SWTs EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HS-1382	SLUICER S-1382 SHUTOFF VALVE POSITIONING SOLENOID HV-1382 HAND SWITCH	POSITIONS SLUICER SHUTOFF VALVE HV-1382	H-2-818559 5 P20 F3	FAILS TO OPERATE	HV-1382 FAILS OPEN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-1383	SLUICER S-1382 SHUTOFF VALVE POSITIONING SOLENOID HV-1383 HAND SWITCH	POSITIONS SUPERNATANT/SLURRY CROSS CONNECTION VALVE HV-1383	H-2-818559 5 P20 F3	FAILS TO OPERATE	HV-1383 FAILS OPEN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-1384	SUPERNATANT/SLURRY CROSS CONNECTION VALVE POSITIONING SOLENOID HV-1384 HAND SWITCH	POSITIONS SUPERNATANT/SLURRY CROSS CONNECTION VALVE HV-1384	H-2-818559 5 F2	FAILS TO OPERATE	HV-1384 FAILS OPEN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-1385	SUPERNATANT/SLURRY CROSS CONNECTION VALVE POSITIONING SOLENOID HV-1385 HAND SWITCH	POSITIONS SUPERNATANT/SLURRY CROSS CONNECTION VALVE HV-1385	H-2-818559 5 F1	FAILS TO OPERATE	HV-1385 FAILS OPEN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-1388	SLURRY SHUTOFF VALVE POSITIONING SOLENOID HV-1388 HAND SWITCH	POSITIONS SLURRY SHUTOFF VALVE HV-1388	H-2-818559 5 P20 F5	FAILS TO OPERATE	HV-1388 FAILS OPEN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HY-1382	SLUICER S-1382 SHUTOFF VALVE HV-1382 POSITIONING SOLENOID	POSITIONS SLUICER SHUTOFF VALVE HV-1382	H-2-818559 5 P20 D2	FAILS TO OPERATE	HV-1382 FAILS OPEN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HY-1383	SLUICER S-1382 SHUTOFF VALVE HV-1383 POSITIONING SOLENOID	POSITIONS SUPERNATANT/SLURRY CROSS CONNECTION VALVE HV-1383	H-2-818559 5 P20 D3	FAILS TO OPERATE	HV-1383 FAILS OPEN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HY-1384	SUPERNATANT/SLURRY CROSS CONNECTION VALVE POSITIONING SOLENOID	POSITIONS SUPERNATANT/SLURRY CROSS CONNECTION VALVE HV-1384	H-2-818559 5 P20 D2	FAILS TO OPERATE	HV-1384 FAILS OPEN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HY-1385	SUPERNATANT/SLURRY CROSS CONNECTION VALVE HV-1385 POSITIONING SOLENOID	POSITIONS SUPERNATANT/SLURRY CROSS CONNECTION VALVE HV-1385	H-2-818559 5 P20 D1	FAILS TO OPERATE	HV-1385 FAILS OPEN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HY-1388	SLURRY SHUTOFF VALVE HV-1388 POSITIONING SOLENOID	POSITIONS SLURRY SHUTOFF VALVE HV-1388	H-2-818559 5 P20 D6	FAILS TO OPERATE	HV-1388 FAILS OPEN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PE-1382	HEEL/SLURRY PUMP DISCHARGE PRESSURE DIAPHRAGM SEAL	PREVENTS DISCHARGE PRESSURE TRANSMITTER BEING CONTAMINATED	H-2-818559 5 P20 D8	FAILS TO SEAL	PRESSURE TRANSMITTER BECOMES CONTAMINATED	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PIT-1382	HEEL/SLURRY PUMP DISCHARGE PRESSURE TRANSMITTER	MONITORS SLURRY DISCHARGE HEADER PRESSURE	H-2-818559 5 P20 E8	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TTI-13818	SLURRY DISCHARGE FLOW TEMPERATURE TRANSMITTER	PROVIDES INDICATION SLURRY TEMPERATURE	H-2-818559 5 P20 E7	FAILS TO OPERATE	LOSS OF CONTROL ROOM INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
UE-13818	SLURRY DISCHARGE FLOW/DENSITY SENSOR	PROVIDES SLURRY FLOW/DENSITY MEASUREMENT	H-2-818559 5 P20 C7	FAIL TO INDICATE	LOSS OF CONTROL ROOM INDICATION; INCREASED POTENTIAL TO PLUG SLURRY LINE AND/OR SLURRY PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
UT-13818	SLURRY DISCHARGE FLOW/DENSITY/TEMPERATURE TRANSMITTER	PROVIDES SIGNAL FOR INDICATION AND ALARMS	H-2-818559 5 P20 E7	FAILS TO OPERATE	LOSS OF SLURRY DENSITY, FLOW AND TEMPERATURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZSH-1382	HV-1382 OPEN POSITION SWITCH	PROVIDE OPEN POSITION INDICATION OF HV-1382	H-2-818559 5 P20 C3	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZSH-1383	HV-1383 OPEN POSITION SWITCH	PROVIDE OPEN POSITION INDICATION OF HV-1383	H-2-818559 5 P20 C4	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZSH-1384	HV-1384 OPEN POSITION SWITCH	PROVIDE OPEN POSITION INDICATION OF HV-1384	H-2-818559 5 P20 D2	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
ZSH-1385	HV-1385 OPEN POSITION SWITCH	PROVIDE OPEN POSITION INDICATION OF HV-1385	H-2-818559 5 P20 D2	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZSH-1388	HV-1388 OPEN POSITION SWITCH	PROVIDE OPEN POSITION INDICATION OF HV-1388	H-2-818559 5 P20 C4	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZSL-1382	HV-1382 CLOSED POSITION SWITCH	PROVIDE CLOSED POSITION INDICATION OF HV-1382	H-2-818559 5 P20 C2	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZSL-1383	HV-1383 CLOSED POSITION SWITCH	PROVIDE CLOSED POSITION INDICATION OF HV-1383	H-2-818559 5 P20 C3	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZSL-1384	HV-1384 CLOSED POSITION SWITCH	PROVIDE CLOSED POSITION INDICATION OF HV-1384	H-2-818559 5 P20 D2	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZSL-1385	HV-1385 CLOSED POSITION SWITCH	PROVIDE CLOSED POSITION INDICATION OF HV-1385	H-2-818559 5 P20 D1	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZSL-1388	HV-1388 CLOSED POSITION SWITCH	PROVIDE CLOSED POSITION INDICATION OF HV-1388	H-2-818559 5 P20 D4	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
CCTV-1383	PUMP PIT CLOSED CIRCUIT TV MONITOR	ALLOWS MONITORING OF PUMP PIT DURING OPERATIONS	H-2-818559 6 P21 D3	FAILS TO OPERATE	LOSS OF MONITORING ABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-1381	SLUICING FLUID SHUTOFF VALVE POSITIONING SOLENOID HV-1381 HAND SWITCH	POSITIONS SLUICING FLUID SHUTOFF VALVE HV-1381	H-2-818559 6 P21 F7	FAILS TO OPERATE	HV-1381 FAILS OPEN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-13845	MODE SELECTOR SWITCH	ALIGN VALVES FOR VARIOUS MODES OF OPERATION	H-2-818559 6 P21 F3	FAILS TO OPERATE	LOSS OF MODE SELECTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HS-13848	SLUICING MODE SELECTOR SWITCH	ALIGN VALVES FOR WASTE SLUICING; INHIBITS PUMP OPERATION	H-2-818559 P21 F3	FAILS TO OPERATE	LOSS OF SLUICING MODE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-13847	RAW WATER FLUSH MODE SELECTOR SWITCH	ALIGN VALVES FOR FLUSHING OPERATIONS; INHIBITS PUMP OPERATION	H-2-818559 P21 F3	FAILS TO OPERATE	POTENTIAL TO CONAMINATE RAW WATER SYSTEM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-13848	TEMPERATURE EQUALIZATION MODE SELECTOR SWITCH	ALIGN VALVES FOR TEMPERATURE EQUALIZATION MODE OF OPERATION	H-2-818559 P21 F4	FAILS TO OPERATE	LOSS OF TEMPERATURE EQUALIZATION MODE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HY-1381	SLUICING FLUID SHUTOFF VALVE HV-1381 POSITIONING SOLENOID	POSITIONS SLUICING FLUID SHUTOFF VALVE HV-1381	H-2-818559 P21 D7	FAILS TO OPERATE	HV-1381 FAILS OPEN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
JXA-1385A	C FARM POWER FAILURE ALARM	PROVIDE INDICATION OF POWER FAILURE	H-2-818559 P21 F2	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
JXA-1386A	CONTROL ROOM POWER FAILURE ALARM	PROVIDE INDICATION OF POWER FAILURE	H-2-818559 P21 F2	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
UJTC-13811	SLUICER S-1382 CONTROLLER FIELD I/O	PROVIDE CONTROL SIGNALS TO SLUICER S-1382 AND POSITIONING SIGNALS TO CONTROL ROOM CONTROLLER	H-2-818559 P21 E3	FAILS TO OPERATE	LOSS OF SLUICER CONTROL, SYSTEM SHUTDOWN REQUIRED FOR REPAIR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
UY-13811	PUMP PIT 241-C-08A SLUICE MAST S-1382 TILT CONTROLS	POSITIONS SLUICE MAST NOZZLE (VERTICALLY)	H-2-818559 P21 E4	UNABLE TO REDIRECT SLUICER SPRAY	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
UY-13812	PUMP PIT 241-C-08A SLUICING MAST S-1382 PAN CONTROLS	POSITIONS SLUICE MAST (ROTATION)	H-2-818559 P21 E3	UNABLE TO REDIRECT SLUICER SPRAY	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
YL-13487	SLURRY PUMP P-1381 MODE PERMISSIVE LIGHT	VALVE LINE CORRECT FOR OPERATION OF SLURRY PUMP OPERATION	H-2-818559 6 P21 F5	FAILS TO INDICATE	LOSS OF PERMISSIVE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
YL-13488	HEEL PUMP P-1382 MODE PERMISSIVE LIGHT	VALVE LINE CORRECT FOR OPERATION OF HEEL PUMP OPERATION	H-2-818559 6 P21 F4	FAILS TO INDICATE	LOSS OF PERMISSIVE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
YL-13489	SLUICE PUMP P-0821 MODE PERMISSIVE LIGHT	VALVE LINE CORRECT FOR OPERATION OF SLUICE PUMP OPERATION	H-2-818559 6 P21 F4	FAILS TO INDICATE	LOSS OF PERMISSIVE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZS-13611	SLUICING PIT 241-C-08A SLUICE MAST S-1382 TILT POSITION	INDICATE POSITION OF SLUICE MAST (VERTICALLY)	H-2-818559 6 P21 D4	LOSS OF CONTROL ROOM INDICATION	LOCAL INDICATION AVAILABLE UNTIL REPAIRS COMPLETED	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZS-13612	SLUICING PIT 241-C-08A SLUICE MAST S-1382 PAN POSITION	INDICATE POSITION OF SLUICE MAST (ROTATION)	H-2-818559 6 P21 D3	LOSS OF CONTROL ROOM INDICATION	LOCAL INDICATION AVAILABLE UNTIL REPAIRS COMPLETED	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZSH-1361	HV-1381 OPEN POSITION INDICATION SWITCH	PROVIDE POSITION OF HV-1381	H-2-818559 6 P21 D7	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZSH-13610	HV-13810 OPEN POSITION INDICATION SWITCH	PROVIDE POSITION OF HV-1310	H-2-818559 6 P21 C8	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZSH-1389	HV-1389 OPEN POSITION INDICATING SWITCH	PROVIDE POSITION OF HV-1389	H-2-818559 6 P21 C8	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZSL-1361	HV-1361 CLOSED POSITION INDICATION SWITCH	PROVIDE POSITION OF HV-1361	H-2-818559 6 P21 C7	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZSL-13610	HV-13610 CLOSED POSITION INDICATION SWITCH	PROVIDE POSITION OF HV-1310	H-2-818559 6 P21 C8	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
ZSL-1389	HV-1389 CLOSED POSITION INDICATING SWITCH	PROVIDE POSITION OF HV-1389	H-2-818559 0 P21 C6	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZT-13811	POSITION TRANSMITTER FOR SLUICER S-1382 TILT CONTROLS	PROVIDE TILT POSITION SIGNAL TO SLUICER CONTROLS	H-2-818559 0 P21 E4	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZT-13812	POSITION TRANSMITTER FOR SLUICER S-1382 PAN CONTROLS	PROVIDE PAN POSITION SIGNAL TO SLUICER CONTROLS	H-2-818559 0 P21 E3	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
CCTV-0821	SLUICE PIT 241-AY-02E CLOSED CIRCUIT TV MONITOR	ALLOWS MONITORING OF SLUICE PIT DURING OPERATIONS	H-2-818560 2 P28 C3	FAILS TO OPERATE	LOSS OF MONITORING ABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
EI-0821	SLUICE PUMP VOLTAGE INDICATOR	INDICATE VOLTAGE AVAILABLE TO SLUICE PUMP	H-2-818560 2 P28 E5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ET-0821	SLUICE PUMP VOLTAGE TRANSMITTER	SENSE VOLTAGE AVAILABLE TO SLUICE PUMP	H-2-818560 2 P28 E5	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-0821A	SLUICE PUMP FAULT RESET HAND SWITCH	RESET SLUICE PUMP CONTROL CIRCUIT	H-2-818560 2 P28 F7	FAILS TO RESET	LOSS OF SLUICE PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-0821B	SLUICE PUMP VSD CABINET START/STOP HAND SWITCH	CONTROLS SLUICE PUMP OPERATION FROM THE VSD CABINET	H-2-818560 2 P28 F7	FAILS TO OPERATE	LOSS OF SLUICE PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-0821E	SLUICE PUMP LOCAL/REMOTE SELECTOR HAND SWITCH	ALLOWS SELECTION OF LOCAL OR REMOTE SLUICE PUMP SPEED CONTROL	H-2-818560 2 P28 F8	FAILS TO OPERATE	LOSS OF SLUICE PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
II-0821A	SLUICE PUMP VSD CABINET CURRENT INDICATOR	INDICATE LOAD CURRENT OF SLUICE PUMP	H-2-818560 2 P28 E5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
IT-0621	SLUICE PUMP CURRENT TRANSMITTER	SENSE LOAD CURRENT OF SLUICE PUMP	H-2-818560 2 P28 E5	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
LE-0621	SLUICE PUMP P-0621 SUCTION HEAD	PROVIDES SUCTION HEAD SIGNAL TO SLURRY PUMP CONTROL SYSTEM	H-2-818560 2 P28 B4	FAILS TO OPERATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
LSL-0621	SLUICE PUMP P-0621 LOW SUCTION HEAD SWITCH	PROVIDES LOW SUCTION HEAD SIGNAL TO SLURRY PUMP CONTROL SYSTEM	H-2-818560 2 P28 E6	FAILS TO OPERATE	LATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PE-0621	SLUICE PUMP DISCHARGE PRESSURE SENSOR	PROVIDES MEASUREMENT OF SLUICE PUMP DISCHARGE PRESSURE	H-2-818560 2 P28 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 3	3
SE-0621	SLUICE PUMP P-0621 SPEED SENSOR	PROVIDE SIGNAL FOR SLUICE PUMP SPEED	H-2-818560 2 P28 B4	FAILS TO OPERATE	LOSS OF SLUICE PUMP SPEED CONTROLLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
SIT-0621	SLUICE PUMP SPEED TRANSMITTER	PROVIDES SIGNAL FOR SLUICE PUMP SPEED CONTROLLER	H-2-818560 2 P28 E6	FAILS TO OPERATE	LOSS OF SLUICE PUMP SPEED CONTROLLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TE-0621	SLUICE PUMP P-0621 MOTOR STATOR TEMPERATURE	MONITOR SLUICE PUMP MOTOR STATOR TEMPERATURE	H-2-818560 2 P28 B6	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TE-0622	SLUICE PUMP P-0621 MOTOR BEARING AND BEARING OIL TEMPERATURE	MONITOR SLUICE PUMP MOTOR BEARING AND BEARING OIL TEMPERATURE	H-2-818560 2 P28 B5	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TIT-0621	SLUICE PUMP P-0621 MOTOR STATOR TEMPERATURE TRANSMITTER	PROVIDES SIGNAL TO MOTOR STATOR HIGH TEMPERATURE ALARM	H-2-818560 2 P28 E7	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TIT-0622	SLUICE PUMP MOTOR BEARING AND BEARING OIL TEMPERATURE TRANSMITTER	PROVIDES TEMPERATURE SIGNAL FOR INDICATION AND ALARM	H-2-818560 2 P28 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 3	3

TABLE B-16-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
TSH-0621	SLUICE PUMP P-0621 MOTOR STATOR HIGH TEMPERATURE SWITCH	PROVIDES HIGH TEMPERATURE SIGNAL TO ACTUATE ALARM	H-2-818560 2 P28 E8	FAILS TO OPERATE	LOSS OF SLUICE PUMP STATOR HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TSH-0622	SLUICE PUMP MOTOR BEARING AND BEARING OIL HIGH TEMPERATURE SWITCH	PROVIDES HIGH TEMPERATURE SIGNAL TO ACTUATE ALARM	H-2-818560 2 P28 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 3	3
TSH-0621	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 P28 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 3	3
UE-0625	SLUICE PUMP DISCHARGE FLOW/DENSITY SENSOR	PROVIDES MEASUREMENT OF SLUICE PUMP DISCHARGE FLOW/DENSITY	H-2-818560 2 P28 C4	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
UT-0625	SLUICING FLUID DISCHARGE FLOW/DENSITY/TEMPERATURE TRANSMITTER	PROVIDES SIGNAL FOR INDICATION AND ALARMS	H-2-818560 2 P17 B4	FAILS TO OPERATE	LOSS OF INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
XL-0621	SLUICE PUMP VSD CABINET VSD FAILURE LIGHT	LOCAL INDICATION OF VARIABLE SPEED DRIVE FAILURE	H-2-818560 2 P28 F5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-0621A	SLUICE PUMP CONTROL ROOM START LIGHT	PROVIDE RUN STATUS INDICATION OF SLUICE PUMP	H-2-818560 2 P28 F7	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-0621B	SLUICE PUMP VSD CABINET STOP LIGHT	PROVIDE RUN STATUS INDICATION OF SLUICE PUMP	H-2-818560 2 P28 F7	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-0621E	SLUICE PUMP VSD CABINET REMOTE LIGHT	PROVIDES INDICATION OF REMOTE CONTROL AT SLUICE PUMP VSD CABINET	H-2-818560 2 P28 F7	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
YL-0821G	SLUICE PUMP VSD CABINET LOCAL LIGHT	PROVIDES INDICATION OF LOCAL CONTROL AT VSD CABINET	H-2-818560 2 P28 F6	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZE-0821	SLUICE PUMP POSITION INDICATOR	PROVIDE POSITION OF SLUICE PUMP (VERTICALLY)	H-2-818560 2 P28 C4	FAILS TO INDICATE	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZS-0821D	SLUICE PUMP UPPER LIMIT POSITION SWITCH	PROVIDES INDICATION OF SLUICE PUMP AT UPPER LIMIT	H-2-818560 2 P28 C3	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZS-0821E	SLUICE PUMP LOWER LIMIT POSITION SWITCH	PROVIDES INDICATION OF SLUICE PUMP AT UPPER LIMIT	H-2-818560 2 P28 C3	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
CCTV-0822	PUMP PIT 241-AY-02A CLOSED CIRCUIT TV MONITOR	ALLOWS MONITORING OF PUMP PIT DURING OPERATIONS	H-2-818560 3 P20 D7	FAILS TO OPERATE	LOSS OF MONITORING ABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
LAH-AY102A-1 A	AY-102 LIQUID LEVEL HIGH ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818560 4 P18 F2	FAILS TO OPERATE	LOSS OF ALARM	LATER	.
PAH-AY102A-1A	AY-102 VAPOR SPACE PRESSURE HIGH ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818560 4 P18 F4	FAILS TO OPERATE	LOSS OF ALARM	LATER	.
PAL-AY102A-1 A	AY-102 VAPOR SPACE PRESSURE LOW ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818560 4 P18 F3	FAILS TO OPERATE	LOSS OF ALARM	LATER	.
RAH-AY102A-1A	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
WFAH-AY102 A-1A	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
WFSHAY102 A-1	LEAK DETECTION PIT 102A WEIGHT FACTOR HIGH SWITCH	PROVIDES SIGNAL FOR WEIGHT FACTOR HIGH ALARM	H-2-818560 4 P18 B8	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES. WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
DAH-0625A	SLUICING FLUID DISCHARGE HIGH DENSITY ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818560 5 P17 F5	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES. WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
DIT-0625	SLUICING FLUID DISCHARGE HIGH DENSITY INDICATING TRANSMITTER	PROVIDES SIGNAL FOR INDICATION, INTERLOCK AND ALARM	H-2-818560 5 P17 E4	FAILS TO OPERATE	LOSS OF LOCAL INDICATION, INTERLOCK AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES. WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
DSH-0625	SLUICING FLUID DISCHARGE HIGH DENSITY SWITCH	PROVIDES SIGNAL FOR ALARM	H-2-818560 5 P17 E4	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES. WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
FL-0625	SLUICING FLUID DISCHARGE FLOW INDICATOR	PROVIDES INDICATION OF SLUICING FLUID FLOW	H-2-818560 5 P17 F4	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES. WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
FQI-0625	SLUICING FLUID DISCHARGE FLOW TOTALIZER	PROVIDES INDICATION OF TOTAL SLUICING FLUID FLOW	H-2-818560 5 P17 F4	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES. WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-0621	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 3	3
HS-0621C	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 3	3
HS-0621D	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 3	3

TABLE B-16-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
JXA-0623A	AY FARM POWER FAILURE (EXCEPT PROJECT W-320)	ALERTS OPERATORS TO ABNORMAL SITUATION	H-2-818560 5 P17 F2	FAILS TO INDICATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES. WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
JXA-0624A	AY FARM PROJECT W-320 POWER FAILURE	ALERTS OPERATORS TO ABNORMAL SITUATION	H-2-818560 5 P17 F2	FAILS TO INDICATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES. WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PIT-0621	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 3	3
SIC-0621	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 3	3
TAH-0621A	SLUICE PUMP P-AY102-1 MOTOR STATOR HIGH TEMPERATURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818560 5 P17 F8	FAILS TO OPERATE	LOSS OF STATOR WINDING HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES. WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TAH-0622A	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 3	3
TAH-0621A	SLUICE 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 3	3
TIT-0625	SLUICING FLUID DISCHARGE TEMPERATURE INDICATING TRANSMITTER	PROVIDES INDICATION OF SLUICING FLUID TEMPERATURE	H-2-818560 5 P17 E5	FAILS TO INDICATE	LOSS OF TEMPERATURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES. WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
XA-0621A	SLUICE PUMP CONTROL ROOM VSD FAILURE LIGHT	REMOTE INDICATION OF VARIABLE SPEED DRIVE FAILURE	H-2-818560 5 P17 F5	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES. WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-2. SWTS EQUIPMENT (PUMPS, VALVES, ETC.)

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
YL-0821F	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 3	3
YL-0821H	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 3	3
ZL-0821D	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 1, CRITERION 3	3
ZL-0821E	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 3	3
ZT-0821	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 3	3

TABLE B-16-3. SWTS RAW WATER SYSTEM

FMEA SAFETY CLASS DESIGNATION

FACILITY: <u>WRSS</u> TANK FARM : <u>241-CIAY</u> SYSTEM : <u>SWTS-RW</u> SYSTEM SAFETY FUNCTION : <u>PROVIDE RAW WATER FLUSHING OF ALL COMPONENTS</u>				SYSTEM SAFETY CLASS JUSTIFICATION : <u>4.6.2</u> SYSTEM SAFETY CLASS : <u>3</u> NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY RE&C IS FOR TRACKING PURPOSES ONLY.			
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HS-13610	RAW WATER DRAIN VALVE POSITIONING SOLENOID HY-13610 HAND SWITCH	POSITIONS RAW WATER DRAIN VALVE HV-13610	H-2-818559 6 P21 F5	FAILS TO OPERATE	HV-13610 FAILS OPEN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-1369	RAW WATER SHUTOFF VALVE POSITIONING SOLENOID HY-1369 HAND SWITCH	POSITIONS RAW WATER SHUTOFF VALVE HV-1369	H-2-818559 6 P21 F6	FAILS TO OPERATE	HV-1369 FAILS CLOSED	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HY-13610	RAW WATER DRAIN VALVE HV-13610 POSITIONING SOLENOID	POSITIONS RAW WATER DRAIN VALVE HV-13610	H-2-818559 6 P21 D6	FAILS TO OPERATE	HV-13610 FAILS OPEN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HY-1369	RAW WATER SHUTOFF VALVE HV-1369 POSITIONING SOLENOID	POSITIONS RAW WATER SHUTOFF VALVE HV-1369	H-2-818559 6 P21 D6	FAILS TO OPERATE	HV-1369 FAILS CLOSED	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-13637	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 3	3
ZLH-13637	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 3	3

TABLE B-16-3. SWTS RAW WATER SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHIT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
ZLL-13637	HIGH EFFICIENCY METAL FILTER HMF-1381 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 3	3
ZSH-13637	HIGH EFFICIENCY METAL FILTER HMF-1381 FILTERED WATER FLUSH SHUT OFF VALVE HV-13637 OPEN POSITION SWITCH	PROVIDES OPEN 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 3	3
ZSL-13637	HIGH EFFICIENCY METAL FILTER HMF-1381 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 3	3
FQI-13628	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 3	3
HS-13662	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 3	3
HS-13669	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 3	3
HY-13662	HV-13662 POSITIONING SOLENOID	PROVIDES INSTRUMENT AIR TO OPEN AND CLOSE WRSS TRANSFER PIPING RAW WATER FLUSH VALVE	H-2-818561 5 P20 C2	FAILS TO OPERATE	HV-13662 FAILS AS IS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HY-13669	HV-13669 POSITIONING SOLENOID	PROVIDES INSTRUMENT AIR TO OPEN AND CLOSE HEME FLUSH VALVE	H-2-818561 5 P20 E7	FAILS TO OPERATE	HV-13669 FAILS CLOSED	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15-3. SWTS RAW WATER SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
KY-1381	HV-13889 TIMER RELAY	CYCLES HV-13889 FOR FLUSHING HEME ONE MINUTE PER HOUR	H-2-818581 5 P20 F7	FAILS TO OPERATE	HV-13889 FAILS CLOSED	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PAH-13810A	RAW WATER SUPPLY HIGH PRESSURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 5 P20 F2	FAILS TO OPERATE	LOSS OF HIGH PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PDAH-13814A	F-1382 HIGH PRESSURE DIFFERENTIAL ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 5 P20 F6	FAILS TO OPERATE	LOSS OF HIGH DIFFERENTIAL PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PDAH-13815A	F-1381 HIGH PRESSURE DIFFERENTIAL ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 5 P20 F5	FAILS TO OPERATE	LOSS OF HIGH DIFFERENTIAL PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PDISH-13814	F-1382 PRESSURE DIFFERENTIAL INDICATING SWITCH	MONITOR PRESSURE ACROSS FILTER F-1382	H-2-818581 5 P20 E6	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PDISH-13815	F-1381 PRESSURE DIFFERENTIAL INDICATING SWITCH	MONITOR PRESSURE ACROSS FILTER F-1381	H-2-818581 5 P20 E5	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PI-13818	RAW WATER SUPPLY PRESSURE INDICATOR	PROVIDES RW PRESSURE INDICATION	H-2-818581 5 P20 F2	FAILS TO INDICATE	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PI-13831	HEME FLUSH WATER PRESSURE INDICATOR	PROVIDES FILTERED WATER PRESSURE INDICATION	H-2-818581 5 P20 E8	FAILS TO INDICATE	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PIT-13818	RAW WATER SUPPLY PRESSURE INDICATING TRANSMITTER	PROVIDES RW PRESSURE AND ALARM DOWN STREAM OF BACKFLOW PREVENTER	H-2-818581 5 P20 B3	FAILS TO INDICATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PSH-13818	RAW WATER SUPPLY HIGH PRESSURE SWITCH	PROVIDES RW HIGH PRESSURE DOWN STREAM OF BACKFLOW PREVENTER ALARM	H-2-818581 5 P20 F2	FAILS TO OPERATE	LOSS OF HIGH PRESSURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15-3. SWTS RAW WATER SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
RAH-1362A	RAW WATER REMOTE HIGH RADIATION ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 5 P20 F4	FAILS TO OPERATE	LOSS OF REMOTE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
RE-1362	RAW WATER RADIATION SENSOR	MONITOR RAW WATER FOR CONTAMINATION IN THE EVENT OF BACKFLOW	H-2-818581 5 P20 C4	FAILS TO INDICATE	LOSS OF INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
RI-1362A	RAW WATER REMOTE RADIATION INDICATOR	LOSS OF REMOTE INDICATION	H-2-818581 5 P20 F4	FAILS TO OPERATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
RIT-1362	RAW WATER RADIATION TRANSMITTER	PROVIDES SIGNAL FOR INDICATION AND ALARMS	H-2-818581 5 P20 E4	FAILS TO OPERATE	LOSS OF INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
RLH-1362	RAW WATER LOCAL HIGH RADIATION STROBE LIGHT	LOCAL HIGH RADIATION ALARM	H-2-818581 5 P20 E4	FAILS TO OPERATE	LOSS OF LOCAL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
RSH-1362A	RAW WATER LOCAL HIGH RADIATION SWITCH	PROVIDES SIGNAL FOR LOCAL ALARM	H-2-818581 5 P20 E4	FAILS TO OPERATE	LOSS OF LOCAL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
RSH-1362B	RAW WATER REMOTE HIGH RADIATION SWITCH	PROVIDES SIGNAL FOR REMOTE ALARM	H-2-818581 5 P20 F4	FAILS TO OPERATE	LOSS OF REMOTE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
RXA-1362A	RAW WATER REMOTE RADIATION TROUBLE ALARM	REMOTE RADIATION MONITOR TROUBLE ALARM	H-2-818581 5 P20 F4	FAILS TO OPERATE	LOSS OF REMOTE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
RXL-1362	RAW WATER LOCAL RADIATION TROUBLE LIGHT	LOCAL RADIATION MONITOR TROUBLE LIGHT	H-2-818581 5 P20 E4	FAILS TO OPERATE	LOSS OF LOCAL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
RXS-1362A	RAW WATER LOCAL RADIATION TROUBLE SWITCH	PROVIDES SIGNAL FOR LOCAL ALARM	H-2-818581 5 P20 E4	FAILS TO OPERATE	LOSS OF LOCAL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
RXS-1362B	RAW WATER REMOTE RADIATION TROUBLE SWITCH	PROVIDES SIGNAL FOR REMOTE ALARM	H-2-818581 5 P20 F4	FAILS TO OPERATE	LOSS OF REMOTE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-3. SWTS RAW WATER SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
ZLH-13682	HV-13682 OPEN POSITION INDICATION LIGHT	PROVIDES INDICATION FOR VALVE OPEN POSITION	H-2-818581 5 P20 F3	FAILS TO OPERATE	LOSS OF VALVE POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZLH-13689	HV-13689 OPEN POSITION INDICATION LIGHT	PROVIDES INDICATION FOR VALVE OPEN POSITION	H-2-818581 5 P20 F7	FAILS TO OPERATE	LOSS OF VALVE POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZLL-13682	HV-13682 CLOSED POSITION INDICATION LIGHT	PROVIDES INDICATION FOR VALVE CLOSED POSITION	H-2-818581 5 P20 F2	FAILS TO OPERATE	LOSS OF VALVE POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZLL-13689	HV-13689 CLOSED POSITION INDICATION LIGHT	PROVIDES INDICATION FOR VALVE CLOSED POSITION	H-2-818581 5 P20 F7	FAILS TO OPERATE	LOSS OF VALVE POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZSH-13682	HV-13682 OPEN POSITION SWITCH	PROVIDES SIGNAL FOR VALVE OPEN POSITION	H-2-818581 5 P20 C3	FAILS TO OPERATE	LOSS OF VALVE POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZSH-13689	HV-13689 OPEN POSITION SWITCH	PROVIDES SIGNAL FOR VALVE OPEN POSITION	H-2-818581 5 P20 E7	FAILS TO OPERATE	LOSS OF VALVE POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZSL-13682	HV-13682 CLOSED POSITION SWITCH	PROVIDES SIGNAL FOR VALVE CLOSED POSITION	H-2-818581 5 P20 C3	FAILS TO OPERATE	LOSS OF VALVE POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZSL-13689	HV-13689 CLOSED POSITION SWITCH	PROVIDES SIGNAL FOR VALVE CLOSED POSITION	H-2-818581 5 P20 E7	FAILS TO OPERATE	LOSS OF VALVE POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
FE-1381	RAW WATER FLOW TOTALIZER SENSOR	PROVIDE SIGNAL FOR RAW WATER TOTALIZER	H-2-818582 1 P28 C4	PLUG	UNABLE TO QUANTIFY RW ADDITION UNTIL REPAIRED/REPLACED	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
FQI-1381	RAW WATER FLOW TOTALIZER INDICATOR	PROVIDES INDICATION OF TOTAL WRSS RAW WATER USE	H-2-818582 1 P28 F4	FAILS TO OPERATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
FQIT-1381	RAW WATER FLOW TOTALIZER TRANSMITTER	TOTALIZE WRSS RAW WATER CONSUMPTION	H-2-818582 1 P28 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 3	3

TABLE B-16-3. SWTS RAW WATER SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
LDA-1365A	SERVICE BUILDING 241-C-73 LEAK DETECTOR ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818582 1 P28 F2	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
LDE-1365	SERVICE BUILDING 241-C-73 LEAK DETECTOR SENSOR	MONITOR RAW WATER LEAKAGE TO SERVICE BLDG	H-2-818582 1 P28 C2	FAILS TO OPERATE	LOSS OF LEAK DETECTOR	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
LDS-1365	SERVICE BUILDING 241-C-73 LEAK DETECTOR SWITCH	PROVIDES SIGNAL FOR ALARM	H-2-818582 1 P28 D2	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
POAH-1365A	RAW WATER DUPLEX STRAINER HIGH DIFFERENTIAL PRESSURE ALARM	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818582 1 P28 F3	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PDISH-1365	RAW WATER DUPLEX STRAINER PRESSURE DIFFERENTIAL INDICATING SWITCH	MONITOR RW PRESSURE THROUGH DUPLEX STRAINER	H-2-818582 1 P28 D3	FAILS TO OPERATE	LOSS OF DP INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PI-1365	RAW WATER HEADER PRESSURE INDICATOR	MONITORS RW SUPPLY PRESSURE	H-2-818582 1 P28 F3	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PIT-1365	RAW WATER HEADER PRESSURE TRANSMITTER	MONITORS RW SUPPLY PRESSURE	H-2-818582 1 P28 D3	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-4. COMPRESSED AIR SYSTEM

FMEA SAFETY CLASS DESIGNATION

FACILITY: <u>WRSS</u>		SYSTEM SAFETY CLASS JUSTIFICATION : <u>4.6.3</u>					SAFETY CLASS
TANK FARM : <u>241-C/AY</u>		SYSTEM SAFETY CLASS : <u>3</u>					
SYSTEM : <u>SWTS-IA</u>		NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY RE&C IS FOR TRACKING PURPOSES ONLY.					
SYSTEM SAFETY FUNCTION : <u>PROVIDE AIR PURGE AND VALVE POSITIONING</u>							
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
FI-1362	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	LATER	3
HS-1366	SLUICE PUMP DISCHARGE VALVE POSITIONING SOLENOID HY-1366 HAND SWITCH	POSITIONS SLUICE PUMP DISCHARGE VALVE HV-1366	H-2-818559 4 P23 F2	FAILS TO OPERATE	HV-1366 FAILS OPEN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-1367	HEEL PUMP DISCHARGE VALVE POSITIONING SOLENOID HY-1367 HAND SWITCH	POSITIONS HEEL PUMP DISCHARGE VALVE HV-1367	H-2-818559 4 P23 F2	FAILS TO OPERATE	HV-1367 FAILS OPEN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HY-1366	SLUICE PUMP DISCHARGE VALVE POSITIONING SOLENOID HY-1366	POSITIONS SLUICE PUMP DISCHARGE VALVE HV-1366	H-2-818559 4 P23 D1	FAILS TO OPERATE	HV-1366 FAILS OPEN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HY-1367	HEEL PUMP DISCHARGE VALVE POSITIONING SOLENOID	POSITIONS HEEL PUMP DISCHARGE VALVE HV-1367	H-2-818559 4 P23 D2	FAILS TO OPERATE	HV-1367 FAILS OPEN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
FO-1361	HEMF BLOW DOWN AIR RESTRICTING ORFICE	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 3	3
PI-13628	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 3	3
PI-13629	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 3	3

TABLE B-15-4. COMPRESSED AIR SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
PI-13630	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 3	3
PAL-1364	INSTRUMENT AIR HEADER LOW PRESSURE ALARM	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818562 1 P28 F7	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PI-1364	INSTRUMENT AIR HEADER PRESSURE INDICATOR	MONITORS INSTRUMENT AIR HEADER PRESSURE	H-2-818562 1 P28 F7	FAILS TO INDICATE	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PI-1366	AIR COMPRESSOR CP-1361 DISCHARGE PRESSURE INDICATOR	MONITORS COMPRESSOR DISCHARGE PRESSURE	H-2-818562 1 P28 D5	FAILS TO INDICATE	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PIT-1364	INSTRUMENT AIR HEADER PRESSURE INDICATING TRANSMITTER	MONITORS INSTRUMENT AIR HEADER PRESSURE	H-2-818562 1 P28 D7	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PSL-1364	INSTRUMENT AIR HEADER LOW PRESSURE SWITCH	PROVIDE INSTRUMENT AIR HEADER LOW PRESSURE ALARM	H-2-818562 1 P28 F7	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
XA-1363A	AIR COMPRESSOR CP-1361 TROUBLE ALARM	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818562 1 P28 F5	FAIL TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13617A	AIR COMPRESSOR CP-1361 RUN LIGHT	PROVIDE INDICATION ORF COMPRESSOR STATUS	H-2-818562 1 P28 F5	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13617B	AIR COMPRESSOR CP-1361 OFF LIGHT	PROVIDE INDICATION ORF COMPRESSOR STATUS	H-2-818562 1 P28 F5	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-5. LEAK DETECTION SYSTEM

FMEA SAFETY CLASS DESIGNATION

FACILITY: WRSS TANK FARM: 241-C/JAY SYSTEM: LEAK DETECTION SYSTEM SAFETY FUNCTION: PROVIDE LEAK DETECTION INDICATION AND INTERLOCKS				SYSTEM SAFETY CLASS JUSTIFICATION: 4.6.4 SYSTEM SAFETY CLASS: 3 NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY REAC IS FOR TRACKING PURPOSES ONLY.			
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHEET REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
LDA-1361GA	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 3	3
LDE-1368	SLUICING PIT 241-C-08C LEAK DETECTOR	DETECT LEAKAGE INTO SLUICING PIT	H-2-818559 2 P21 D7	LOSS OF LEAK DETECTION SLUICE PIT 241-C-08C	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
LDS-1368	SLUICING PIT 241-C-08C LEAK DETECTOR SWITCH	PROVIDE LEAKAGE SIGNAL TO INTERLOCKS AND ALARMS	H-2-818559 2 P21 E7	LOSS OF LEAK DETECTION SLUICE PIT 241-C-08C	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
LDE-1367	HEEL PIT 241-C-08B LEAK DETECTOR	DETECT LEAKAGE INTO HEEL PIT	H-2-818559 3 P23 E4	LOSS OF LEAK DETECTION HEEL PIT 241-C-08B	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
LDS-1367	HEEL PIT 241-C-08B LEAK DETECTOR SWITCH	PROVIDES LEAK DETECTOR SIGNAL TO ALARMS AND INTERLOCK	H-2-818559 3 P23 E3	FAILS TO OPERATE	LOSS OF LEAK DETECTION ALARM AND INTERLOCK	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
LDE-1361	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 3	3
LDS-1361	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 3	3
LDE-1363	LEAK DETECTOR 6" ENC-100-M26a	LEAK DETECTOR SLURRY LINE	H-2-818559 5 P20 E4	FAIL TO DETECT	LOSS OF ENCAPSULATION LINE LEAK DETECTION CAPABILITY	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-6. LEAK DETECTION SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT. REV. ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
LDS-1383	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
LDE-1384	LEAK DETECTOR 6" ENC-200-M28a	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
LDE-1388	PUMP PIT 241-C-08A LEAK DETECTOR	DETECT LEAKAGE INTO PUMP PIT	H-2-818559 6 P21 E2	LOSS OF LEAK DETECTION PUMP PIT 241-C-08A	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
LDS-1384	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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
LDS-1388	PUMP PIT 241-C-08A 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-4-48, SECTION 9, TABLE 1, CRITERION 3	3
LDE-0821	SLUICE PUMP P-0821 MOTOR LEAK DETECTOR	DETECT LEAKAGE INTO SLUICE PUMP MOTOR CASING	H-2-818580 2 P28 B6	LOSS OF SLUICE PUMP MOTOR LEAK DETECTION	SYSTEM SHUTDOWN REQUIRED FOR CORRECTIVE ACTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
LDS-0821	SLUICE PUMP P-0821 MOTOR LEAK DETECTOR RELAY	PROVIDES MOTOR CASING LEAKAGE SIGNAL TO SLUICE PUMP VARIABLE SPEED DRIVE CONTROLS	H-2-818580 2 P28 E6	FAILS TO OPERATE	LOSS OF SLUICE PUMP	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
LDA-102-21722 A	SLUICE PIT 241-AY-02E /PUMP PIT 241-AY-02A LEAK DETECTOR ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818580 5 P17 F2	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-6. VENTILATION SYSTEM

FMEA SAFETY CLASS DESIGNATION

FACILITY: <u>WRSS</u>		SYSTEM SAFETY CLASS JUSTIFICATION: <u>4.5.6</u>					SYSTEM SAFETY CLASS: <u>1</u>		NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY REAC IS FOR TRACKING PURPOSES ONLY.	
TANK FARM: <u>241-C</u>		SYSTEM SAFETY FUNCTION: <u>PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING</u>					FAILURE MODE		FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	
SYSTEM: <u>VENTILATION</u>		DRAWING SHT REV ZONE					FUNCTION		SAFETY CLASS JUSTIFICATION	
SYSTEM SAFETY FUNCTION: <u>PROVIDE CONFINEMENT OF HAZARDOUS AEROSOLS; TANK COOLING</u>		EQUIPMENT, COMPONENT, INSTRUMENT NAME					FAILURE MODE		FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.		EQUIPMENT, COMPONENT, INSTRUMENT NAME					FUNCTION		FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	
HS-13843		DIRECTED AIR DEFOGGING SYSTEM POWER ON/OFF HAND SWITCH					CONTROLS POWER TO DIRECTED AIR DEFOGGING SYSTEM		LOSS OF DIRECTED AIR DEFOGGING SYSTEM NOZZLE POSITIONING CONTROL	
HS-13844		DIRECTED AIR DEFOGGING SYSTEM NOZZLE POSITIONING HAND SWITCH					POSITIONS DIRECTED AIR DEFOGGING NOZZLE		LOSS OF DIRECTED AIR DEFOGGING SYSTEM NOZZLE POSITIONING CONTROL	
HV-13874		DIRECTED AIR DEFOGGING SYSTEM NOZZLE POSITIONER INSTRUMENT AIR CONTROL VALVE					ALLOW POSITIONING OF DIRECTED AIR DEFOGGING NOZZLE		LOSS OF DIRECTED AIR DEFOGGING SYSTEM NOZZLE POSITIONING CONTROL	
HV-13875		DIRECTED AIR DEFOGGING SYSTEM NOZZLE POSITIONER INSTRUMENT AIR CONTROL VALVE					ALLOW POSITIONING OF DIRECTED AIR DEFOGGING NOZZLE		LOSS OF DIRECTED AIR DEFOGGING SYSTEM NOZZLE POSITIONING CONTROL	
HZ-1381		DIRECTED AIR DEFOGGING SYSTEM NOZZLE POSITIONER					ALLOWS DIRECTING VENTILATION RECIRCULATION RETURN/DEFOGGING NOZZLE		DECREASE IN TANK IMAGING SYSTEM EFFECTIVENESS; INCREASE IN VAPOR LOADING IN VENTILATION SYSTEM	
YL-13645		DIRECTED AIR DEFOGGING SYSTEM POWER OFF INDICATING LIGHT					PROVIDE INDICATION OF POWER STATUS		LOSS OF LOCAL INDICATION	

TABLE B-15-6. VENTILATION SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
YL-13848	DIRECTED AIR DEFOGGING SYSTEM POWER ON INDICATING LIGHT	PROVIDE INDICATION OF POWER STATUS	H-2-818559 3 P23 F2	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZL-13817	DIRECTED AIR DEFOGGING SYSTEM NOZZLE POSITION INDICATOR	PROVIDES NOZZLE POSITION INDICATION	H-2-818559 3 P23 F1	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZL-13817	DIRECTED AIR DEFOGGING SYSTEM NOZZLE POSITION INDICATING LIGHT	PROVIDES ZERO DEGREE POSITION INDICATION	H-2-818559 3 P23 F2	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZL-13818	DIRECTED AIR DEFOGGING SYSTEM NOZZLE POSITION INDICATING LIGHT	PROVIDES ONE EIGHTY DEGREE POSITION INDICATION	H-2-818559 3 P23 F2	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZS-13817	DIRECTED AIR DEFOGGING SYSTEM NOZZLE POSITION SWITCH	PROVIDES ZERO DEGREE POSITION SIGNAL TO INDICATING LIGHT	H-2-818559 3 P23 C2	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZS-13818	DIRECTED AIR DEFOGGING SYSTEM NOZZLE POSITION SWITCH	PROVIDES ONE EIGHTY DEGREE POSITION SIGNAL TO INDICATING LIGHT	H-2-818559 3 P23 C2	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ZT-13817	DIRECTED AIR DEFOGGING SYSTEM NOZZLE POSITION TRANSMITTER	PROVIDES POSITION SIGNAL TO INDICATOR	H-2-818559 3 P23 C2	FAILS TO OPERATE	LOSS OF DIRECTED AIR DEFOGGING SYSTEM NOZZLE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-13828	CARBON DIOXIDE SUPPLY SHUTOFF VALVE HAND SWITCH	PROVIDES CARBON DIOXIDE FLOW CONTROL	H-2-818581 1 P27 F2	FAILS TO OPERATE	LOSS OF CARBON DIOXIDE	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15-6. VENTILATION SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
LG-1368	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 3	3
LG-1367	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 3	3
PAL-13628A	CARBON DIOXIDE SUPPLY LOW PRESSURE ALARM	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818561 1 P27 F3	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES. WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PISL-13628	CARBON DIOXIDE SUPPLY PRESSURE INDICATION AND SWITCH	INDICATE CARBON DIOXIDE SUPPLY PRESSURE AND PROVIDE LOW PRESSURE ALARM	H-2-818561 1 P27 E3	FAILS TO OPERATE	LOSS OF FOG SUPPRESSION AND IN TANK VISUAL MONITORING AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES. WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZLH-13628	CARBON DIOXIDE SUPPLY SHUTOFF VALVE, HV-13628 OPEN INDICATING LIGHT	PROVIDE VALVE OPEN POSITION INDICATION	H-2-818561 1 P27 F2	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES. WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZLL-13628	CARBON DIOXIDE SUPPLY SHUTOFF VALVE CLOSED, HV-13628 INDICATING LIGHT	PROVIDE VALVE CLOSED POSITION INDICATION	H-2-818561 1 P27 F2	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES. WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZSH-13628	CARBON DIOXIDE SUPPLY SHUTOFF VALVE OPEN, HV-13628 POSITION SWITCH	PROVIDE VALVE OPEN POSITION INDICATION	H-2-818561 1 P27 E2	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES. WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZSL-13628	CARBON DIOXIDE SUPPLY SHUTOFF VALVE CLOSED, HV-13628 POSITION SWITCH	PROVIDE VALVE CLOSED POSITION INDICATION	H-2-818561 1 P27 E2	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES. WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
FAL-1364	CIRC PUMP DISCHARGE LOW FLOW ALARM	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 3	3

TABLE B-15-6. VENTILATION SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
FE-1364	FLOW ELEMENT	MONITOR FLOW OF GLYCOL COOLING MEDIA	H-2-818581 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 3	3
FI-1364	FLOW INDICATOR	PROVIDES INDICATION OF GLYCOL FLOW	H-2-818581 2 P23 F2	FAILS TO INDICATE	LOSS OF FLOW INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
FI-1364	FLOW TRANSMITTER	PROVIDES SIGNAL TO INSTRUMENT CONTROL BLDG FOR INDICATION AND ALARMS FOR MONITORING GLYCOL COOLING MEDIA FLOW	H-2-818581 2 P23 E2	FAILS TO OPERATE	LOSS OF FLOW INDICATION AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
FSL-1364	CIRC PUMP DISCHARGE LOW FLOW ALARM SWITCH	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 2 P23 F2	FAILS TO OPERATE	LOSS OF LOW FLOW ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
FSL-1364	CIRC PUMP DISCHARGE LOW-LOW FLOW ALARM SWITCH	PROVIDES LOW FLOW SIGNAL TO CHILLER SHUTDOWN INTERLOCK	H-2-818581 2 P23 F2	FAILS TO OPERATE	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-13619	CIRC PUMP LOW DISCHARGE PRESSURE RESET HAND SWITCH	RESETS LOW PRESSURE LIGHT	H-2-818581 2 P23 E3	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-13627A	AIR COOLED CHILLER CONTROL ROOM START HAND SWITCH	REMOTE OPERATION SWITCH FOR AIR COOLED CHILLER R-1381	H-2-818581 2 P23 F8	FAILS TO OPERATE	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-13627B	AIR COOLED CHILLER CONTROL ROOM STOP HAND SWITCH	REMOTE OPERATION SWITCH FOR AIR COOLED CHILLER R-1381	H-2-818581 2 P23 F7	FAILS TO OPERATE	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-13628	AIR COOLED CHILLER C-CWR-1 ON/OFF LOCAL HAND SWITCH	PROVIDES CONTROL OF CHILLER	H-2-818581 2 P23 E7	FAILS TO OPERATE	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-13631	CIRC PUMP P-1385 ON/OFF/REMOTE LOCAL HAND SWITCH	LOCAL/REMOTE OPERATION SWITCH FOR CIRC PUMP P-1385	H-2-818581 2 P23 E4	FAILS TO OPERATE	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15-6. VENTILATION SYSTEM
FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
PSL-1366	EXPANSION TANK TK1362 PRESSURE INDICATION 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 3	3
PLL-13610	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 3	3
TAH-13618A	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 3	3
TE-13618	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 3	3
TE-13619	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 3	3
TIT-13618	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 3	3
TIT-13619	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 3	3
TSH-13618	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 3	3
XA-1364A	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 3	3
YL-13627A	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 3	3

TABLE B-15-6. VENTILATION SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HS-13832	CIRC PUMP P-1384 ON/OFF/REMOTE LOCAL HAND SWITCH	LOCAL/REMOTE OPERATION SWITCH FOR CIRC PUMP P-1384	H-2-818581 2 P23 E4	FAILS TO OPERATE	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-13833	CIRC PUMP P-1385 ON/AUTO/OFF REMOTE SELECTOR SWITCH	PROVIDES CONTROL FROM CIRC PUMP P-1385	H-2-818581 2 P23 F5	FAILS TO OPERATE	LOSS OF CIRC PUMP/CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-13834	CIRC PUMP P-1384 ON/AUTO/OFF REMOTE SELECTOR SWITCH	PROVIDES CONTROL FROM CIRC PUMP P-1384	H-2-818581 2 P23 F4	FAILS TO OPERATE	LOSS OF CIRC PUMP/CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PAL-13810A	CIRC PUMP LOW DISCHARGE PRESSURE ALARM	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818581 2 P23 F3	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PAL-1386A	EXPANSION TANK TK1382 PRESSURE LOW ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 2 P23 F6	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PDAH-1388A	CIRC PUMP SUCTION STRAINER DIFFERENTIAL PRESSURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 2 P23 F5	FAILS TO OPERATE	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PDISH-1388	CIRC PUMP SUCTION STRAINER DIFFERENTIAL PRESSURE INDICATING SWITCH	MONITOR PRESSURE ACROSS GLYCOL STRAINER P-1384	H-2-818581 2 P23 D5	FAILS TO OPERATE	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PI-1387	MAKE UP STORAGE TANK TK1381 PRESSURE	MONITOR MAKE UP TANK PRESSURE	H-2-818581 2 P23 C8	FAILS TO INDICATE	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PI-1388	PCV-1388 OUTLET PRESSURE INDICATION	MONITOR OUTLET PRESSURE OF PCV-1388	H-2-818581 2 P23 C7	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
PISL-13810	CIRC PUMP DISCHARGE PRESSURE INDICATING SWITCH	MONITOR DISCHARGE PRESSURE OF GLYCOL RECIRCULATION PUMPS; STARTS STANDBY PUMP	H-2-818581 2 P23 D3	FAILS TO OPERATE	LOSS OF CHILLER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-6. VENTILATION SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
YL-13627B	AIR COOLED CHILLER R-1381 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 3	3
YL-13631A	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 3	3
YL-13631B	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 3	3
YL-13631C	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 3	3
YL-13632A	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 3	3
YL-13632B	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 3	3
YL-13632C	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 3	3
YL-13633A	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 3	3
YL-13633B	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 3	3
YL-13633C	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 3	3
YL-13634A	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 3	3

TABLE B-16-8. VENTILATION SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
YL-13834B	CIRC PUMP P-1384 REMOTE OFF INDICATING LIGHT	PROVIDES INDICATION OF PUMP OFF STATUS	H-2-818581 2 P23 F4	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
YL-13834C	CIRC PUMP P-1384 REMOTE AUTO INDICATING LIGHT	PROVIDES INDICATION OF PUMP AUTO STATUS	H-2-818581 2 P23 F4	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-13835B	RECIRCULATION FAN REMOTE RUN HAND SWITCH	PROVIDES REMOTE CONTROL OF RECIRCULATION FAN	H-2-818581 3 P30 F2	FAILS TO OPERATE	LOSS OF RECIRCULATION FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-13835C	RECIRCULATION FAN REMOTE OFF HAND SWITCH	PROVIDES REMOTE CONTROL OF RECIRCULATION FAN	H-2-818581 3 P30 F2	FAILS TO OPERATE	LOSS OF RECIRCULATION FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-13838	RECIRCULATION FAN LOCAL REMOTE SELECTOR HAND SWITCH	ALLOWS LOCAL OR REMOTE CONTROL OF RECIRCULATION FAN	H-2-818581 3 P30 E2	FAILS TO OPERATE	LOSS OF RECIRCULATION FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-13838A	RECIRCULATION FAN LOCAL RUN HAND SWITCH	PROVIDES LOCAL CONTROL OF RECIRCULATION FAN	H-2-818581 3 P30 E2	FAILS TO OPERATE	LOSS OF RECIRCULATION FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
HS-13838B	RECIRCULATION FAN LOCAL OFF HAND SWITCH	PROVIDES LOCAL CONTROL OF RECIRCULATION FAN	H-2-818581 3 P30 E2	FAILS TO OPERATE	LOSS OF RECIRCULATION FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
IAH-13835A	RECIRCULATION FAN HIGH CURRENT ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 3 P30 F1	FAILS TO OPERATE	LOSS OF HIGH CURRENT ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
IAL-13835A	RECIRCULATION FAN LOW CURRENT ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 3 P30 F1	FAILS TO OPERATE	LOSS OF LOW CURRENT ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
IL-13835A	RECIRCULATION FAN LOCAL CURRENT INDICATOR	PROVIDES LOCAL INDICATION OF FAN LOAD	H-2-818581 3 P30 E1	FAILS TO INDICATE	LOSS OF LOCAL CURRENT INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15-6. VENTILATION SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
II-13635B	RECIRCULATION FAN REMOTE CURRENT INDICATOR	PROVIDES REMOTE INDICATION OF FAN LOAD	H-2-818581 3 P30 F1	FAILS TO INDICATE	LOSS OF REMOTE CURRENT INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ISH-13635	RECIRCULATION FAN HIGH CURRENT SWITCH	PROVIDES SIGNAL FOR ALARM AND INTERLOCK	H-2-818581 3 P30 F1	FAILS TO OPERATE	LOSS OF HIGH CURRENT ALARM AND INTERLOCK	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
ISL-13635	RECIRCULATION FAN LOW CURRENT SWITCH	PROVIDES SIGNAL FOR ALARM	H-2-818581 3 P30 F1	FAILS TO OPERATE	LOSS OF LOW CURRENT ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
IT-13635	RECIRCULATION FAN CURRENT TRANSMITTER	PROVIDES CURRENT SIGNAL FOR INDICATION, ALARM AND INTERLOCK	H-2-818581 3 P30 E1	FAILS TO OPERATE	LOSS OF CURRENT INDICATION, ALARM AND HIGH CURRENT SHUTDOWN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
IY-13635	RECIRCULATION FAN CURRENT CONVERTER	PROVIDES CURRENT SIGNAL FOR INDICATION, ALARM AND INTERLOCK	H-2-818581 3 P30 E1	FAILS TO OPERATE	LOSS OF CURRENT INDICATION, ALARM AND HIGH CURRENT SHUTDOWN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
LAH-1369A	SEAL POT HIGH LEVEL ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 3 P30 F3	FAILS TO OPERATE	LOSS OF HIGH LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
LAL-1368A	PROCESS BUILDING 241-C-81, ROOM 1 FLOOR DRAIN LOW LEVEL ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 3 P30 F4	FAILS TO OPERATE	LOSS OF LOW LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
LAL-1369A	SEAL POT LOW LEVEL ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 3 P30 F3	FAILS TO OPERATE	LOSS OF LOW LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
LDA-13612A	PROCESS BUILDING 241-C-81 SUMP LEVEL ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 3 P30 F8	FAILS TO OPERATE	LOSS OF LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
LDA-1369A	PROCESS BUILDING 241-C-81, ROOM 1 LEVEL ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 3 P30 F4	FAILS TO OPERATE	LOSS OF LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

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FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHEET REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
LDE-13612	PROCESS BUILDING 241-C-91 SUMP LEVEL SENSOR	PROCESS BUILDING 241-C-91 SUMP LEVEL SENSOR	H-2-818581 3 P30 C8	FAILS TO OPERATE	LOSS OF LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
LDE-1369	PROCESS BUILDING 241-C-91, ROOM 1 LEVEL SENSOR	PROVIDES ROOM 1 LEVEL ALARM	H-2-818581 3 P30 B4	FAILS TO OPERATE	LOSS OF LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
LDS-13612	PROCESS BUILDING 241-C-91 SUMP LEVEL SWITCH	PROVIDES SUMP LEVEL ALARM	H-2-818581 3 P30 E8	FAILS TO OPERATE	LOSS OF LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
LDS-1369	PROCESS BUILDING 241-C-91, ROOM 1 LEVEL SWITCH	PROVIDES ROOM 1 LEVEL ALARM	H-2-818581 3 P30 E4	FAILS TO OPERATE	LOSS OF LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
LE-1368	PROCESS BUILDING 241-C-81, ROOM 1 FLOOR DRAIN LEVEL SENSOR	PROVIDES ROOM 1 FLOOR DRAIN LEVEL ALARM	H-2-818581 3 P30 B4	FAILS TO OPERATE	LOSS OF LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
LE-1369	SEAL POT LEVEL ELEMENT	PROCESS BUILDING 241-C-91 SEAL POT LEVEL SENSOR	H-2-818581 3 P30 C3	FAILS TO INDICATE	LOSS OF LEVEL ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
LSL-1368	PROCESS BUILDING 241-C-91, ROOM 1 FLOOR DRAIN LOW LEVEL SWITCH	PROVIDES ROOM 1 FLOOR DRAIN LEVEL ALARM	H-2-818581 3 P30 E4	FAILS TO OPERATE	LOSS OF LEVEL ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
LSLH-1369	SEAL POT HIGH/LOW LEVEL SWITCH	PROVIDES HIGH/LOW SEAL POT LEVEL ALARMS	H-2-818581 3 P30 E3	FAILS TO OPERATE	LOSS OF LEVEL ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
POAH-13611A	HEAT EXCHANGER HIGH DIFFERENTIAL PRESSURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 3 P30 F7	FAILS TO OPERATE	LOSS OF HIGH DP ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PDI-13611A	HEAT EXCHANGER DIFFERENTIAL PRESSURE INDICATOR	PROVIDES INDICATION OF PRESSURE DROP ACROSS HEAT EXCHANGER HX-1361	H-2-818581 3 P30 E8	FAILS TO INDICATE	LOSS OF DP INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

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FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
PDSH-13811	HEAT EXCHANGER HIGH DIFFERENTIAL PRESSURE SWITCH	PROVIDES HIGH DIFFERENTIAL PRESSURE ALARM	H-2-818581 3 P30 F7	FAILS TO OPERATE	LOSS OF HIGH DP ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PDI-13811	HEAT EXCHANGER DIFFERENTIAL PRESSURE TRANSMITTER	MONITOR EXHAUST DIFFERENTIAL PRESSURE ACROSS HEAT EXCHANGER HE-1381	H-2-818581 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 3	3
PI-13811A	C-108 LOCAL PRESSURE INDICATOR	PROVIDE LOCAL INDICATION C-108 TANK PRESSURE	H-2-818581 3 P30 E7	FAILS TO INDICATE	LOSS OF LOCAL TANK PRESSURE INDICATION	LATER	•
PI-13811B	C-108 REMOTE PRESSURE INDICATOR	PROVIDE REMOTE INDICATION C-108 TANK PRESSURE	H-2-818581 3 P30 F7	FAILS TO INDICATE	LOSS OF REMOTE TANK PRESSURE INDICATION	LATER	•
PT-13811	C-108 PRESSURE TRANSMITTER	PROVIDE C-108 TANK PRESSURE	H-2-818581 3 P30 E7	FAILS TO OPERATE	LOSS OF TANK PRESSURE INDICATION	LATER	•
TAH-13821A	MOISTURE SEPARATOR MS-1381 INLET HIGH TEMPERATURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 3 P30 F6	FAILS TO OPERATE	LOSS OF HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TAH-13822	HEATING COIL HC-1381 OUTLET HIGH TEMPERATURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 3 P30 F5	FAILS TO OPERATE	LOSS OF HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TE-13820	HEAT EXCHANGER INLET TEMPERATURE SENSOR	MONITOR EXHAUST AIR TEMPERATURE FROM C-108 INLET OF CONDENSER C-H2-08-1	H-2-818581 3 P30 D7	FAILS TO OPERATE	LOSS OF HEAT EXCHANGER HX-1381 INLET TEMPERATURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TE-13821	MOISTURE SEPARATOR INLET TEMPERATURE SENSOR	MONITOR EXHAUST AIR TEMPERATURE INLET TO MOISTURE SEPARATOR MS-1381	H-2-818581 3 P30 D6	FAILS TO OPERATE	LOSS OF INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

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FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
TE-13822	HEATING COIL HC-1381 OUTLET TEMPERATURE SENSOR	MONITOR EXHAUST AIR TEMPERATURE OUTLET OF HEATING COIL HC-1381	H-2-818581 3 P30 D5	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1381	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TC-13822	HEATING COIL HC-1381 TEMPERATURE CONTROLLER	PROVIDE HEATER CONTROL	H-2-818581 3 P30 F5	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1381, INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TT-13820	HEAT EXCHANGER INLET TEMPERATURE TRANSMITTER	PROVIDE HEAT EXCHANGER INLET TEMPERATURE	H-2-818581 3 P30 E7	FAILS TO OPERATE	LOSS OF HEAT EXCHANGER HX-1381 INLET TEMPERATURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TTT-13821	MOISTURE SEPARATOR INLET TEMPERATURE TRANSMITTER	MONITOR EXHAUST AIR TEMPERATURE INLET TO MOISTURE SEPARATOR MS-1381	H-2-818581 3 P30 E9	FAILS TO OPERATE	LOSS OF INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TTT-13822	HEATING COIL HC-1381 TEMPERATURE TRANSMITTER	PROVIDE INDICATION, ALARM, AND HEATER CONTROL	H-2-818581 3 P30 E5	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1381, INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TSH-13821	MOISTURE SEPARATOR INLET HIGH TEMPERATURE SWITCH	PROVIDES SIGNAL TO HIGH TEMPERATURE ALARM	H-2-818581 3 P30 F6	FAILS TO OPERATE	LOSS OF HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TSH-13822	HEATING COIL HC-1381 HIGH TEMPERATURE SWITCH	PROVIDES SIGNAL TO HIGH TEMPERATURE ALARM	H-2-818581 3 P30 F5	FAILS TO OPERATE	LOSS OF HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TY-13822	HEATING COIL HC-1381 TEMPERATURE CONTROL RELAY	PROVIDE HEATER CONTROL	H-2-818581 3 P30 E5	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1381	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
XA-1383	HVAC SYSTEM FAILURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 3 P30 F2	FAILS TO OPERATE	LOSS OF SYSTEM FAILURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13822A	HEATING COIL HC-1381 ON LOCAL INDICATING LIGHT	PROVIDE LOCAL INDICATION OF HEATER STATUS	H-2-818581 3 P30 E5	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-6. VENTILATION SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
YL-13622B	HEATING COIL HC-1361 OFF LOCAL INDICATING LIGHT	PROVIDE LOCAL INDICATION OF HEATER STATUS	H-2-818581 3 P30 E5	FAILS TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13622C	HEATING COIL HC-1361 ON REMOTE INDICATING LIGHT	PROVIDE REMOTE INDICATION OF HEATER STATUS	H-2-818581 3 P30 F4	FAILS TO OPERATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13622D	HEATING COIL HC-1361 OFF REMOTE INDICATING LIGHT	PROVIDE REMOTE INDICATION OF HEATER STATUS	H-2-818581 3 P30 F4	FAILS TO OPERATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13633(a)	RECIRCULATION FAN RUN REMOTE INDICATING LIGHT	PROVIDE REMOTE INDICATION OF FAN STATUS	H-2-818581 3 P30 F2	FAILS TO INDICATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13633(b)	RECIRCULATION FAN OFF REMOTE INDICATING LIGHT	PROVIDE REMOTE INDICATION OF FAN STATUS	H-2-818581 3 P30 F2	FAILS TO INDICATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13636A	RECIRCULATION FAN RUN LOCAL INDICATING LIGHT	PROVIDE LOCAL INDICATION OF FAN STATUS	H-2-818581 3 P30 E2	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13636A(a)	RECIRCULATION FAN LOCAL CONTROL LOCAL INDICATING LIGHT	PROVIDE LOCAL INDICATION OF FAN CONTROL STATUS	H-2-818581 3 P30 E2	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13636B	RECIRCULATION FAN OFF LOCAL INDICATING LIGHT	PROVIDE LOCAL INDICATION OF FAN STATUS	H-2-818581 3 P30 E2	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13636B(b)	RECIRCULATION FAN LOCAL CONTROL LOCAL INDICATING LIGHT	PROVIDE LOCAL INDICATION OF FAN CONTROL STATUS	H-2-818581 3 P30 E1	FAILS TO INDICATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13636C	RECIRCULATION FAN REMOTE CONTROL REMOTE INDICATING LIGHT	PROVIDE REMOTE INDICATION OF FAN CONTROL STATUS	H-2-818581 3 P30 F2	FAILS TO INDICATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15-6. VENTILATION SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT, TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
YL-13638D	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 3	3
HS-13638	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 3	3
HY-13638	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 DOWN STREAM COMPONENTS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PDAH-13612A	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 3	3
PDAH-13613A	HMF-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 3	3
PDI-13612A	HME-1361 LOCAL DIFFERENTIAL PRESSURE INDICATOR	PROVIDES LOCAL HEMF 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 3	3
PDI-13613A	HMF-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 3	3
PDSH-13612	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 3	3
PDSH-13613	HMF-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 3	3

TABLE B-16-6. VENTILATION SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
PDT-13612	HME-1361 DIFFERENTIAL PRESSURE TRANSMITTER	PROVIDES SIGNAL FOR INDICATION AND ALARM	H-2-818581 4 P27 E7	FAILS TO OPERATE	LOSS OF INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PDT-13613	HMF-1361 DIFFERENTIAL PRESSURE TRANSMITTER	PROVIDES SIGNAL FOR INDICATION AND ALARM	H-2-818581 4 P27 E3	FAILS TO OPERATE	LOSS OF INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
RAH-1361	PROCESS BUILDING 241-C-91 ROOM 1 REMOTE HIGH RADIATION ALARM	ALERTS OPERATORS TO ABNORMAL SITUATION	H-2-818581 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 3	3
RE-1361	PROCESS BUILDING 241-C-91 ROOM 1 RADIATION ELEMENT	MONITOR RADIATION LEVEL OF ROOM 1	H-2-818581 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 3	3
RI-1361A	PROCESS BUILDING 241-C-91 ROOM 1 RADIATION INDICATOR	PROVIDE RADIATION LEVEL INDICATION OF ROOM 1	H-2-818581 4 P27 F5	FAILS TO INDICATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
RIT-1361	PROCESS BUILDING 241-C-91 ROOM 1 RADIATION TRANSMITTER	PROVIDE SIGNAL FOR INDICATION AND ALARM	H-2-818581 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 3	3
RLH-1361	PROCESS BUILDING 241-C-91 ROOM 1 HIGH RADIATION STROBE LIGHT	ALERTS OPERATORS TO ABNORMAL SITUATION	H-2-818581 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 3	3
RSH-1361A	PROCESS BUILDING 241-C-91 ROOM 1 HIGH RADIATION SWITCH	PROVIDE SIGNAL LOCAL ALARM LIGHT	H-2-818581 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 3	3
RSH-1361B	PROCESS BUILDING 241-C-91 ROOM 1 REMOTE HIGH RADIATION SWITCH	PROVIDE SIGNAL REMOTE ALARM LIGHT	H-2-818581 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 3	3
RXA-1361	PROCESS BUILDING 241-C-91 ROOM 1 REMOTE RADIATION TROUBLE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 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 3	3

TABLE B-16-8. VENTILATION SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
RXL-1381	PROCESS BUILDING 241-C-91 ROOM 1 RADIATION TROUBLE LIGHT	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 4 P27 E5	FAILS TO OPERATE	LOSS OF ROOM 1 RADIATION DETECTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
RXS-1381A	PROCESS BUILDING 241-C-91 ROOM 1 RADIATION TROUBLE SWITCH	PROVIDE SIGNAL TO LOCAL TROUBLE LIGHT	H-2-818581 4 P27 E5	FAILS TO OPERATE	LOSS OF ROOM 1 RADIATION DETECTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
RXS-1381B	PROCESS BUILDING 241-C-91 ROOM 1 REMOTE RADIATION TROUBLE SWITCH	PROVIDE SIGNAL TO REMOTE TROUBLE ALARM	H-2-818581 4 P27 F5	FAILS TO OPERATE	LOSS OF ROOM 1 RADIATION DETECTION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TAH-13823A	PROCESS BUILDING 241-C-91 ROOM 1 HIGH TEMPERATURE ALARM	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818581 4 P27 F4	FAILS TO OPERATE	LOSS OF ROOM 1 HIGH TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TAL-13823A	PROCESS BUILDING 241-C-91 ROOM 1 LOW TEMPERATURE ALARM	ALERT OPERATOR TO ABNORMAL SITUATION	H-2-818581 4 P27 F4	FAILS TO OPERATE	LOSS OF ROOM 1 LOW TEMPERATURE ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TC-13830	PROCESS BUILDING 241-C-91 ROOM 1 TEMPERATURE CONTROLLER	CONTROLS ROOM 1 UNIT HEATER	H-2-818581 4 P27 D1	FAILS TO OPERATE	LOSS OF ROOM 1 UNIT HEATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TE-13823	PROCESS BUILDING 241-C-91 ROOM 1 TEMPERATURE SENSOR	PROVIDE SIGNAL TO REMOTE ALARMS	H-2-818581 4 P27 D4	FAILS TO OPERATE	LOSS OF ROOM 1 TEMPERATURE ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TE-13825	HEME AIR OUTLET TEMPERATURE SENSOR	MONITOR EXHAUST AIR TEMPERATURE OUTLET OF HME-1381	H-2-818581 4 P27 D8	FAILS TO OPERATE	LOSS OF HEME OUTLET TEMPERATURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TE-13830	PROCESS BUILDING 241-C-91 ROOM 1 TEMPERATURE SENSOR	PROVIDE TEMPERATURE SIGNAL TO ROOM 1 HEATER CONTROLS	H-2-818581 4 P27 D1	FAILS TO OPERATE	LOSS OF ROOM 1 TEMPERATURE CONTROLS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15-6. VENTILATION SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
TTI-13625	HEME AIR OUTLET TEMPERATURE TRANSMITTER	PROVIDES SIGNAL FOR INDICATION	H-2-818581 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 3	3
TSHL-13623	PROCESS BUILDING 241-C-81 ROOM 1 HIGH/LOW TEMPERATURE SWITCH	PROVIDE SIGNAL TO REMOTE ALARMS	H-2-818581 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 3	3
ZLH-13638	HIGH EFFICIENCY METAL FILTER HMF-1381 DRAIN VALVE HV-13638 OPEN POSITION INDICATING LIGHT	PROVIDES OPEN POSITION INDICATION FOR HV-13638	H-2-818581 4 P27 E2	FAILS TO OPERATE	LOSS OF POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZLL-13638	HIGH EFFICIENCY METAL FILTER HMF-1381 DRAIN VALVE HV-13638 CLOSED POSITION INDICATING LIGHT	PROVIDES CLOSED POSITION INDICATION FOR HV-13638	H-2-818581 4 P27 E2	FAILS TO OPERATE	LOSS OF POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZSH-13638	HIGH EFFICIENCY METAL FILTER HMF-1381 DRAIN VALVE HV-13638 OPEN POSITION SWITCH	PROVIDES OPEN POSITION SIGNAL FOR HV-13638	H-2-818581 4 P27 B3	FAILS TO OPERATE	LOSS OF POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
ZSL-13638	HIGH EFFICIENCY METAL FILTER HMF-1381 DRAIN VALVE HV-13638 CLOSED POSITION SWITCH	PROVIDES CLOSED POSITION SIGNAL FOR HV-13638	H-2-818581 4 P27 B3	FAILS TO OPERATE	LOSS OF POSITION INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TAH-13624A	PROCESS BUILDING 241-C-81 ROOM 2 HIGH TEMPERATURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 5 P20 F6	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TAL-13624A	PROCESS BUILDING 241-C-81 ROOM 2 LOW TEMPERATURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 5 P20 F5	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-6. VENTILATION SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
TC-13811	PROCESS BUILDING 241-C-01 ROOM 2 HEATER TEMPERATURE CONTROLLER	CONTROL ROOM 2 TEMPERATURE	H-2-818581 5 P20 E1	FAILS TO OPERATE	LOSS OF ROOM 2 HEATING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TE-13811	PROCESS BUILDING 241-C-01 ROOM 2 HEATER TEMPERATURE SENSOR	MONITOR ROOM 2 TEMPERATURE	H-2-818581 5 P20 E1	FAILS TO OPERATE	LOSS OF ROOM 2 HEATING	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TE-13824	PROCESS BUILDING 241-C-01 ROOM 2 TEMPERATURE SENSOR	MONITOR ROOM 2 TEMPERATURE	H-2-818581 5 P20 E5	FAILS TO OPERATE	LOSS OF ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TSHL-13824	PROCESS BUILDING 241-C-01 ROOM 2 HIGH/LOW TEMPERATURE SWITCH	PROVIDE SIGNALS FOR ALARMS	H-2-818581 5 P20 E5	FAILS TO OPERATE	LOSS OF ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
818581-018	EXHAUST FAN FN-1382 VSD CABINET	HOUSES FAN VARIABLE SPEED DRIVE CONTROLS AND INDICATIONS	H-2-818581 6 P25 D2	STRUCTURAL DAMAGE	LOSS OF EXHAUST FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-13839(a)	EXHAUST FAN FN-1382 LOCAL/REMOTE SELECTOR HAND SWITCH	ALLOWS LOCAL OR REMOTE FAN OPERATION	H-2-818581 6 P25 E2	FAILS TO OPERATE	LOSS OF EXHAUST FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-13839(b)	EXHAUST FAN FN-1382 LOCAL RUN HAND SWITCH	ALLOWS LOCAL FAN OPERATION	H-2-818581 6 P25 E3	FAILS TO OPERATE	LOSS OF EXHAUST FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-13839(c)	EXHAUST FAN FN-1382 LOCAL OFF HAND SWITCH	ALLOWS LOCAL FAN OPERATION	H-2-818581 6 P25 E2	FAILS TO OPERATE	LOSS OF EXHAUST FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
HS-13840(a)	EXHAUST FAN FN-1382 REMOTE RUN HAND SWITCH	ALLOWS REMOTE FAN OPERATION	H-2-818581 6 P25 F2	FAILS TO OPERATE	LOSS OF EXHAUST FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15-6. VENTILATION SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HS-13640(b)	EXHAUST FAN FN-1362 REMOTE OFF HAND SWITCH	ALLOWS REMOTE FAN OPERATION	H-2-818581 6 P25 F2	FAILS TO OPERATE	LOSS OF EXHAUST FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
LG-1361	HEATING COIL HC-1362 DRAIN LINE SIGHT GLASS	CHECK DRAIN LINE FLOW	H-2-818581 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 3	3
LG-1362	HEPA FILTER HEP-1361 DRAIN LINE SIGHT GLASS	CHECK DRAIN LINE FLOW	H-2-818581 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 3	3
LG-1363	HEPA FILTER HEP-1362 DRAIN LINE SIGHT GLASS	CHECK DRAIN LINE FLOW	H-2-818581 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 3	3
LG-1364	EXHAUST FAN FN-1362 DRAIN LINE SIGHT GLASS	CHECK DRAIN LINE FLOW	H-2-818581 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 3	3
PDAH-13618A	PRESSURE DIFFERENTIAL HIGH ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 6 P25 F5	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PDAH-13619A	PRESSURE DIFFERENTIAL HIGH ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 6 P25 F4	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PDAH-13620A	PRESSURE DIFFERENTIAL HIGH ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 6 P25 F4	FAILS TO OPERATE	LOSS OF FILTER DP ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PDAH-13619A	PRESSURE DIFFERENTIAL LOW ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 6 P25 F4	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PDI-13618	PRESSURE DIFFERENTIAL INDICATOR	MONITOR EXHAUST DIFFERENTIAL ACROSS 1st STAGE HEPA FILTER HEP-1361	H-2-818581 6 P25 F5	FAILS TO INDICATE	LOSS OF FILTER DP INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PDI-13618	PRESSURE DIFFERENTIAL INDICATOR	MONITOR EXHAUST DIFFERENTIAL ACROSS 2nd STAGE HEPA FILTER HEP-1362	H-2-818581 6 P25 F4	FAILS TO INDICATE	LOSS OF FILTER DP INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15-8. VENTILATION SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
PDI-13620	PRESSURE DIFFERENTIAL INDICATOR	MONITORS HEPA FILTER HEP-1381 AND HEP-1382 DIFFERENTIAL PRESSURE	H-2-818581 P25 F4	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PDI-13618	PRESSURE DIFFERENTIAL INDICATING TRANSMITTER	MONITORS EXHAUST ACROSS 1st STAGE HEPA FILTER HEP-1361	H-2-818581 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 3	3
PDI-13619	PRESSURE DIFFERENTIAL INDICATING TRANSMITTER	MONITORS EXHAUST DIFFERENTIAL ACROSS 2nd STAGE HEPA FILTER HEP-1362	H-2-818581 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 3	3
PDI-13620	PRESSURE DIFFERENTIAL INDICATING TRANSMITTER	MONITORS HEPA FILTER HEP-1381 AND HEP-1382 DIFFERENTIAL PRESSURE	H-2-818581 P25 E4	FAILS TO OPERATE	LOSS OF PRESSURE INDICATION AND ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PDSH-13618	PRESSURE DIFFERENTIAL HIGH SWITCH	PROVIDES SIGNAL FOR ALARM	H-2-818581 P25 F5	FAILS TO OPERATE	LOSS OF FILTER DP ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PDSH-13620	PRESSURE DIFFERENTIAL HIGH SWITCH	PROVIDES SIGNAL FOR ALARM	H-2-818581 P25 F4	FAILS TO OPERATE	LOSS OF FILTER DP ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PDSH-13619	PRESSURE DIFFERENTIAL HIGH/LOW SWITCH	PROVIDES SIGNAL FOR ALARMS	H-2-818581 P25 F4	FAILS TO OPERATE	LOSS OF FILTER DP ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
SCP-1362	SCR CONTROL PANEL FOR HEATING COIL HC-1362	HOUSES HEATER CONTROLS	H-2-818581 P25 D6	STRUCTURAL DAMAGE	LOSS OF HEATING COIL	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TDAL-13628A	HEATING COIL HC-1362 LOW DIFFERENTIAL TEMPERATURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 P25 F6	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES, WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TDIC-13628	HEATING COIL HC-1362 DIFFERENTIAL TEMPERATURE CONTROLLER	DETERMINES HEATER TEMPERATURE DIFFERENTIAL FOR HEATER CONTROL	H-2-818581 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 3	3

TABLE B-16-6. VENTILATION SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
TDSL-13828	HEATING COIL HC-1382 LOW DIFFERENTIAL TEMPERATURE SWITCH	PROVIDES SIGNAL TO ALARM	H-2-818581 6 P25 F6	FAILS TO OPERATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TE-13828	HEATING COIL HC-1382 INLET TEMPERATURE SENSOR	MONITORS EXHAUST AIR TEMPERATURE INLET TO HEATING COIL	H-2-818581 6 P25 D7	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1382	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TE-13828	HEATING COIL HC-1382 OUTLET TEMPERATURE SENSOR	MONITORS EXHAUST AIR TEMPERATURE OUTLET OF HEATING COIL	H-2-818581 6 P25 D5	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1382	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TE-13835	HEPA FILTER OUTLET TEMPERATURE SENSOR	MONITORS EXHAUST AIR TEMPERATURE OUTLET OF HEPA FILTER	H-2-818581 6 P25 D4	FAILS TO OPERATE	LOSS OF ALARM AND INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TIC-13829	HEATING COIL HC-1382 SET POINT CONTROLLER	PROVIDES TEMPERATURE SET POINT FOR HEATER CONTROL	H-2-818581 6 P25 E6	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1382	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TTI-13828	HEATING COIL HC-1382 INLET TEMPERATURE TRANSMITTER	PROVIDES SIGNALS FOR HEATER CONTROLS, INDICATION AND ALARMS	H-2-818581 6 P25 E7	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1382 CONTROLS, INDICATIONS AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TTI-13829	HEATING COIL HC-1382 OUTLET TEMPERATURE TRANSMITTER	PROVIDES SIGNALS FOR HEATER CONTROLS, INDICATION AND ALARMS	H-2-818581 6 P25 E5	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1382 CONTROLS, INDICATIONS AND ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TTI-13835	HEPA FILTER OUTLET TEMPERATURE TRANSMITTER	PROVIDES SIGNALS FOR HEATER CONTROLS, INDICATIONS AND ALARMS	H-2-818581 6 P25 E4	FAILS TO OPERATE	LOSS OF ALARM AND INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
TY-13829	HEATING COIL HC-1382 CONTROLLER	PROVIDES HEATER CONTROL	H-2-818581 6 P25 D8	FAILS TO OPERATE	LOSS OF HEATING COIL HC-1382	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3
XA-13840A	EXHAUST FAN FN-1382 VARIABLE SPEED DRIVE TROUBLE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 6 P25 F2	FAILS TO INDICATE	LOSS OF ALARM	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-48, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-6. VENTILATION SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
YL-13628A	HEATING COIL HC-1362 ON LOCAL INDICATING LIGHT	PROVIDES INDICATION OF HEATING COIL STATUS	H-2-818581 6 P25 D6	FAILS TO OPERATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13628B	HEATING COIL HC-1362 OFF LOCAL INDICATING LIGHT	PROVIDES INDICATION OF HEATING COIL STATUS	H-2-818581 6 P25 D6	FAILS TO OPERATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13628C	HEATING COIL HC-1362 ON REMOTE INDICATING LIGHT	PROVIDES INDICATION OF HEATING COIL STATUS	H-2-818581 6 P25 F6	FAILS TO OPERATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13628D	HEATING COIL HC-1362 OFF REMOTE INDICATING LIGHT	PROVIDES INDICATION OF HEATING COIL STATUS	H-2-818581 6 P25 F5	FAILS TO OPERATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13638A	EXHAUST FAN FN-1362 LOCAL LOCAL INDICATING LIGHT	PROVIDES LOCAL INDICATION OF FAN CONTROL STATUS	H-2-818581 6 P25 E3	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13638B	EXHAUST FAN FN-1362 LOCAL REMOTE INDICATING LIGHT	PROVIDES LOCAL INDICATION OF FAN CONTROL STATUS	H-2-818581 6 P25 E3	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13638C	EXHAUST FAN FN-1362 REMOTE LOCAL INDICATING LIGHT	PROVIDES REMOTE INDICATION OF FAN CONTROL STATUS	H-2-818581 6 P25 F3	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13638D	EXHAUST FAN FN-1362 REMOTE REMOTE INDICATING LIGHT	PROVIDES REMOTE INDICATION OF FAN CONTROL STATUS	H-2-818581 6 P25 F3	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13640A	EXHAUST FAN FN-1362 LOCAL RUN INDICATING LIGHT	PROVIDES LOCAL INDICATION OF FAN STATUS	H-2-818581 6 P25 E3	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13640B	EXHAUST FAN FN-1362 LOCAL OFF INDICATING LIGHT	PROVIDES LOCAL INDICATION OF FAN STATUS	H-2-818581 6 P25 E2	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15-6. VENTILATION SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
YL-13640C	EXHAUST FAN FN-1362 REMOTE RUN INDICATING LIGHT	PROVIDES REMOTE INDICATION OF FAN STATUS	H-2-818581 6 P25 F2	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
YL-13640D	EXHAUST FAN FN-1362 REMOTE OFF INDICATING LIGHT	PROVIDES REMOTE INDICATION OF FAN STATUS	H-2-818581 6 P25 F2	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
LG-1365	EXHAUST STACK DRAIN LINE SIGHT GLASS	CHECK DRAIN LINE FLOW	H-2-818581 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 3	3
TC-13616	TEMPERATURE CONTROLLER, SERVICE BLDG HEATER HC-1363	CONTROLS SERVICE BUILDING TEMPERATURE	H-2-818582 1 P28 D4	FAILS TO OPERATE	LOSS OF SERVICE BUILDING HEATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TC-13628	TEMPERATURE CONTROLLER, SERVICE BUILDING 241-C-73 EXHAUST FAN FN-1363	CONTROLS SERVICE BUILDING TEMPERATURE	H-2-818582 1 P28 D2	FAILS TO OPERATE	LOSS OF SERVICE BUILDING EXHAUST FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TE-13616	HEATING COIL HC-1363 TEMPERATURE SENSOR	CONTROL HEATING COIL FOR SERVICE BUILDING	H-2-818582 1 P28 D3	FAILS TO OPERATE	LOSS OF HEATER	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TE-13617	SERVICE BUILDING AMBIENT AIR TEMPERATURE SENSOR	PROVIDES SIGNAL FOR SERVICE BUILDING TEMPERATURE ALARMS	H-2-818582 1 P28 C3	FAILS TO OPERATE	LOSS OF ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TE-13629	EXHAUST FAN FN-1363 TEMPERATURE SENSOR	CONTROL EXHAUST FAN FOR SERVICE BUILDING	H-2-818582 1 P28 D2	FAILS TO OPERATE	LOSS OF EXHAUST FAN	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
TSHL-13617	SERVICE BUILDING 241-C-73 HIGH/LOW TEMPERATURE SWITCH	PROVIDES SERVICE BUILDING HIGH/LOW TEMPERATURE ALARMS	H-2-818582 1 P28 D3	FAILS TO OPERATE	LOSS OF ALARMS	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-15.7. VENTILATION EXHAUST RADIATION MONITORING SYSTEM

FACILITY: <u>WRSS</u> TANK FARM : <u>241-C</u> SYSTEM : <u>VENT RAD MON</u> SYSTEM SAFETY FUNCTION : <u>TANK C-108 EXHAUST RADIATION MONITORING</u>				SYSTEM SAFETY CLASS JUSTIFICATION : <u>4.6.7</u> SYSTEM SAFETY CLASS : <u>3</u> NOTE: EQUIPMENT, COMPONENT OR INSTRUMENT TAG NUMBER ASSIGNED BY RE&C IS FOR TRACKING PURPOSES ONLY.			
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
818561-020	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 3	3
AE-1364	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 3	3
AE-1365	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 3	3
FAL-1362A	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 3	3
FAL-1365A	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 3	3
FAL-1368A	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 3	3
FE-1365	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 3	3

TABLE B-15-7. VENTILATION EXHAUST RADIATION MONITORING SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
FE-1366	BETA-GAMMA SAMPLE FLOW SENSOR	MONITOR AIR FLOW OF BETA-GAMMA SAMPLER	H-2-818581 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 3	3
FI-1367	EXHAUST STACK LOCAL FLOW INDICATOR	PROVIDES LOCAL FLOW INDICATION	H-2-818581 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 3	3
FI-1365	RECORD AIR SAMPLE FLOW CONTROLLER	CONTROL AIR FLOW OF RECORD AIR SAMPLE	H-2-818581 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 3	3
FI-1368	BETA/GAMMA PARTICULATE AIR SAMPLE FLOW CONTROLLER	CONTROL AIR FLOW OF BETA/GAMMA PARTICULATE AIR SAMPLE	H-2-818581 7 P22 D3	FAIL TO OPERATE	FC-1368 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 3	3
FL-1365	RECORD AIR SAMPLE LOW FLOW LIGHT	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 7 P22 C6	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 3	3
FL-1368	BETA/GAMMA PARTICULATE AIR SAMPLE LOW FLOW LIGHT	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 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 3	3
FQI-1367	EXHAUST STACK FLOW TOTALIZER	PROVIDES TOTAL EXHAUST STACK FLOW	H-2-818581 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 3	3
FQI-1365	EXHAUST STACK RECORD SAMPLER FLOW TOTALIZER	PROVIDES TOTAL EXHAUST STACK RECORD SAMPLER FLOW	H-2-818581 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 3	3
FQI-1368	EXHAUST STACK BETA/GAMMA PARTICULATE SAMPLER FLOW TOTALIZER	PROVIDES TOTAL EXHAUST STACK BETA/GAMMA PARTICULATE SAMPLER FLOW	H-2-818581 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 3	3

TABLE B-16-7. VENTILATION EXHAUST RADIATION MONITORING SYSTEM

FMEA SAFETY CLASS DESIGNATION							
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
FSL-13827	EXHAUST STACK LOW FLOW SWITCH	PROVIDE STACK EXHAUST AIR LOW FLOW ALARM	H-2-818581 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 3	3
FSL-1385	RECORD AIR SAMPLE LOW FLOW SWITCH	PROVIDES SIGNAL FOR LOW FLOW ALARM	H-2-818581 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 3	3
FSL-1388	BETA/GAMMA PARTICULATE SAMPLE LOW FLOW SWITCH	PROVIDES SIGNAL FOR LOW FLOW ALARM	H-2-818581 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 3	3
FT-13827	EXHAUST STACK FLOW TRANSMITTER	PROVIDE STACK EXHAUST AIR FLOW FOR CONTROL, ALARM AND INDICATION	H-2-818581 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 3	3
FT-1385	RECORD AIR SAMPLE FLOW TRANSMITTER	MONITOR AIR FLOW OF RECORD AIR SAMPLER	H-2-818581 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 3	3
FT-1388	BETA/GAMMA PARTICULATE AIR SAMPLE FLOW TRANSMITTER	MONITOR AIR FLOW OF BETA/GAMMA PARTICULATE AIR SAMPLE	H-2-818581 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 3	3
FY-13827	EXHAUST STACK FLOW CONVERTOR	PROVIDES LINEAR SIGNAL FOR CONTROL, INDICATION AND ALARM	H-2-818581 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 3	3
FY-1385	RECORD AIR SAMPLE FLOW CONVERTOR	PROVIDES TEMPERATURE COMPENSATED LINEAR SIGNAL FOR CONTROL, INDICATION AND ALARM	H-2-818581 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 3	3
FY-1388	BETA/GAMMA PARTICULATE SAMPLE FLOW CONVERTOR	PROVIDES TEMPERATURE COMPENSATED LINEAR SIGNAL FOR CONTROL, INDICATION AND ALARM	H-2-818581 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 3	3

TABLE B-16-7. VENTILATION EXHAUST RADIATION MONITORING SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
HS-13841A	VACUUM PUMP P-1388 ON/OFF/AUTO SELECTOR SWITCH	CONTROLS VACUUM PUMP AND SUCTION/DISCHARGE VALVES	H-2-818581 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 3	3
HS-13841B	VACUUM PUMP P-1388 RESET HAND SWITCH	RESETS VACUUM PUMP CONTROL CIRCUIT	H-2-818581 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 3	3
HS-13842A	VACUUM PUMP P-1387 ON/OFF/AUTO SELECTOR SWITCH	CONTROLS VACUUM PUMP AND SUCTION/DISCHARGE VALVES	H-2-818581 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 3	3
HS-13842B	VACUUM PUMP P-1387 RESET HAND SWITCH	RESETS VACUUM PUMP CONTROL CIRCUIT	H-2-818581 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 3	3
PIC-13821	EXHAUST STACK SAMPLE PRESSURE CONTROLLER	PROVIDE SIGNAL FOR VACUUM CONTROL VALVE PV-13821	H-2-818581 7 P22 B3	FAIL TO OPERATE	LOSS OF SAMPLE VACUUM CONTROL	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
PISH-13841	VACUUM PUMP P-1388 HIGH SUCTION PRESSURE SWITCH	PROVIDE SIGNAL FOR INTERLOCKS AND INDICATION	H-2-818581 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 3	3
PISH-13842	VACUUM PUMP P-1387 HIGH SUCTION PRESSURE SWITCH	PROVIDE SIGNAL FOR INTERLOCKS AND INDICATION	H-2-818581 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 3	3
PT-13821	EXHAUST STACK SAMPLE PRESSURE TRANSMITTER	PROVIDE SIGNAL FOR VACUUM CONTROL VALVE PV-13821	H-2-818581 7 P22 B3	FAIL TO OPERATE	LOSS OF SAMPLE VACUUM CONTROL	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
RAH-1383A	BETA/GAMMA PARTICULATE MONITOR HIGH RADIATION ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 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 3	3

TABLE B-16-7. VENTILATION EXHAUST RADIATION MONITORING SYSTEM

FMEA SAFETY CLASS DESIGNATION							
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
RE-1363	BETA/GAMMA PARTICULATE MONITOR	MEASURES BETA/GAMMA IN EXHAUST STREAM	H-2-818581 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 3	3
RI-1363A	BETA/GAMMA PARTICULATE MONITOR INDICATOR	MONITORS EXHAUST AIR RADIATION LEVEL	H-2-818581 7 P22 F5	FAILS TO INDICATE	LOSS OF INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
RII-1363	BETA/GAMMA PARTICULATE MONITOR TRANSMITTER	PROVIDES SIGNAL FOR ALARM AND INDICATION	H-2-818581 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 3	3
RLH-1363B	BETA/GAMMA PARTICULATE MONITOR HIGH RADIATION ALARM (LOCAL STROBE LIGHT)	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 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 3	3
RLH-1363C	BETA/GAMMA PARTICULATE MONITOR HIGH RADIATION ALARM (LOCAL LIGHT)	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 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 3	3
RSH-1363	BETA/GAMMA PARTICULATE MONITOR HIGH RADIATION SWITCH	PROVIDES SIGNAL FOR ALARM	H-2-818581 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 3	3
RXA-1363A	BETA/GAMMA PARTICULATE MONITOR FAILURE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 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 3	3
RXL-1363A	BETA/GAMMA PARTICULATE MONITOR FAILURE LIGHT	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 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 3	3
RXS-1363	BETA/GAMMA PARTICULATE MONITOR FAILURE SWITCH	PROVIDES SIGNAL TO ALARM	H-2-818581 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 3	3

TABLE B-16-7. VENTILATION EXHAUST RADIATION MONITORING SYSTEM

FMEA SAFETY CLASS DESIGNATION

EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
TE-13828	EXHAUST STACK SAMPLE TEMPERATURE SENSOR	PROVIDE STACK EXHAUST SAMPLE AIR FLOW TEMPERATURE COMPENSATION	H-2-818581 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 3	3
TI-13827(a)	EXHAUST STACK LOCAL TEMPERATURE INDICATOR	PROVIDE STACK EXHAUST AIR TEMPERATURE LOCAL INDICATION	H-2-818581 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 3	3
TI-13827(b)	EXHAUST STACK REMOTE TEMPERATURE INDICATOR	PROVIDE STACK EXHAUST AIR TEMPERATURE REMOTE INDICATION	H-2-818581 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 3	3
TT-13827	EXHAUST STACK TEMPERATURE TRANSMITTER	PROVIDE STACK EXHAUST AIR TEMPERATURE INDICATION	H-2-818581 7 P22 C6	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 3	3
TT-13828	EXHAUST STACK SAMPLE TEMPERATURE TRANSMITTER	PROVIDE STACK EXHAUST SAMPLE AIR FLOW TEMPERATURE COMPENSATION	H-2-818581 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 3	3
UA-1385	VENTILATION EXHAUST RADIATION MONITOR FAILURE BELL	LOCAL INDICATION OF MONITOR FAILURE	H-2-818581 7 P22 E6	FAIL TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3
UE-13827	EXHAUST STACK FLOW/TEMPERATURE SENSOR	PROVIDE STACK EXHAUST AIR FLOW AND TEMPERATURE	H-2-818581 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 3	3
XA-13842	VACUUM PUMP TROUBLE ALARM	ALERTS OPERATOR TO ABNORMAL SITUATION	H-2-818581 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 3	3
XA-1385A	VENTILATION EXHAUST RADIATION MONITOR FAILURE ALARM	REMOTE INDICATION OF MONITOR FAILURE	H-2-818581 7 P22 F8	FAIL TO OPERATE	LOSS OF REMOTE INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES: WHC-CM-4-46, SECTION 9, TABLE 1, CRITERION 3	3

TABLE B-16-7. VENTILATION EXHAUST RADIATION MONITORING SYSTEM

FMEA SAFETY CLASS DESIGNATION							
EQUIPMENT, COMPONENT, INSTRUMENT TAG NO.	EQUIPMENT, COMPONENT, INSTRUMENT NAME	FUNCTION	DRAWING SHT REV ZONE	FAILURE MODE	FAILURE EFFECT ON SYSTEM SAFETY FUNCTION	SAFETY CLASS JUSTIFICATION	SAFETY CLASS
XL-1385A	VENTILATION EXHAUST RADIATION MONITOR FAILURE LIGHT	LOCAL INDICATION OF MONITOR FAILURE	H-2-818561 7 PZZ E0	FAIL TO OPERATE	LOSS OF LOCAL INDICATION	PRECLUDES IMPLEMENTING ALARA PRINCIPLES; WHCCM-440, SECTION 9, TABLE 1, CRITERION 3	3

APPENDIX C

COMPONENT SAFETY CLASSIFICATION

None; Safety Classifications for components will be determined later.

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APPENDIX D
PARTS SAFETY CLASSIFICATION

None; Safety Classifications for parts will be determined later.

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APPENDIX E
SOURCE TERMS

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Table E-1. C-106 Radionuclide Inventory Data (Van Vleet 1993b)

SAMPLE TYPE	Drainable Interstitial Liquid			Sludge/Slurry Solids			TANK INV.
SAMPLE DATE	05/19/86			05/19/86			05/19/86
DENSITY g/ml				1.43			
VOL. (1E+3 gal)	16			197			213
VOL. (L)	6.06E+4			7.46E+5			8.06E+5
UNITS	Ci/L	Bq/L	Bq	Ci/g	Bq/L	Bq	Bq
C ¹⁴	3.51E-1	1.30E+4	7.87E+8	2.32E-4	1.23E+4	9.12E+9	9.94E+9
Co ⁶⁰	<1.27E+1	4.70E+5	2.85E+10	8.88E-1	4.50E+7	3.51E+13	3.51E+13
Sr ^{89/90}	1.65E+3	6.11E+7	3.70E+12	1.98E+3	1.05E+11	7.82E+16	7.82E+16
Tc ⁹⁹	1.41E+2	5.22E+6	3.16E+11	2.19E-1	1.16E+7	8.64E+12	8.96E+12
I ¹²⁹	1.40E-2	5.18E+2	3.14E+7	8.10E-5	4.29E+3	3.20E+9	3.23E+9
Cs ¹³⁷	2.78E+4	1.03E+9	6.23E+13	3.30E+2	1.75E+10	1.30E+16	1.30E+16
U-Nat	9.58E-1 g/l	2.50E+1	1.52E+6	4.09E+2 g/g	1.53E+4	1.14E+10	1.14E+10
Pu ^{239/240}	9.78E+2	3.62E+7	2.20E+12	2.69E+0	1.42E+8	1.06E+14	1.08E+14
Am ²⁴¹	<1.39E+1	5.14E+5	3.12E+10	1.05E+0	5.56E+7	4.15E+13	4.15E+13
Total α							
Total β							
Total γ	2.78E+4	1.03E+9	6.23E+13	3.63E+2	1.92E+10	1.43E+16	1.44E+16

Table E-2. AY-101 Radionuclide Laboratory Data (Van Vleet 1993a)

SAMPLE	CC SUPER	CC SUPER		COMPLEXANT CONCENTRATE SOLIDS	Supernatant	SLURRY
SAMPLE DATE	Feb. 1985		March 1987	March 1985	July 1988	
REFERENCE #	65453-85-41		65453-87-96	65453-85-53	12221-PCL88-169	
SAMPLE #	R-3641 By .A1	R-3641 By APDU	TD062387 CPLX	R-3642	R-8371	
Co ⁶⁰				NA		
Sr ^{89/90}	2.00E+5	-	1.44E+5	1.1E+4	9.87E+6*	-
Tc ⁹⁹	-	-	19.6	-	-	-
I ¹²⁹	-	-	<0.15	-	-	-
Cs ¹³⁷	2.20E+6	-	1.15E+5	5.2E+2	1.09E+5	1.54E+4
U-Nat.	7.83E-3	-	-	2.26	-	-
Pu ^{239/240}	1.21E+1	4.2	4.03E-3	6.77E+1	-	-
Pu ²⁴¹	-	1.60E+1	-	-	-	-
Am ²⁴¹	3.03+1	1.60E+1	NR	3.01E+2	-	-
Total α	-	-	-	-	4.80E+2	6.51E+3
Total β	-	-	-	-	-	-

* Assume all Sr²⁺ of 0.07 g/L is Sr-90.

NA Not Analyzed

NR Not Reported

All units are in Ci/L unless otherwise indicated.

Table E-3. AY-102 Radioactive Nuclide Laboratory Data (Van Vleet 1993a)

SAMPLE			CORE		
SAMPLE DATE	November 1984		Jan. 1988	Feb. 1990	
REFERENCE #	65453-84-348		PNL LOG	PNL Report	
SAMPLE #	R-3214	R-3215	PNL 12988	Supernatant	Washed Solids
DENSITY g/ml	--	-	-	≈1.0	≈1.4
C ¹⁴	-	-	-	NA	<1.40E+0
Co ⁶⁰	-	-	-	ND	2.02E+3
Sr ^{89/90}	2.32E+4	IS	-	6.58E+3	4.13E+7
Y ⁹⁰	-	-	-	-	-
Tc ⁹⁹	-	-	-	NA	3.50E+1
I ¹²⁹	-	-	-	NA	<1.68E+0
Cs ¹³⁴	-	-	-	4.95E+0	ND
Cs ¹³⁷	5.925E+5	7.525E-1	-	4.32E+3	1.60E+3
Pm ¹⁴⁷	-	-	-	-	-
Eu ¹⁵⁴	-	-	-	ND	7.20E+4
U-Nat.	-	-	-	5.71E-1	1.46E+1
Np ²³⁷	-	-	5.29E+1	-	-
Pu ²³⁸	-	-	1.59E+1	ND	1.60E+3
Pu ^{239/240}	-	-	3.18E+1	2.34E-1	5.05E+3
Pu ²⁴¹	-	-	1.90E+2	-	-
Am ²⁴¹	-	-	2.91E+2	1.50E-3	2.55E+4
Am ^{242M}	-	-	-	-	-
Am ²⁴³	-	-	-	-	-
Cm ²⁴²	-	-	-	ND	8.83E+2
Cm ²⁴⁴	-	-	7.41	-	-
Total α	-	-	-	-	-
Total β	-	-	-	-	-

IS Insufficient Sample

NA Not Analyzed

ND Not Detected

All Units are in Ci/L unless otherwise indicated.

Table E-4. C-106 Chemical Inventory Data (Van Vleet 1993b)

SAMPLE TYPE	Sludge			Supernatant			TANK INV. ^{s1}
SAMPLE DATE	4/1/90 ^d						
SAMPLE ID	RAT-C106-4A						
DENSITY g/ml	1.75						
VOL. (1E+3 gal)	181			32			213
VOL. (L)	6.85E+5			1.21E+5			8.06E+5
UNITS	ug/g	g/L	g		g/L	g	g
Ag	2.10E+3	3.68E+0	2.52E+6				2.58E+6
Al	1.15E+5	2.01E+2	1.38E+8				1.38E+8
As	3.90E+2	6.83E-1	4.68E+5				4.68E+5
B	3.50E+2	6.13E-1	4.20E+5				4.20E+5
Ba	3.50E+2	6.13E-1	4.20E+5				4.20E+5
Ca	1.90E+3	3.33E+0	2.28E+6				2.28E+6
Ce	4.90E+2	8.58E-1	5.88E+5				5.88E+5
Cr	1.75E+3	3.06E+0	2.10E+6				2.10E+6
Cu	3.00E+2	5.25E-1	3.60E+5				3.60E+5
Fe	8.24E+4	1.44E+2	9.88E+7				9.88E+7
Mg	4.20E+2	7.35E-1	5.04E+5				5.04E+5
Mn	4.50E+3	7.88E+0	5.40E+6				5.40E+6
Na	1.56E+5	2.73E+2	1.87E+8				1.87E+8
Nd	5.60E+2	9.80E-1	6.71E+5				6.71E+5
P	7.30E+3	1.28E+1	8.75E+6				8.75E+6
Pb	2.50E+3	4.38E+0	3.00E+6				3.00E+6
Sb	2.90E+3	5.08E+0	3.48E+6				3.48E+6
Se	1.40E+3	2.45E+0	1.68E+6				1.68E+6
Si	2.60E+4	4.55E+1	3.12E+7				3.12E+7
Sr	1.10E+2	1.93E-1	1.32E+5				1.32E+5
Ti	3.30E+2	5.78E-1	3.96E+5				3.96E+5
Tl	1.20E+3	2.10E+0	1.44E+6				1.44E+6
Zr	6.00E+2	1.05E+0	7.19E+5				7.19E+5

"S1" denotes sludge volume only
"d" denotes date of document

Table E-5. AY-101 Chemical Inventory Data (Van Vleet 1993a)

SAMPLE TYPE	Supernatant			Slurry/Sludge			TANK INV.*
SAMPLE DATE	07/20/88			07/20/88			07/20/88
SAMPLE ID	R-8371						-
REFERENCE	WHC I.M. 12221-PCL88-169						-
DENSITY g/ml	1.09						-
VOL. (1E+3 gal)	853			83			853
VOL. (L)	3.23E+6			3.14E+5			3.54E+6
UNITS		g/L	g		g/L	g	g
Al(OH)4-		4.64E+0	1.50E+7				1.50E+7
CO3--		1.84E+1	5.93E+7				5.93E+7
Cl-		4.40E-1	1.42E+6				1.42E+6
F-		7.60E-1	2.45E+6				2.45E+6
K		3.10E-1	1.00E+6				1.00E+6
NH3		2.79E+0	9.01E+6				9.01E+6
NO2-		1.36E+1	4.38E+7				4.38E+7
NO3-		3.84E+1	1.24E+8				1.24E+8
Na		4.48E+1	1.45E+8				1.48E+8
OH-		8.06E+0	2.60E+7				2.60E+7
PO4---		7.70E-1	2.49E+6				2.49E+6
SO4--		4.83E+0	1.56E+7				1.56E+7
TOC		4.47E+0	1.44E+7				1.77E+7

Table E-6. AY-102 Chemical Inventory Data (Van Vleet 1993a)

SAMPLE TYPE	Supernatant			Comp Solids/Sludge			TANK INV.
SAMPLE DATE	2nd Qtr 1988			2nd Qtr 1988			2nd Qtr 1988
SAMPLE ID	102-AY Seg 1			102-AY Comp			-
REFERENCE	PNL Letter Rpt 9000855 (2/12/90)			PNL Letter Rpt 9000855 (2/12/90)			-
DENSITY g/ml	1.0			1.4			-
VOL. (1E+3 gal)	818 (June 1988)			32 (June 1988)			850
VOL. (L)	3.10E+6			1.21E+5			3.22E+6
UNITS	M	g/L	g	mmol/g	g/L	g	g
Ag	6.40E-5	6.90E-3	2.14E+4	6.70E-2	1.01E+1	1.23E+6	1.25E+6
Al	5.90E-5	1.59E-3	4.93E+3	1.60E+0	6.04E+1	7.32E+6	7.33E+6
B	7.70E-4	8.33E-3	2.58E+4	4.40E-1	6.67E+0	8.07E+5	8.33E+5
Ba	2.90E-6	3.98E-4	1.23E+3	1.50E-2	2.88E+0	3.49E+5	3.51E+5
Ca	1.10E-4	4.41E-3	1.37E+4	4.20E-1	2.36E+1	2.85E+6	2.87E+6
Cd	<1.00E-6	<1.12E-4	<3.48E+2	4.00E-3	6.29E-1	7.63E+4	7.66E+4
Ce	<4.00E-6	<5.61E-4	<1.74E+3	8.60E-3	1.69E+0	2.04E+5	2.06E+5
Cl-	1.70E-2	6.03E-1	1.87E+6	2.40E-1	1.19E+1	1.44E+6	3.31E+6
Cr	2.50E-4	1.30E-2	4.03E+4	7.20E-2	5.24E+0	6.35E+5	6.75E+5
Dy	<1.00E-7	<1.63E-5	<5.03E+1				<5.03E+1
F-	9.30E-3	1.77E-1	5.47E+5	1.80E-1	4.79E+0	5.80E+5	1.13E+6
Fe	7.20E-6	4.02E-4	1.25E+3	1.60E+0	1.25E+2	1.52E+7	1.52E+7
Hg				3.80E-4	1.07E-1	1.29E+4	1.29E+4
K	1.10E-3	4.30E-2	1.33E+5	5.90E-2	3.23E+0	3.91E+5	5.24E+5
La	<4.00E-7	<5.56E-5	<1.72E+2	3.00E-2	5.83E+0	7.07E+5	7.07E+5
Li	<1.00E-5	<6.94E-5	<2.15E+2				<2.15E+2
Mg	2.30E-5	5.59E-4	1.73E+3	3.00E-1	1.02E+1	1.24E+6	1.24E+6
Mn	<2.00E-7	<1.10E-5	<3.40E+1	1.70E-1	1.31E+1	1.58E+6	1.58E+6
Mo	4.30E-6	4.13E-4	1.28E+3	2.00E-3	2.69E-1	3.25E+4	3.38E+4
NO2-	2.50E-2	1.15E+0	3.56E+6	1.10E-1	7.09E+0	8.58E+5	4.42E+6
NO3-	4.40E-3	2.73E-1	8.45E+5	1.70E-2	1.48E+0	1.79E+5	1.02E+6
Na	9.60E-2	2.21E+0	6.86E+6	1.80E+0	5.79E+1	7.02E+6	1.39E+7
Nd	<7.00E-7	<1.01E-4	<3.13E+2	1.90E-2	3.84E+0	4.65E+5	4.65E+5
Ni	<2.00E-6	<1.17E-4	<3.64E+2	5.60E-2	4.60E+0	5.58E+5	5.58E+5
P	1.00E-4	3.10E-3	9.59E+3	2.30E-1	9.97E+0	1.21E+6	1.22E+6
P04---	5.50E-4	5.22E-2	1.62E+5	2.40E-2	3.19E+0	3.87E+5	5.48E+5
Rh	<2.00E-6	<2.06E-4	<6.37E+2				<6.37E+2

Table E-6. AY-102 Chemical Inventory Data (Van Vleet 1993a)

SAMPLE TYPE	Supernatant			Comp Solids/Sludge			TANK INV.
SAMPLE DATE	2nd Qtr 1988			2nd Qtr 1988			2nd Qtr 1988
SAMPLE ID	102-AY Seg 1			102-AY Comp			-
REFERENCE	PNL Letter Rpt 9000855 (2/12/90)			PNL Letter Rpt 9000855 (2/12/90)			-
DENSITY g/ml	1.0			1.4			-
VOL. (1E+3 gal)	818 (June 1988)			32 (June 1988)			850
VOL. (L)	3.10E+6			1.21E+5			3.22E+6
UNITS	M	g/L	g	mmol/g	g/L	g	g
Ru	<1.00E-6	<1.01E-4	<3.13E+2				<3.13E+2
S04--	1.10E-3	1.06E-1	3.27E+5	8.10E-3	1.09E+0	1.32E+5	4.59E+5
Si	5.90E-3	1.66E-1	5.13E+5	4.30E-1	1.69E+1	2.05E-6	2.56E-6
Sr	2.60E-6	2.28E-4	7.05E+2	9.00E-3	1.10E+0	1.34E+5	1.34E+5
TOC	2.40E-2	2.88E-1	8.92E+5	3.82E+0	6.42E+1	7.78E+6	8.67E+6
Te	<2.00E-6	<2.55E-4	<7.90E+2	4.00E-3	7.15E-1	8.66E+4	8.74E+4
Ti	<4.00E-7	<1.92E-5	<5.93E+1	7.10E-3	4.76E-1	5.77E+4	5.77E+4
U	3.50E-3	8.33E-1	2.58E+6	6.50E-2	2.17E+1	2.62E+6	5.20E+6
Zn	5.00E-6	3.27E-4	1.01E+3	8.10E-3	7.41E-1	8.98E+4	9.08E+4
Zr	7.60E-7	6.93E-5	2.15E+2	6.30E-3	8.05E-1	9.75E+4	9.77E+4

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APPENDIX F
DOSE CALCULATIONS

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Raytheon Engineers & Constructors A Consolidation of Badger and UE&C	CALCULATION SUMMARY & CONTROL SHEET Page 1 of 2	CALCULATION SET NO. 7362-H-006								
PROJECT TITLE <u>241-C-106 Waste Retrieval</u>		PRELIM.	FINAL X	VOID	REVISION 0					
		DISCIPLINE Mech-Nuclear								
		J.O. 7362.007								
STRUCTURE OF SYSTEM <u>N/A</u> DESIGN CLASSIFICATION <u>Varies</u>										
SUBJECT <u>EDE Dose Consequences and EHSC Calculations</u>										
COMPLETED BY <u>Nagaraj S Vembar</u> <i>Nagaraj S Vembar</i> DATE <u>04/22/94</u>										
CHECKED BY <u>Donnie Harrison (Jason Associates)</u> <i>Donnie Harrison</i> DATE <u>4/22/94</u>										
APPROVED BY <u>A. Pham</u> <i>A. Pham</i> DATE <u>4/26/94</u>										
REASON FOR REVISION: Not applicable		TOTAL NUMBER OF SHEETS IN THIS ISSUE <u>48</u>								
		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 <u>44</u> of General Computation Sheets for Summary and Conclusions										

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CALCULATION SUMMARY & CONTROL SHEET Page 2 of 2 PROJECT TITLE <u>241-C-106 Waste Tank Retrieval System</u>	CALCULATION SET NO. 7362-H-006			
	PRELIM.	FINAL	VOID	REVISION
		X		0
	DISCIPLINE Mech-Nuclear			
J.O. 7362.007				
DESIGN BASIS See Page <u>1</u> of General Computation Sheets				
UNVERIFIED ASSUMPTIONS/OPEN ITEMS: NONE				
REFERENCES: (SPECIFICATIONS, DRAWINGS, CODES, CALCULATIONS, TEXTS, REPORTS, COMPUTER DATA, FSAR, ETC.) See Page <u>6</u> of General Computation Sheets				

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	VOID	0	NSY DATE 4-22-94	DATE 4-22-94	
		X						
		SHEET 1 OF 48				DATE	DATE	
PROJECT <u>241-C-106 Waste Retrieval</u>		J.O. 7362.007						
SUBJECT <u>Dose Consequences and EHSC Calculations</u>								

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)

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			7362-H-006				
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PROJECT <u>241-C-106 Waste Retrieval</u>			J.O. 7362.007				
SUBJECT <u>Dose Consequences and EHSC Calculations</u>							

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

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				PRELIM.	FINAL	VOID	0	MSV DATE 4-22-94
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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

- 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).
- 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.
- Design data for process systems that are considered for the accident analyses are taken from WHC-SD-W320-FDC-001, Rev. 2, Ref. 12.
- The solids/sludge within the Tank AY-102 are presumed not to be disturbed during sluicing from C-106 to AY-102.

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

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		X						
PROJECT <u>241-C-106 Waste Retrieval</u>				SHEET 5 OF 48			DATE	DATE
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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

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		X						
	SHEET 6 OF 48				DATE			DATE
PROJECT <u>241-C-106 Waste Retrieval</u>	J.O. 7362.007							
SUBJECT <u>Dose Consequences and EHSC Calculations</u>								

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PROJECT <u>241-C-106 Waste Retrieval</u>				J.O. 7362.007				
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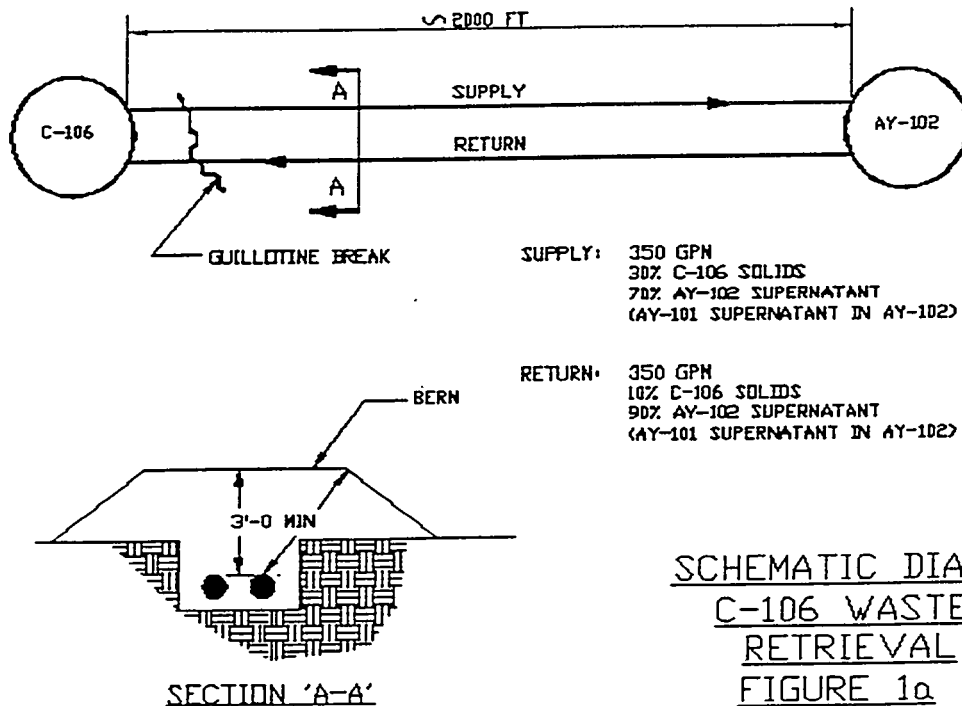
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15. Mishima, J., *Recommended Values and Technical Basis for Airborne Release Fractions (ARFs), Airborne Release Rates (ARRs), and Respirable Fractions (RFs) for Materials from Accidents in DOE Fuel Cycle, Ex-Reactor Facilities*, Rev. 2, Draft Date April 21, 1993, DOE-HDBK-0013-93, Rev. 2, Draft Date April 21 1993, U. S. Department of Energy, Washington D. C.
16. *Safety Analysis Report, Stabilization of Single Shell Waste Storage Tanks by Salt Well Pumping*, WHC-SD-WM-SAR-034, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
17. *Safety Analysis and Regulation, Desk Instructions*, WHC-IP-690, Appendix C, Rev. D-1, Westinghouse Hanford Company, Richland, Washington.

Form 5007 (Rev. 4/93)

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

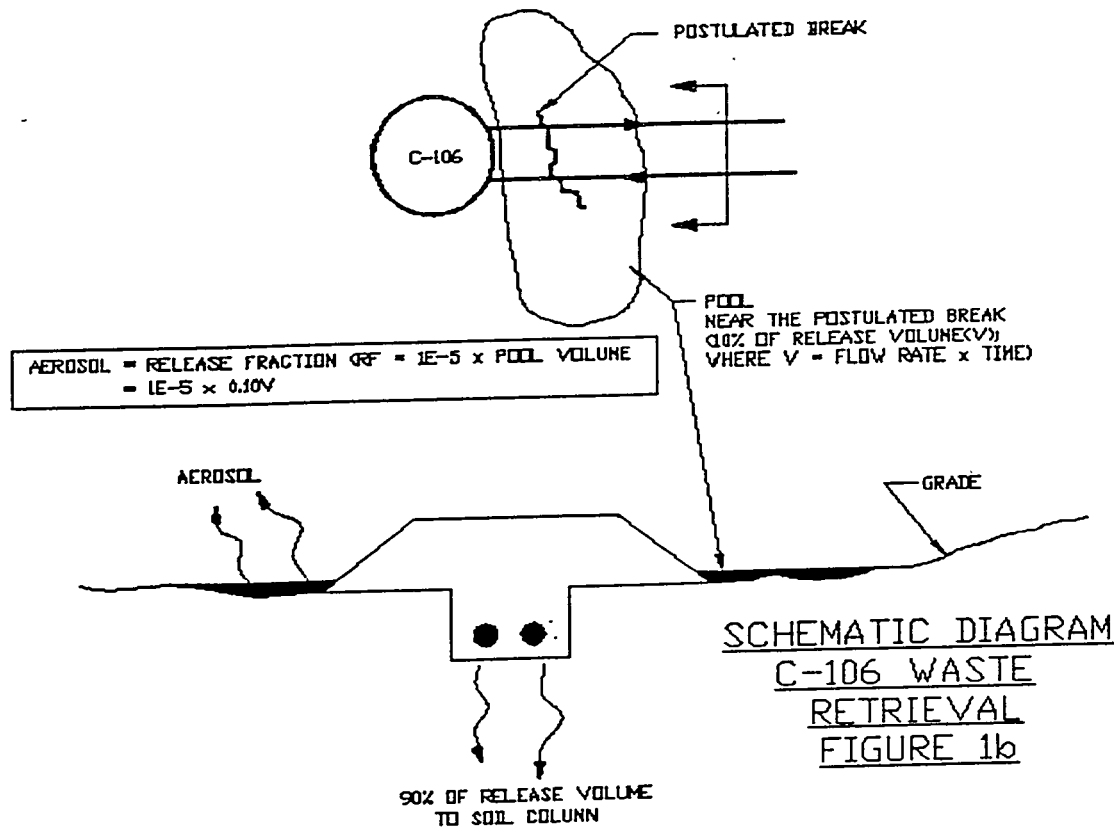
CALCULATIONS**A. ONSITE AND OFFSITE DOSE CONSEQUENCE CALCULATIONS****1. SCENARIO NO. 1: WASTE TRANSFER LINES BREAK**

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



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				7362-H-006				
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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,

$$\begin{aligned}\text{Volume release is} &= 2 \text{ hrs} \times 60 \text{ min/hr} \times 350 \text{ gpm} \\ &= \underline{4.20\text{E}+4 \text{ gallons}}\end{aligned}$$

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:

$$\begin{aligned}\text{Volume of 2000 ft of piping} &= \pi \times (4.026 \text{ in})^2 / 4 \times 2000 \text{ ft} \times 12 \text{ in/ft} \\ &= \underline{3.06\text{E}+5 \text{ in}^3}\end{aligned}$$

$$\text{Per Appendix B-11 of Ref. 1, } 231 \text{ in}^3 \text{ volume} = 1 \text{ gallon}$$

$$\begin{aligned}\text{Therefore, volume of liquid} &= 3.06\text{E}+5 \text{ in}^3 / 231 \text{ in}^3 / \text{gal} \\ \text{in the pipe} &= \underline{1.32\text{E}+3 \text{ gallons}}\end{aligned}$$

$$\begin{aligned}\text{Total volume release} &= 4.20\text{E}+4 + 1.32\text{E}+3 \\ &= \underline{4.33\text{E}+4 \text{ gallons}}\end{aligned}$$

$$\begin{aligned}\text{At 3.785 liters per gallon, per Ref. 1,} & \\ \text{Effective radioactive volume} &= 4.33\text{E}+4 \text{ gal} \times 3.785 \text{ liters/gal} \\ \text{release} &= \underline{1.64\text{E}+5 \text{ liters}}\end{aligned}$$

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	PROJECT <u>241-C-106 Waste Retrieval</u>	PRELIM.	FINAL X	VOID			
		SHEET 11 OF 48					
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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

$$= 1.64E+5 \times 0.1$$

$$= \underline{1.64E+4 \text{ liter}}$$

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

$$= 1.0E-5 \times 1.64E+4$$

$$= \underline{1.64E-1 \text{ liters}}$$

Solids Radioactive Release calculation

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

Effective radioactive volume release = $1.64E-1 \times 0.30 / 1.2$

$$= \underline{4.10E-2 \text{ liters}}$$

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

$$= 1.47E-2 \text{ rem/liter} \times 4.10E-2 \text{ liter}$$

$$= \underline{6.03E-4 \text{ rem}}$$

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

$$= 1.40E+1 \text{ rem/liter} \times 4.10E-2 \text{ liter}$$

$$= \underline{5.75E-1 \text{ rem}}$$

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Liquid Radioactive Release calculation

Based on 70 percent supernatant liquid
(per Criterion 15, Sh. 5),

$$\begin{aligned} \text{Effective radioactive volume release} &= 1.64\text{E-1} \times 0.70 \\ &= \underline{1.15\text{E-1 liters}} \end{aligned}$$

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.

$$\begin{aligned} \text{Therefore, for a total volume release of } 1.15\text{E-1 liters,} \\ \text{the offsite EDE} &= 1.15\text{E-5 rem/liter} \times 1.15\text{E-1 liter} \\ &= \underline{1.32\text{E-6 rem}} \end{aligned}$$

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 .

$$\begin{aligned} \text{Therefore, for a total volume release of } 1.15\text{E-1 liters,} \\ \text{the onsite EDE} &= 1.10\text{E-2 rem/liter} \times 1.15\text{E-1 liter} \\ &= \underline{1.26\text{E-3 rem}} \end{aligned}$$

$$\begin{aligned} \text{EDE dose consequence for Offsite Individual for both solids and liquid,} \\ \text{Scenario No. 1a} &= \underline{6.0\text{E-4 rem}} \end{aligned}$$

$$\begin{aligned} \text{EDE dose consequence for Onsite Individual for both solids and liquid,} \\ \text{Scenario No. 1a} &= \underline{5.8\text{E-1 rem}} \end{aligned}$$

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				PRELIM.	FINAL	VOID	0	NS ✓ DATE 4-22-94
	PROJECT <u>241-C-106 Waste Retrieval</u>			SHEET 13 OF 48			DATE	DATE
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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 = $1.64E-1 \times 0.10$
= 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 = $1.47E-2 \text{ rem/liter} \times 1.64E-2 \text{ liter}$
= 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 = $1.40E+1 \text{ rem/liter} \times 1.64E-2 \text{ liter}$
= 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 = $1.64E-1 \times 0.90$
= 1.48E-1 liters

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				7362-H-006				
	PRELIM.	FINAL	VOID	0	NSV DATE 4-22-94	DATE 4-22-94		
	SHEET 14 OF 46				DATE	DATE		
PROJECT <u>241-C-106 Waste Retrieval</u>				J.O. 7362.007				
SUBJECT <u>Dose Consequences and EHSC Calculations</u>								

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

Therefore, for a total volume release of $1.48\text{E-}1$ liters,
 the offsite EDE $= 1.15\text{E-}5$ rem/liter $\times 1.48\text{E-}1$ liter
 $= \underline{1.70\text{E-}6 \text{ rem}}$

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

Therefore, for a total volume release of $1.48\text{E-}1$ liters,
 the onsite EDE $= 1.10\text{E-}2$ rem/liter $\times 1.48\text{E-}1$ liter
 $= \underline{1.62\text{E-}3 \text{ rem}}$

EDE dose consequence for Offsite Individual for both solids and liquid,
 Scenario No. 1b $= \underline{2.4\text{E-}4 \text{ rem}}$

EDE dose consequence for Onsite Individual for both solids and liquid,
 Scenario No. 1b $= \underline{2.3\text{E-}1 \text{ rem}}$

EVALUATION OF BOTH SUPPLY AND RETURN LINE BREAK

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

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

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.

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	PRELIM.	FINAL	VOID	0	NTV DATE 4-22-94	DATE 4-22-94		
		X						
PROJECT <u>241-C-106 Waste Retrieval</u>				SHEET 15 OF 48			DATE	DATE
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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,

$$\begin{aligned}
 \text{Volume release} &= 10 \text{ sec} \times 350 \text{ gpm} / 60 \text{ sec/min} \\
 &= \underline{5.83E+1 \text{ gallons}}
 \end{aligned}$$

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:

$$\begin{aligned}
 \text{Volume of 2000 ft of pipe} &= \pi \times (4.026 \text{ in})^2 / 4 \times 2000 \text{ ft} \times 12 \text{ in/ft} \\
 &= \underline{3.06E+5 \text{ in}^3}
 \end{aligned}$$

$$\text{Per Appendix B-11 of Ref. 1, } 231 \text{ in}^3 \text{ volume} = 1 \text{ gallon}$$

$$\begin{aligned}
 \text{Therefore, volume of liquid in the pipe} &= 3.06E+5 \text{ in}^3 / 231 \text{ in}^3 / \text{gal} \\
 &= \underline{1.32E+3 \text{ gallons}}
 \end{aligned}$$

$$\begin{aligned}
 \text{Total volume release} &= (5.83E+1) + (1.32E+3) \\
 &= \underline{1.38E+3 \text{ gallons}}
 \end{aligned}$$

$$\begin{aligned}
 \text{At 3.785 liters per gallon, per Ref. 1,} \\
 \text{Effective radioactive volume release} &= 1.38E+3 \text{ gal} \times 3.785 \text{ liters/gal} \\
 &= \underline{5.22E+3 \text{ liters}}
 \end{aligned}$$

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				PRELIM.	FINAL	VOID	0	ADY DATE 4-22-94
	PROJECT 241-C-106 Waste Retrieval			SHEET 16 OF 46			DATE	DATE
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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

$$= 5.22E+3 \times 0.1$$

$$= \underline{5.22E+2 \text{ liter}}$$

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

$$= 1.0E-5 \times 5.22E+2$$

$$= \underline{5.22E-3 \text{ liters}}$$

Solids Radioactive Release Calculation

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

Effective radioactive volume release

$$= 5.22E-3 \times 0.30 / 1.2$$

$$= \underline{1.31E-3 \text{ liters}}$$

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

$$= 2.30E-2 \text{ rem/liter} \times 1.31E-3 \text{ liter}$$

$$= \underline{3.01E-5 \text{ rem}}$$

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

$$= 4.37E+1 \text{ rem/liter} \times 1.31E-3 \text{ liter}$$

$$= \underline{5.72E-2 \text{ rem}}$$

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SUBJECT <u>Dose Consequences and EHSC Calculations</u>									

Liquid Radioactive Release Calculation

Based on 70 percent supernatant liquid
(per Criterion 15, Sh. 5),

$$\begin{aligned} \text{Effective radioactive volume release} &= 5.22\text{E-}3 \times 0.70 \\ &= \underline{3.65\text{E-}3 \text{ liters}} \end{aligned}$$

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

$$\begin{aligned} \text{Therefore, for a total volume release of } 3.65\text{E-}3 \text{ liters,} \\ \text{the offsite EDE} &= 1.80\text{E-}5 \text{ rem/liter} \times 3.65\text{E-}3 \text{ liter} \\ &= \underline{6.57\text{E-}8 \text{ rem}} \end{aligned}$$

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

$$\begin{aligned} \text{Therefore, for a total volume release of } 3.65\text{E-}3 \text{ liters,} \\ \text{the onsite EDE} &= 3.42\text{E-}2 \text{ rem/liter} \times 3.65\text{E-}3 \text{ liter} \\ &= \underline{1.25\text{E-}4 \text{ rem}} \end{aligned}$$

$$\begin{aligned} \text{EDE dose consequence for Offsite Individual for both solids and liquid,} \\ \text{Scenario No. 1c} &= \underline{3.0\text{E-}5 \text{ rem}} \end{aligned}$$

$$\begin{aligned} \text{EDE dose consequence for Onsite Individual for both solids and liquid,} \\ \text{Scenario No. 1c} &= \underline{5.7\text{E-}2 \text{ rem}} \end{aligned}$$

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		X						
PROJECT <u>241-C-106 Waste Retrieval</u>			SHEET 18 OF 48			DATE	DATE	
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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 = $5.22\text{E-}3 \times 0.10$
= 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 = $2.30\text{E-}2 \text{ rem/liter} \times 5.22\text{E-}4 \text{ liter}$
= 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 = $4.37\text{E+}1 \text{ rem/liter} \times 5.22\text{E-}4 \text{ liter}$
= 2.28E-2 rem

Liquid Radioactive Release Calculation

Based on 90 percent supernatant liquid
(per Criterion 15 on Sheet 5),
Effective radioactive volume release = $5.22\text{E-}3 \times 0.90$
= 4.70E-3 liters

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	PRELIM.	FINAL	VOID	0	NSV DATE 4-22-94	DATE 4-22-94	
		X					
PROJECT <u>241-C-106 Waste Retrieval</u>				SHEET 19 OF 48		DATE	DATE
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From Table A-1, offsite unit liter release EDE inhalation dose for AY-102 with AY-101 supernatant is equal to $1.80\text{E-}5$ rem/liter without PM.

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

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

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

EDE dose consequence for Offsite Individual for both solids and liquid,
 Scenario No. 1d $= \underline{1.2\text{E-}5 \text{ rem}}$

EDE dose consequence for Onsite Individual for both solids and liquid,
 Scenario No. 1d $= \underline{2.3\text{E-}2 \text{ rem}}$

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	PRELIM.	FINAL	VOID	0	NSV DATE 4-22-94	DATE 4-22-94	
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PROJECT <u>241-C-106 Waste Retrieval</u>				J.O. 7362.007			
SUBJECT <u>Dose Consequences and EHSC Calculations</u>							

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

$$= (3.0E-5) + (1.2E-5) \text{ rem}$$

$$= \underline{4.2E-5 \text{ rem}}$$

EDE dose consequence for Onsite Individual for both solids and liquid,
 Scenarios 1c and 1d

$$= (5.7E-2) + (2.3E-2) \text{ rem}$$

$$= \underline{8.0E-2 \text{ rem}}$$

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.

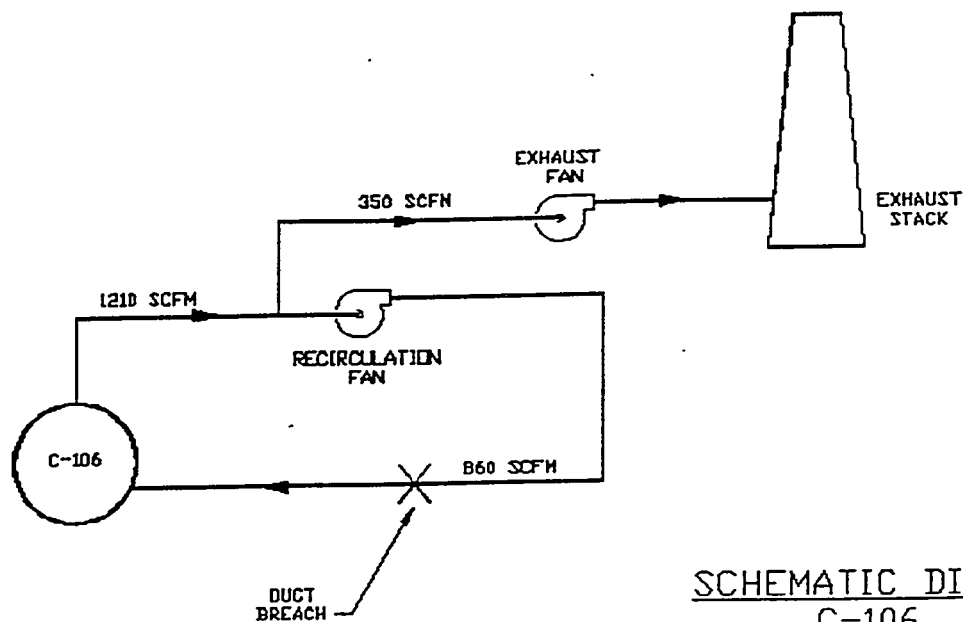
Based on the onsite EDE values (using release time of 10 seconds), the time to reach the SC-1, Criterion 1 of Ref. 9 (500 mrem for offsite individual), will be equal to 33 hours $[500 \text{ mrem} / (4.2E-5 \text{ rem} \times 1000 \text{ mrem/rem} \times (3600 \text{ sec/hr} / 10 \text{ sec})]$, and the time to reach the SC-2, Criterion 2 of Ref. 9 (5 rem for onsite individual), will be equal to 10.4 minutes $[5 \text{ rem} / (8.02E-2 \text{ rem} \times (60 \text{ sec/min} / 10 \text{ sec})]$. 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.

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	PRELIM.	FINAL	VOID	0	NSV DATE 4-22-94	DATE 4-22-94
		X				
PROJECT <u>241-C-106 Waste Retrieval</u>	SHEET 21 OF 48				DATE	DATE
SUBJECT <u>Dose Consequences and EHSC Calculations</u>	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)

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	PRELIM.	FINAL	VOID	0	NSV DATE 4-22-94	 DATE 4-22-94		
		X						
	PROJECT <u>241-C-106 Waste Retrieval</u>			SHEET 22 OF 48		DATE	DATE	
SUBJECT <u>Dose Consequences and EHSC Calculations</u>			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/m³. 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

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

= 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 = $(2.30\text{E-}2) \times 0.10 \times 0.073 + (1.80\text{E-}5) \times 0.90 \times 0.073$
 = 1.7E-4 rem

EDE dose consequence for Onsite Individual for

Tank C-106 (without plume meander effect),

Scenario No. 2 = $(4.37\text{E} + 1) \times 0.10 \times 0.073 + (3.42\text{E-}2) \times 0.90 \times 0.073$
 = 3.2E-1 rem

Form 5007 (Rev. 4/93)

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				7362-H-006				
	PRELIM.	FINAL	VOID	0	NSV			
		X			DATE	DATE		
PROJECT 241-C-106 Waste Retrieval			SHEET 23 OF 46			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 $= (1.7E-4) \times (0.64) / 0.5$
 $= \underline{2.2E-4 \text{ rem}}$

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

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 $= (2.2E-4) \times 2$
 $= \underline{4.4E-4 \text{ rem}}$

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

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		X						
	PROJECT <u>241-C-106 Waste Retrieval</u>			SHEET 24 OF 48		DATE		DATE
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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.

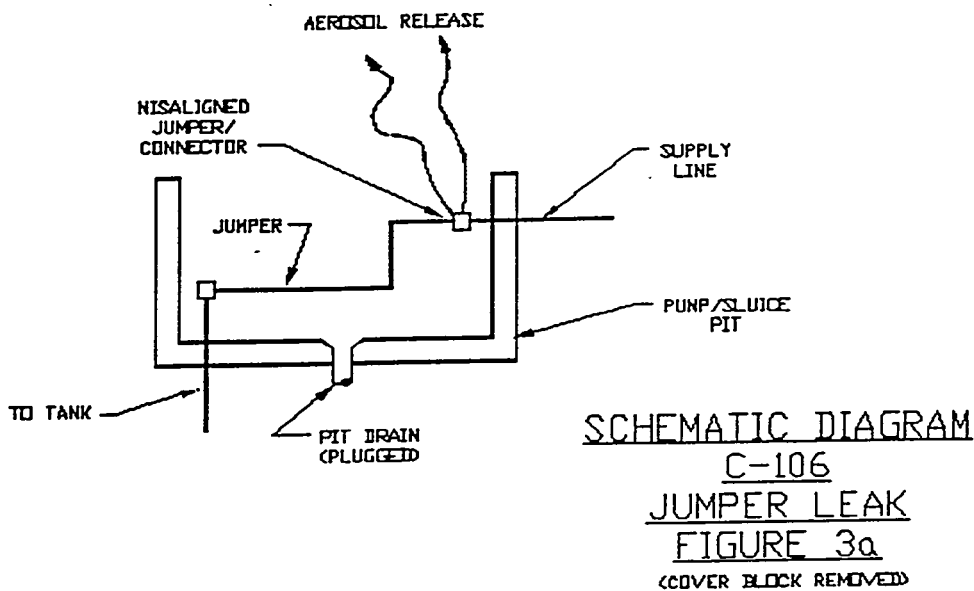
Form 5007 (Rev. 4/93)

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	VOID	0	NSV DATE 4-22-94	DATE 4-22-94		
		X						
	SHEET 25 OF 48							
PROJECT <u>241-C-106 Waste Retrieval</u>	J.O. 7362.007				DATE	DATE		
SUBJECT <u>Dose Consequences and EHSC Calculations</u>								

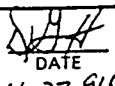
3. SPRAY LEAK FROM A JUMPER OR CONNECTOR INSIDE THE PIT

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.



Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UE&C	GENERAL COMPUTATION SHEET		CALCULATION SET NO.		REV.	COMP. BY	CHK'D BY
			7362-H-006				
	PRELIM.	FINAL	VOID	0	NSV DATE 4-22-94	 DATE 4-22-94	
		X					
PROJECT <u>241-C-106 Waste Retrieval</u>	SHEET 28 OF 48					DATE	DATE
SUBJECT <u>Dose Consequences and EHSC Calculations</u>	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 $9.94\text{E-}5 \text{ m}^3/\text{sec}$

At 200 psi, value is $1.26\text{E-}4 \text{ m}^3/\text{sec}$

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

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

$$= 1.15\text{E-}4 \text{ m}^3/\text{sec}$$

Therefore, volume of material suspended
 in 2 hours = $1.15\text{E-}4 \text{ m}^3/\text{sec} \times 2 \text{ hours} \times 3600 \text{ sec/hr} \times 1000 \text{ L/m}^3$

$$= 8.31\text{E}+2 \text{ liters}$$

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	VOID	0	NTV DATE 4-22-94
	PROJECT 241-C-106 Waste Retrieval			SHEET 27 OF 48			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 $= 8.31E+2 \times 0.3 / 1.2$
 $= 2.08E+2$ 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 $= 8.31E+2 \times 0.7$
 $= 5.81E+2$ 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

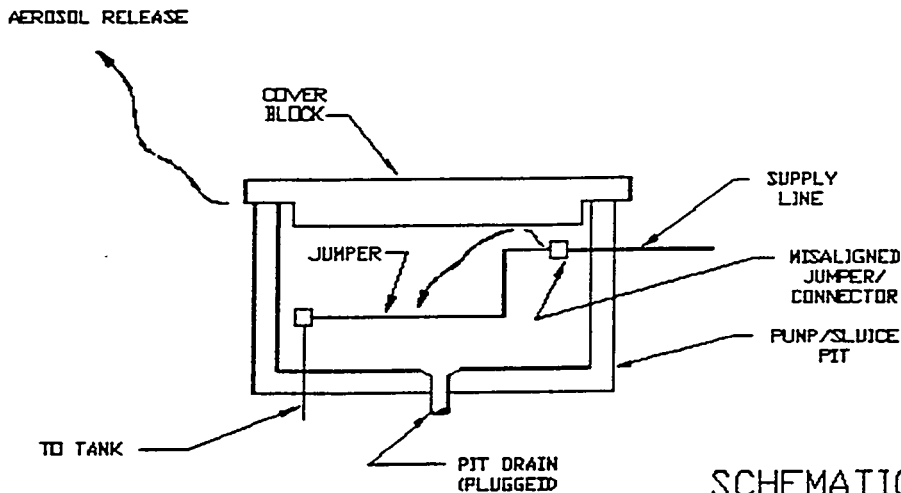
From the above, the EDE dose consequence values are > 500 mrem for offsite
 individual and > 5 rem for onsite individual doses. Therefore, the pit covers shall be
 classified as SC-1, per Ref. 7.

Form 5007 (Rev. 4/93)

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	VOID	0	NSV 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 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		
		X						
	SHEET 29 OF 48					DATE	DATE	
PROJECT <u>241-C-106 Waste Retrieval</u>				J.O. 7362.007				
SUBJECT <u>Dose Consequences and EHSC Calculations</u>								

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, m³/sec
- 0.61 = Discharge coefficient for a sharp edged orifice
- A = Area of opening, m²
- g = Gravitational acceleration, 9.8 m/sec²
- 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 Consolidation of Badger and UE&C PROJECT <u>241-C-106 Waste Retrieval</u> SUBJECT <u>Dose Consequences and EHSC Calculations</u>	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
	SHEET 30 OF 48					DATE	DATE
	J.O. 7362.007						

$$\begin{aligned} \text{and slit area, } A &= (0.1 \text{ mm} \times 1 \text{ m}/1000 \text{ mm}) \times (5 \text{ cm} \times 1 \text{ m}/100 \text{ cm}) \\ &= \underline{5.0\text{E-}6 \text{ m}^2} \end{aligned}$$

Substituting in the above equation,

$$Q = \underline{1.52\text{E-}4 \text{ m}^3/\text{sec}}$$

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 length of one shift,

$$\begin{aligned} \text{The amount of waste volume released to the environment is} \\ &= 1.52\text{E-}4 \text{ m}^3/\text{sec} \times 8 \text{ hrs} \times 3600 \text{ sec/hr} \\ &= \underline{4.38 \text{ m}^3} \end{aligned}$$

Solids Radioactive Release Calculation

$$\begin{aligned} \text{At 30 percent solids content per Criterion 15 on Sheet 5, the volume released to the environment is} \\ &= 4.38 \text{ m}^3 \times 0.30 \times 1/1.2 \\ &= \underline{1.1 \text{ m}^3} \end{aligned}$$

$$\begin{aligned} \text{Assuming the aerosol capacity is equivalent to } 10 \text{ mg/m}^3 \text{ per Ref. 3, the amount of aerosol released to the environment} \\ &= 1.1 \text{ m}^3 \times 10 \text{ mg/m}^3 \times 1\text{E-}6 \text{ L/mg} \\ &= \underline{1.10\text{E-}5 \text{ liters}} \end{aligned}$$

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:

$$\text{EDE dose consequence for Offsite Individual with PM for C-106 solids} = \underline{1.6\text{E-}7 \text{ rem}}$$

$$\text{EDE dose consequence for Onsite Individual for C-106 solids} = \underline{1.5\text{E-}4 \text{ rem}}$$

Form 5007 (Rev. 4/93)

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

Liquid Radioactive Release Calculation

At 70 percent liquid content per Criteria 15, the volume released to the environment is

$$= 4.38 \text{ m}^3 \times 0.70$$

$$= \underline{3.07 \text{ m}^3}$$

Assuming the aerosol capacity is equivalent to 10 mg/m³ per Ref. 3, the amount of aerosol released to the environment

$$= 3.07 \text{ m}^3 \times 10 \text{ mg/m}^3 \times 1\text{E-}6 \text{ L/mg}$$

$$= \underline{3.07\text{E-}5 \text{ liters}}$$

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

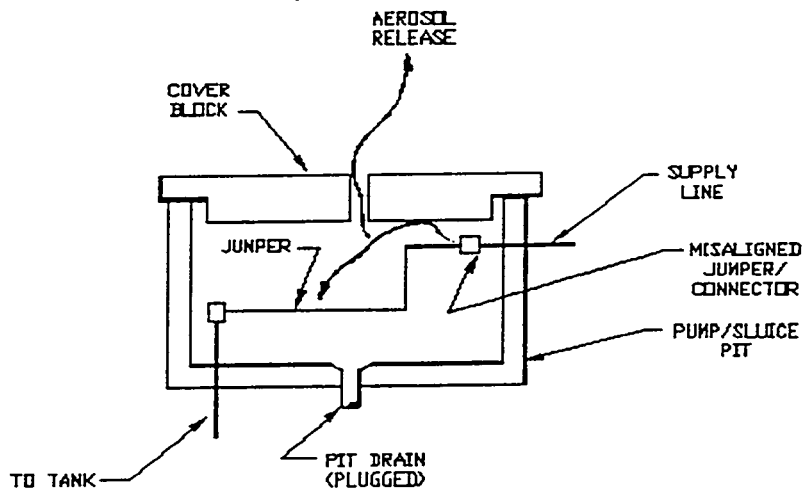
From the above, based on 8 hour release, the dose consequence values are < 500 mrem for offsite individual and < 5 rem for onsite individual doses. Therefore, the pit covers should always be covered prior to any transfer operation via the jumpers/connectors within the pit.

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. 0	COMP. BY NSV	CHK'D BY S. H. H.
				PRELIM. X	VOID	DATE 4-22-94	DATE 4-22-94	
	PROJECT <u>241-C-106 Waste Retrieval</u>			SHEET 32 OF 46		DATE		DATE
	SUBJECT <u>Dose Consequences and EHSC Calculations</u>			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 misalignment 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 Consolidation of Badger and UE&C	GENERAL COMPUTATION SHEET			CALCULATION SET NO: 7362-H-006		REV.	COMP. BY	CHK'D BY
				PRELIM.	FINAL	VOID	0	<i>NSV</i> DATE <i>4-22-94</i>
	SHEET 33 OF 48				DATE	DATE		
	PROJECT <u>241-C-106 Waste Retrieval</u>			J.O. 7362.007				
SUBJECT <u>Dose Consequences and EHSC Calculations</u>								

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, m³/sec
- 0.61 = Discharge coefficient for a sharp edged orifice
- A = Area of opening, m²
- g = Gravitational acceleration, 9.8 m/sec²
- 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, $h = 180 \text{ psig} \times 27.7 \text{ inches/psig} \times 2.54 \text{ cm/inch} \times 1 \text{ m/100 cm}$
 $= \underline{1.27E+2 \text{ m}}$

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UE&C	GENERAL COMPUTATION SHEET			CALCULATION SET NO.		REV.	COMP. BY	CHK'D BY
				7362-H-006				
	PRELIM.	FINAL	VOID		NTV	SCH		
		X		0	DATE 4-22-94	DATE 4-22-94		
PROJECT <u>241-C-106 Waste Retrieval</u>				SHEET 34 OF 48			DATE	DATE
SUBJECT <u>Dose Consequences and EHSC Calculations</u>				J.O. 7362.007				

and 2 inch square edged

$$\begin{aligned} \text{opening area, } A &= \pi \times \{(2.0 \text{ inch} \times 2.54 \text{ cm/inch})^2 / 4\} \times (1 \text{ m}/100 \text{ cm})^2 \\ &= \underline{2.03\text{E-}3 \text{ m}^2} \end{aligned}$$

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

$$\begin{aligned} \text{to the environment is} &= 0.062 \text{ m}^3/\text{sec} \times 8 \text{ hrs} \times 3600 \text{ sec/hr} \\ &= \underline{1.77\text{E}+3 \text{ m}^3} \end{aligned}$$

Solids Radioactive Release Calculation

At 30 percent solids content per Criterion 15 on Sheet 5, the volume released to

$$\begin{aligned} \text{the environment is} &= 1.77\text{E}+3 \text{ m}^3 \times 0.30 \times 1/1.2 \\ &= \underline{4.44\text{E}+2 \text{ m}^3} \end{aligned}$$

Assuming the aerosol capacity is equivalent to 10 mg/m³ per Ref. 3,

the amount of aerosol released to

$$\begin{aligned} \text{the environment} &= 4.44\text{E}+2 \text{ m}^3 \times 10 \text{ mg/m}^3 \times 1\text{E-}6 \text{ L/mg} \\ &= \underline{4.44\text{E-}3 \text{ liters}} \end{aligned}$$

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:

$$\text{EDE dose consequence for Offsite Individual with PM for C-106 solids} = \underline{6.5\text{E-}5 \text{ rem}}$$

$$\text{EDE dose consequence for Onsite Individual for C-106 solids} = \underline{6.2\text{E-}2 \text{ rem}}$$

Form 5007 (Rev. 4/93)

Raytheon Engineers & Constructors A Consolidation of Badger and UE&C	GENERAL COMPUTATION SHEET			CALCULATION SET NO.		REV.	COMP. BY	CHK'D BY
				7362-H-006				
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		X						
PROJECT <u>241-C-106 Waste Retrieval</u>				SHEET 35 OF 48			DATE	DATE
SUBJECT <u>Dose Consequences and EHSC Calculations</u>				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

$$= 1.77\text{E}+3 \text{ m}^3 \times 0.70$$

$$= \underline{1.24\text{E}+3 \text{ m}^3}$$

Assuming the aerosol capacity is equivalent to 10 mg/m³ per Ref. 3,
the amount of aerosol released to
the environment

$$= 1.24\text{E}+3 \text{ m}^3 \times 10 \text{ mg/m}^3 \times 1\text{E}-6 \text{ L/mg}$$

$$= \underline{1.24\text{E}-2 \text{ liters}}$$

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 UE&C	GENERAL COMPUTATION SHEET			CALCULATION SET NO. 7362-H-006		REV.	COMP. BY	CHK'D BY
				PRELIM.	FINAL X	VOID	0	<u>NTV</u> DATE 4-22-94
	PROJECT <u>241-C-106 Waste Retrieval</u>			SHEET 36 OF 48			DATE	DATE
	SUBJECT <u>Dose Consequences and EHSC Calculations</u>			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: <u>Supply and Return Transfer Line Break</u> DATE: <u>04/22/94</u>			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, sludges, gases, powders, and unconsolidated solids. ☐ No Stop. Associated items are safety class 3, other criteria permitting. ☒ Yes Proceed.																											
2. QUANTITY OF MATERIALS RELEASED The following matrix provides multiplying factors which are a function of the total estimated cune 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 radioisotopes by half-life ($T_{1/2}$) category and show total amount (in Curies (Ci)) for each category for release time of 8 hours: $T_{1/2} < 1$ yr: Amount = <u>0.00</u> Ci $T_{1/2} = 1$ to 100 yrs: Amount = <u>2.46E+5</u> Ci $T_{1/2} > 100$ yrs: Amount = <u>3.71E+2</u> Ci Mark the applicable multiplying factors below.			MF(2.) = 11,000																								
	<table border="1"> <thead> <tr> <th>Amount (Ci)</th> <th colspan="3">Half-life</th> </tr> <tr> <th></th> <th>< 1 yr.</th> <th>1-100 yrs.</th> <th>> 100 yrs.</th> </tr> </thead> <tbody> <tr> <td>< 1</td> <td>MF = 1</td> <td>MF = 10</td> <td>MF = 100</td> </tr> <tr> <td>1-1000</td> <td>MF = 10</td> <td>MF = 100</td> <td>MF = 1,000</td> </tr> <tr> <td>> 1000-10⁶</td> <td>MF = 100</td> <td>MF = 1,000</td> <td>MF = 10,000</td> </tr> <tr> <td>> 10⁶</td> <td>MF = 1,00</td> <td>MF = 10,000</td> <td>MF = 100,000</td> </tr> </tbody> </table>			Amount (Ci)	Half-life				< 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
Amount (Ci)	Half-life																										
	< 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 5007 (Rev. 4/93)

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

RADIOACTIVE MATERIAL EHSC CALCULATION	
COMPONENT/SYSTEM: <u>Supply and Return Transfer Lines Break</u> DATE: <u>04/22/94</u> Sheet 2 of 2 DRAWING: _____ LOCATION: _____	
3. TOTAL QUANTITY OF MATERIAL RELEASED ⁽¹⁾ = <u>3.28E+5</u> liter (8.65E+4 gallon) ≤100 gal MF=1 >1,000-10,000 gal ... MF=10 >100-1,000 gal ... MF=5 ≥10,000 gal MF=100	MF(3.) = 100
4. PROXIMITY TO ENVIRONMENTAL RECEIVERS	
A. DEPTH TO AQUIFER = <u>>150</u> feet >150 feet MF=1 21-75 feet MF=5 75-150 feet MF=2 0-20 feet MF=10	MF(4.A) = 1
B. DISTANCE TO SENSITIVE SURFACE WATER ⁽²⁾ = <u>NA</u> feet >2500 feet NA 100-500 feet MF=20 >1000-2500 feet MF=9 <100 feet MF=25 >500-1000 feet MF=16 Direct discharge to surface water ... MF=50	MF(4.B) = NA
C. DISTANCE TO OFFSITE BOUNDARY ⁽⁴⁾ = <u>NA</u> feet >2500 feet ... NA 1000-2500 feet ... MF=5 <1000 feet ... MF=10	MF(4.C) = NA
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) = (11000)(100)(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).

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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	VOID	0	NSV DATE 4-22-94
	PROJECT <u>241-C-106 Waste Retrieval</u>			SHEET 38 OF 48			DATE	DATE
	SUBJECT <u>Dose Consequences and EHSC Calculations</u>			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: <u>Supply and Return transfer Line Break</u>		DATE: <u>04/22/94</u>	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, sludges, gases, powders, and unconsolidated solids. ☐ No Stop. Associated items are safety class 3, other criteria permitting. ☒ Yes Proceed.																							
2. QUANTITY OF MATERIALS RELEASED MF(2.) = 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 system(s), component(s), and/or structure(s) of interest. From Tables B-2 and B-3, Group radionuclides by half-life ($T_{1/2}$) category and show total amount (in Curies (Ci)) for each category for release time of 8 hours: $T_{1/2} < 1$ yr: Amount = <u>0.00</u> Ci $T_{1/2} = 1$ to 100 yrs: Amount = <u>7.83E+3</u> Ci $T_{1/2} > 100$ yrs: Amount = <u>1.18E+1</u> Ci Mark the applicable multiplying factors below. <table border="1"> <thead> <tr> <th>Amount (Ci)</th> <th>Half-life < 1 yr.</th> <th>1-100 yrs.</th> <th>> 100 yrs.</th> </tr> </thead> <tbody> <tr> <td>< 1</td> <td>MF = 1</td> <td>MF = 10</td> <td>MF = 100</td> </tr> <tr> <td>1-1000</td> <td>MF = 10</td> <td>MF = 100</td> <td>MF = 1,000</td> </tr> <tr> <td>> 1000-10⁴</td> <td>MF = 100</td> <td>MF = 1,000</td> <td>MF = 10,000</td> </tr> <tr> <td>> 10⁴</td> <td>MF = 1,000</td> <td>MF = 10,000</td> <td>MF = 100,000</td> </tr> </tbody> </table> MF(2.) = SUM of underlined MFs = 1000 + 1000 = 2000				Amount (Ci)	Half-life < 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 ⁴	MF = 100	MF = 1,000	MF = 10,000	> 10 ⁴	MF = 1,000	MF = 10,000	MF = 100,000
Amount (Ci)	Half-life < 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 ⁴	MF = 100	MF = 1,000	MF = 10,000																				
> 10 ⁴	MF = 1,000	MF = 10,000	MF = 100,000																				

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Raytheon Engineers & Constructors A Consolidation of Badger and UE&C GENERAL COMPUTATION SHEET PROJECT <u>241-C-106 Waste Retrieval</u> SUBJECT <u>Dose Consequences and EHSC</u> <u>Calculations</u>	CALCULATION SET NO.			REV.	COMP. BY	CHK'D BY
	7362-H-006					
	PRELIM.	FINAL	VOID		NSV	NSV
		X		0	DATE 4-22-94	DATE 4-22-94
SHEET 39 OF 48				DATE	DATE	
J.O. 7362.007						

RADIOACTIVE MATERIAL EHSC CALCULATION	
COMPONENT/SYSTEM: <u>Supply and Return Transfer Line Break</u> DATE: <u>04/22/94</u> Sheet 2 of 2 DRAWING: _____ LOCATION: _____	
3. TOTAL QUANTITY OF MATERIAL RELEASED ⁽¹⁾ = <u>1.04E+4 liter</u> (2.76E+3 gallons)	MF(3.) = 10
≤ 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 = <u>> 150</u> feet	MF(4.A) = 1
> 150 feet MF = 1 21-75 feet MF = 5 76-150 feet MF = 2 0-20 feet MF = 10	
B. DISTANCE TO SENSITIVE SURFACE WATER ⁽²⁾ = <u>NA</u> feet	MF(4.B) = NA
> 2500 feet NA 100-500 feet MF = 20 > 1000-2500 feet MF = 8 < 100 feet MF = 25 > 500-1000 feet MF = 16 Direct discharge to surface water ... MF = 50	
C. DISTANCE TO OFFSITE BOUNDARY ⁽³⁾ = <u>NA</u> 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 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).

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Raytheon Engineers & Constructors A Consolidation of Badger and UE&C	GENERAL COMPUTATION SHEET		CALCULATION SET NO.		REV.	COMP. BY	CHK'D BY
			7362-H-006				
	PRELIM.	FINAL	VOID	0	MSV DATE 4-22-94	SLH DATE 4-22-94	
	SHEET 40 OF 48				DATE	DATE	
PROJECT <u>241-C-106 Waste Retrieval</u>			J.O. 7362.007				
SUBJECT <u>Dose Consequences and EHSC Calculations</u>							

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

- 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
- Per Criterion 14 on Sh. 5, C-106 will have supernatant from AY-101 via AY-102.
- $\text{Curies/L} = (\text{Bq/L}) / (3.7\text{E} + 10)$

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				7362-H-006				
	PRELIM.	FINAL	VOID	0	NSV DATE 4-22-94	DATE 4-22-94		
	X							
PROJECT <u>241-C-106 Waste Retrieval</u>				SHEET 41 OF 48			DATE	DATE
SUBJECT <u>Dose Consequences and EHSC Calculations</u>				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	28.6	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:

- Based on Release Volume of $1.64\text{E}+5$ Liters ($4.33\text{E}+4$ gallons, from Scenario 1a and Criterion 15)
- Based on Release Volume of $5.22\text{E}+3$ Liters ($1.38\text{E}+3$ gallons, from Scenario 1c and Criterion 15)
- Example Calc. for total release in curies: Cs-137 and 2 hour release

From Table B-1, $(4.73\text{E}-1) \times 0.30 \times (1.64\text{E}+5) + (1.09\text{E}-1) \times 0.70 \times (1.64\text{E}+5) = \underline{3.58\text{E}+4 \text{ Curies}}$

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Raytheon Engineers & Constructors A Consolidation of Badger and UE&C PROJECT <u>241-C-106 Waste Retrieval</u> SUBJECT <u>Dose Consequences and EHSC Calculations</u>	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	
	SHEET 42 OF 48				DATE	DATE	
	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	28.6	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:

- Based on Release Volume of $1.64\text{E}+5$ Liters ($4.33\text{E}+4$ gallons, from Scenario 1b and Criterion 15)
- Based on Release Volume of $5.22\text{E}+3$ Liters ($1.38\text{E}+3$ gallons, from Scenario 1d and Criterion 15)
- Example Calc. for total release in curies: Cs-137 and 2 hour release
 From Table B-1, $(4.73\text{E}-1) \times 0.10 \times (1.64\text{E}+5) + (1.09\text{E}-1) \times 0.90 \times (1.64\text{E}+5)$
 $= 2.38\text{E}+4 \text{ Curies}$

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				7362-H-006				
	PRELIM.	FINAL	VOID	0	NSV DATE 4-22-94	DATE 4-22-94		
		X						
PROJECT <u>241-C-106 Waste Retrieval</u>				SHEET 43 OF 46			DATE	DATE
SUBJECT <u>Dose Consequences and EHSC Calculations</u>				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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	PRELIM.	FINAL	VOID		0	<u>NSV</u> DATE 4-22-94	<u>NSV</u> DATE 4-22-94
	SHEET 44 OF 48					DATE	DATE
PROJECT <u>241-C-106 Waste Retrieval</u>				J.O. 7362.007			
SUBJECT <u>Dose Consequences and EHSC Calculations</u>							

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

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				7362-H-006				
	PRELIM.	FINAL	VOID	0	NSV DATE 4-22-94	SAH DATE 4-22-94		
	SHEET 45 OF 48				DATE	DATE		
PROJECT <u>241-C-106 Waste Retrieval</u>				J.O. 7362.007				
SUBJECT <u>Dose Consequences and EHSC Calculations</u>								

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 [$500 \text{ mrem} / (4.2\text{E-}5 \text{ rem} \times 1000 \text{ mrem/rem} \times (3600 \text{ sec/hr} / 10 \text{ sec}))$], 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 [$5 \text{ rem} / (8.02\text{E-}2 \text{ rem} \times (60 \text{ sec/min} / 10 \text{ sec}))$]. 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 $4.4\text{E-}1 \text{ mrem}$ is within the allowable limit of 500 mrem, and the calculated onsite EDE dose value of $4.2\text{E-}1 \text{ rem}$ 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 $3.1\text{E+}3 \text{ mrem}$ exceeds the allowable limit of 500 mrem, and also, the calculated onsite EDE dose value of $2.9\text{E+}3 \text{ rem}$ 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.	REV.	COMP. BY	CHK'D BY
				7362-H-006			
	PRELIM.	FINAL	VOID		0	NSV DATE 4-22-94	SHH DATE 4-22-94
	SHEET 48 OF 48					DATE	DATE
PROJECT <u>241-C-106 Waste Retrieval</u>				J.O. 7362.007			
SUBJECT <u>Dose Consequences and EHSC Calculations</u>							

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 G
PACKAGING DOSE CONSEQUENCE ANALYSIS

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Westinghouse
Hanford Company

Internal
Memo

From: Radiation Physics and Shielding 22570-HJG-94-005
Phone: 6-3765 HO-35
Date: January 6, 1994
Subject: TANKS 106-C AND 102-AY EQUIPMENT PACKAGING DOSE CONSEQUENCE
ANALYSIS FOR SAFETY CLASS ASSIGNMENT

To: D. B. Calmus G2-02
cc: J. G. Field G2-02
J. Greenborg HO-35
R. L. Simons HO-35
S. R. Gedeon HO-35
HJG File/LB

REFERENCES: Internal Memo 22570-HJG-94-001, H.J.Goldberg to D.B.Calmus.
"Tanks 106-C and 102-AY Equipment Packaging Dose Consequence
Analysis", 7 October 1993

The following analysis is a modification of the analysis referenced above that was developed to support evaluations in the Safety Evaluation for Packaging (SEP) for the 106-C project. The present analysis is to facilitate the assignment of a safety classification to the packages. The release is assumed to be an unmitigated release, and thus 100% of the inventories have been assumed to have been released in the accident scenario. In addition, the onsite worker has been assumed to be 100 m from the accident. These criteria were made to conform to WHC-CM-6-1; Section EP-1.4 Rev. 1, *Standard Engineering Practices; Safety Classification*.

In the previous analysis, the waste was in a solid crystalline form. As per WHC-CM-6-1, 100% of this material was assumed to be released from the shipping container. In order to ascertain the fraction in the respirable range that becomes airborne, the material was assumed to be in a powder form when released. Since the time of the original analysis, several questions have arisen which will be discussed below.

It can be argued that 100% of release from the shipping container does not imply 100% release of the material from the pump surface. This material was washed with a 3,000 psi water spray. While it was decided that no credit would be taken for the cleaning effect of this spray process, it can easily be argued that any material that remains on the pump after this treatment is relatively fixed. It boggles the mind to imagine that material that is so fixed could be completely dislodged by a fall of a meter or so from the shipping container on the back of a truck.

D. B. Calmus
Page 2
6 January 1994

22570-HJG-94-005

In addition, only a fraction of these crystals would be crushed to a powder that is respirable ($\leq 1\mu$). An analysis of an FFTF assembly came to the conclusion that, at most, only about 10% of the fuel would be powdered by being crushed between a transport vehicle and a concrete floor. I can dig this number out of the literature, but in the time available for this epistle necessitates that I must rely on my memory.

I would think that, if an accident were to occur, the pump slides out of the damaged container, and a portion of it is crushed by the overturned truck, a conservative estimate of that portion of the attached crystalline material that is removed from the pump might be 50%.

Of this material, it is also quite conservative if we assume that half of that released material is crushed into a powder of a respirable sized particles. The rest will be in the form of larger crystals. While I do not have very much experience with this material and its form on removed equipment, I do recall reading reports about the removal of the air lance from the 101-SY tank.

In that operation, large chunks of material, some solid and some in a more liquid form, fell to the ground. From what I read of the solids in that case it is extremely unlikely that crystals of that size would have become airborne in less than a tornado. In addition it takes an active imagination to imagine a nostril capable of inhaling such chunks.

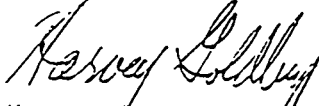
Thus, I would not find it difficult to estimate that 25%-30% of the material were to be released to the ground in the form of particles that are respirable. To this inventory, the previously applied airborne fraction would be available for inhalation by persons standing 100 m from the accident site. With these changes in the parameters of the problem, the doses to a worker and to the maximally exposed farmer are as follows;

D. B. Calmus
Page 3
6 January 1994

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Effective Dose Equivalent (EDE)		
	Dose to Worker (rem)	Dose to Farmer (rem)
106-C Heel Pump	3.3	0.03
106-C Transfer Pump	0.45	0.0039
102-AY Agitator Pump	2.0	0.036

Thus, it would seem that all of the packages analyzed are in safety class three. This conclusion is based on safety class criteria presented in EP 1.4 indicating that estimated releases less than 0.5 rem for offsite workers and greater than 5 rem for onsite workers are safety class two and releases less than 5 rem to onsite workers are safety class three.


Harvey J. Goldberg
Principal Engineer

CONCURRENCE:


Jess Greenborg, Manager
Radiation Physics and Shielding

CHECKLIST FOR CALCULATION REVIEW AND APPROVAL

Document Reviewed (Complete reference) Tanks 106-C and 102-AY Equipment
Packaging Shielding Analysis for Safety Class Assignment

Author(s) Harvey Goldberg

CHECKLIST FOR CALCULATION REVIEW

Yes No N/A

General Considerations

☒	☐	☐	Problem completely defined.
☒	☐	☒	Necessary assumptions explicitly stated and supported.
☒	☐	☐	Computer codes and data files documented.
☒	☐	☐	Data used in calculations explicitly stated in document.
☒	☐	☐	Data checked for consistency with original source information as applicable.
☒	☐	☐	Mathematical derivations checked including dimensional consistency of results.
☒	☐	☐	Models appropriate and used within range of validity or use outside range of established validity justified.
☒	☐	☐	Hand calculations checked for errors.
☐	☐	☒	Code runstreams correct and consistent with analysis documentation.
☐	☐	☒	Code output consistent with input and with results reported in analysis documentation.
☒	☐	☐	Acceptability limits on analytical results applicable and supported. Limits checked against sources.
☒	☐	☐	Safety margins consistent with good engineering practices.
☒	☐	☐	Conclusions consistent with analytical results and applicable limits.
☒	☐	☐	Results and conclusions address all points required in the problem statement.

Reviewer Name: Stephen R. Gedeon
 (print or type)



Technical Reviewer Approval

6 Jan 95

Date

Note: Any calculations, comments, or notes generated as part of this review should be signed, dated and attached to this checklist. Such material should be labeled and recorded in such a manner as to be intelligible to a technically qualified third party.

APPENDIX H

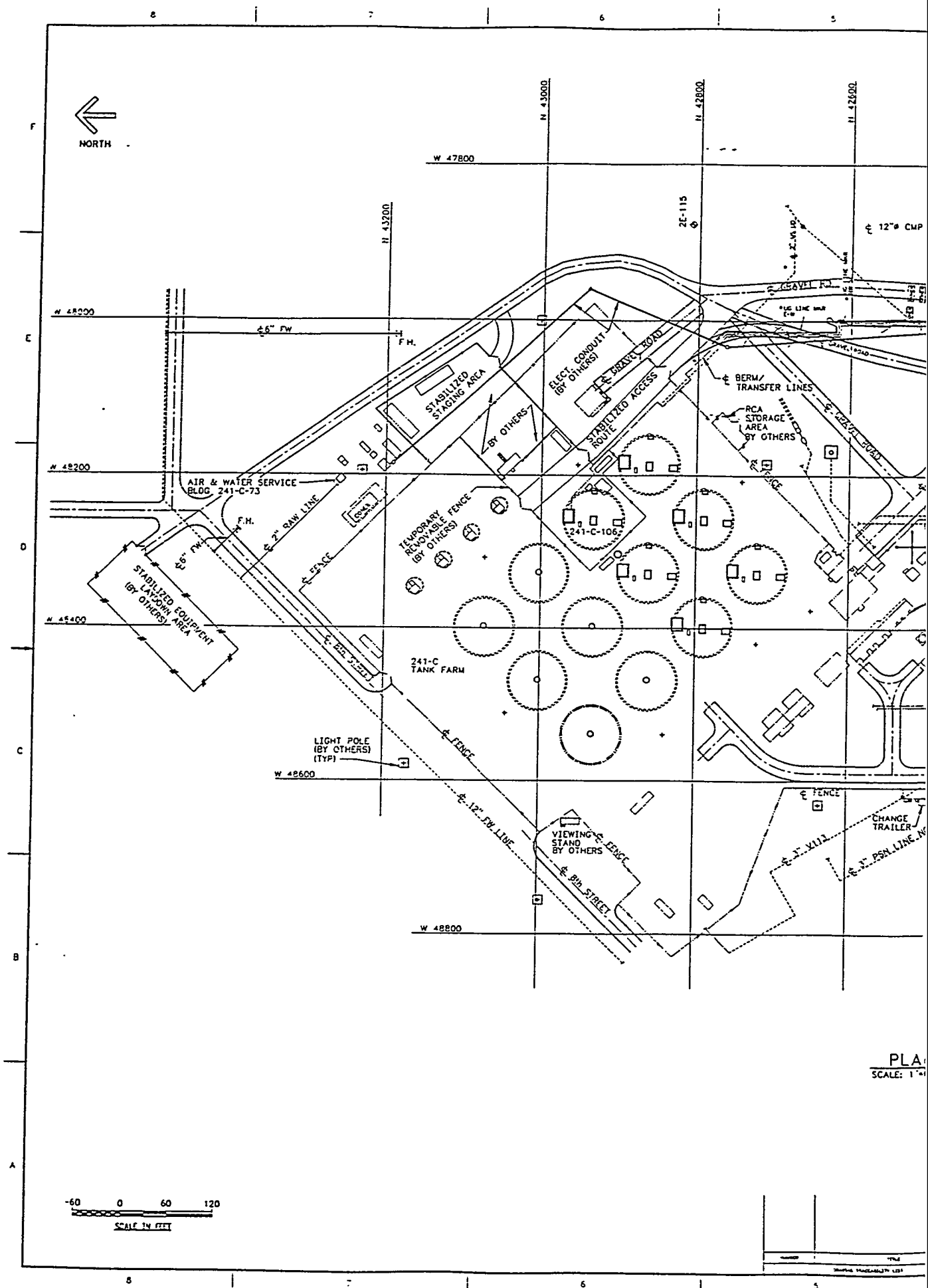
DRAWINGS

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LIST OF DRAWINGS

DRAWING NO.	TITLE	PAGE
H-2-818424	Civil Project Site Plan	H-5
H-2-818431	Civil 241-C-106 Enlarged Site Plan (Sheet 1 of 2)	H-7
H-2-818432	Civil 241-AY-102 Enlarged Site Plan	H-9
H-2-818470	HVAC Overall Flow Diagram	H-11
H-2-818520	Piping 241-C Tank Farm	H-13
H-2-818536	Piping Hydraulic Diagram	H-15
H-2-818540	Piping Tank 241-AY-102 Plan	H-17
H-2-818558	P&ID Legends, Equipment Identification, Details, & Interlock Schedules (4 Sheets)	H-19
H-2-818559	P&ID Tank 241-C-106 (6 Sheets)	H-27
H-2-818560	P&ID Tank 241-AY-102 (7 Sheets)	H-39
H-2-818561	P&ID TK 241-C-106 HVAC (7 Sheets)	H-53
H-2-818562	P&ID Air & Water System	H-67
H-2-818680	Electrical C-Farm One-Line Diagram	H-69
H-2-818681	Electrical C-Farm Area Plan (Sheet 1 of 3)	H-71
H-2-818693	Electrical AY-Farm One Line Diagram	H-73
H-2-818694	Electrical AY-Farm Plan and Details (Sheet 1 of 3)	H-75

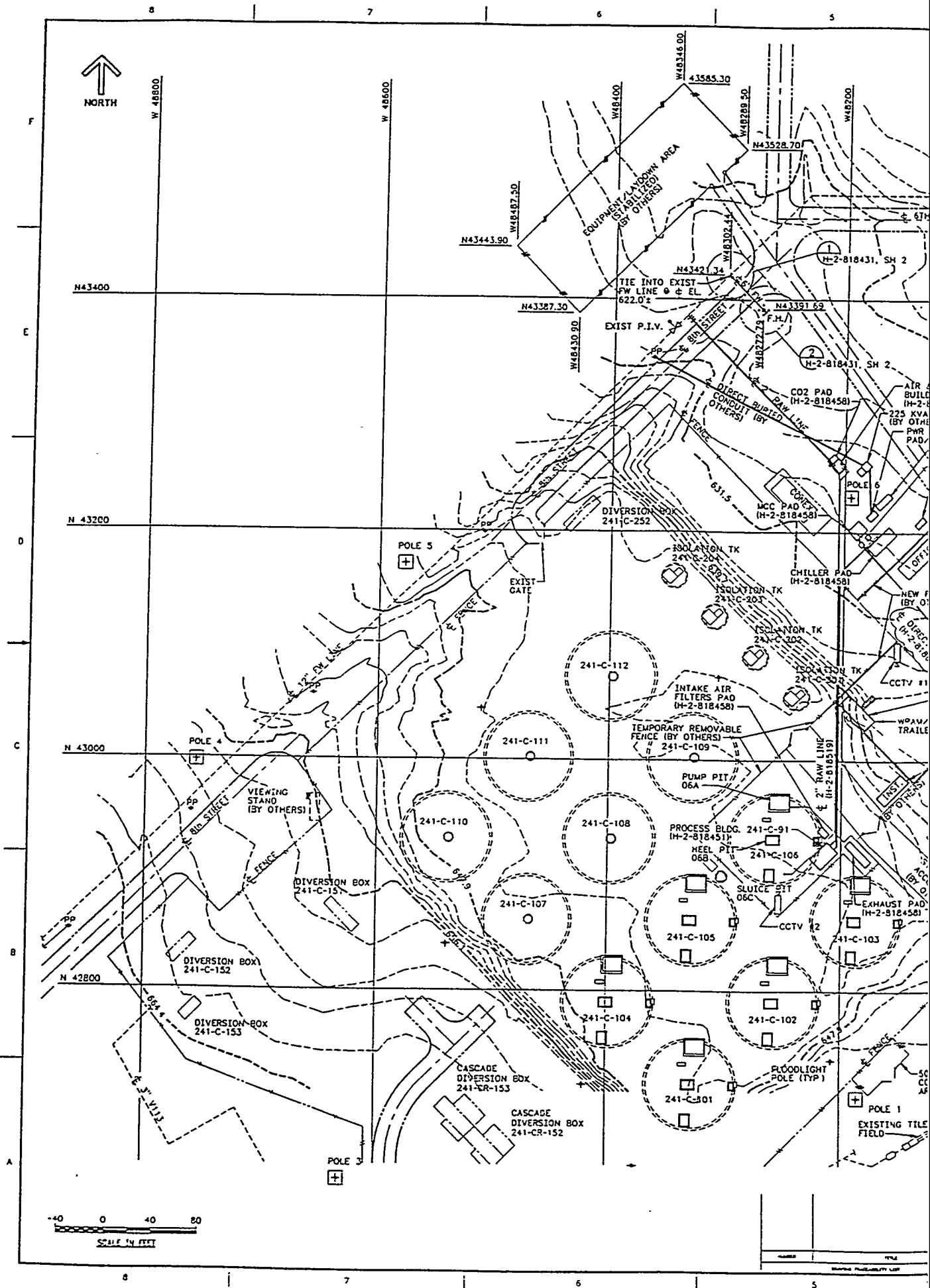
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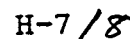


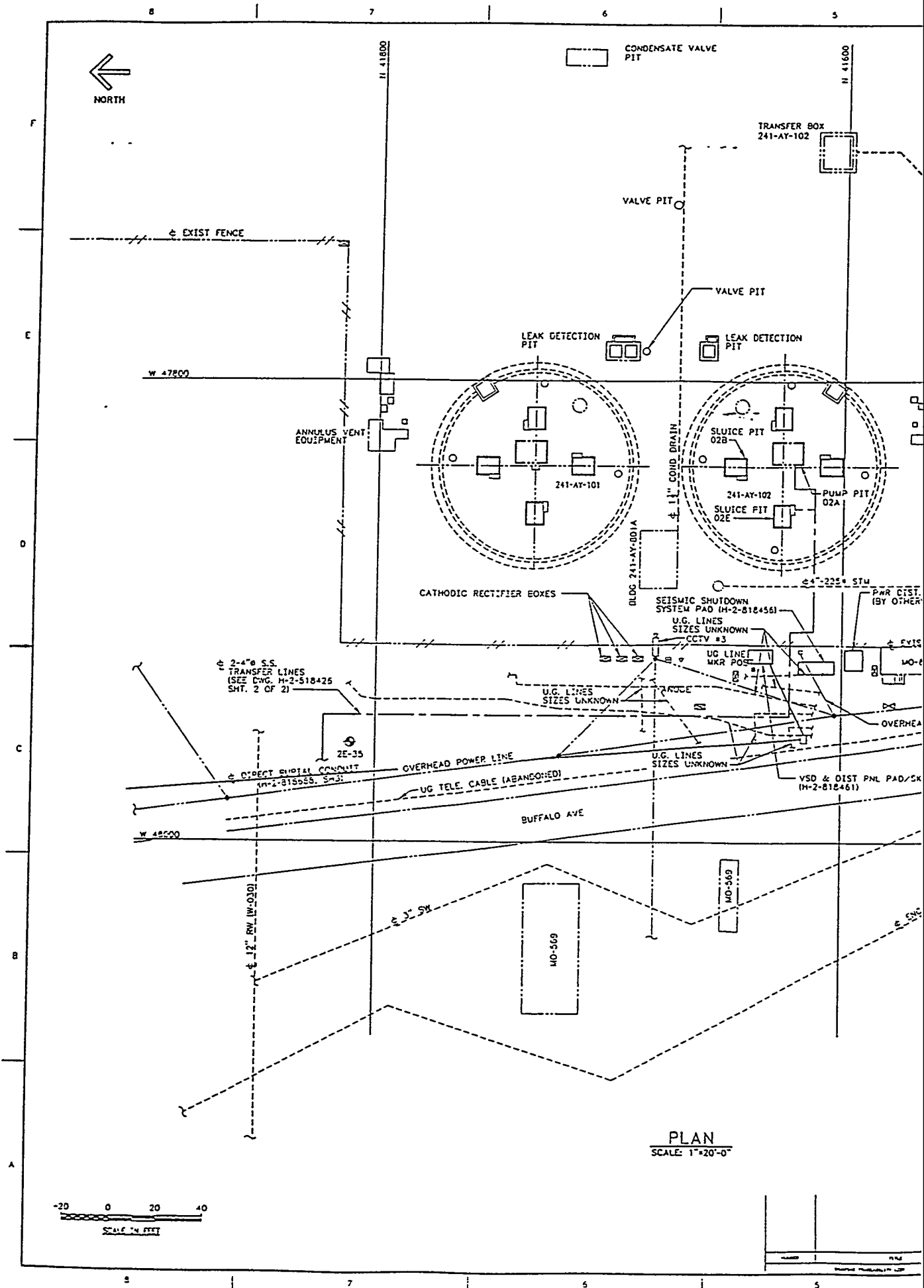


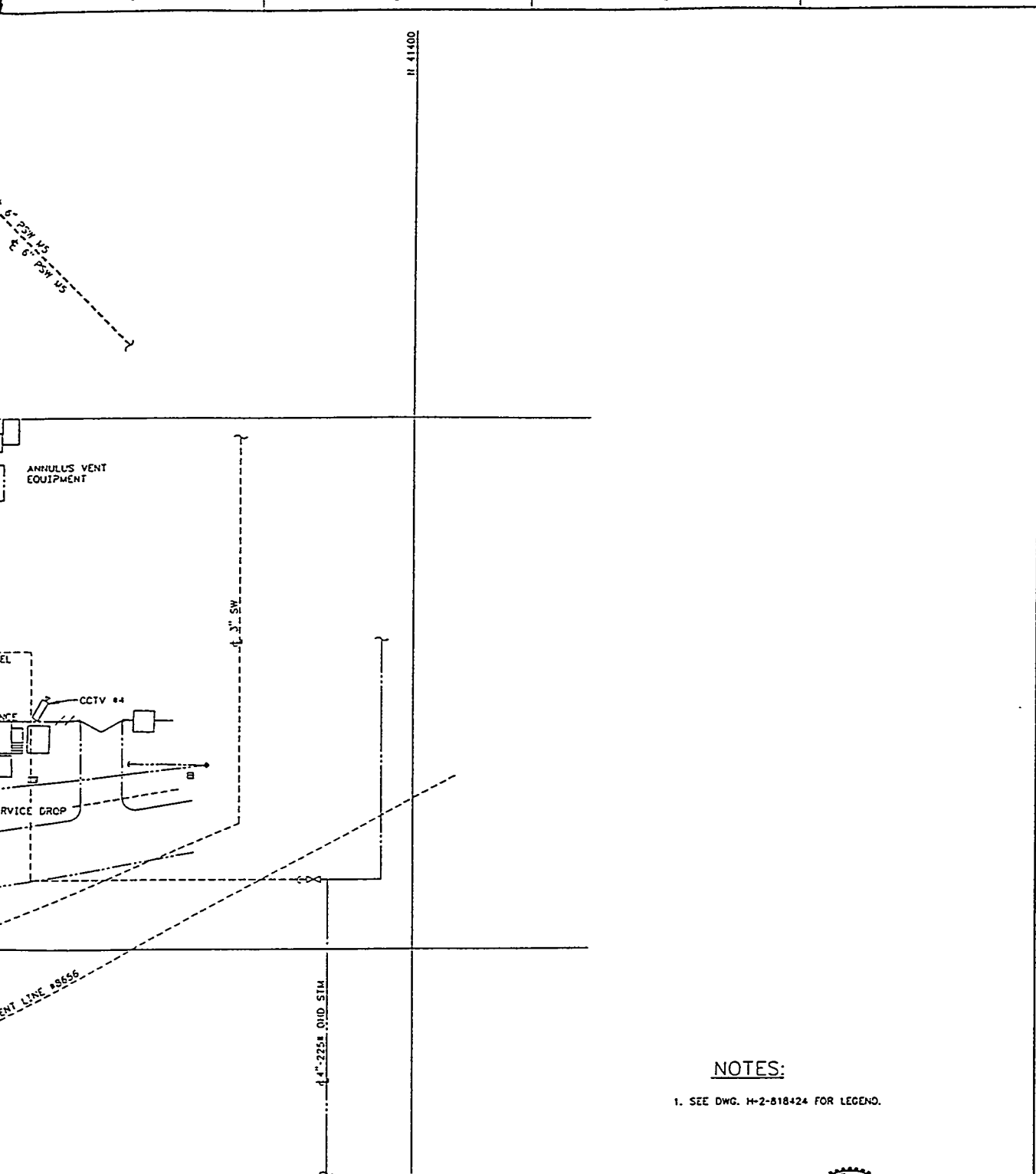
CPYDEC 53-53-24

DRAWN BY PC BRINKMAN ETC.		SAFETY CLASS 3		DATE 1 MAY 1968	
PROJECT NAME		U.S. DEPARTMENT OF ENERGY RICHLAND OPERATIONS OFFICE ICF KAISER HANFORD COMPANY CIVIL PROJECT SITE PLAN			
DESIGNER					
SAFETY SEE DR/AT FORM					
OWNER SEE DR/AT FORM					
DRAWN BY SEE DR/AT FORM		W-320, TANK 241-C-106 SLUICING			
SCALE					
LEAD ENGINEER					
PROJECT NO. 31		TITLE SHEET NO. 1 OF 1 F 200E 0110 H-2818424 0			
FOR INFORMATION		SCALE SHOWN H-2818424 0			









NOTES:

1. SEE DWG. H-2-818424 FOR LEGEND.



EXPIRES 03-03-16

DESIGNED PC BRINKMAN E.E.		DATE 3		LINE PRELIMINARY	
CHECKED		DATE		U.S. DEPARTMENT OF ENERGY	
BY		DATE		RICHMOND OPERATIONS OFFICE	
BY		DATE		ICF KAISER HANFORD COMPANY	
BY		DATE		CIVIL	
BY		DATE		241-AY-102 ENLARGED SITE PLAN	
BY		DATE		W-320 TANK 241-C-106 SLUICING	
BY		DATE		F 2000 0110 H-2-818432 10	
BY		DATE		NAME SHOWN DATE 04319	

H-2-818423 DRAWING LIST

SH-5

1 OF 1

2 J 2M-ACD2 12 0 NN

2 PLOT SCALE: 1"=40' <E-CAD

H-9/10

AIRSTREAM CONDITION ASSUMPTIONS:

- ① 95 FDB, 95 FWB, 100±% RH, AEROSOL LOADING, -1.50" = g.
- ② 40 FDB, 40 FWB, 100±% RH, REENTRAINMENT
- ③ 77 FDB, 57 FWB, 50% RH
- ④ 55 FDB, 48 FWB, 55% RH
- ⑤ 60 FDB, -1.00" = g.

F.

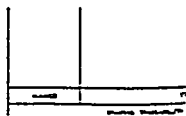
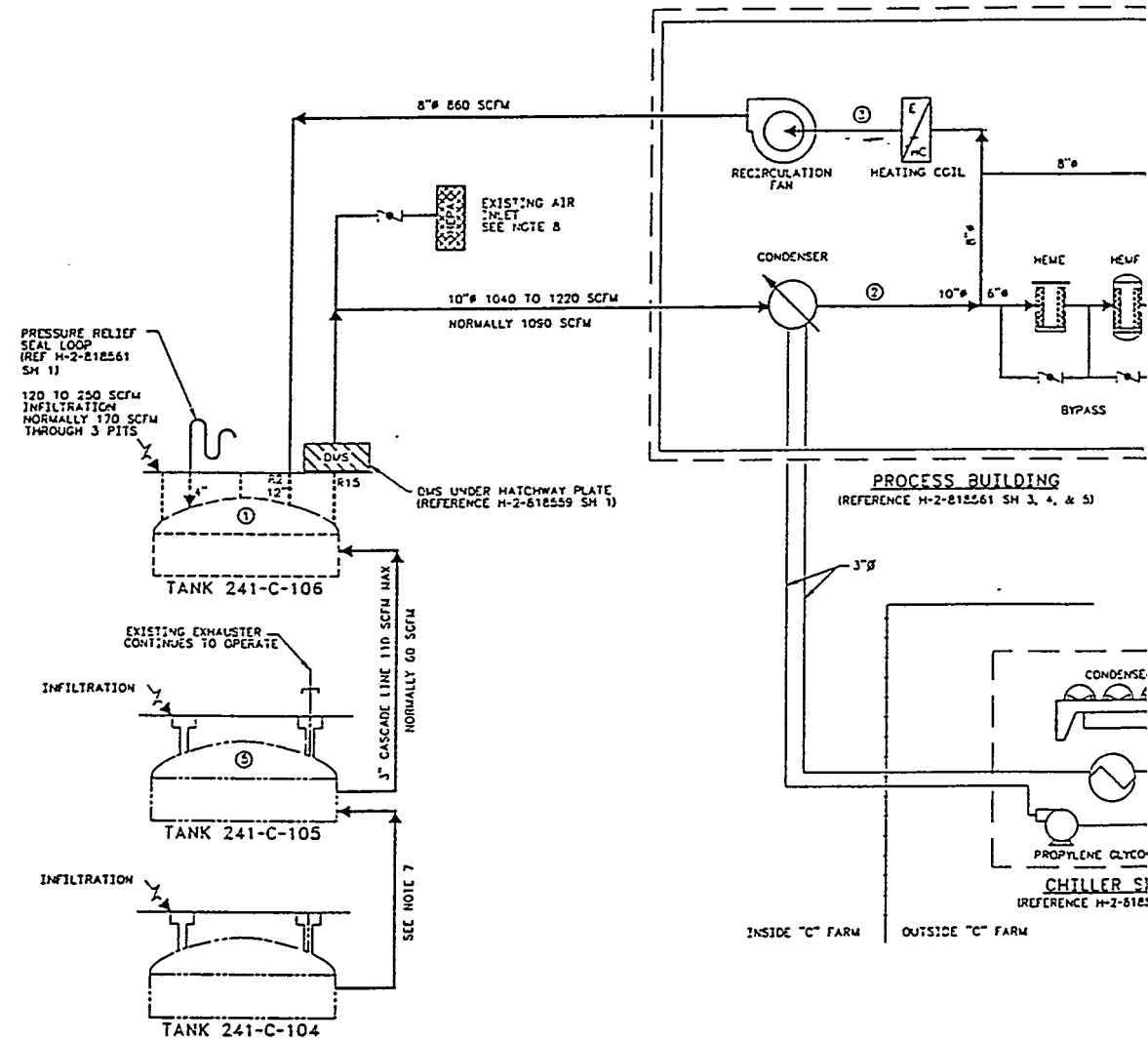
E

D

C

B

A



1. SEE DWG H-2-818558 FOR P & ID SYMBOLS AND LEGEND.
2. SEE DWG H-2-818561 FOR DETAILED P & ID.
3. DEWJSTER (DWJ), HEWE, AND HEWF WILL BE PROVIDED WITH FLUSH CAPABILITIES.
4. CONDENSER CONDENSATE ALLOW WITH HEWE AND HEWF FLUSH WATER WILL BE RETURNED TO TANK C-106 THROUGH RISER #4 IN THE SLUICE PIT. THIS FLUSH WATER WILL DRAIN BACK TO TANK C-106 UNDER THE HATCHWAY PLATE/RISER R15.
5. STANDARD REFERENCE DEFINED AS 70 FDB, BONE DRY AIR AT 14.696 PSIA.
6. PORTABLE EXHAUSTER NOT PROVIDED BY PROJECT W-320. ONLY PORTABLE EXHAUSTER HOOKUP IS PROVIDED.
7. CASCADE LINE BETWEEN C-105 AND C-106 IS ASSUMED TO BE OPEN. CASCADE LINE BETWEEN C-104 AND C-105 MAY HAVE BEEN ISOLATED.
8. EXISTING EXHAUSTER AND AIR INLET REMAIN CONNECTED AND VALVED OFF FROM TANK 241-C-106 DURING SLUICING OPERATIONS.
9. HEWF AND HEWE ARE SELF SHIELDED.



NAME PH LANGOWSKI		DATE 3	PAGE PRELIMINARY	
JOB NAME		U.S. DEPARTMENT OF ENERGY		
PROJECT		NUCLEAR OPERATIONS OFFICE 1CT KAISER HANFORD COMPANY		
DRAWN SEE DR/AT FORM		HVAC		
CHECKED SEE DR/AT FORM		OVERALL FLOW DIAGRAM		
DESIGNED		W320, 241-C-106 SLUICING		
REVISION NO. 16		F 241-C 8900 H-2-818470 0		
APPROVED FOR SUBMITTAL		NONE		
DATE WMC		E R 4319		

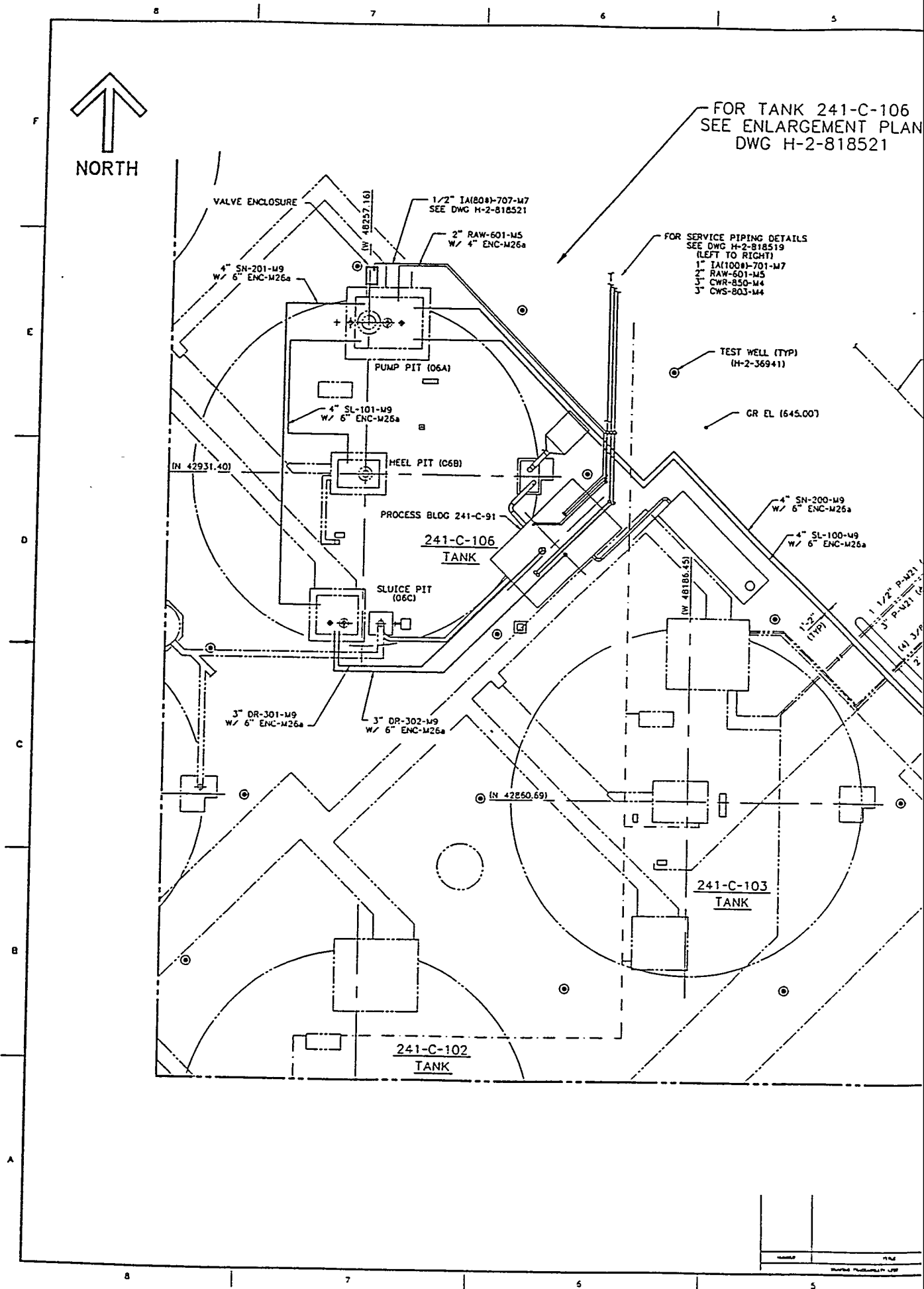
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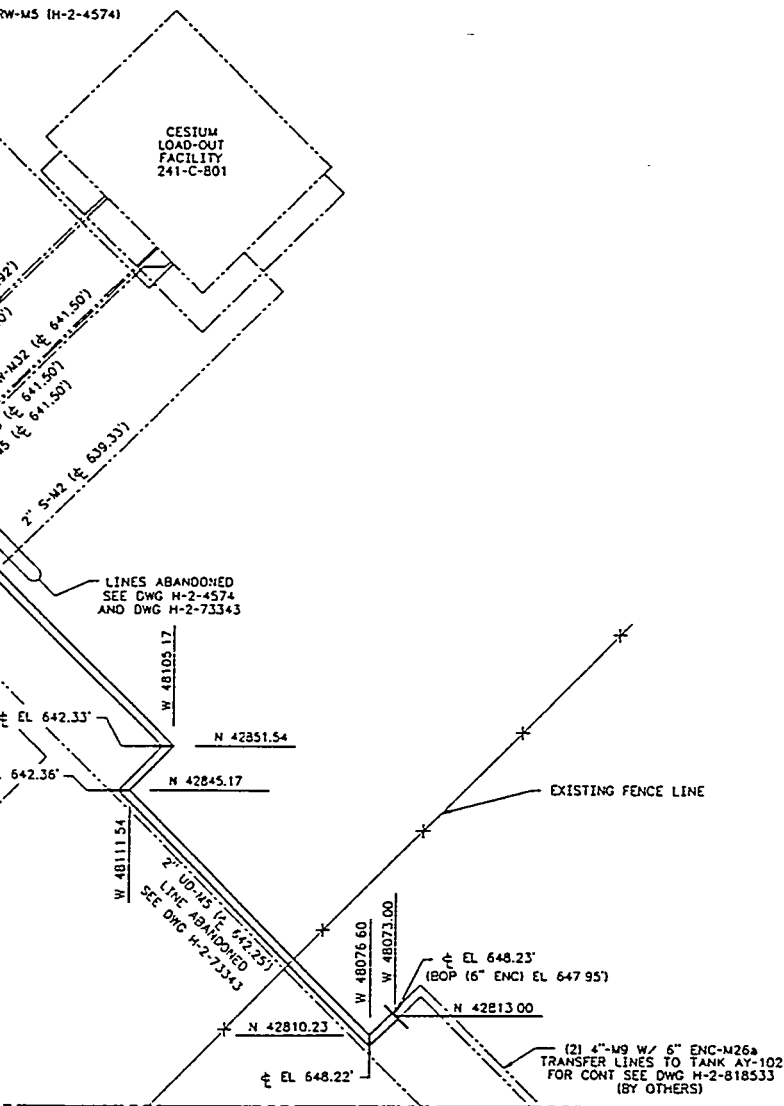
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2 PLOT SCALE: 1=1

KEMCAD

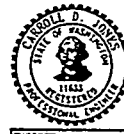
H-11 / 12





NOTES:

1. FOR GENERAL NOTES, LEGEND AND KEY PLAN, SEE H-2-818518.
2. FOR PIPE SUPPORTS, GUIDES AND ANCHORS, SEE H-2-818535.



EXPIRES

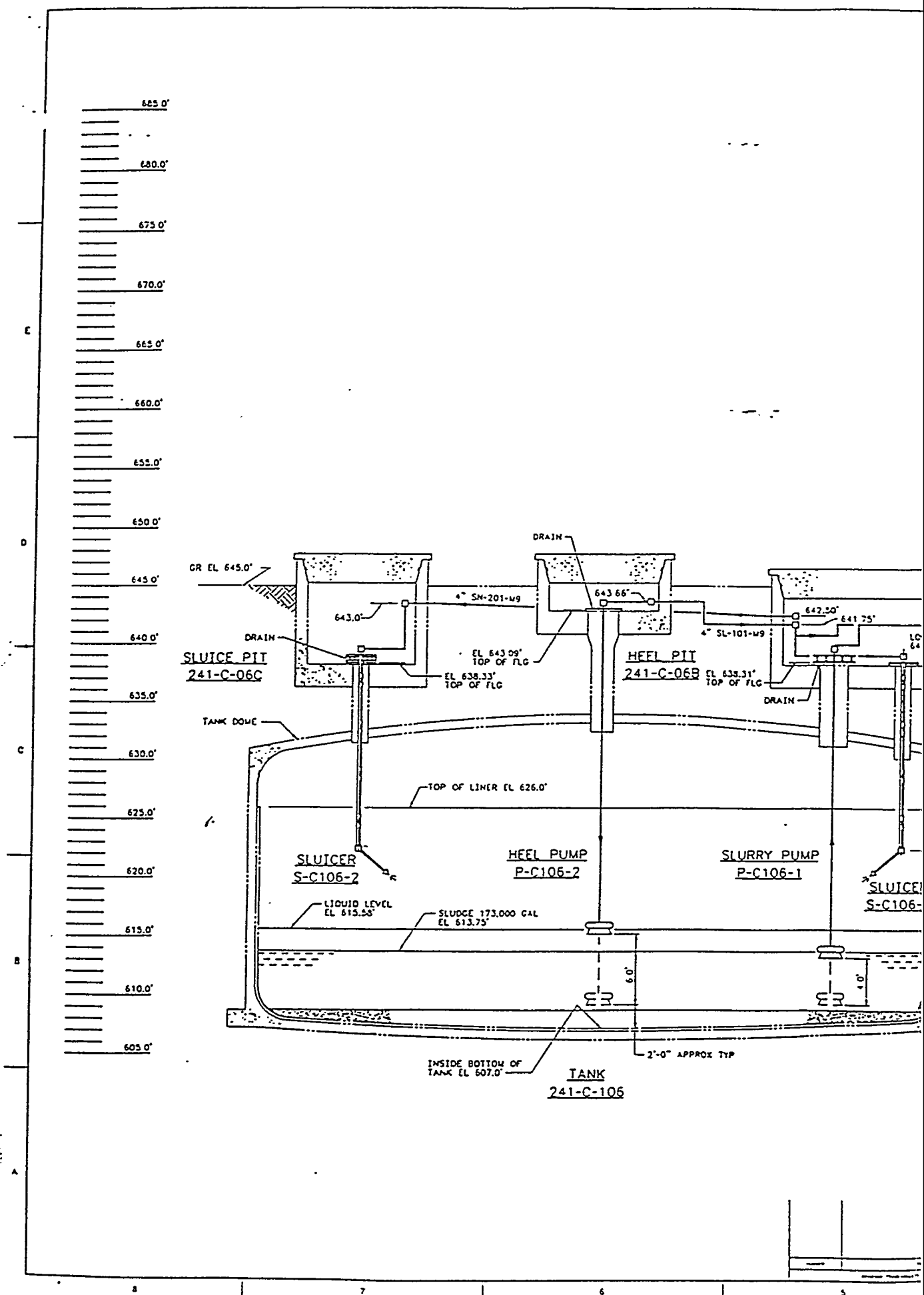
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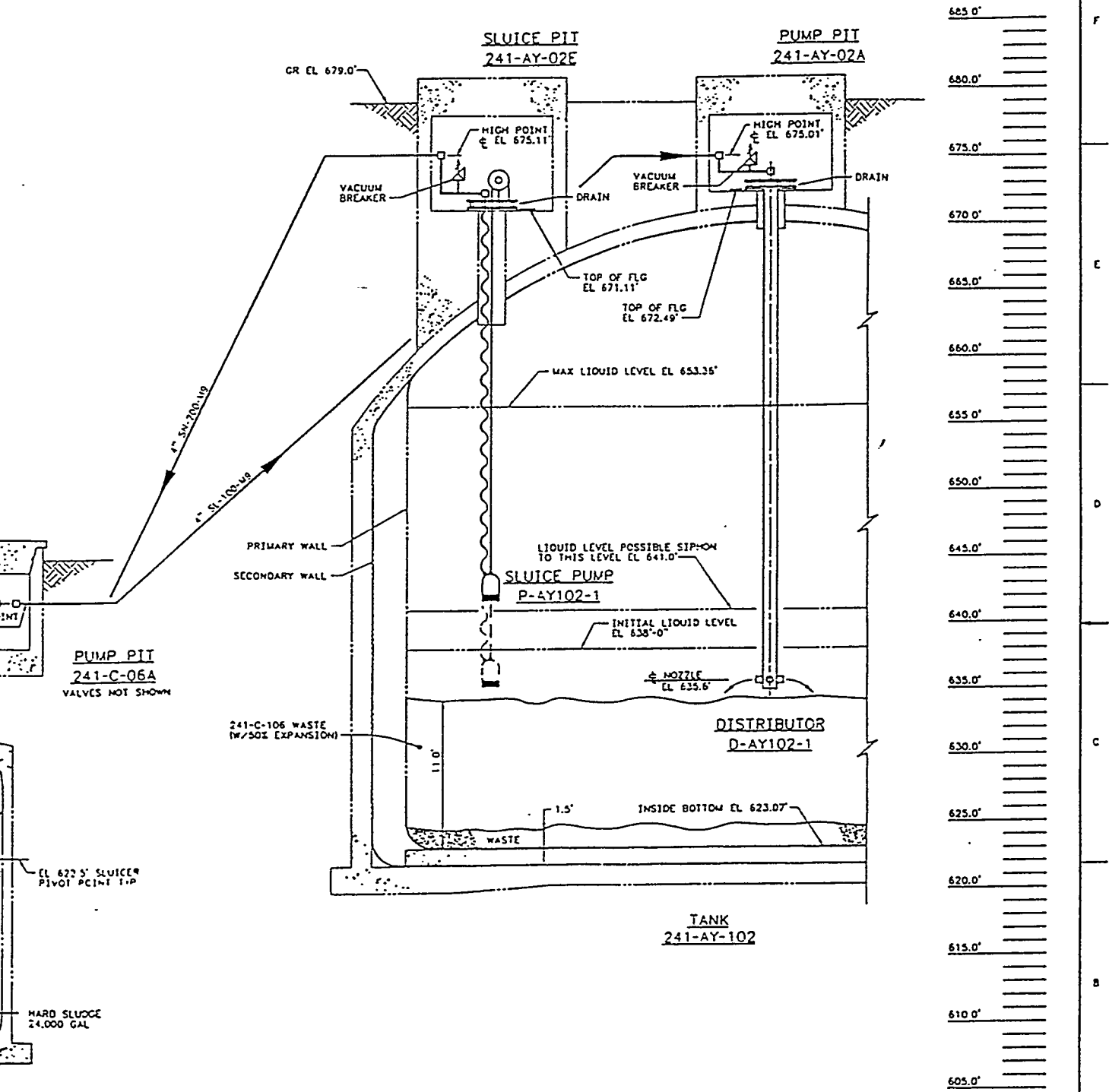
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| DESIGNED BY R. W. SCHROEDER | | SAFETY CLASS 2 | | DATE | |
| CHECKED BY | | PROJECT | | W320, TANK 241-C-105 SLUICING | |
| SAFETY SEE DR/AT FORM | | U.S. DEPARTMENT OF ENERGY | | REV. NO. | |
| DESIGN SEE DR/AT FORM | | RICHMOND OPERATIONS OFFICE | | 10 | |
| CONSTRUCTION SEE DR/AT FORM | | ICF KAISER HANFORD COMPANY | | H-2-818520 | |
| DATE | | PIPING | | 241-C TANK FARM | |
| 2818520A | | F 241-C | | 0402 | |
| 2818520B | | SCALE | | 1"=10'-0" | |
| 2818520C | | DATE | | 0402 | |
| 2818520D | | BY | | EPA319 | |
| 2818520E | | CHECKED BY | | 1 OF 1 | |

2 PLOT SCALE: 1"=10'

KEHCAO

H-13/14





HYDRAULIC DIAGRAM

SCALE: VERTICAL - 1/4" = 1'-0"
HORIZONTAL - NONE

C.D. JONES, PE

| | | | |
|---|--|--|--|
| U.S. DEPARTMENT OF ENERGY
RICHMOND OPERATIONS OFFICE
ICF KAISER HANFORD COMPANY | | PROJECT W-320
PIPING
HYDRAULIC DIAGRAM | |
| W-320, TANK 241-C-106 SLUICING | | H-2-818536 | |
| 7 | | 7001 | |
| F | | H-2-818536 | |
| 1 | | 1 | |

| NO. | REVISION | DATE | BY | CHKD. | APP'D. | DESCRIPTION |
|-----|----------|------|----|-------|--------|-------------|
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |



INSTRUMENT BLDG
241-AY-801
(H-2-64416)

STEAM PIPING (ABOVE GRADE)
(H-2-64404)

TANK VENT INTAKE
(PROJECT W-030)

STYLEWAY

FENCE
(N47914.00)

FOR CONT. SEE DWG H-2-818534

END OF ENC

4" SN-200-W9
4" SL-100-W9

EL 675.21
END OF CF
(BOP EL 674.93)
(ENCASEMENT)

W47922.87

EL 675.27
N41521.57

1'-2" EL 676.197

N41511.25
EL 675.30

W47902.04

12" ANNULUS VENT OUTLET
EL 673.51
14" ANNULUS VENT INLET
EL 673.52

TYP

6" ENC-W25a

TX-102-AY
(N41626.50)

SLUICE BRT
241-AY-025

FOR ENLARGED PLAN
SEE H-2-818543

ELECT ENCLOSURE
EL 675.45

A H-2-818541
TOP EL 674.317

B H-2-818541

3" NHW-V720
(H-2-54017)

6" PSW-5508 (H-2-64406)
3" PSW-4513 (H-2-64406)

241-AY-102
TANK

PL



C

- 8



3

2 PLOT SCALE: 1=5

КЕЛСАД

H-17 / 18

LINE TYPES:

| | |
|--|---|
| | NEW PIPE, DUCT LINE |
| | INSTRUMENTATION OR EQUIPMENT |
| | EXISTING PIPE, INSTRUMENTATION OR EQUIPMENT |
| | CAPILLARY LINE |
| | HYDRAULIC SIGNAL |
| | FLEXIBLE HOSE |
| | EXISTING ELECTRICAL SIGNAL |
| | NEW ELECTRICAL SIGNAL |
| | COMMUNICATION SYSTEM LINK (SOFTWARE OR DATA LINK) |
| | PNEUMATIC SIGNAL |
| | PURCHASED FLEX-ATE |
| | FUTURE EQUIPMENT |
| | LOCATED LINE |
| | CATHODIC PROTECTED LINE |
| | HEAT TRACED/INSULATED LINE - SELF LIMITING |
| | HEAT TRACED/INSULATED LINE - UNLESS OTHERWISE NOTED |
| | HEAT TRACED/INSULATED LINE - CONTROLLER CONTROLLED |
| | INSULATED LINE |
| | FLOW DIRECTION |

VALVES:

| | |
|--|---|
| | GATE VALVE |
| | BALL VALVE |
| | BALL VALVE WITH PLUG |
| | GLOBE VALVE |
| | MULTI-PORT INSTRUMENT PLUG VALVE |
| | BALL VALVE - 3 WAY |
| | 3 WAY VALVE |
| | CHECK VALVE |
| | BUTTERFLY DAMPER/VALVE |
| | FLOW INDICATOR VALVE |
| | SOLENOID OPERATED VALVE |
| | SOLENOID OPERATED VALVE - 3 WAY |
| | SOLENOID OPERATED VALVE - 3 WAY |
| | PRESSURE REDUCING REGULATOR, SELF-CONTAINED |
| | BACKPRESSURE REGULATOR WITH EXTERNAL PRESSURE TAP |
| | PRESSURE SAFETY VALVE |
| | BACK-FLOW PREVENTER |

ACTUATORS:

| | |
|--|---------------------------------------|
| | ELECTRIC ACTUATOR |
| | SOLENOID OPERATOR |
| | CYLINDER SPRING OFFSET, SINGLE ACTING |
| | CYLINDER SPRING OFFSET, DOUBLE ACTING |
| | PNEUMATIC ACTUATOR |

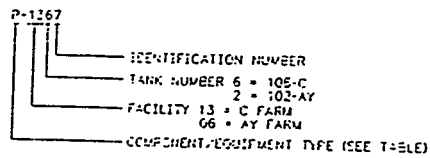
HVAC & MISCELLANEOUS DEVICES:

| | |
|--|-----------------------------|
| | SEAL LOOP |
| | LOOSE CONNECTION (H-C) |
| | SPRAY NOZZLE |
| | PORTABLE SPRAY WAND |
| | FLANGE |
| | REMOTE PIPE CONNECTOR |
| | REMOTE PIPE BLANK CONNECTOR |
| | RESTRICTING ORIFICE |

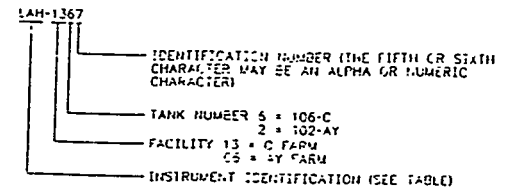
PROCESS, HVAC &

| | |
|--|--|
| | REDUCER |
| | PIPE PLUG THREADED |
| | PIPE CAP WELDED |
| | PIPE CAP THREADED |
| | NOZZLE/RISER |
| | AIR-CAP SIGHT DRAIN |
| | QUICK CONNECTOR |
| | FLEXIBLE CONNECTOR |
| | PARTICULATE FILTER HEADER |
| | HIGH EFFICIENCY METAL FILTER (H-MF) |
| | HIGH EFFICIENCY MIST ELIMINATOR (H-ME) |
| | HIGH EFFICIENCY PARTICULATE AIR FILTER |
| | MOISTURE SEPARATOR |
| | VORTEX SEPARATOR |
| | DUPLEX BASKET STRAINER |
| | WYE STRAINER |
| | FILTER TEST PORT |
| | INFILTRATION AND EXFILTRATION AIRFLOW |
| | FILTER |
| | SPRAY RING |
| | CENTRIFUGAL PUMP |
| | SUBMERSIBLE PUMP |
| | COMPRESSOR |
| | MOTOR CONTROL CENTER/MOTOR STARTER |
| | VARIABLE SPEED DRIVE |
| | HEAT EXCHANGER |
| | CONDENSER |
| | SHIELD |

EQUIPMENT IDENTIFICATION



INSTRUMENT IDENTIFICATION



COMPONENT/EQUIPMENT TYPE TABLE

| SYMBOL | DESCRIPTION |
|--------|---------------------------------------|
| MS | MOISTURE SEPARATOR |
| HC | HEATING COIL |
| HEP | FILTER -HEPA |
| FN | FAN |
| AC | AIR CONDITIONING UNIT |
| HMF | HIGH EFFICIENCY METAL FILTER (HMF) |
| CND | CONDENSER |
| HME | HIGH EFFICIENCY MIST ELIMINATOR (HME) |
| HE | HEAT EXCHANGER |
| BP | BACKFLOW PREVENTER |
| CP | CUMULATIVE |
| U | UNIT |
| F | FILTER OR STRAINER |
| P | PUMP |
| R | CHILLER |
| TK | TANK |
| UH | UNIT HEATER |
| VP | VACUUM PUMP |

SYSTEM DESIGNATOR TABLE

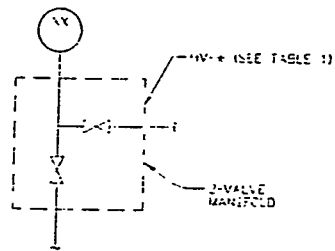
| SYMBOL | DESCRIPTION |
|--------|--|
| A | AIR |
| AM | AIR MONITOR |
| CO2 | CARBON DIOXIDE |
| CW | CHILLED WATER SYSTEM |
| CAR | CHILLED WATER RETURN |
| CWS | CHILLED WATER SUPPLY |
| DR | DRAIN |
| ENC | ENCASEMENT |
| FW | FILTERED WATER |
| FL | FLUSH |
| FR | HYDRAULIC RETURN |
| IS | HYDRAULIC SUPPLY |
| I | INSTRUMENT SENSING LINE |
| IA | INSTRUMENT AIR |
| RAW | RAW WATER (RW IS USED ON EXISTING LINES) |
| SL | SUPPLY |
| SN | SUPERNATE |
| V | VENT |
| VT | VENTILATION |

LINE IDENTIFICATION NUMBER TABLE

| NUMBER | DESCRIPTION |
|-----------|----------------------------|
| 100-199 | SL (SLURRY) |
| 200-299 | SN (SUPERNATE) |
| 300-399 | DR (DRAIN) |
| 400-499 | V (VENT) |
| 500-549 | AM (AIR MONITOR) |
| 550-599 | CO2 (CARBON DIOXIDE) |
| 600-624 | RAW (RAW WATER) |
| 625-629 | FW (FILTERED WATER) |
| 700-749 | IA (INSTRUMENT AIR) |
| 750-799 | I (INSTRUMENT SENSING) |
| 800-849 | CWS (CHILLED WATER SUPPLY) |
| 850-899 | CAR (CHILLED WATER RETURN) |
| 900-999 | FL (FLUSH) |
| 1000-1099 | VT (VENTILATION) |

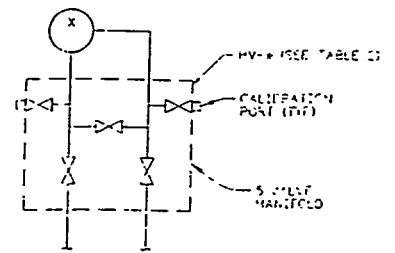
MATERIAL CODE TABLE (SEE GENERAL NOTE 5)

| PIPE CODE | DESCRIPTION |
|-----------|----------------------------------|
| D3 | STAINLESS STEEL COIL |
| I31 | 316SS TUBING |
| I33 | COPPER TUBING |
| M4 | CARBON STEEL CHILLED WATER PIPE |
| M5 | CARBON STEEL PIPE |
| M7 | CARBON STEEL PIPE |
| M8 | STAINLESS STEEL VENTILATION PIPE |
| M9 | STAINLESS STEEL PIPE |
| M24 | CARBON STEEL PIPE |
| M26 | CARBON STEEL PIPE |
| M33a | COPPER TUBING |
| M42 | CARBON STEEL |



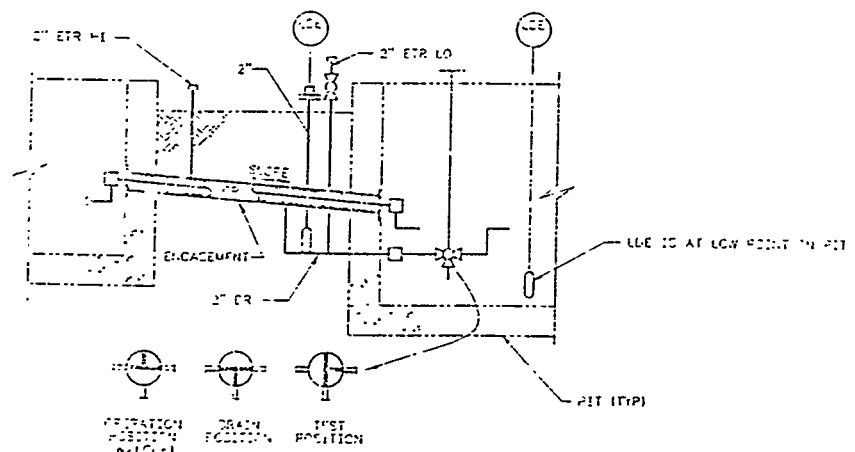
XX - TYPICAL FOR ALL PISL, RICH, PIT, PT
EXCEPT FOR 241-AY TANK
FARM INSTRUMENTS (SEE TABLE 1)

2-VALVE MANIFOLD DETAIL



X - TYPICAL FOR ALL POIT, FOISM, FOI,
EXCEPT FOR 241-AY TANK
FARM INSTRUMENTS (SEE TABLE 2)

5-VALVE MANIFOLD DETAIL



1
OPERATION POSITION (W/LEAK)
1
DRAIN POSITION
1
TEST POSITION

1
DETAIL
ENCASEMENT DETAIL

ENCASEMENT LEAK DETECTION

FOR LINES BETWEEN C FARM AND AY FARM



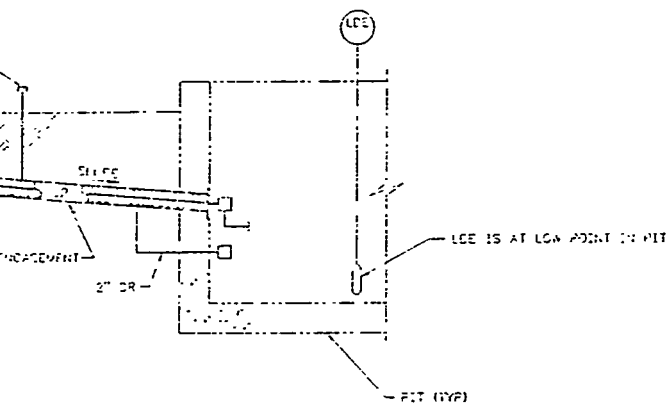
ENCASEMENT

TABLE 1

| INSTRUMENT
(Hz) | HV * | REF CWG |
|--------------------|-----------|-----------------|
| FIT 1261 | HV-126164 | H-2-318559 CH 2 |
| FISL 12610 | HV-126178 | H-2-318561 CH 2 |
| FIT-12611 | HV-126163 | H-2-318561 CH 3 |
| FIT-12615 | HV-126165 | H-2-318561 CH 5 |
| FIT-12621 | HV-126177 | H-2-318561 CH 7 |
| FISL-12641 | HV-126171 | H-2-318561 CH 7 |
| FISL-12642 | HV-126172 | H-2-318561 CH 7 |
| FIT-1264 | HV-126170 | H-2-318562 CH 1 |
| FIT 1265 | HV-126169 | H-2-318562 CH 1 |

TABLE 2

| INSTRUMENT
(X) | HV-* | REF BAG |
|-------------------|-----------|-----------------|
| PDISH-1369 | HV-136173 | H-2-818551 SH 2 |
| POT-13611 | HV-136162 | H-2-818551 SH 3 |
| FOT-13612 | HV-136160 | H-2-818551 SH 4 |
| POT-13613 | HV-136161 | H-2-818551 SH 4 |
| FDISH-13614 | HV-136165 | H-2-818551 SH 5 |
| PDISH-13615 | HV-136167 | H-2-818551 SH 5 |
| POT-13618 | HV-136174 | H-2-818551 SH 6 |
| FOT-13619 | HV-136175 | H-2-818551 SH 6 |
| POT-13620 | HV-136176 | H-2-818551 SH 6 |
| FDISH-13625 | HV-136168 | H-2-818552 SH 1 |



DETAIL

315559, 54 1 H-2-315559, 54 1

ENT LEAK DETECTION

LINES 20000 C F 2000

NOTE:

FOR GENERAL NOTES AND LEGEND SEE SHEET 1.

H.K. CHOUDHRY, PE/C.D. JONES, PE

[illegible]

H-23 / 24

| INTERLOCK SCHEDULE | | | |
|--------------------|--|---|---|
| INTERLOCK | EVENT | ACTION | DWG NO/SH NO |
| 1 | A. SLUICE PIT 241-C-050 LEAK DETECTED
B. HEEL PIT 241-C-008 LEAK DETECTED
C. TANK AY-102 HIGH VACUUM (EXCESS VAC)
D. TANK AY-102 HIGH LEVEL
E. SLUICE PIT 241-A-001 LEAK DETECTED
F. PUMP PIT 241-A-02A LEAK DETECTED
G. FLUSH WATER RADIATION DETECTED
H. LOSS OF VACUUM CONTROL (STRONG) AIR PRESS
I. SLURRY LINE 241-C-100-M9 LEAK DETECTED
J. SUPERHEAT LINE 241-C-100-M9 LEAK DETECTED
K. PUMP PIT 241-C-15A LEAK DETECTED
L. TANK AY-102 LOSS OF VACUUM
M. LOSS OF HVAC AT AY-102
N. LOSS OF CONTROL RM POWER (LOSS OF MONITOR/CONTROL)
O. TANK C-106 LOSS OF VACUUM (LOW-LOW VAC)
P. FLUSH WATER PRESSURE HIGH | + SHUT OFF HEEL PUMP P-1362
+ SHUT OFF SLURRY PUMP P-1361
+ SHUT OFF SLUICE PUMP " | H-2-818550 SH 2
H-2-818560 SH 4
H-2-818560 SH 4
H-2-818560 SH 5
H-2-818560 SH 6
H-2-818561 SH 5
H-2-818562 SH 1
H-2-818559 SH 4
H-2-818559 SH 6
H-2-818560 SH 4
H-2-818559 SH 6
H-2-818560 SH 4
H-2-818559 SH 6
H-2-818559 SH 2
H-2-818561 SH 5 |
| 2 | A. PUMP P-1361 DISCHARGE SOLIDS CONTENT HIGH | + SHUT OFF SLURRY PUMP P-1361 | H-2-818559 SH 6 |
| 3 | A. PUMP P-0521 DISCHARGE SOLIDS CONTENT HIGH
B. LOSS OF ALL 4-000 C FARM POWER | + SHUT OFF SLUICE PUMP P-0521 | H-2-818560 SH 5
H-2-818559 SH 6 |
| 4 | A. PUMP P-1361 DISCHARGE SOLIDS CONTENT HIGH (ONLY APPLIES WHEN MODE SWITCH IS IN MODE A, C, OR D POSITIONS) | + SHUT OFF SLURRY PUMP P-1361 | H-2-818559 SH 5
H-2-818559 SH 6 |
| 5 | A. FLOW MODE A-F (SEE TABLE 1) | + ESTABLISH SLURRY AND SLUICE PUMP VALVE LINE-UP | H-2-818559 SH 6 |
| 6 | A. FLOW MODE C (SEE TABLE 1) | + ESTABLISH HEEL AND SLUICE PUMP VALVE LINE-UP | H-2-818559 SH 6 |
| 7 | A. FLOW MODE P-F (SEE TABLE 1) | + ALL VALVES AC
HEEL, SLURRY, AND SLUICE PUMP
REMISSIVES OFF | H-2-818559 SH 6 |
| 8 | A. SEISMIC ACTIVITY AS DETECTED BY AT FARM SEISMIC DETECTORS | + SHUT DOWN MODES THAT POWER PUMPS, HVAC, AND AESS SLURRY TRANSFER SYSTEM | H-2-818559 SH 1 |
| 9 | A. COOLING WATER SUPPLY TO CONDENSER FLOW LOW-LOW | + SHUT DOWN AIR COOLED CHILLER SYSTEM | H-2-818561 SH 2 |
| 10 | A. PRIMARY CIRC PUMP P-1364 SHUT DOWN | + START UP STANDBY CIRC PUMP P-1365 | H-2-818561 SH 2 |
| 11 | A. RECIRC FAN FN-1361 SHUT DOWN | + SHUT OFF HEATING COIL HC-1361 | H-2-818561 SH 3 |
| 12 | A. HIGH PRESSURE DIFF SWITCHES EXHAUST FILTERS (P-1361 AND P-1362 10-50 SEC)
B. RADIATION MONITOR SE-1363 FAILURE (30-00 MIN)
C. HIGH RADIATION RELATED EXHAUST STACK
D. TANK C-106 HIGH VACUUM (EXCESS VAC)
E. LOSS OF CONTROL RM POWER
LOSS OF MONITOR/CONTROL | + SHUT DOWN EXHAUST FAN FN-1362
+ SHUT OFF HEEL PUMP P-1362
+ SHUT OFF SLURRY PUMP P-1361
+ SHUT OFF SLUICE PUMP P-0521
+ SHUT DOWN VAC PUMPS (STACK MONITOR SYS) | H-2-818561 SH 6
H-2-818559 SH 7
H-2-818561 SH 7
H-2-818561 SH 6
H-2-818560 SH 6 |
| 13 | A. RECIRC FAN FN-1361 HIGH CURRENT
B. LOSS OF CONTROL RM POWER
LOSS OF MONITOR/CONTROL | + SHUT DOWN RECIRC FAN FN-1361 | H-2-818561 SH 3
H-2-818562 SH 1 |
| 14 | A. EXHAUST FAN FN-1362 SHUT DOWN | + SHUT OFF HEATING COIL HC-1362
+ SHUT OFF HEEL PUMP P-1362
+ SHUT OFF SLURRY PUMP P-1361
+ SHUT OFF SLUICE PUMP P-0521
+ SHUT DOWN VAC PUMPS (STACK MONITOR SYS) | H-2-818561 SH 6
H-2-818559 SH 7 |
| 15 | A. CIRC PUMP P-1364 OR P-1365 DISCHARGE PRESSURE LOW | + START STANDBY CIRC PUMP P-1365 OR P-1364 | H-2-818561 SH 6 |

| INTERLOCK SCHEDULE | | |
|--------------------|--|-------------------------------|
| INTERLOCK | EVENT | ACTION |
| 16 | A. C-106 EXHAUST LEVEL GUARD LOG IN "UP" POSITION | * PREVENTS STA PUMPS |
| 17 | A. SEISMIC ACTIVITY AS DETECTED BY AT FARM SEISMIC DETECTORS | * SHUT DOWN HVAC AND WESS SLU |
| 18 | A. PRIMARY VACUUM PUMP SHUTDOWN | * STARTUP STAN |
| 19 | A. PRIMARY & STANDBY VACUUM PUMP (STACK MONITORING SYSTEM) SHUT DOWN | * SHUT DOWN C |

| TMACS MONITORING
(ONLY CRITICAL ALARMS/PARAMETERS WILL REMAIN) | |
|---|--------------------------------------|
| 2750-E BUTL | |
| TAG NUMBER | DESCRIPTION |
| AAH-1361C | C-106 SEISMIC SYSTEM TRIP DIV A |
| AAH-1362C | C-106 SEISMIC SYSTEM TRIP DIV B |
| LEA-13610C | TK C-106 LEAK DETECTED |
| FAH-0671C | AY-102 SEISMIC SYSTEM TRIP DIV A |
| AAH-0625C | AY-102 SEISMIC SYSTEM TRIP DIV B |
| LDA-1365C | SERVICE BUILDING 241-C-73 LEAK DETEC |
| WFAH-AY102A-1D | LK DETECTION PIT 102A W/FIGHT FACTOR |
| FAH-AY102A-1D | LK DETECTION PIT 102A RAD LEVEL HI |
| FAH-AY102-1C | 241-AY-102 TANK VACUUM HI |
| FAH-AY102B-1C | 241-AY-102 TANK VACUUM LO |
| LAH-AY102-1C | 241-AY-102 TANK LEVEL HI |
| LDA-102-C1/22B | TK AY-102 PUMP PIT 02A/SLUICE PIT C |
| XA-1361B | TK C-106 HVAC SYSTEM SHUTDOWN |
| FAH-1361C | TK C-106 VACUUM HI |
| FALL-1361C | TK C-106 VACUUM LOW-LOW |
| FAH-1363C | TK C-106 EXHAUST STACK PAD HI |
| FAH-1363C | TK C-106 EXHAUST STACK PAD FAIL |
| FOI-1361C | SERVICE BLDG 241-C-73 FAN WATER FLO |
| LDA-13612C | PROCESS BUILDING 241-C-51 SUMP LEAK |
| LDA-1370C | PROCESS BUILDING PCCM 1 241-C-91 SL |

| T/A | | | | | |
|-----------|----------|---------|---------|---------|---------|
| FLOW MODE | DESCR | HY-1361 | HY-1362 | HY-1363 | HY-1364 |
| A | TEMP ECL | X | | | |
| B | TEMP ECL | | | | X |
| C | TEMP ECL | X | | X | |
| D | TEMP ECL | X | X | | |
| E | SLUICING | | X | | X |
| F | SLUICING | | | X | X |
| G | SLUICING | | | | X |
| RAF | FLUSHING | AC | AC | AC | AC |

** = FOR DETAIL
 AC = ADMINISTER
 X = CLOSED

INTERLOCK SCHEDULE

| EVENT | ACTION | DWG NO/SI NO |
|----------------------------------|--|-----------------|
| "FL
UP" | * PREVENTS STARTING SLURRY AND SLUICE
PUMPS | H-2-B18559 SH 2 |
| ITY AS
FARM
CRS | * SHUT DOWN MCC'S THAT POWER PUMPS
AND WRESS SLUICING TRANSFER SYSTEM | H-2-B18560 SH 7 |
| 4 PUMP | * STARTUP STANDEY VACUUM PUMP | H-2-B18561 SH 7 |
| MOBY VACUUM
NITROPING
DOWN | * SHUT DOWN EXHAUST FAN | H-2-B18561 SH 7 |

TMACS MONITORING SUMMARY

LAFLIN/PARAMETERS WILL BE MONITORED BY THE IMACS SYSTEM.)

2750-E BUILDING

| DESCRIPTION | DWG NO/SII NO |
|--|-----------------|
| SEISMIC SYSTEM TRIP DIV A | H-2-B18559 SH 1 |
| SEISMIC SYSTEM TRIP DIV B | H-2-B18559 SH 1 |
| LEAK DETECTED | H-2-B18559 SH 2 |
| SEISMIC SYSTEM TRIP DIV A | H-2-B18560 SH 7 |
| SEISMIC SYSTEM TRIP DIV B | H-2-B18560 SH 7 |
| BUILDING 241-C-73 LEAK DETECTED | H-2-B18562 SH 1 |
| STATION PIT 102A WEIGHT FACTOR HI | H-2-B18560 SH 4 |
| STATION PIT 102A RAD LEVEL HI | H-2-B18560 SH 4 |
| 2 TANK VACUUM HI | H-2-B18560 SH 4 |
| 2 TANK VACUUM LO | H-2-B18560 SH 4 |
| 2 TANK LEVEL HI | H-2-B18560 SH 4 |
| 2 PUMP PIT 02A/SUVICE PIT 02E LEAK DETECTED | H-2-B18560 SH 5 |
| HVAC SYSTEM SHUTDOWN | H-2-B18561 SH 3 |
| VACUUM HI | H-2-B18560 SH 2 |
| VACUUM LOW-LOW | H-2-B18559 SH 2 |
| EXHAUST STACK PAD HI | H-2-B18561 SH 7 |
| EXHAUST STACK PAD FAIL | H-2-B18561 SH 7 |
| BLDG 241-C-73 FAN WATER FLOW | H-2-B18562 SH 1 |
| BUILDING 241-C-91 SLUMP LEAK DETECTED | H-2-B18561 SH 3 |
| BUILDING ROOM 1 241-C-91 SLUMP LEAK DETECTED | H-2-B18561 SH 3 |

TABLE 3 **

[illegible]

* * * FOR DETAILED DESCRIPTION OF FLOW MODES SEE CWC H-2-81852
 AC * ADMINISTRATIVELY CONTROLLED
 X * CLOSED

NOTE:

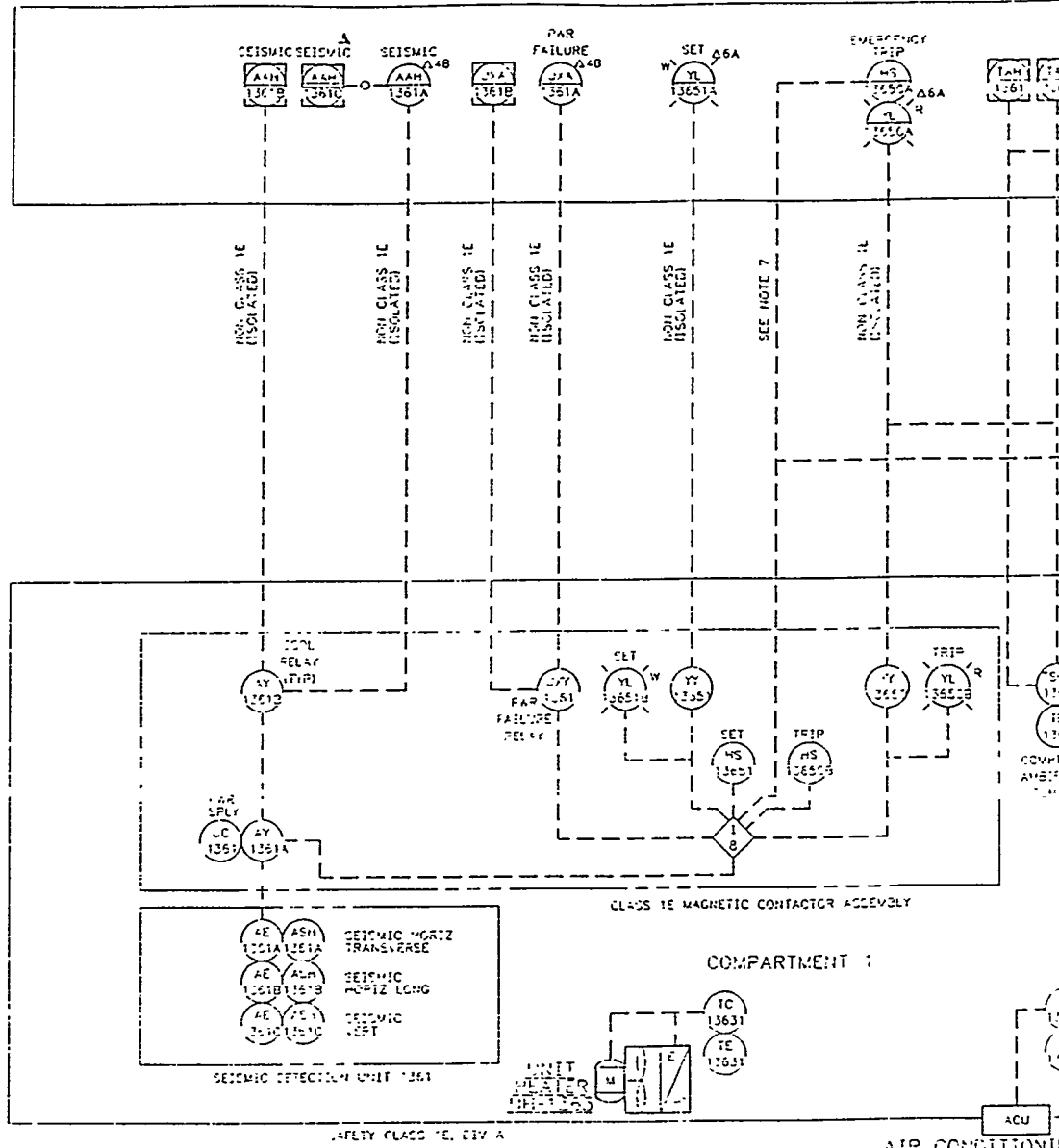
FOR GENERAL NOTES AND LEGEND SEE SHEET 1.

H.K. CHOUDHRY, PE/C.D. JONES, PE

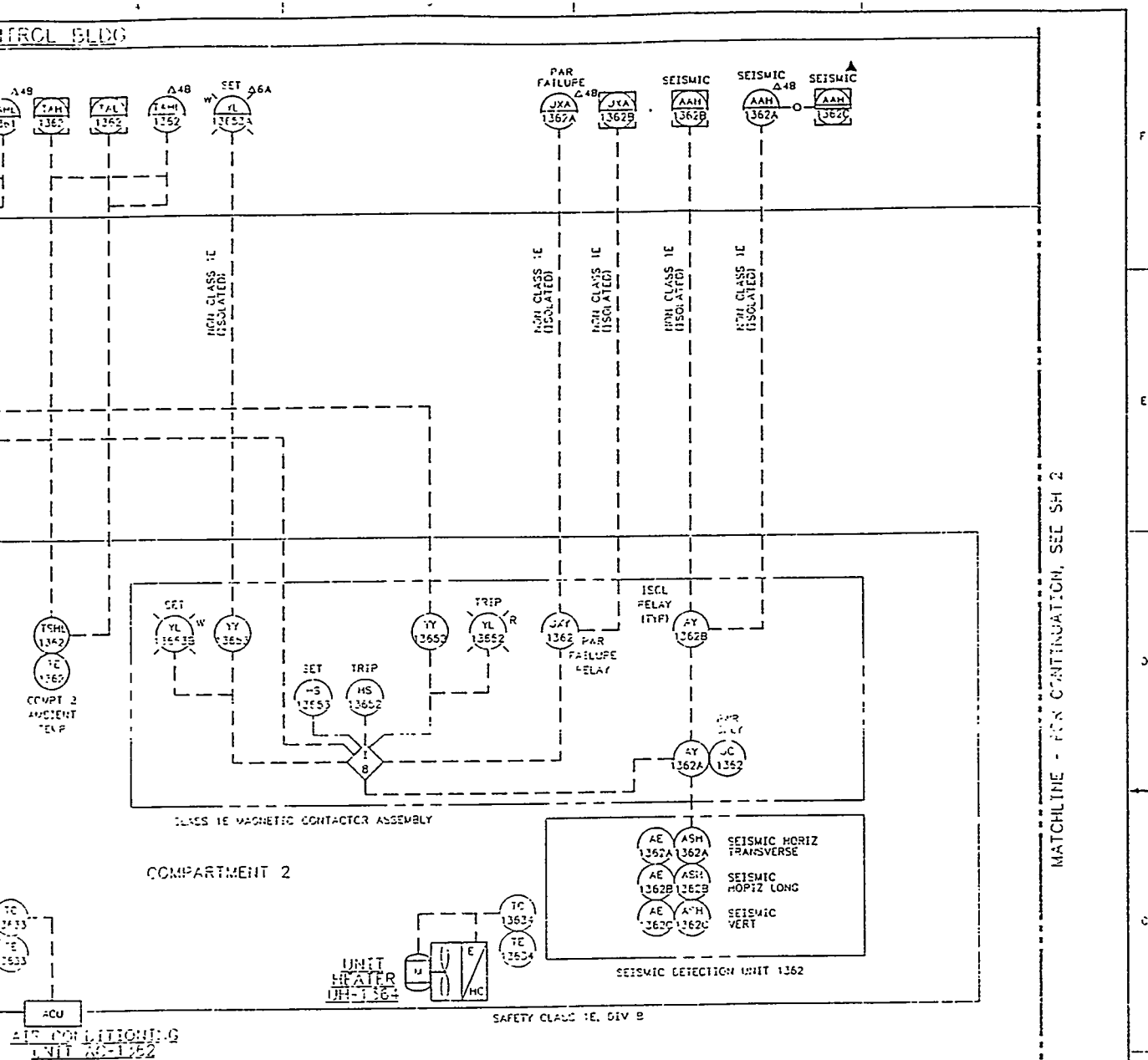
| | | | | | |
|---------------------------|----------|----------------------------|---------------------------------|-----|-------------|
| DRAWN BY J. L. BRINKLEY | | DATE | 3 | REV | PRELIMINARY |
| CHECKED BY | | U.S. DEPARTMENT OF ENERGY | | | |
| DESIGNED BY | | NRC REGULATIONS OFFICE | | | |
| NOTED BY SEE CR/AT FORM | | ICF KAISER HANFORD COMPANY | | | |
| DATE SEE CR/AT FORM | | PROJECT W-320 | | | |
| LAST DATE SEE CR/AT FORM | | P & ID | | | |
| DRAWN BY K. CHOUDHURY | | INTERLOCK SCHEDULE | | | |
| REVISION | 11 | REASON | W-320, TANK 241-C-1C5, SPLICING | | |
| APPROVED FOR SUBMITTANCE | | DATE | 12/28/83 | BY | H-2-818558 |
| DATE | 12/28/83 | TIME | NONE | BY | ER4310 |
| 2. PLOT SCALE: 1" = 1'-0" | | | | | |

H-25/26

F
C
D
C
B
A



| | |
|----------|-------------------|
| 4-2-4340 | MASTER ENGR. FLOW |
| 4-2-4340 | REMOVAL 7-104, 1 |
| 4-2-4340 | PIPING RIZER 50 |
| 4-2-4340 | SH 1 |
| 4-2-4340 | EX-THACS-1050-1 |
| 4-2-4340 | SH 2 |

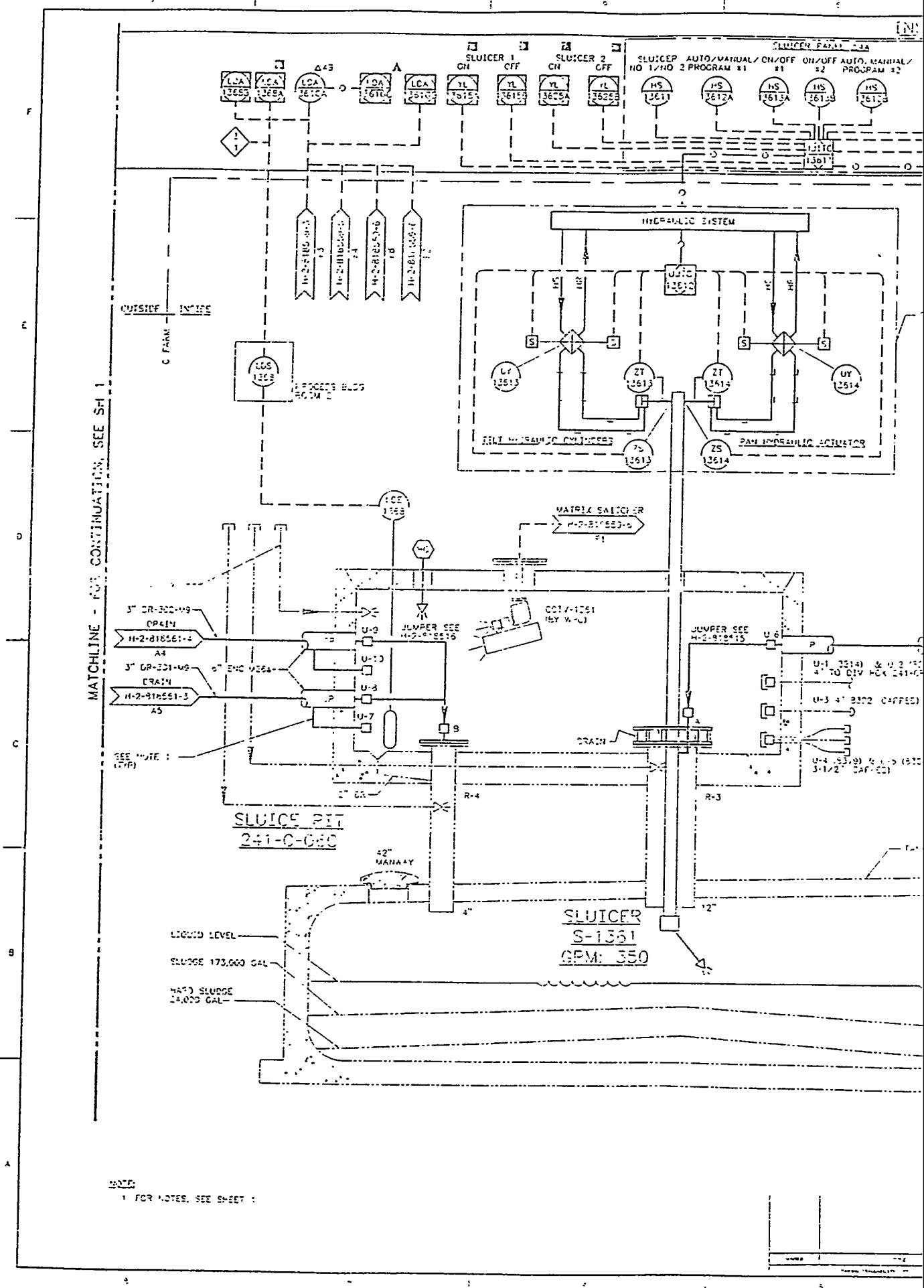


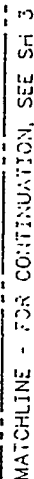
NOTES:

1. FOR SYMBOLS, LEGENDS, FEDERAL NOTES, EQUIPMENT IDENTIFICATION, LOCATION, LEAK DETECTION & INSTRUMENT DETAILS, SEE DWG H-2-818558 SH 1 THRU 3
2. FOR INTERLOCK SCHEDULE, SEE H-2-818558, SH 4.
3. PARTS OF EXISTING INSTRUMENTATION, PIPING AND EQUIPMENT SHOWN FOR CLARITY ONLY. FOR COMPLETE INSTRUMENTATION, PIPING AND EQUIPMENT, SEE DWGS H-2-4010C, H-2-60314, AND H-2-89763.
4. TE-1169 IS USED FOR MEASUREMENT OF TALK VAPOR SPACE DURING SLUICING OPERATION. PUMP #1-152 WILL BE IN A RETRACTABLE YOCF DURING SLUICING OPERATION.
5. * INTERLOCK NUMBERS 1, 5, 6, 7, 8, 14, 17, AND 18.
6. * INTERLOCK NUMBERS 1, 2, 4, 5, 8, 14, 16, 17, AND 18.
7. COBLE FUSE ISOLATION IS PROVIDED BETWEEN CLASS 1F AND HCM CLASS 1F DEVICES.

H.K. CHOUDHRY, P.E.

[illegible]

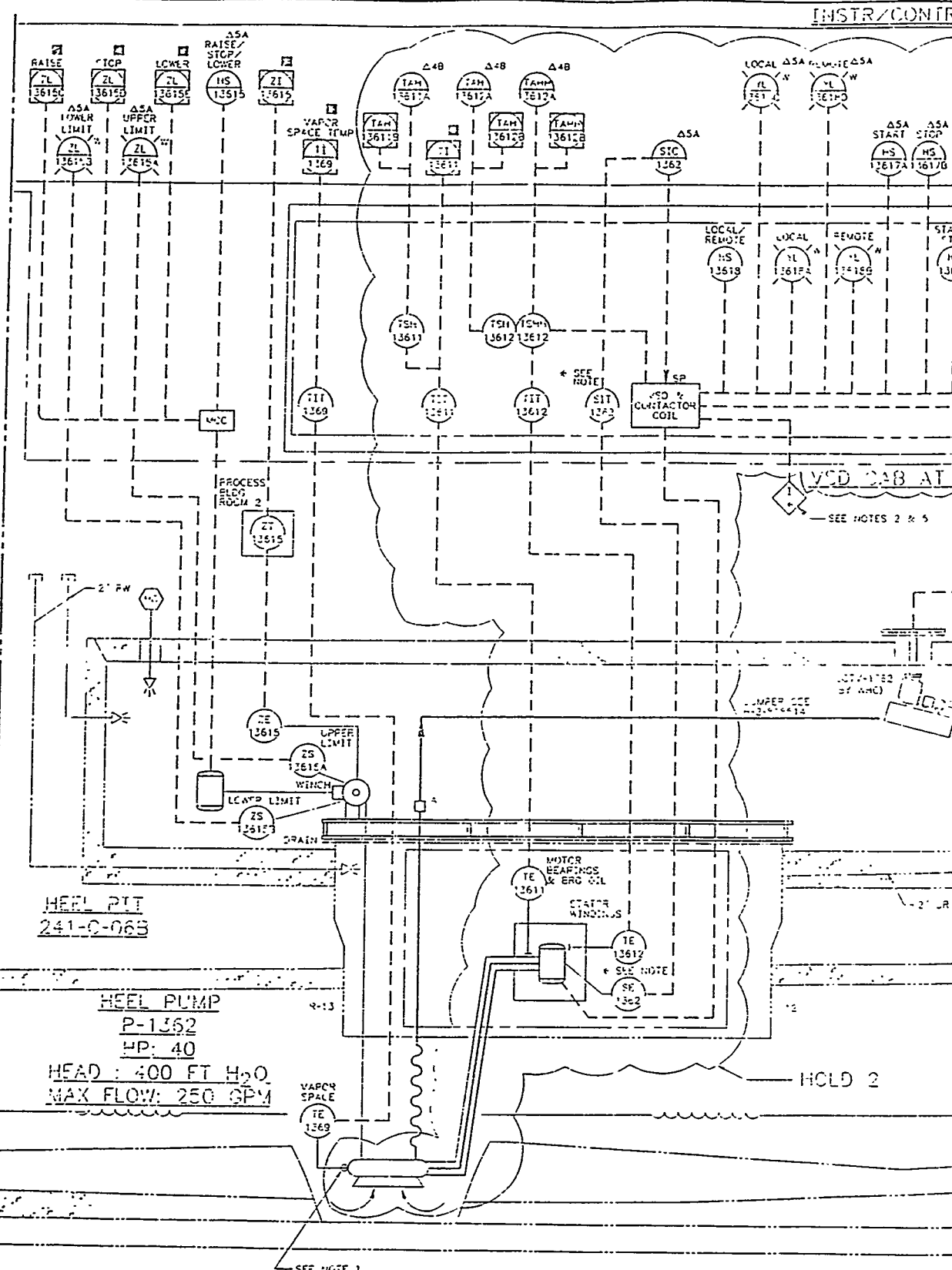




H.K. CHOUDHRY, PE/C.D. JONES, PE

H-29 / 30

MATCHLINE - 1-K CONTINUATION, SH. 2



HEEL PIT
241-C-068

HEEL PUMP
P-1362
HP: 40
HEAD: 400 FT H₂O
MAX FLOW: 250 GPM

SEE NOTE 1

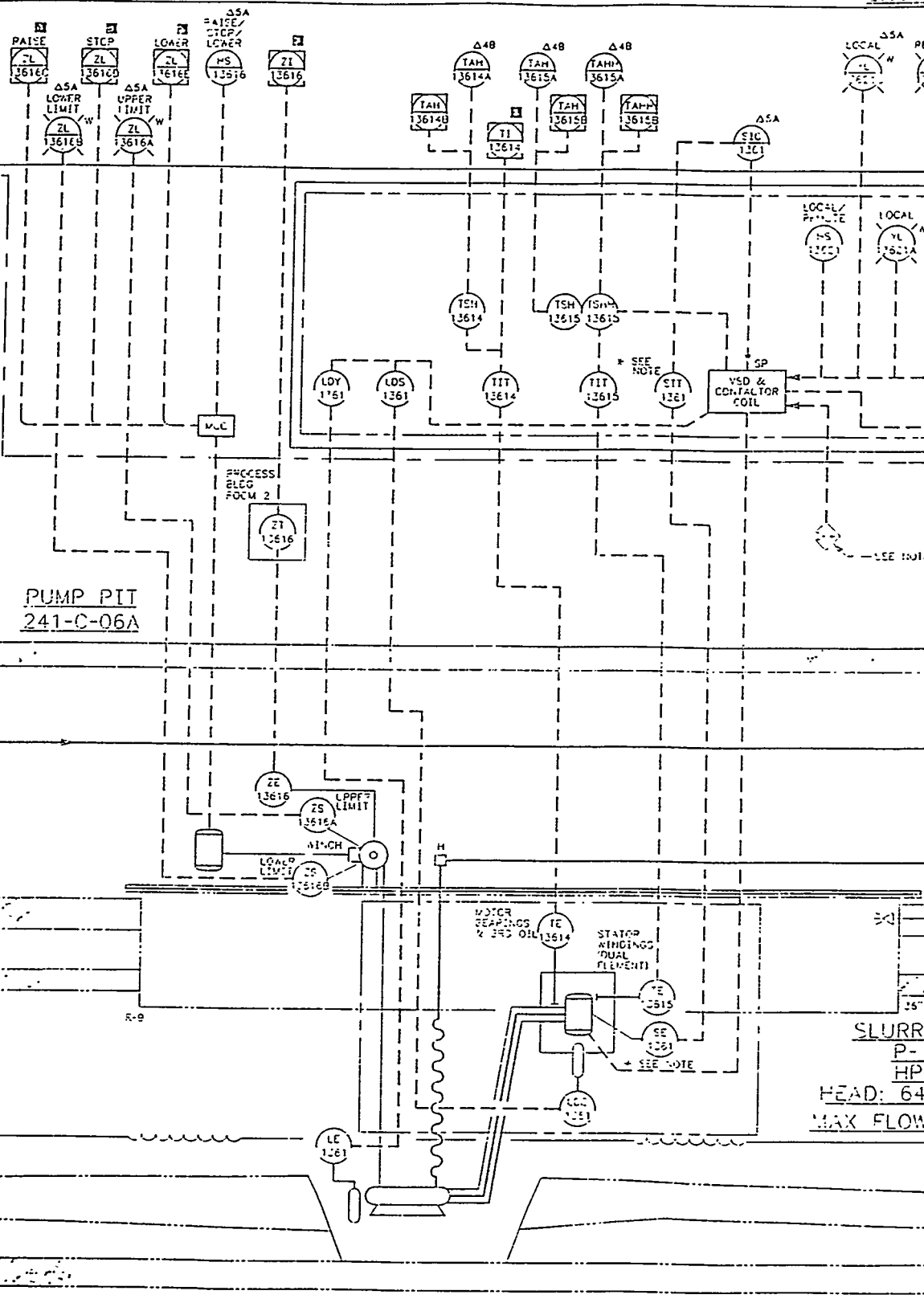
| HOLD TABLE | | |
|------------|---|--------------------|
| NO. | DESCRIPTION | EXPECTED PLSE DATE |
| 1 | INFO BY WHC | 10/94 |
| 2 | LCI-APPI RESOLUTION BY WHC/ICF - EH (SIMPLIFIED REEL PUMP DESIGN) | 11/94 |

241-C-106 TA

NOTE:
1. FOR NOTES, SEE SHEET 1.
* - OPTIONAL AS DETERMINED BY VSD VENDOR

| | | | | | | |
|---------------------|--|-------------------------------|-----------|---|-----|-------------|
| PERSON: B3 MEYER SF | | SWT# | SWT# DATE | 7 | ICF | PRELIMINARY |
| NAME DATE | | U.S. DEPARTMENT OF ENERGY | | | | |
| FICHER | | RICHLAND OPERATIONS OFFICE | | | | |
| SWT# | | ICF RICHARD HANFORD COMPANY | | | | |
| NAME DATE | | PROJECT W-320 | | | | |
| NAME DATE | | P & ID | | | | |
| NAME DATE | | TANK 241-C-106 | | | | |
| NAME DATE | | K CHOUDHARY | | | | |
| NAME DATE | | 23 | | | | |
| NAME DATE | | 320, TANK 241-C-106 SLOUICING | | | | |
| NAME DATE | | F-241-C 700A H-2-218559 | | | | |
| NAME DATE | | NONE | | | | |

MATCHLINE - FOR CONTINUATION, SEE SH 3

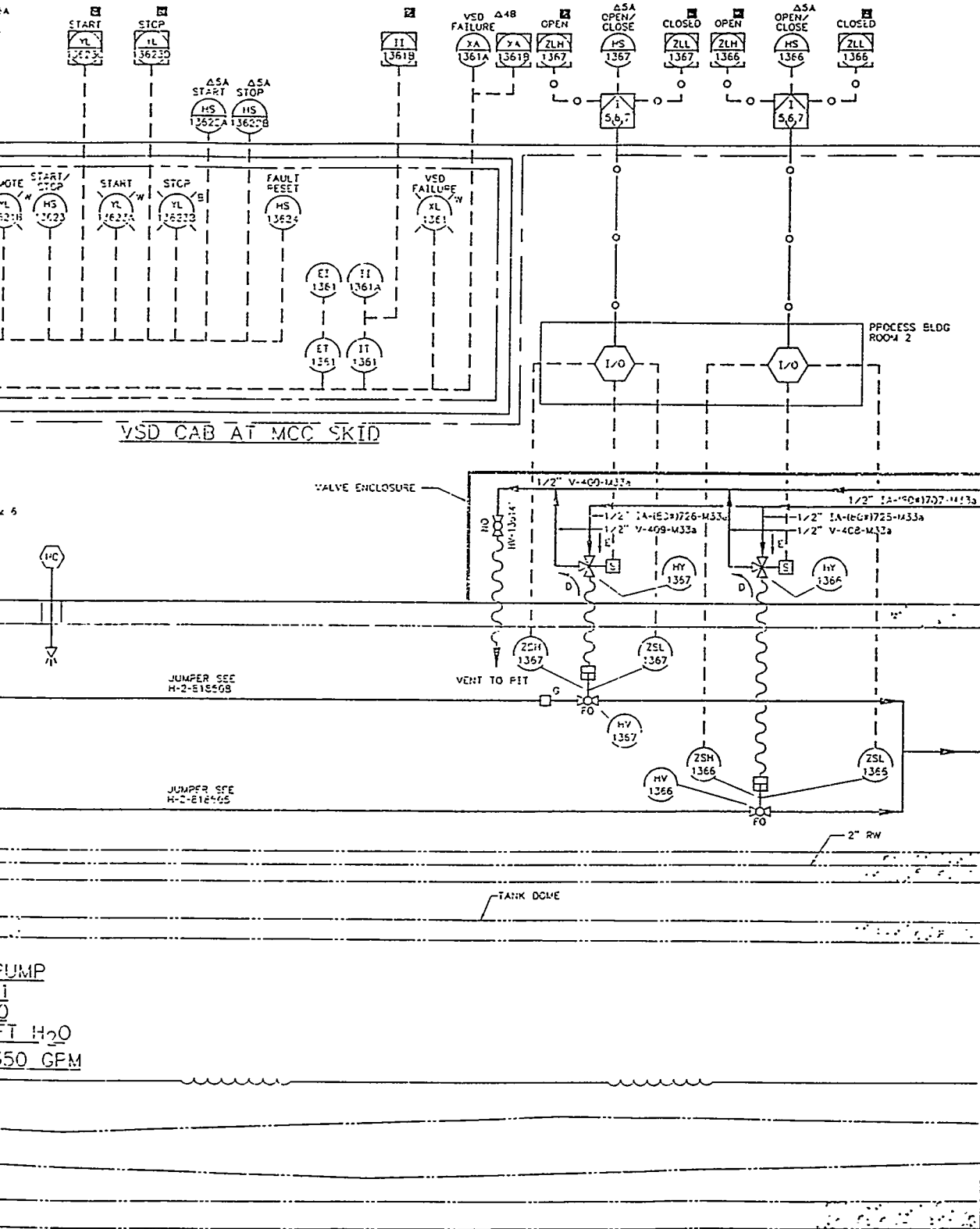


241-C-106 TANK

NOTE:
 1. FOR NOTES, SEE SHEET 1.
 * - OPTIONAL AS DETERMINED BY VSD VENDOR

SLURRY
 P-1
 HP:
 HEAD: 64
 MAX FLOW

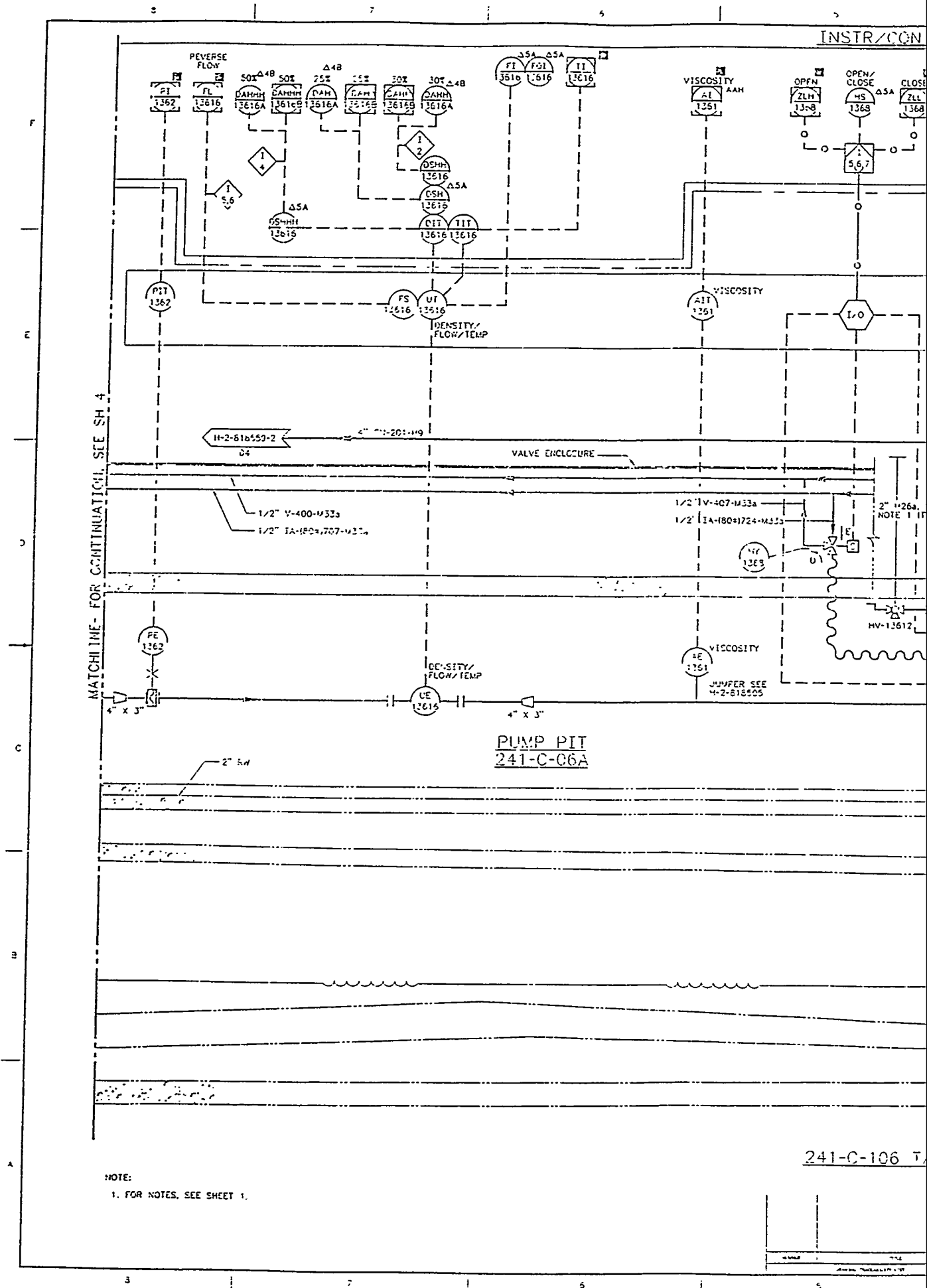
CONTROL BLDG



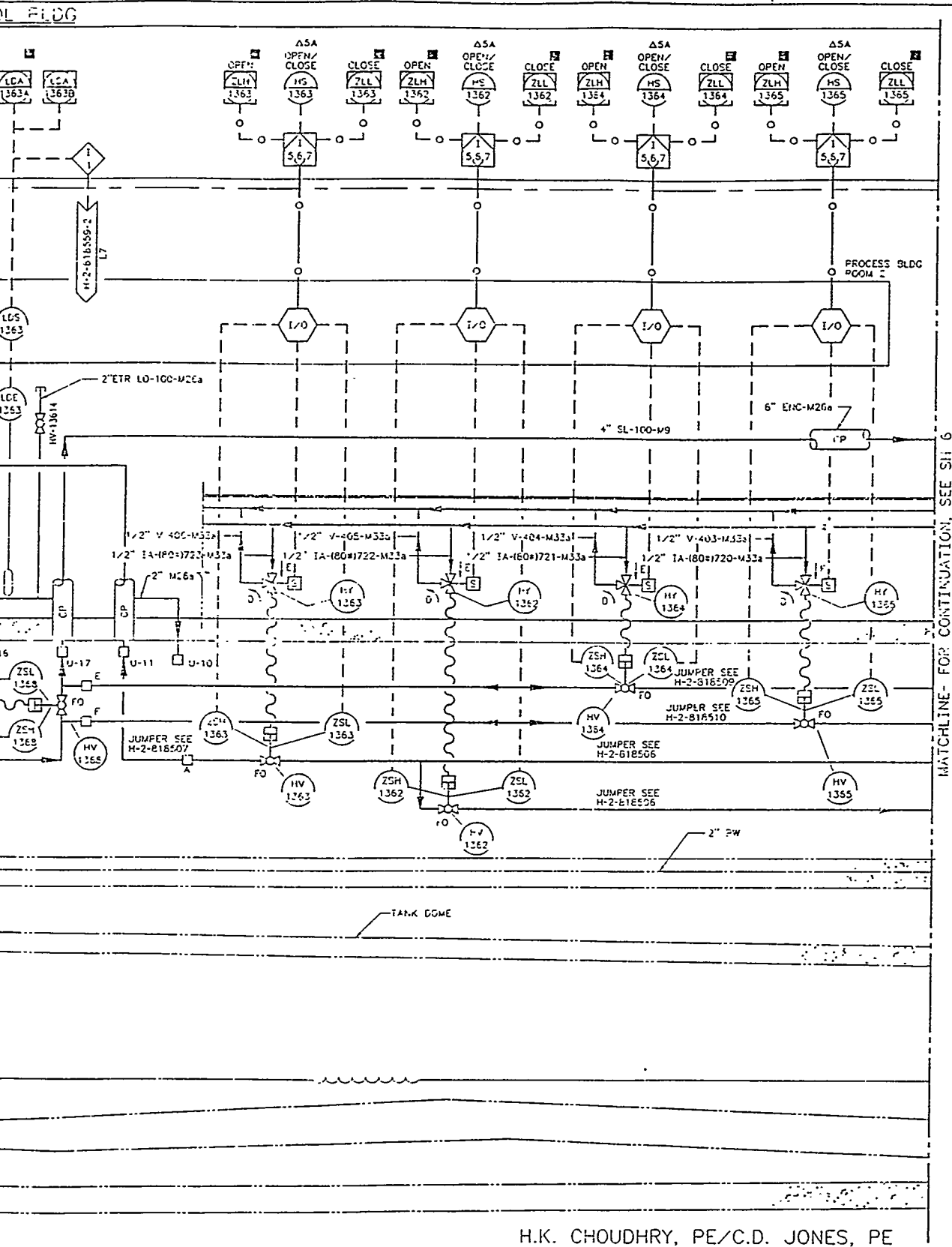
MATCHLINE - FOR CONTINUATION, SEE SH 5

H.K. CHOUDHRY, PE/C.D. JONES, PE

| | | | | | |
|--|--|---------|--|--------------|--|
| DESIGNED BY MEYER SE | | SCALE 2 | | DATE 10/1/83 | |
| PROJECT W-320, TANK 241-C-106 SLUICING | | | | | |
| U.S. DEPARTMENT OF ENERGY | | | | | |
| FACILITY OPERATIONS OFFICE | | | | | |
| ICF KAISER HANFORD COMPANY | | | | | |
| PROJECT W-320 | | | | | |
| P & ID | | | | | |
| TANK 241-C-106 | | | | | |
| DRAWN BY K. CHOUDHRY | | | | | |
| CHECKED BY | | DATE | | SCALE | |
| H.K. CHOUDHRY | | 10/1/83 | | 1:1 | |
| APPROVED BY | | DATE | | SCALE | |
| H.K. CHOUDHRY | | 10/1/83 | | 1:1 | |
| REVISIONS | | DATE | | | |
| 1. AS SHOWN | | 10/1/83 | | | |



PL FLDG

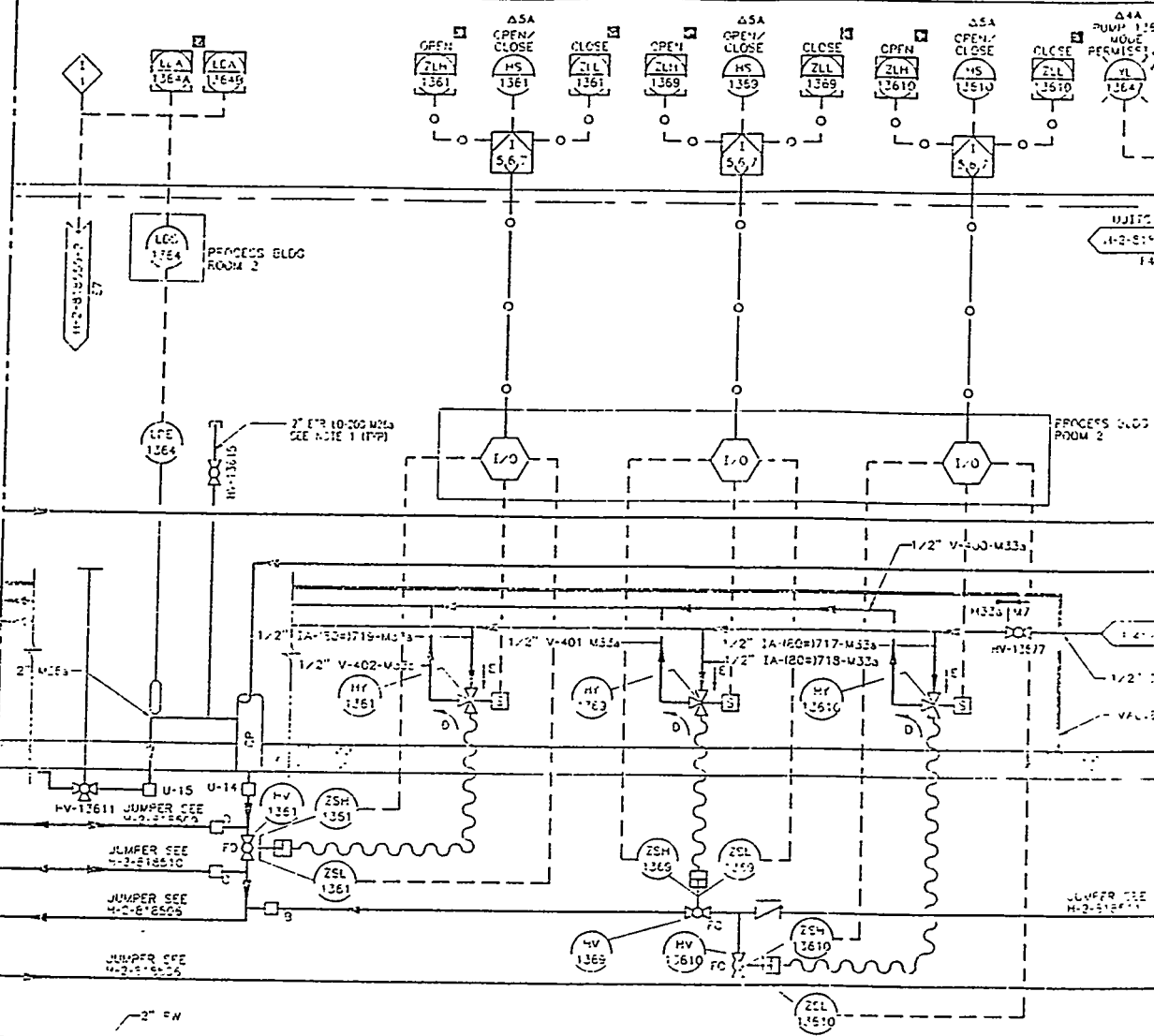


MATCHLINE- FOR CONTINUATION, SEE SH 6

H.K. CHOUDHRY, PE/C.D. JONES, PE

| | | | | | |
|--------------------------------|-------|--------|------------|-----------------|--|
| DESIGNED BY MEYER sr | | DATE 2 | | REV PRELIMINARY | |
| U.S. DEPARTMENT OF ENERGY | | | | | |
| RICHLAND OPERATIONS OFFICE | | | | | |
| ICP KAISER HANFORD COMPANY | | | | | |
| PROJECT W-320 | | | | | |
| P & ID | | | | | |
| TANK 241-C-106 | | | | | |
| W-320, TANK 241-C-106 SLUICING | | | | | |
| DATE | 241-C | 7004 | H-2-818559 | A | |
| NAME | NONE | | DATE | 254319 | |
| 2 PLOT SCALE: 1:1 KERCAD | | | | | |

MATCHLINE- FOR CONTINUATION SEE SH. 5



NOTE

1. FOR NOTES, SEE SHEET 1.

[illegible]

MATCHLINE

OUTSIDE
BY FARMINSIDE
AT FARM

TRANSM

4" 816558-2

4" 816558-2

4" 816558-2

4" 816558-2

6" 816558-2

4" 816558-2

LEAK DETECTION
PIT 102A

NOTES:

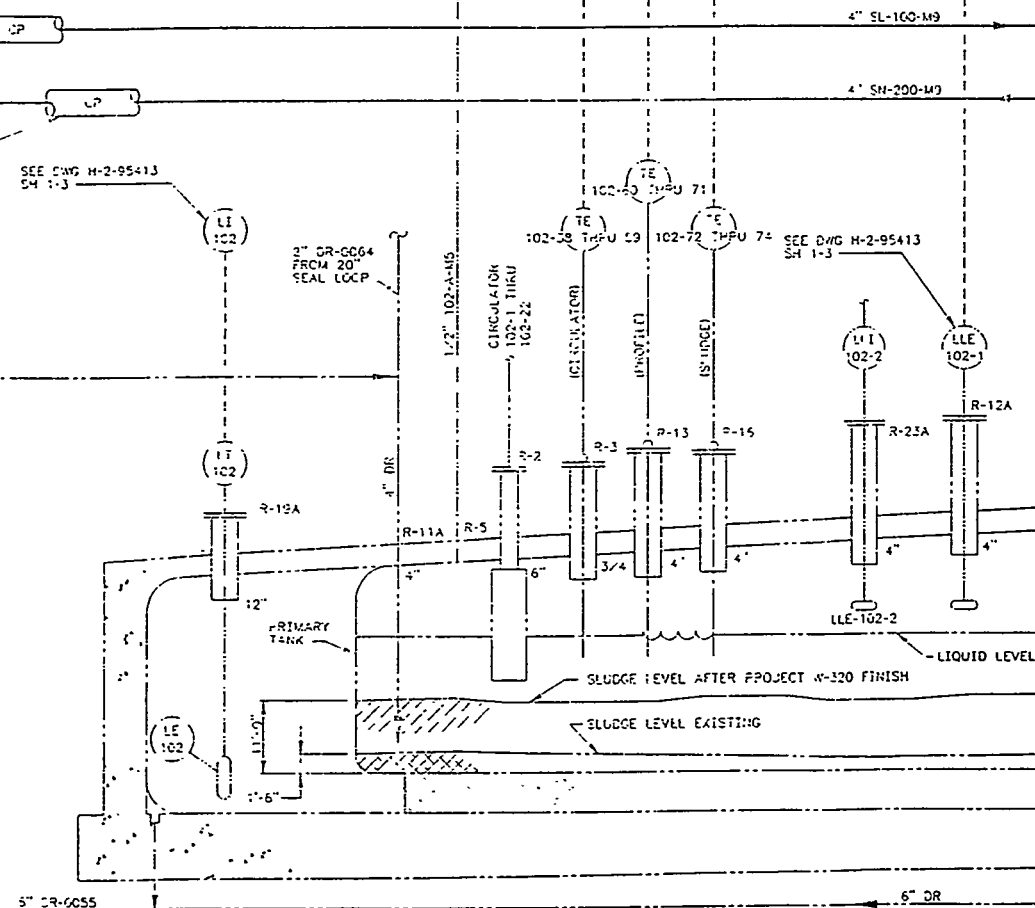
- FOR SYMBOLS, LEGENDS, GENERAL NOTES, EQUIPMENT IDENTIFICATION, ENCASUREMENT LEAK DETECTION & INSTRUMENT DETAILS, SEE DWG 4-2-816558, SH 1 THRU 3.
- FOR INTERLOCK SCHEDULE SEE DWG 4-2-816558 SH 4.
- PARTS OF EXISTING INSTRUMENTATION, PIPING AND EQUIPMENT SHOWN FOR CLARITY ONLY. FOR COMPLETE INSTRUMENTATION, PIPING AND EQUIPMENT, SEE DWG 4-2-64400, SH 6, 7, & 8.
- AVERAGE LIQUID TEMPERATURE FOR TE-102-4, 50, 52, 55, 64, 69, 70, 73.
- INTERLOCK NUMBERS 1, 3, 5, 6, 7, 8, 14, 16, 13.
- TYPICAL FOR TE-102-7, 10, 26, 27, 33, 34, 50, 52, 55, 64, 69 TYP 73, 82, 80 AND 93.

| | | | |
|------|------|------|------|
| SH 4 | SH 5 | SH 6 | SH 7 |
| SH 2 | SH 3 | | |

| | | | |
|--------------|----------|----------|----------|
| 4-2-816558-2 | SH 1-3 | SH 4-7 | SH 8-13 |
| 4-2-816558-2 | SH 14-16 | SH 17-19 | SH 20-23 |
| 4-2-816558-2 | SH 24-26 | SH 27-29 | SH 30-33 |
| 4-2-816558-2 | SH 34-36 | SH 37-39 | SH 40-43 |
| 4-2-816558-2 | SH 44-46 | SH 47-49 | SH 50-53 |
| 4-2-816558-2 | SH 54-56 | SH 57-59 | SH 60-63 |
| 4-2-816558-2 | SH 64-66 | SH 67-69 | SH 70-73 |
| 4-2-816558-2 | SH 74-76 | SH 77-79 | SH 80-83 |
| 4-2-816558-2 | SH 84-86 | SH 87-89 | SH 90-93 |

CONTINUATION, SEE CH 4

ER ENCL 241-AY-102



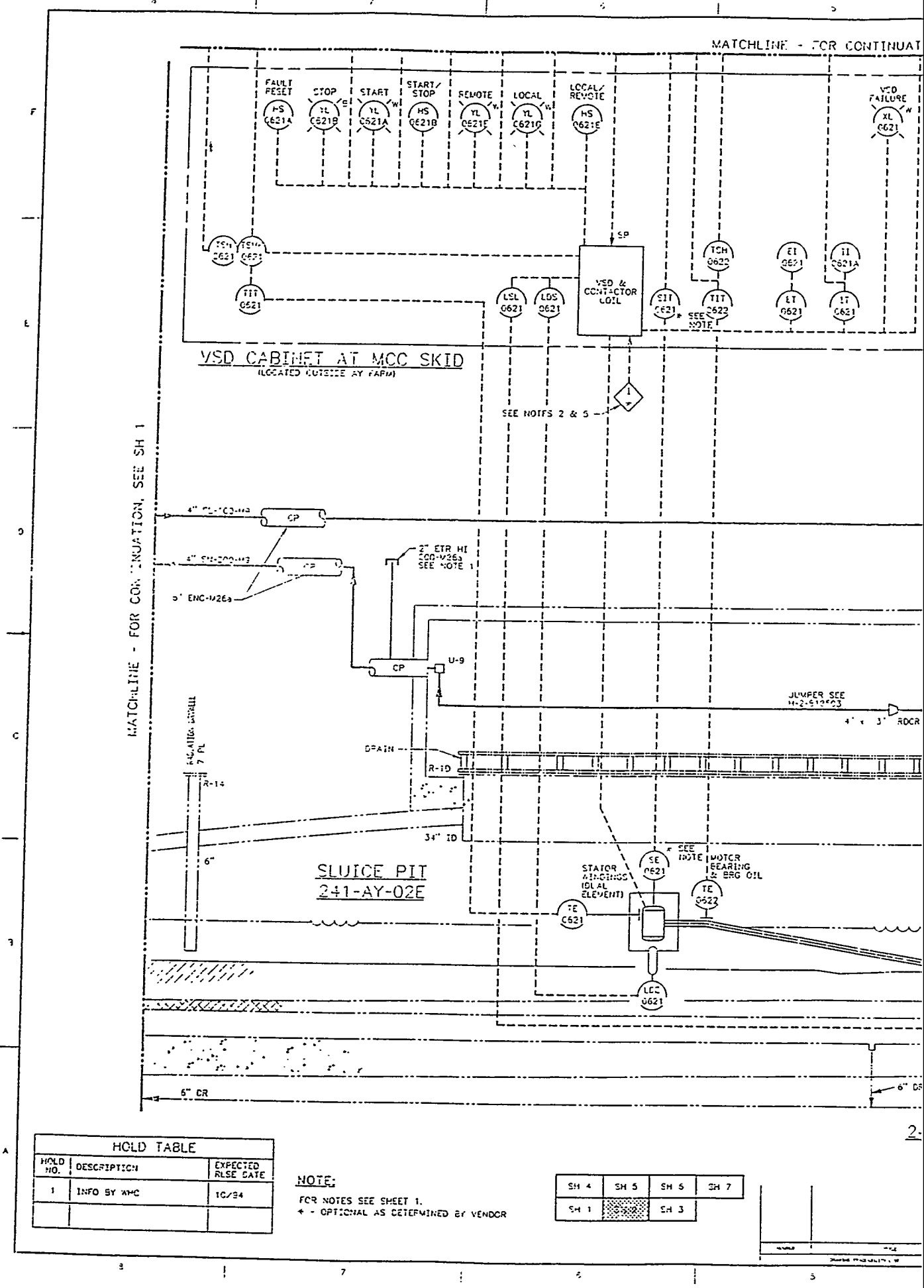
MATCHLINE - FOR CONTINUATION, SEE SH 2

241-AY-102 TANK

H.K. CHOUDHRY, PE/C.D. JONES, PE

| | | | |
|--|--------------|-------------|----------------|
| DESIGNED BY MEYER | SCALE | SHEET NO. 2 | TOTAL SHEETS 7 |
| U.S. DEPARTMENT OF ENERGY
PICHAND OPERATIONS OFFICE
ICF KAISER HANFORD COMPANY | | | |
| PROJECT W-320
P & ID
TANK 241-AY-102 | | | |
| PROJECT W-320, TANK 241-C-106 SLUICING | | | |
| DATE 11-2-81 | BY F 241-AY | 7004 | H-2-818560 |
| SCALE NONE | DATE 11-2-81 | BY ER4319 | SHEET 1 OF 7 |

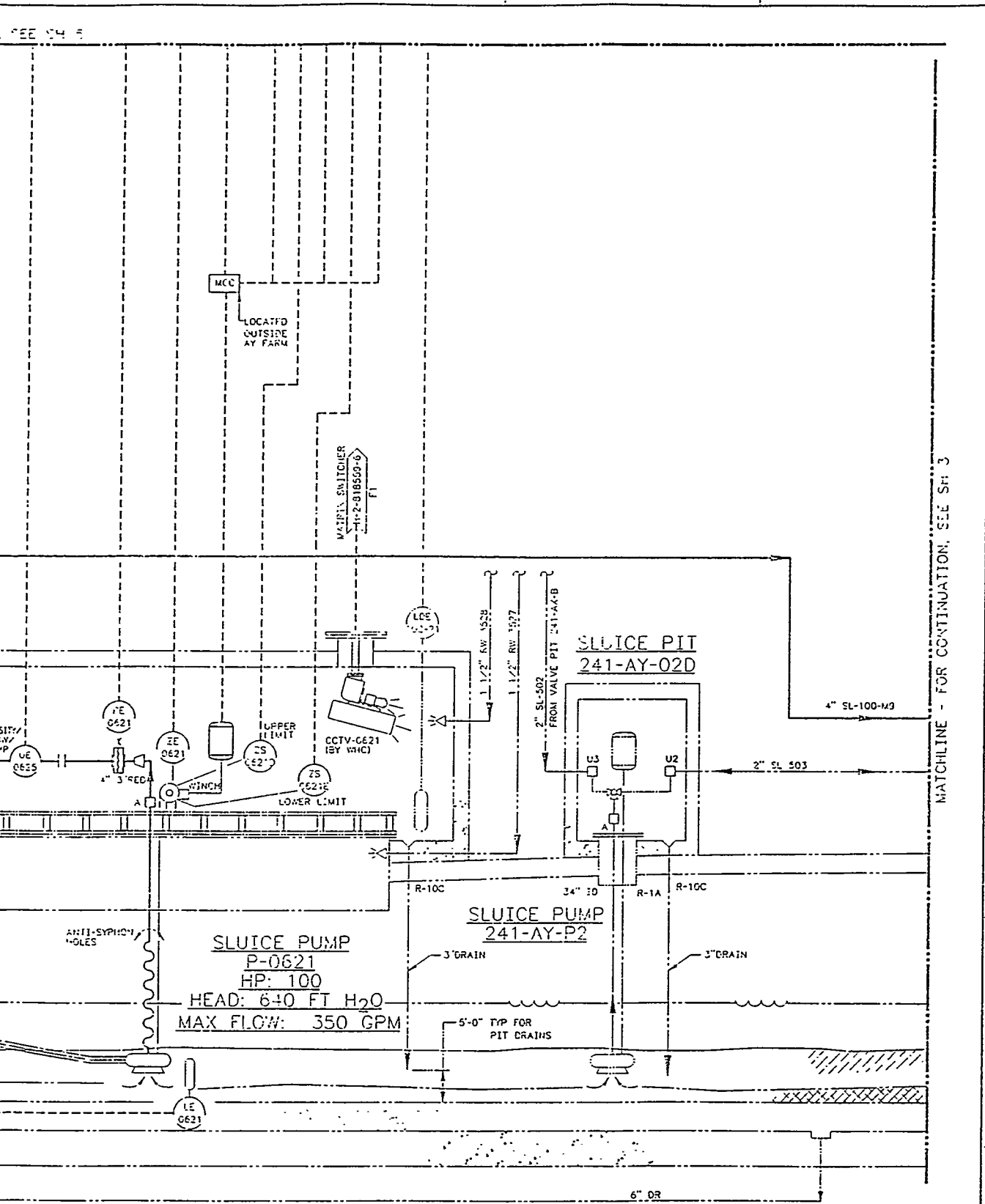
H-39/40



| HOLD TABLE | | |
|------------|-------------|--------------------|
| HOLD NO. | DESCRIPTION | EXPECTED RLSE DATE |
| 1 | INFO BY WMC | 10/24 |
| | | |

NOTE:
 FOR NOTES SEE SHEET 1.
 * - OPTIONAL AS DETERMINED BY VENDOR

| | | | |
|------|------|------|------|
| SH 4 | SH 5 | SH 6 | SH 7 |
| SH 1 | SH 2 | SH 3 | |



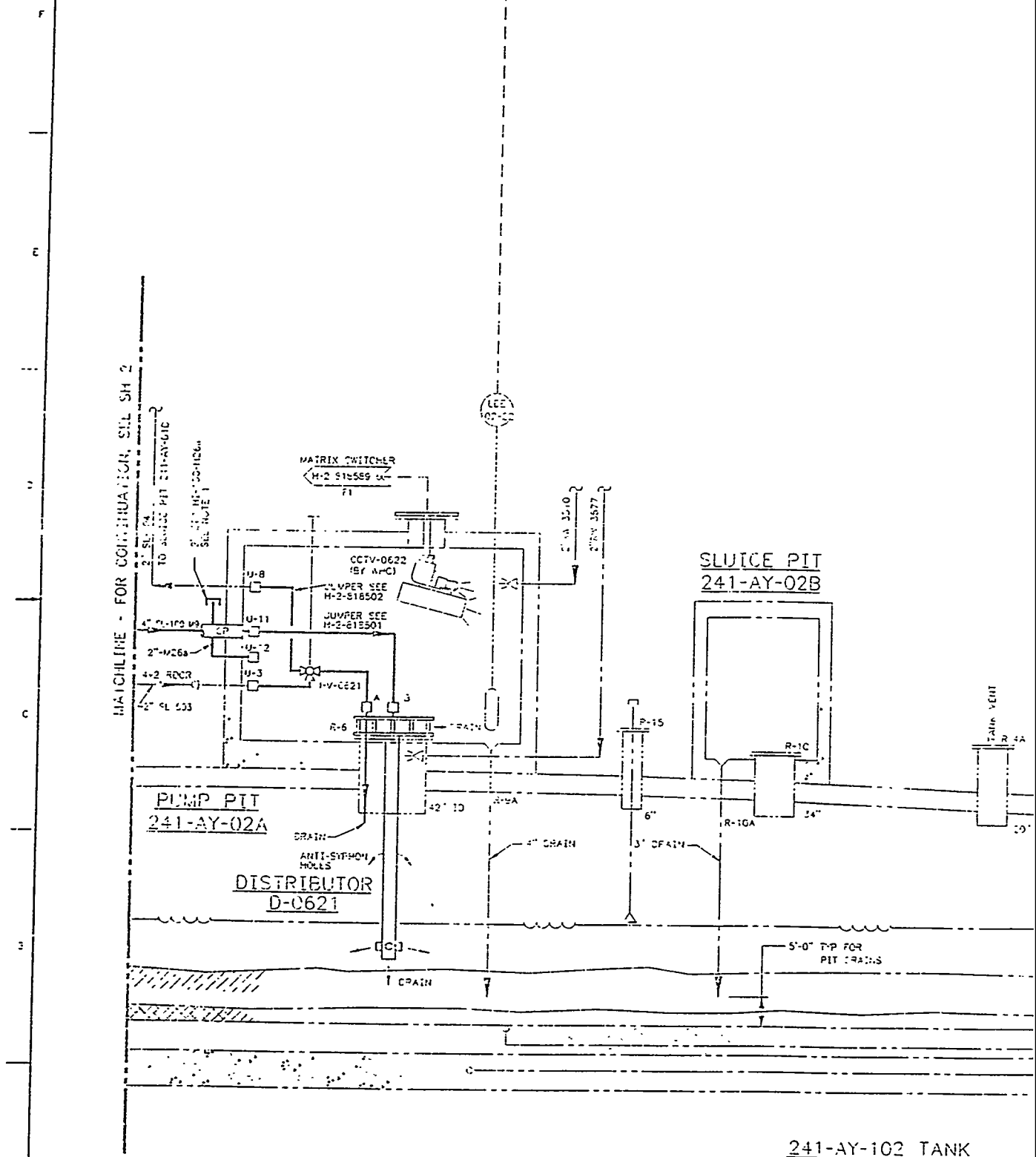
MATCHLINE - FOR CONTINUATION, SEE SH: 3

AY-102 TANK

H.K. CHOUDHRY, PE/C.D. JONES, PE

| | | | | | |
|---|--|---|--|---------------|--|
| DESIGNED BY: H.K. CHOUDHRY | | CHECKED BY: JONES, PE | | DATE: 26 | |
| PROJECT: W-320, TANK 241-C-106 SLUICING | | SHEET: 2 OF 7 | | SCALE: 1"=1' | |
| U.S. DEPARTMENT OF ENERGY | | PROJECT: W-320, TANK 241-C-106 SLUICING | | SHEET: 2 OF 7 | |
| RICHMOND OPERATIONS OFFICE | | PROJECT: W-320, TANK 241-C-106 SLUICING | | SHEET: 2 OF 7 | |
| ICF KAISER HANFORD COMPANY | | PROJECT: W-320, TANK 241-C-106 SLUICING | | SHEET: 2 OF 7 | |
| PROJECT: W-320, TANK 241-C-106 SLUICING | | PROJECT: W-320, TANK 241-C-106 SLUICING | | SHEET: 2 OF 7 | |
| P & ID | | PROJECT: W-320, TANK 241-C-106 SLUICING | | SHEET: 2 OF 7 | |
| TANK 241-AY-102 | | PROJECT: W-320, TANK 241-C-106 SLUICING | | SHEET: 2 OF 7 | |
| H-2-818560 | | PROJECT: W-320, TANK 241-C-106 SLUICING | | SHEET: 2 OF 7 | |
| A | | PROJECT: W-320, TANK 241-C-106 SLUICING | | SHEET: 2 OF 7 | |

H-41 / 42



MATCHLINE - FOR CONTINUATION, SEE SH 2

PUMP PIT
241-AY-02ADISTRIBUTOR
D-0621SLUICE PIT
241-AY-02B

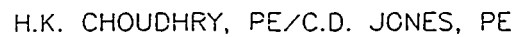
241-AY-102 TANK

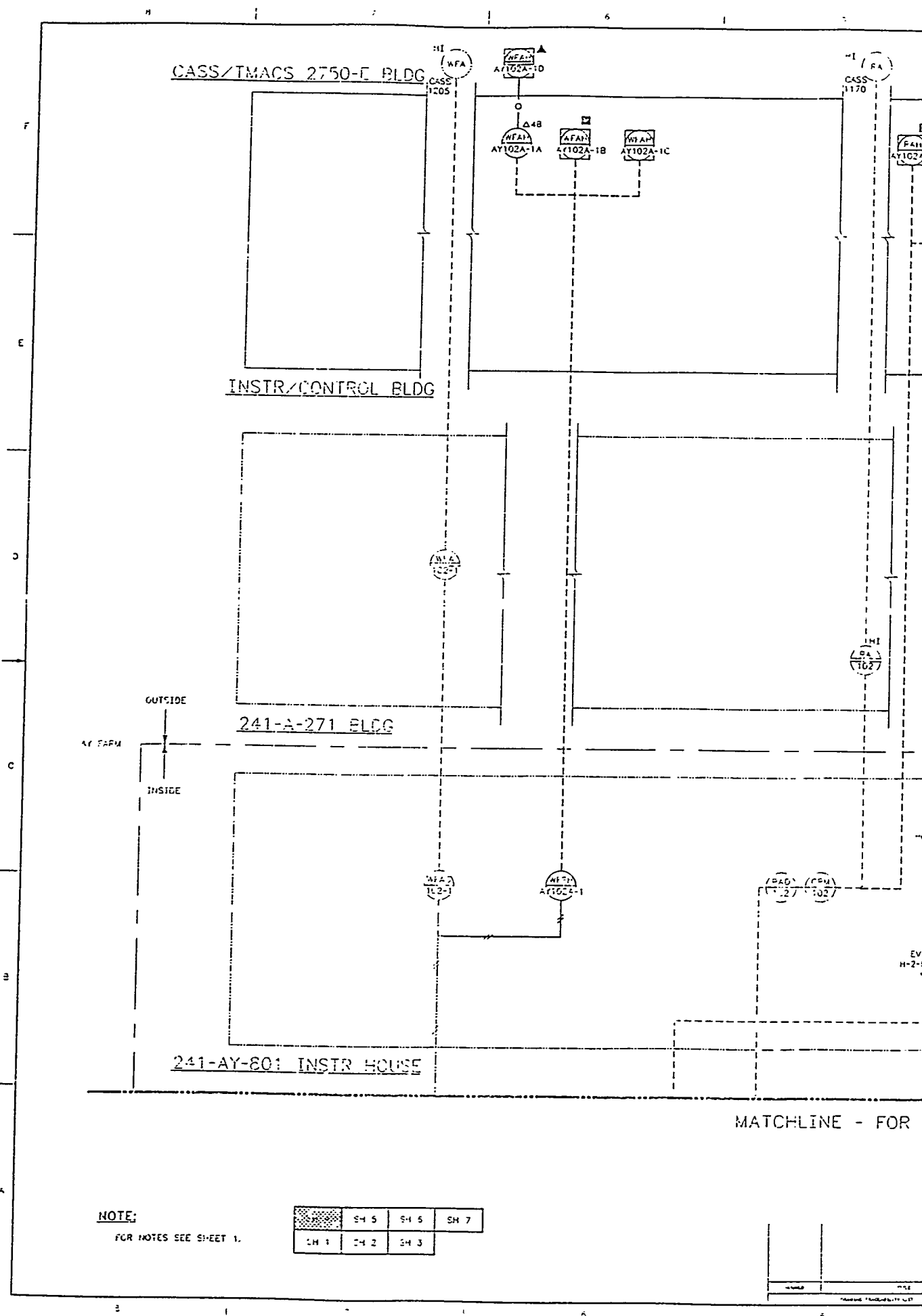
| HOLD TABLE | | |
|------------|-------------|--------------------|
| FIELD NO. | DESCRIPTION | EXPECTED FILE DATE |
| 1 | INFO BY WNC | 10/94 |

NOTE:

FOR NOTES SEE SHEET 1.

| | | | |
|------|------|------|------|
| SH 4 | SH 5 | SH 6 | SH 7 |
| SH 1 | SH 2 | | |

[illegible]

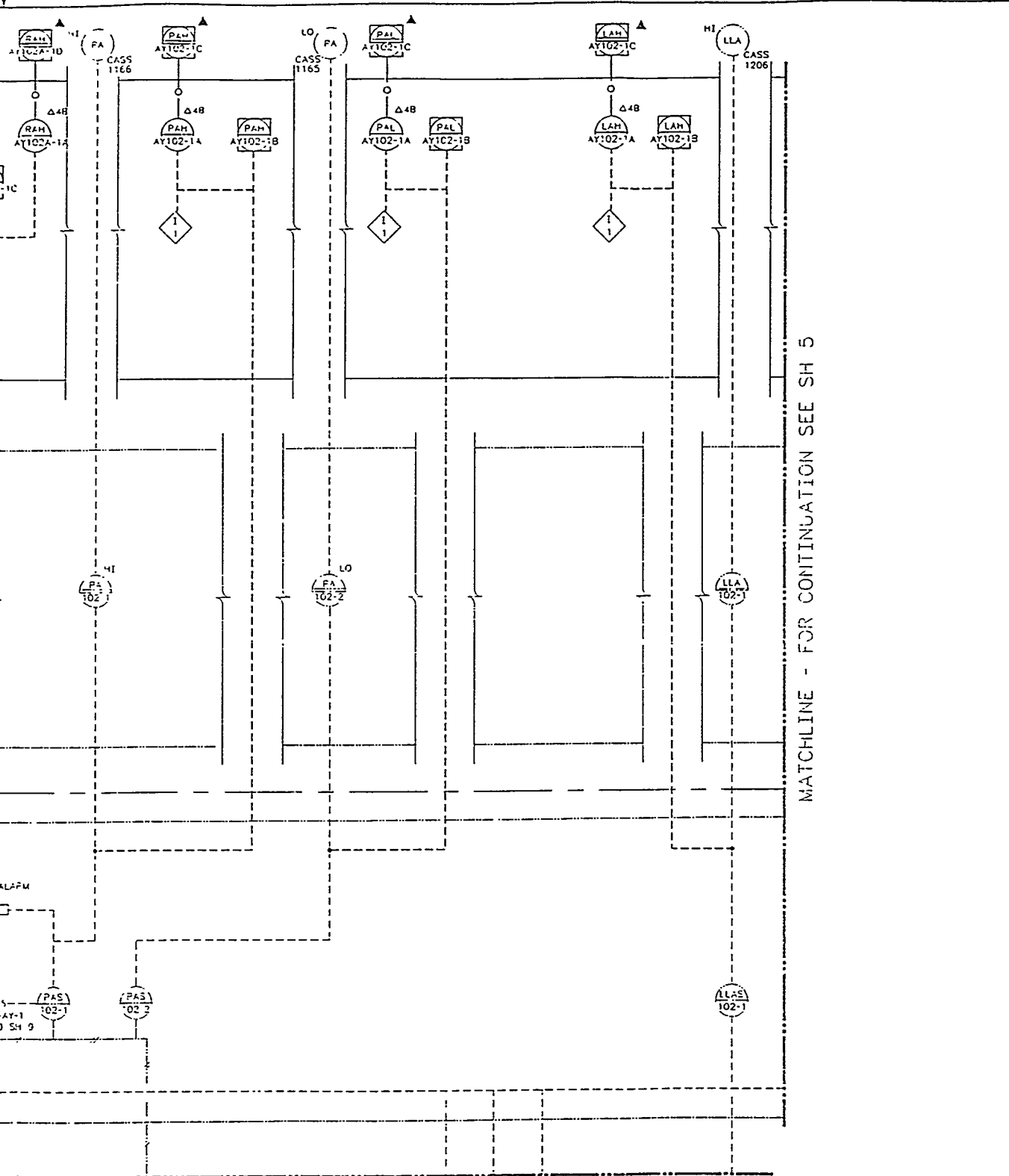


NOTE:
FOR NOTES SEE SHEET 1.

| | | | | | | |
|------|------|------|------|------|------|------|
| SH 1 | SH 2 | SH 3 | SH 4 | SH 5 | SH 6 | SH 7 |
|------|------|------|------|------|------|------|

MATCHLINE - FOR

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
|---|---|---|---|---|---|---|---|---|-----|

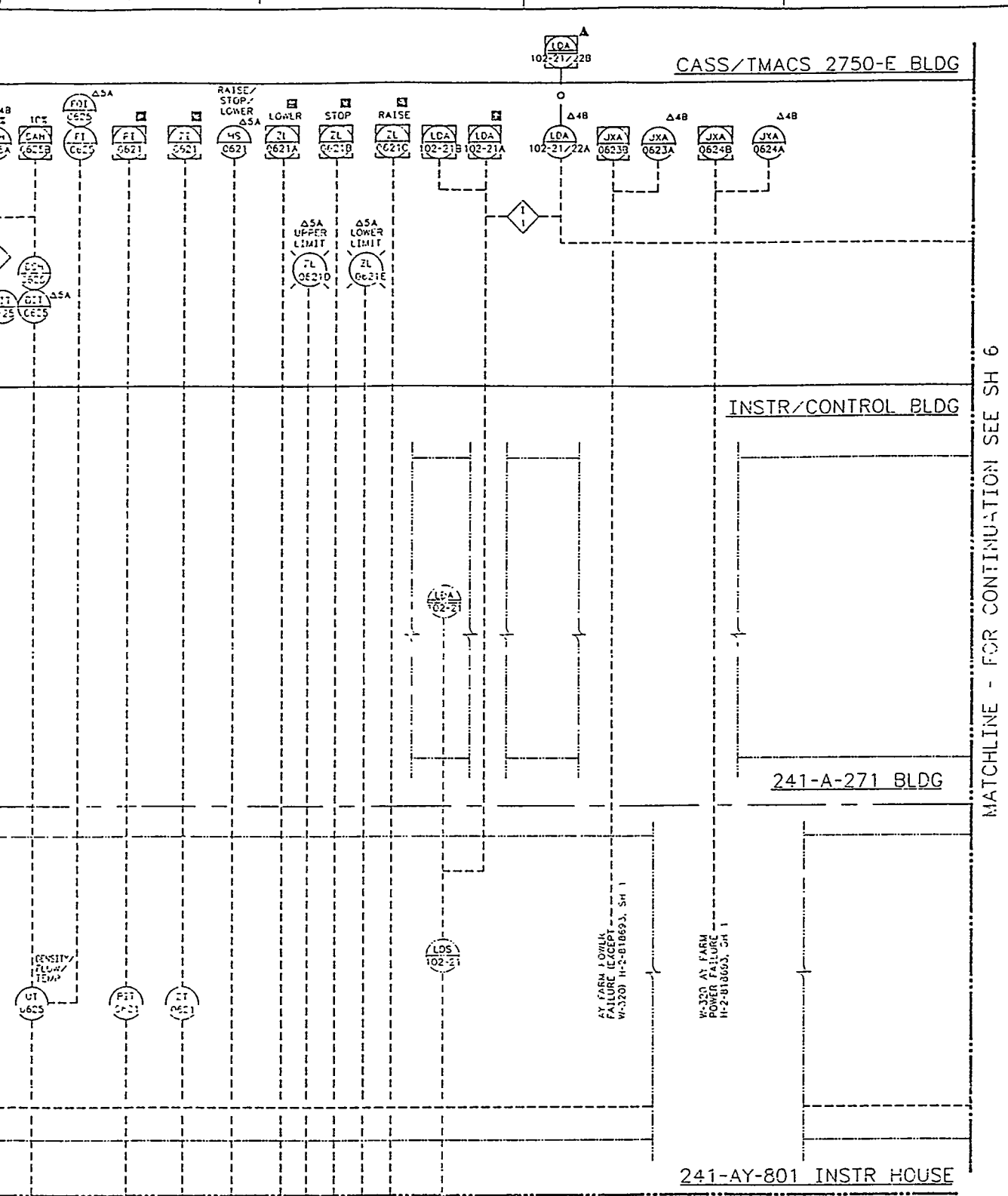


CONTINUATION SEE SH 1

H.K. CHOUDHRY, PE/C.D. JONES, PE

| | | |
|---|--|-------------------|
| PROJECT: W-320, TANK 241-C-105 SLUICING
F 241-AY 7004 H-2-818560 A | | SHEET: 3
OF: 7 |
| U.S. DEPARTMENT OF ENERGY
RICHMOND OPERATIONS OFFICE
ICF KAISER HANFORD COMPANY | | |
| PROJECT W-320
P & ID
TANK 241-AY-102 | | |
| DRAWN BY: H.K. CHOUDHRY
CHECKED BY: J. BRINKLEY
DATE: 1/18/78 | | |
| SCALE: NONE
1" = 10' | | |

H-45/46

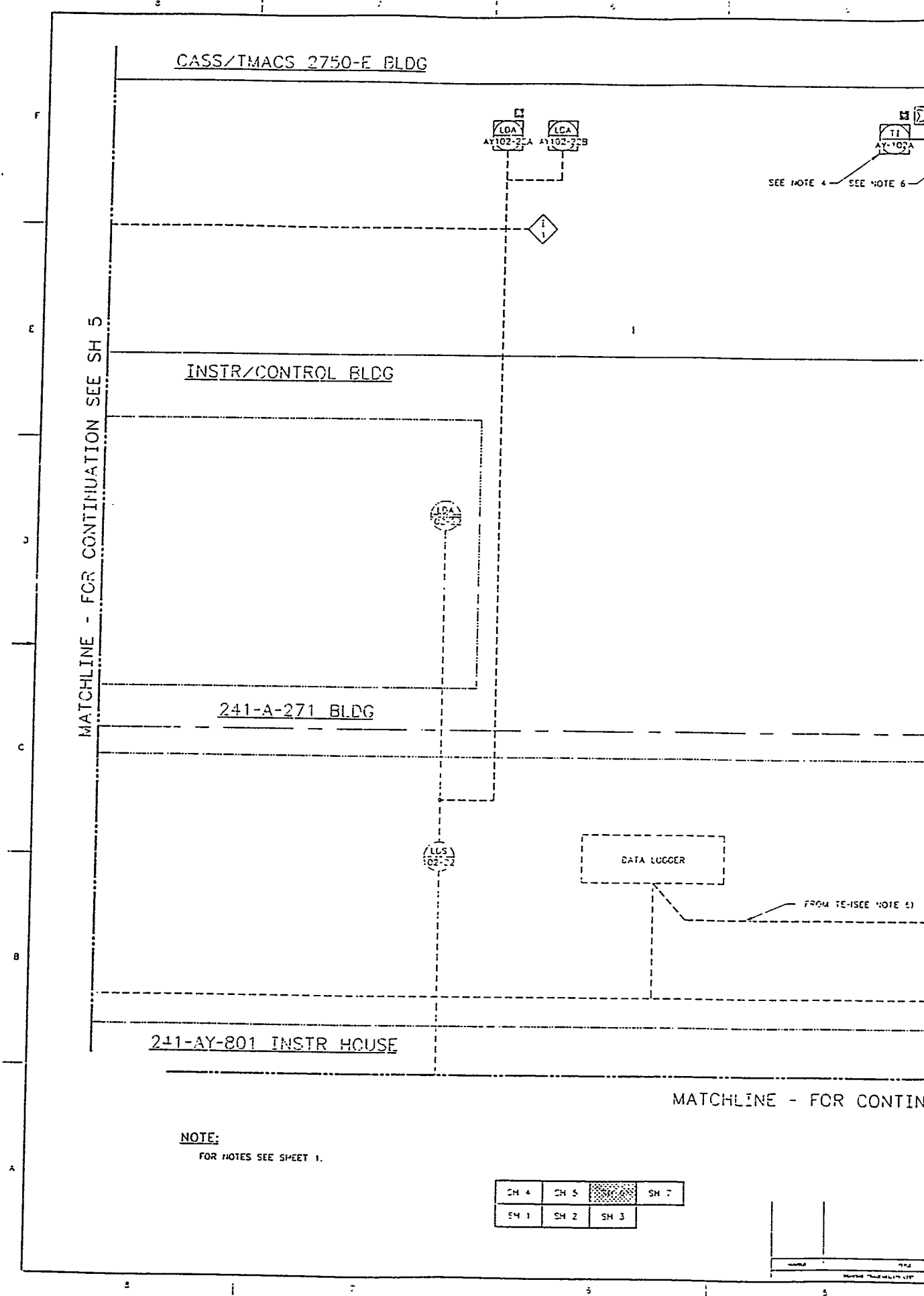


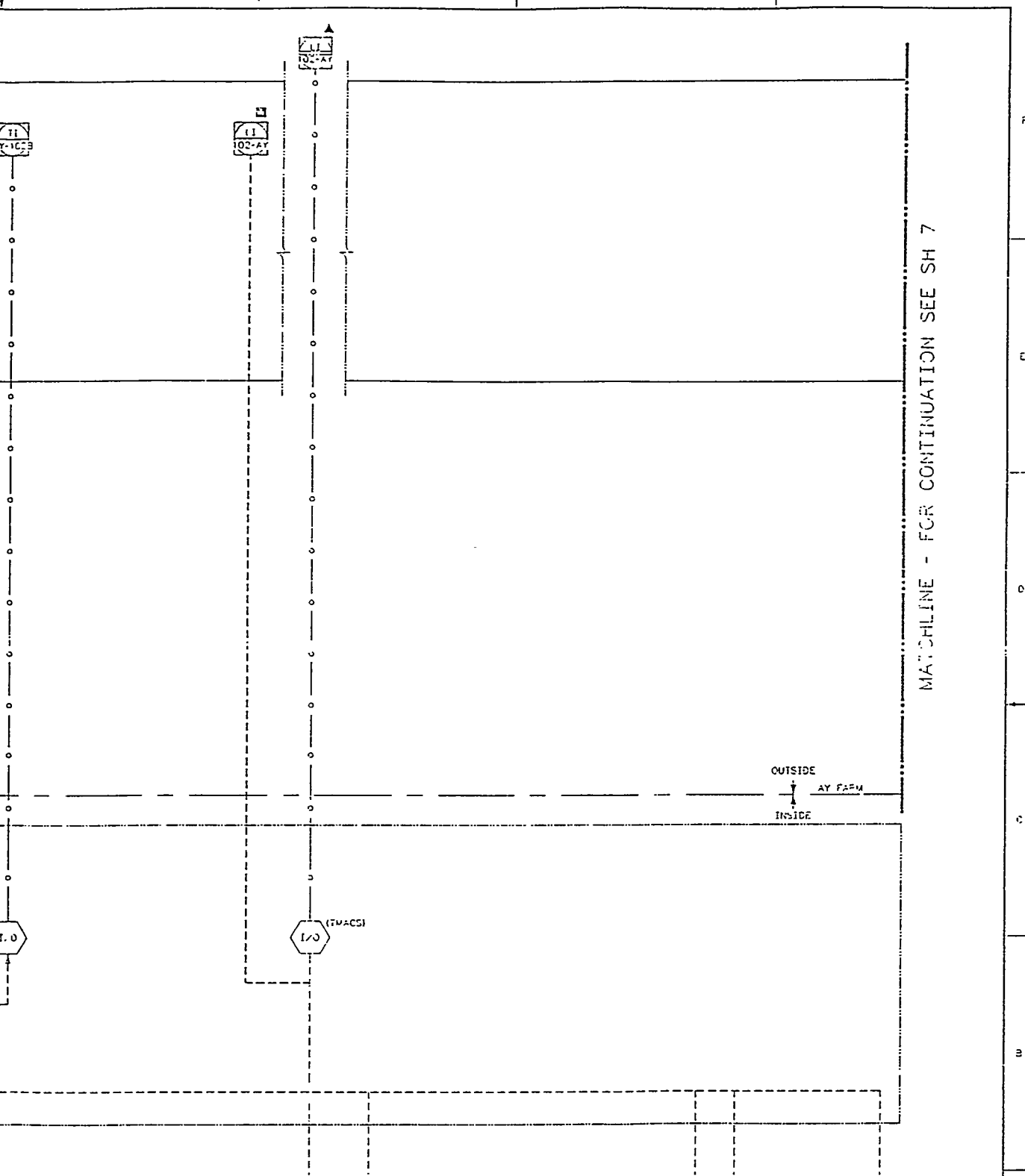
CONTINUATION SEE SH 2

H.K. CHOUDHRY, PE/C.D. JONES, PE

| | | | |
|---|--|---|--|
| DESIGNER J. BRINKLEY
CHECKED
DATE
DRAWN
DATE
IN CHARGE K. CHOUDHRY | | SAFETY CLASS 3
U.S. DEPARTMENT OF ENERGY
RICHMOND OPERATIONS OFFICE
ICF KAISER HANFORD COMPANY
PROJECT W-320
P & ID
TANK 241-AY-102 | |
| REVISIONS
NO. 17
DATE 12/21/81
BY H.K. CHOUDHRY | | PROJECT W-320, TANK 241-C-105 SLUICING
F 241-AY 7004 H-2-818560 A | |
| SCALE 1"=1'
PLOT SCALE 1"=1' | | DATE 12/21/81
DRAWN BY H.K. CHOUDHRY
CHECKED BY C.D. JONES | |

H-47/48



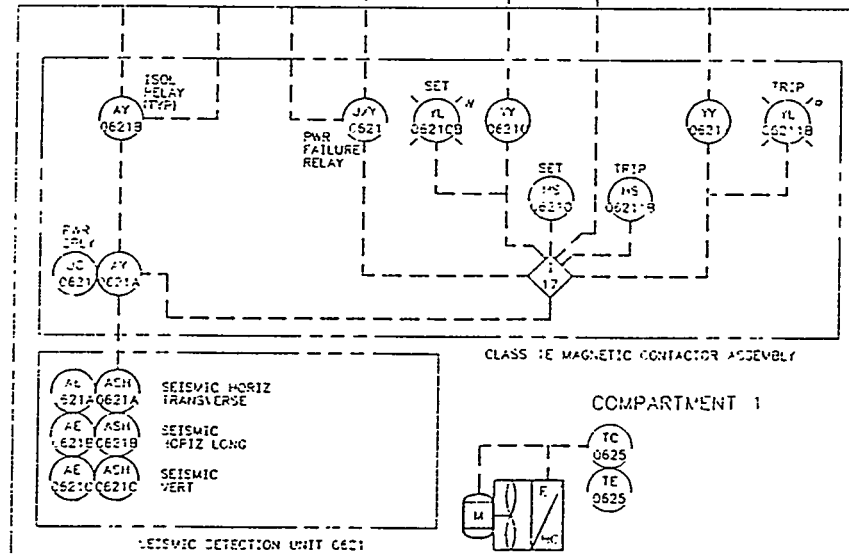
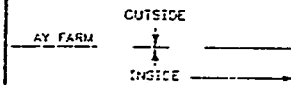


TION SEE SH 3

H.K. CHOUDHRY, PE/C.D. JONES, PE

| | | | | | |
|---------------------------|--|----------------------------|--|--------------------------------|------------------|
| PLANNED JL BRINKLEY DATE | | SWIFT CLASS | | 3 | DATE PRELIMINARY |
| PLAN OWNER | | U.S. DEPARTMENT OF ENERGY | | | |
| DETAILS | | RICHMOND DISTRICTS OFFICE | | | |
| WATER SEE CR/AT FORM | | ICF KAISER HANFORD COMPANY | | | |
| LUMBER SEE CR/AT FORM | | PROJECT W-320 | | | |
| PUMP DISPOSE CR/AT FORM | | P & ID | | | |
| WELD CAPM K CHOUDHRY | | TANK 241-A-102 | | | |
| NO. OF PIPES 17 | | PIPES | | W-320, TANK 241-C-106 SLUICING | |
| APPROVED FOR SUBMITTATION | | F 241-A-1 | | H-2-818560 | |
| APPROVED DATE | | NONE | | ER-4319 | |

MATCHLINE - FOR CONTINUATION SEE SH 6



SAFETY CLASS 1E, DIV A

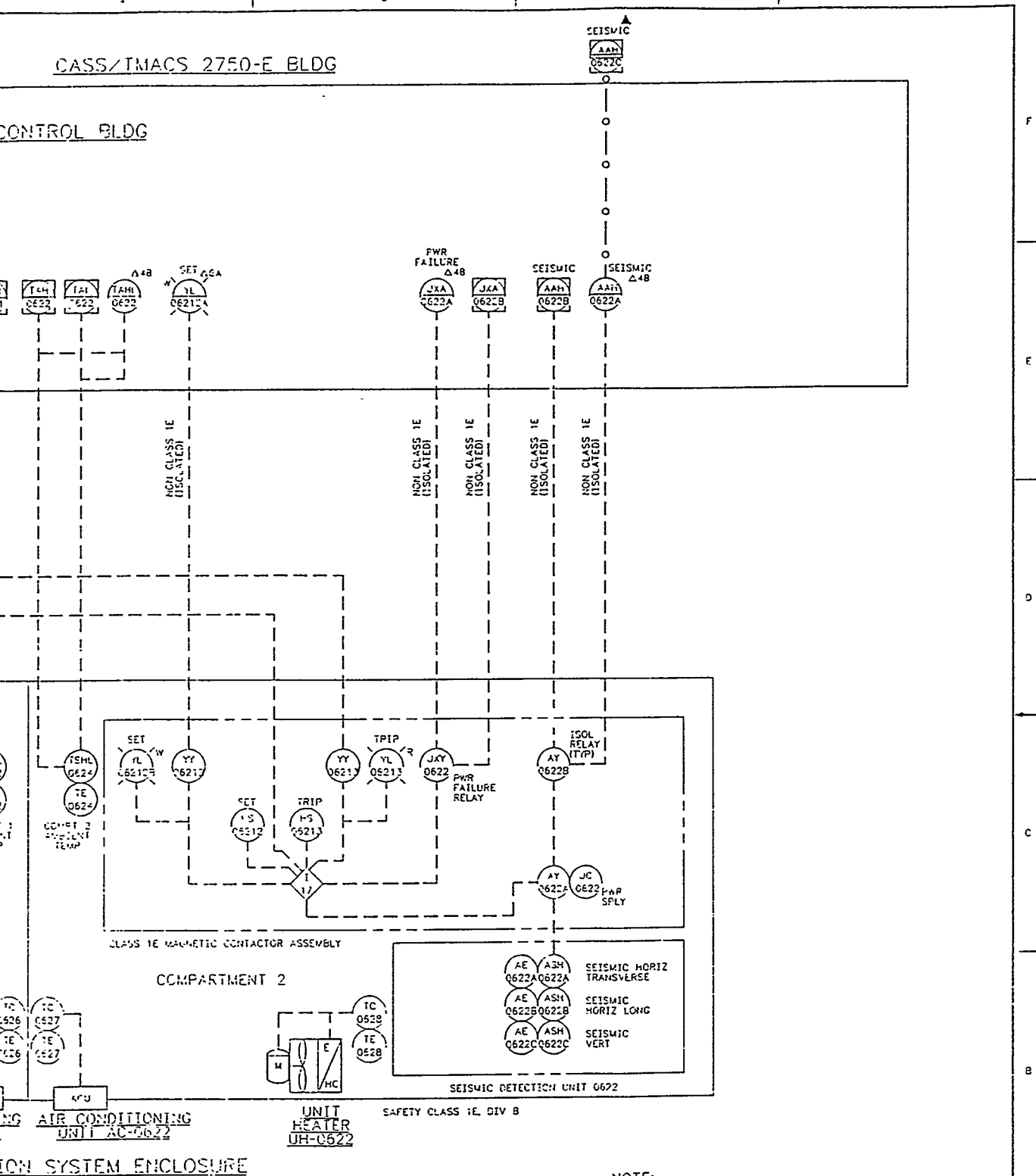
UNIT HEATER
UH-0621

AIR CONDITI
UNIT AC-0

SEISMIC DETEC

| | | | |
|------|------|------|--|
| SH 4 | SH 5 | SH 6 | |
| SH 1 | SH 2 | SH 3 | |

CONTROL BLDG

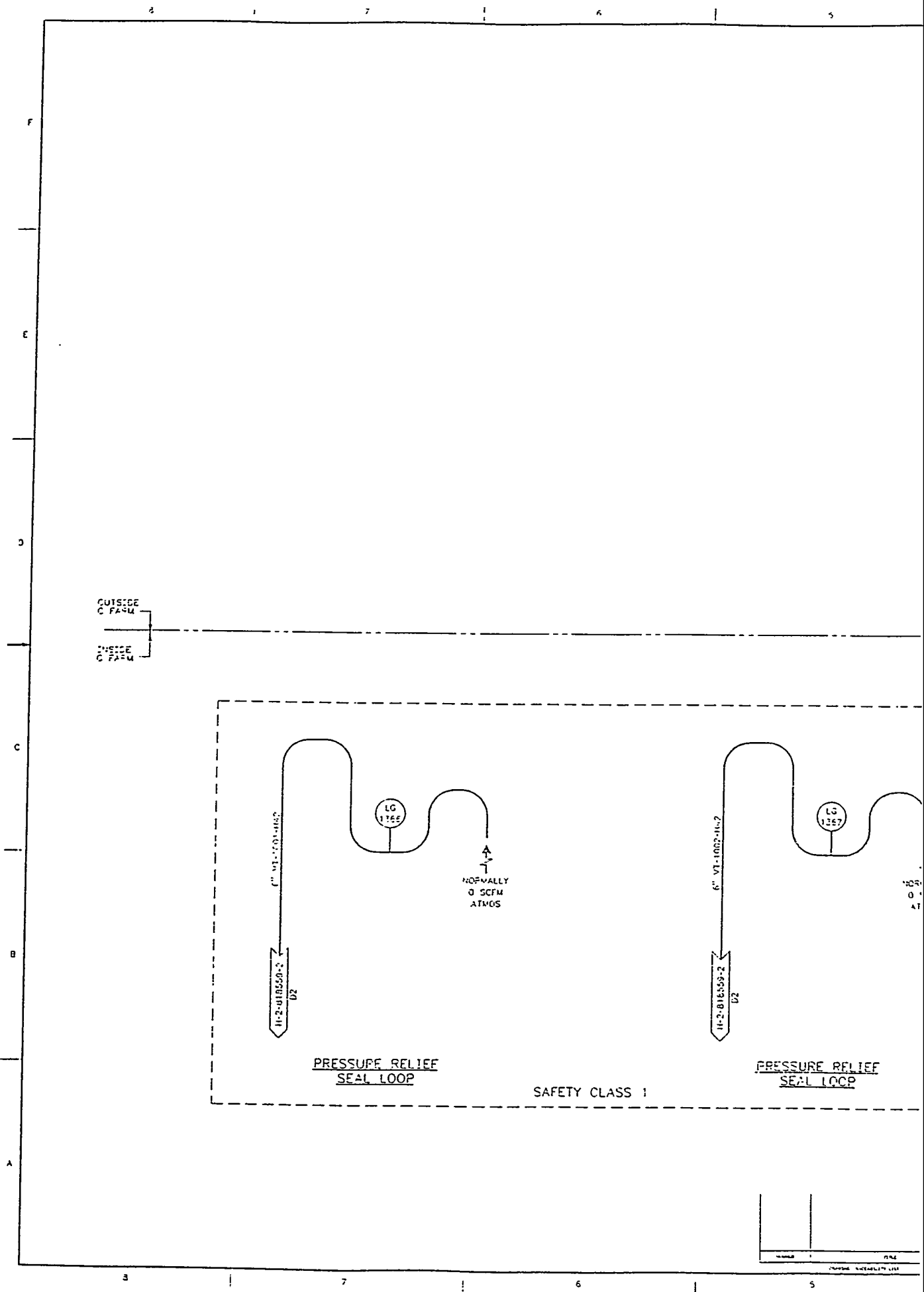


NOTE:

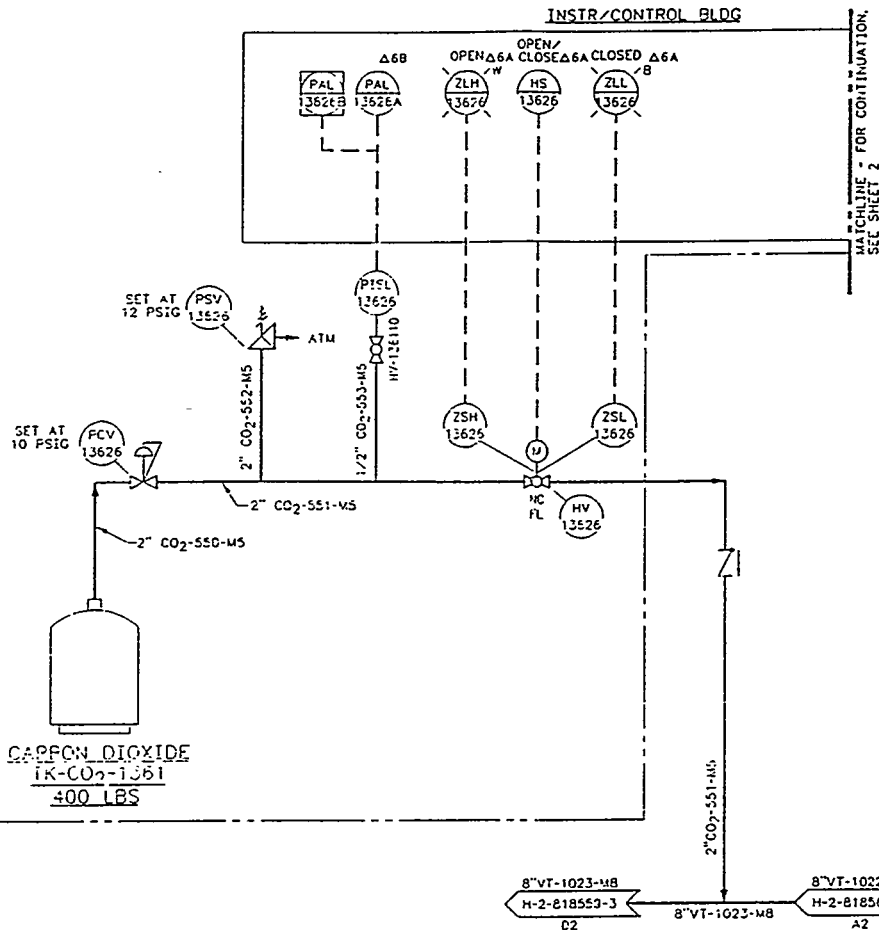
FOR NOTES SEE SHEET 1.

H.K. CHOUDHRY, P.E.

| | | | | | |
|-----------------------|--|----------------------------|---------|------|-------------------------|
| PLANE B3 MEYER sr | | DATE | 1 | DATE | PRELIMINARY |
| FROM BOMB | | U.S. DEPARTMENT OF ENERGY | | | |
| TO BOMB | | RICHLAND OPERATIONS OFFICE | | | |
| SUBJECT | | ICP KAISER HANFORD COMPANY | | | |
| ACTION | | PROJECT W-320 | | | |
| INFO | | P & ID | | | |
| FROM BOMB | | TANK 241-AY-102 | | | |
| TO BOMB | | TANK 241-C-106 SLUICING | | | |
| REVIEW NO. | | 25 | PROJECT | W320 | TANK 241-C-106 SLUICING |
| APPROVED FOR DISPATCH | | DATE | 7-21-AY | 7004 | H-2-818560 |
| BY | | NAME | NONE | | |
| DATE | | DATE | ER4319 | DATE | 7 of 7 |



INSTR/CONTROL BLDG

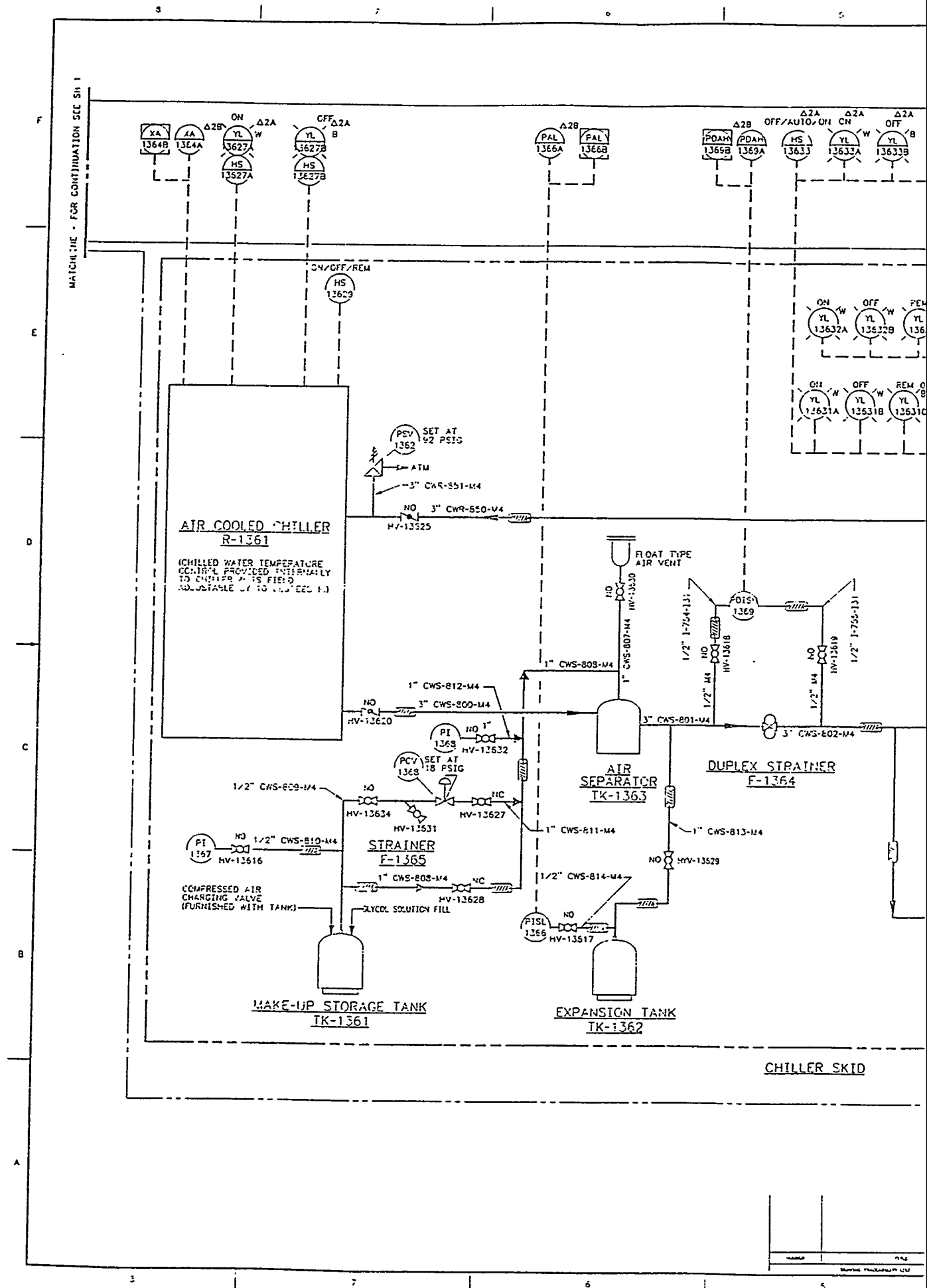


NOTES:

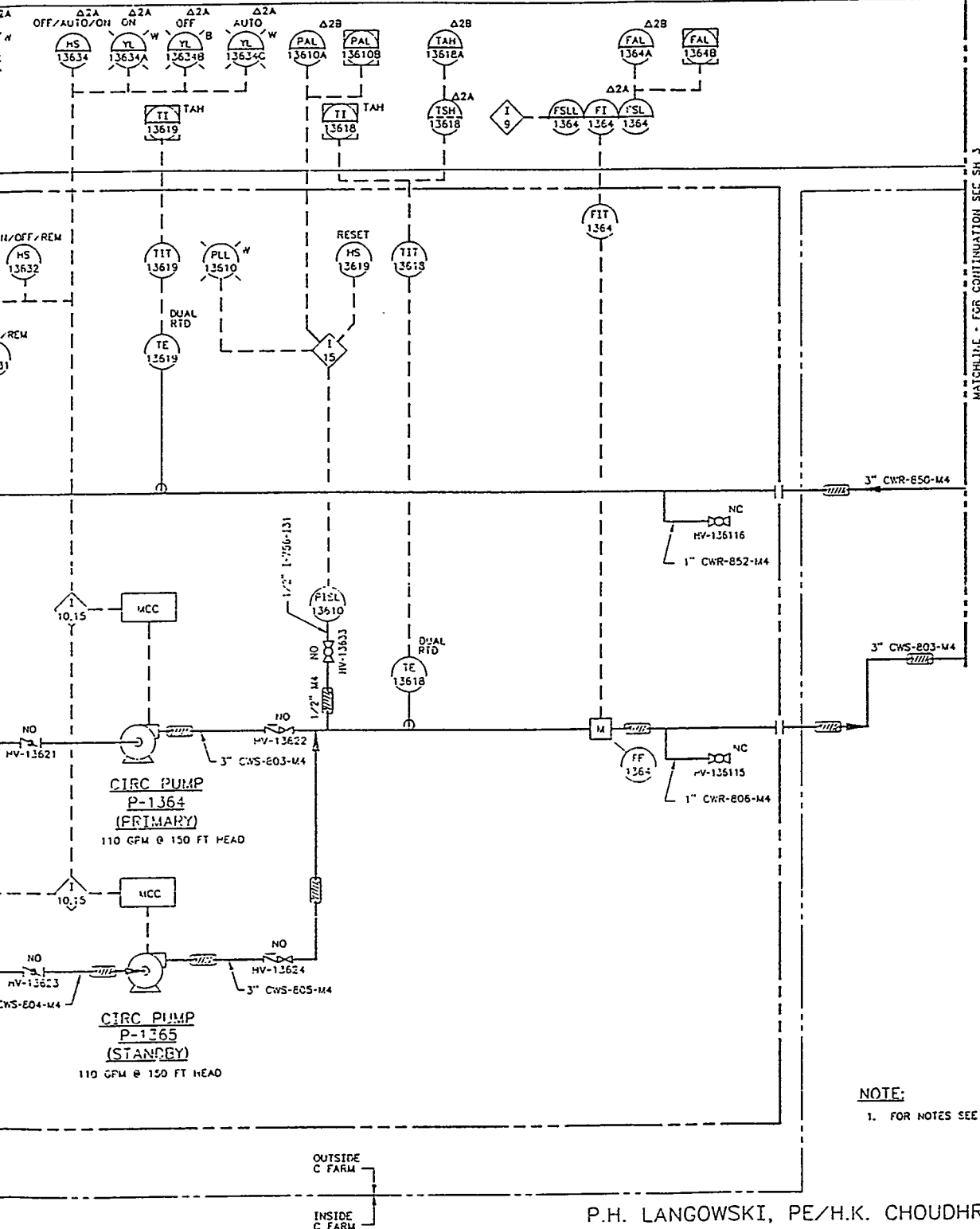
1. FOR GENERAL NOTES, LEGENDS, INSTR DETAILS & EQUIPMENT IDENTIFICATION SEE DWG H-2-81855S, SM 1 THRU 3.
2. FOR INTERLOCK SCHEDULE SEE DWG H-2-81855S, SM 4.
3. THE HEATING COILS HC-1361 AND HC-1362 ARE EQUIPPED WITH (1) AN INTERNAL LOW FLOW SWITCH, (2) HIGH-HIGH TEMPERATURE CUTOFF SWITCH, AND A MANUAL CUTOFF SWITCH.
4. LOCATE THESE DEVICES AS CLOSE AS POSSIBLE TO THE SAMPLE INLET.

P.H. LANGOWSKI, PE/H.K. CHOUDHRY, PE

[illegible]



STR/CONTROL BLDG



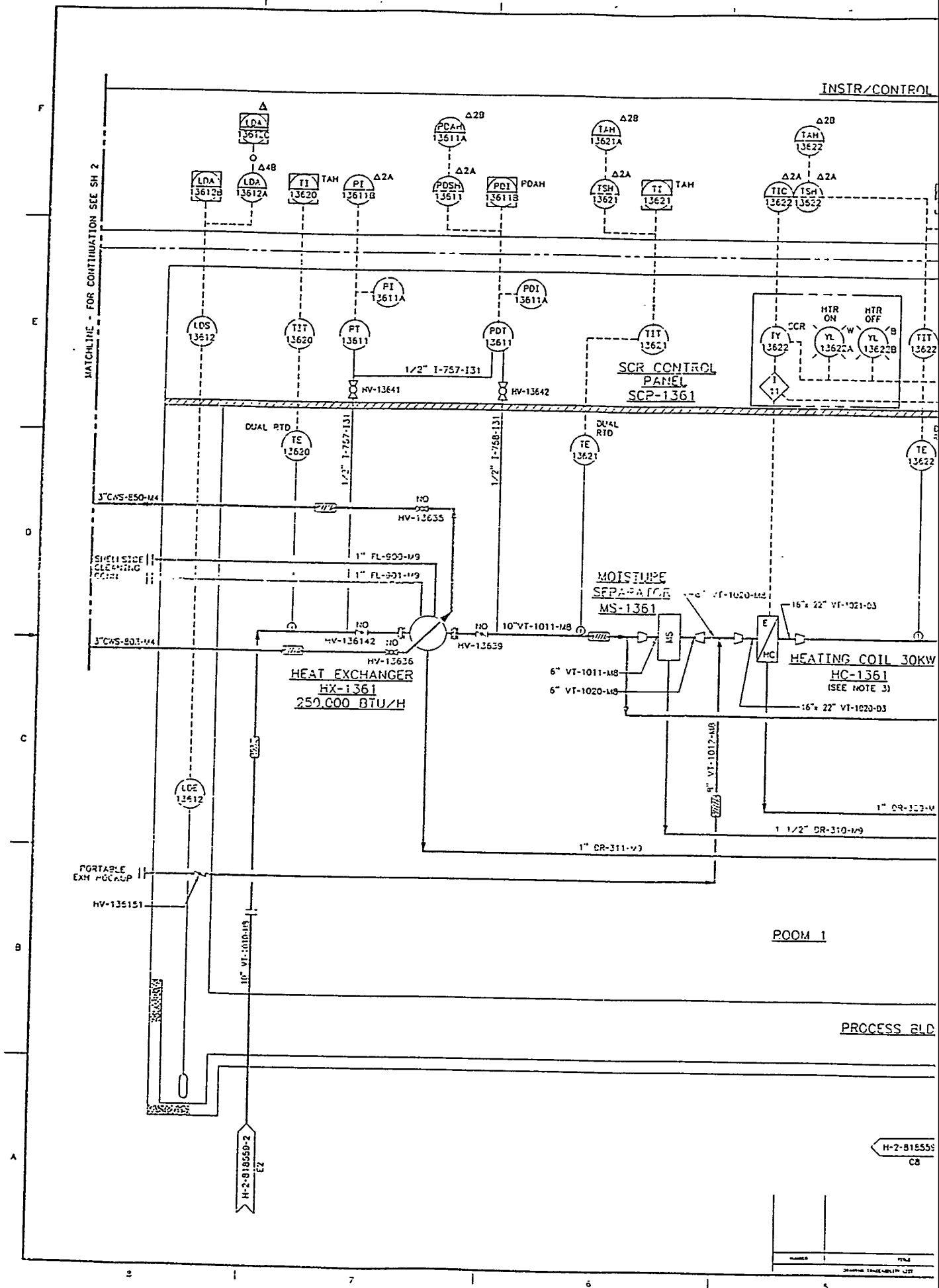
MATCHLINE - FOR CONTINUATION SEE SH 3

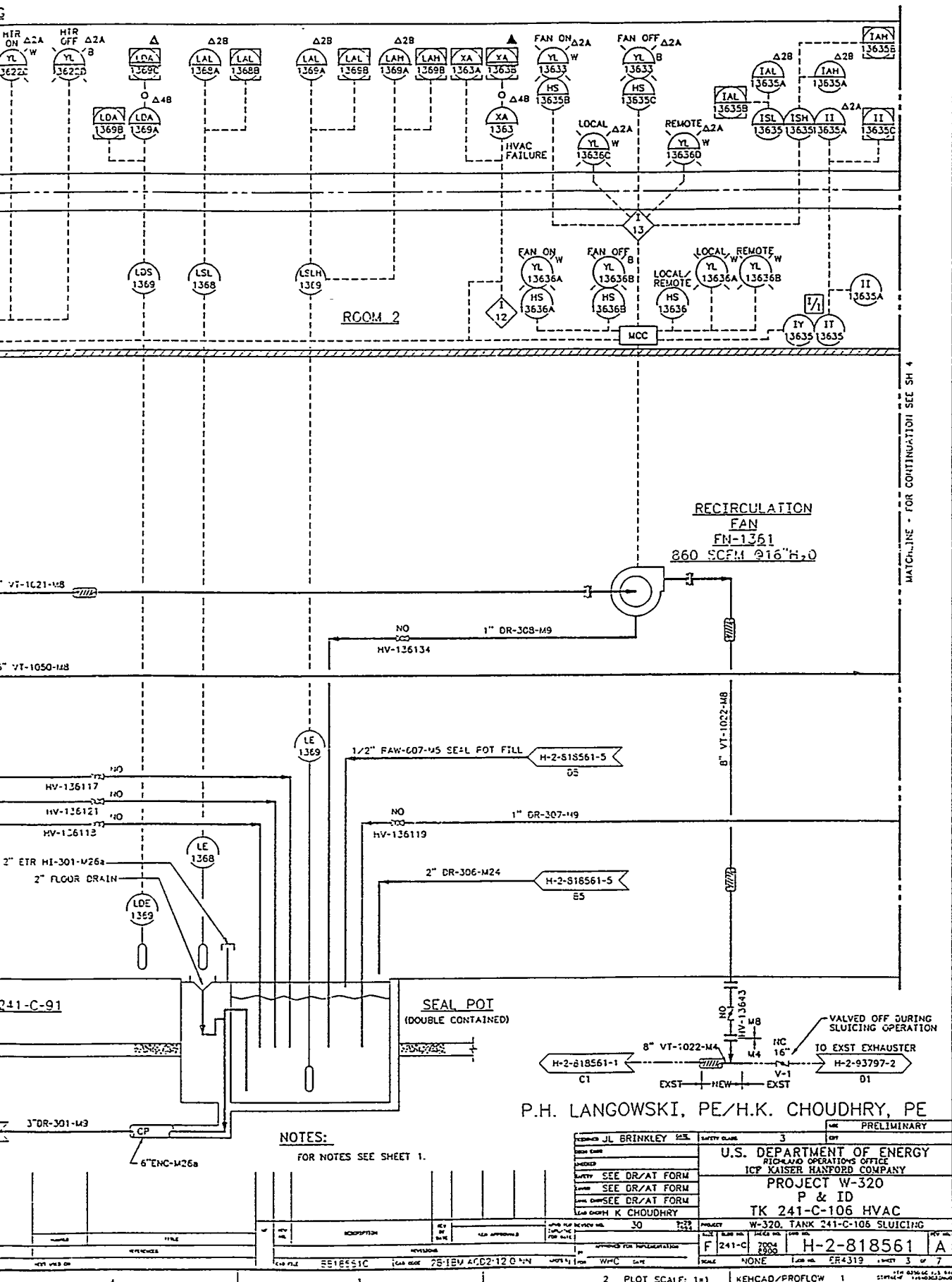
NOTE:
1. FOR NOTES SEE SHEET 1.

P.H. LANGOWSKI, PE/H.K. CHOUDHRY, PE

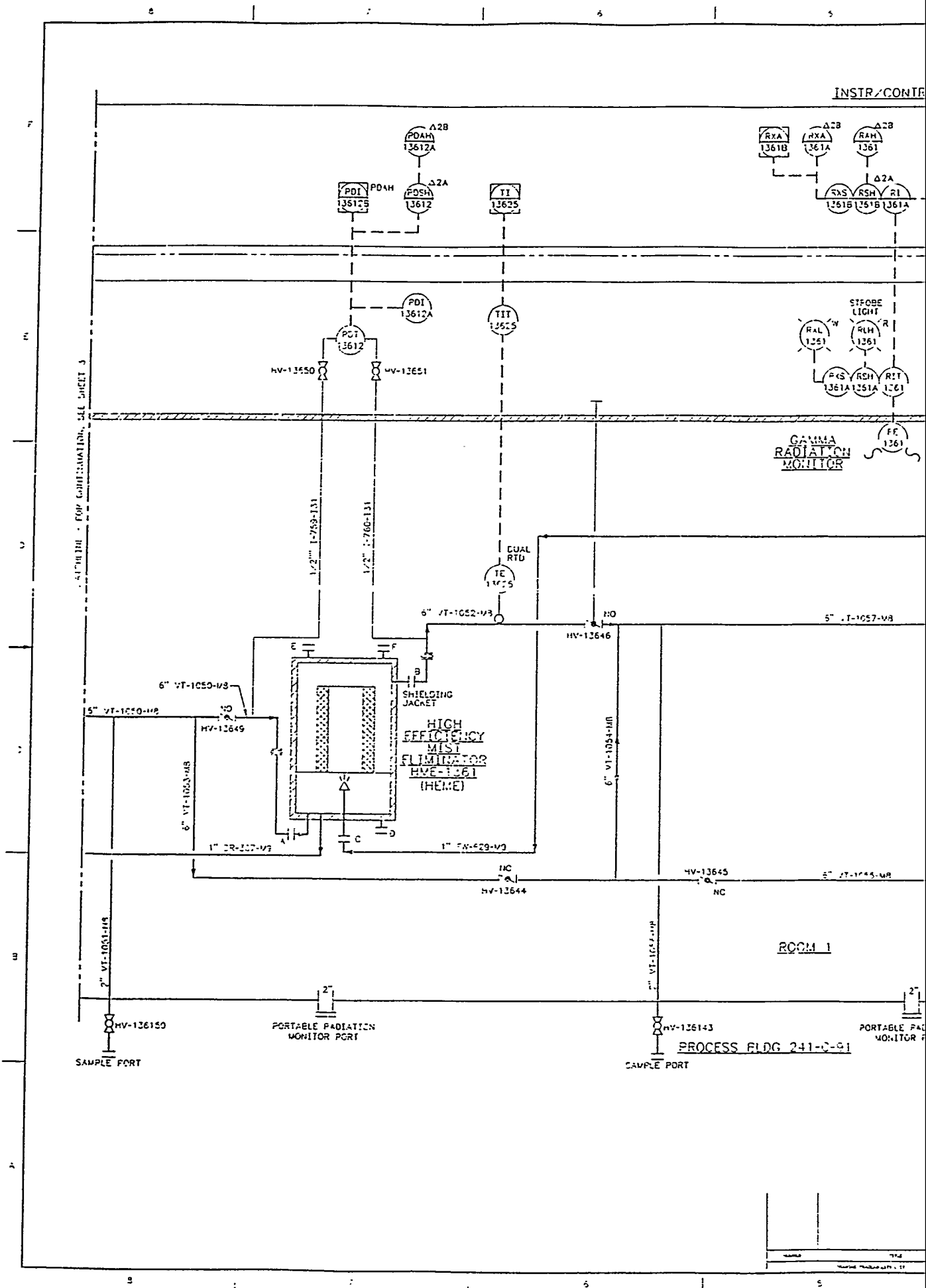
| | | | |
|--|--|---|--|
| DESIGNED BY: J.L. BRINKLEY
CHECKED BY: []
DATE: [] | | U.S. DEPARTMENT OF ENERGY
RICHMOND OPERATIONS OFFICE
ICP KAISER HANFORD COMPANY
PROJECT W-320
P & ID
TK 241-C-106 HVAC | |
| DRAWN BY: []
DATE: [] | | PROJECT: W-320, TANK 241-C-106 SLUICING
SHEET NO. 2 OF 7
H-2-818561 | |
| REVISIONS: []
DATE: [] | | PLOT SCALE: 1"=1'
KEHCAD/PROFLGW | |

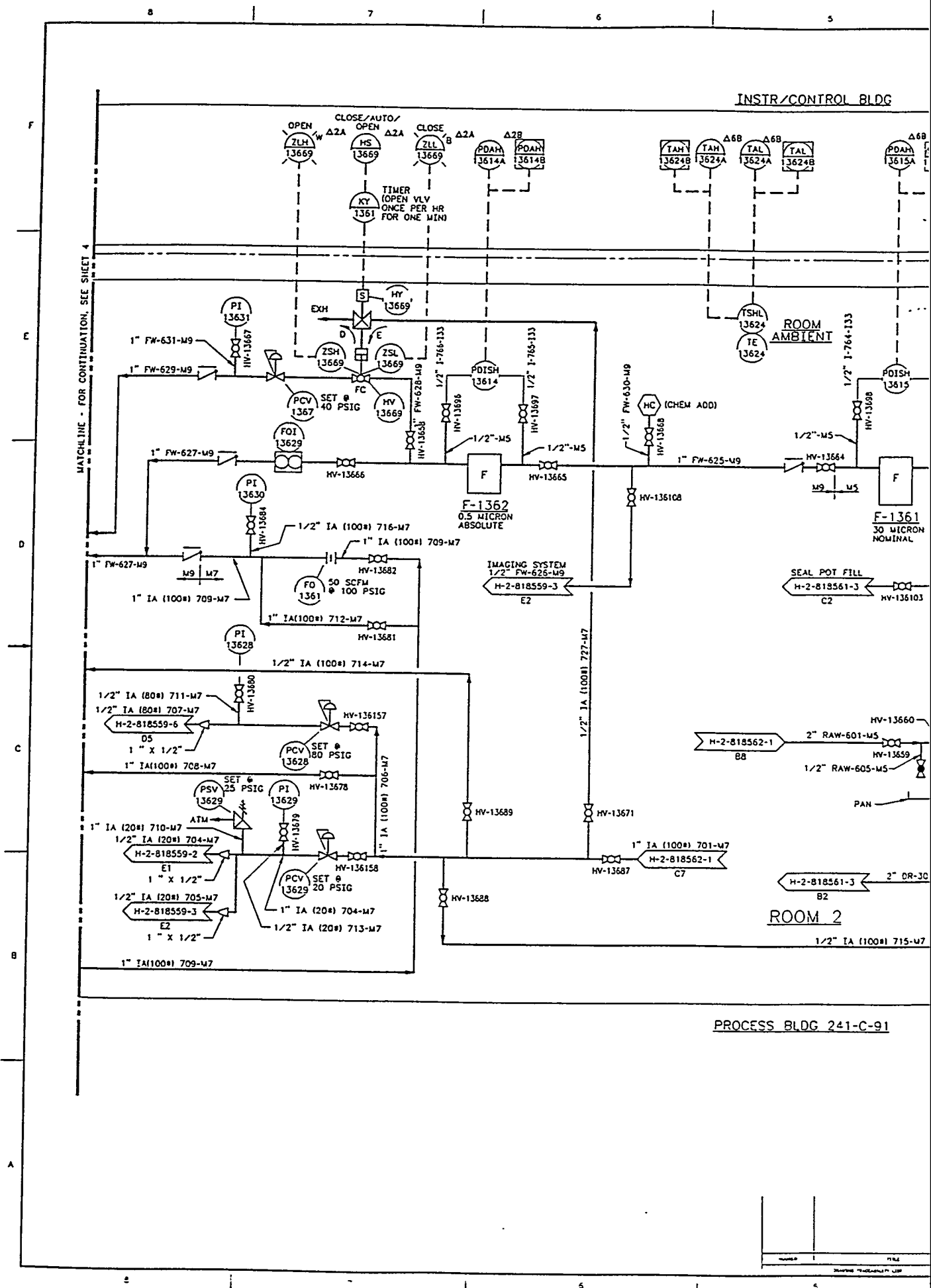
H-55/56

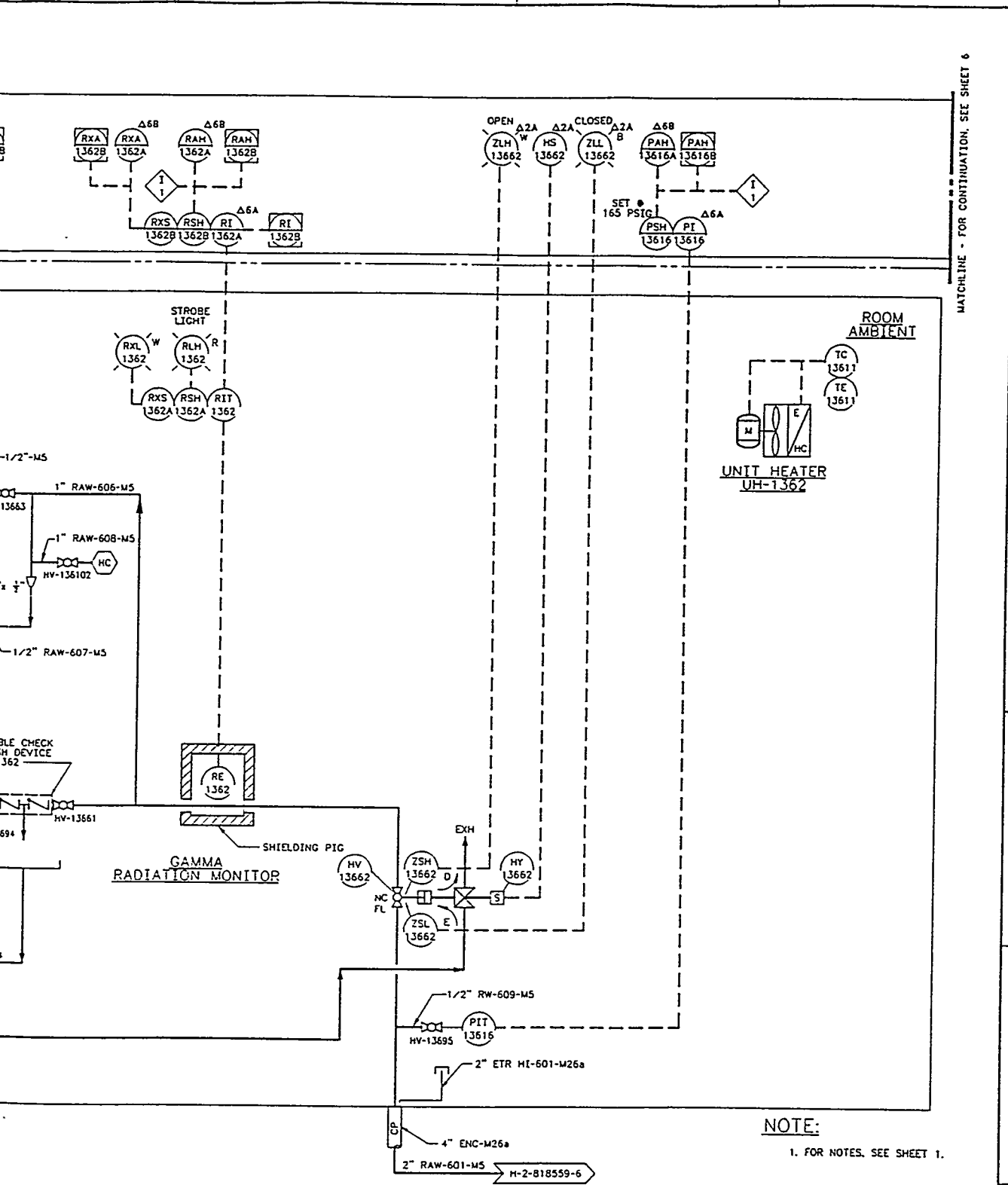




H-57/58







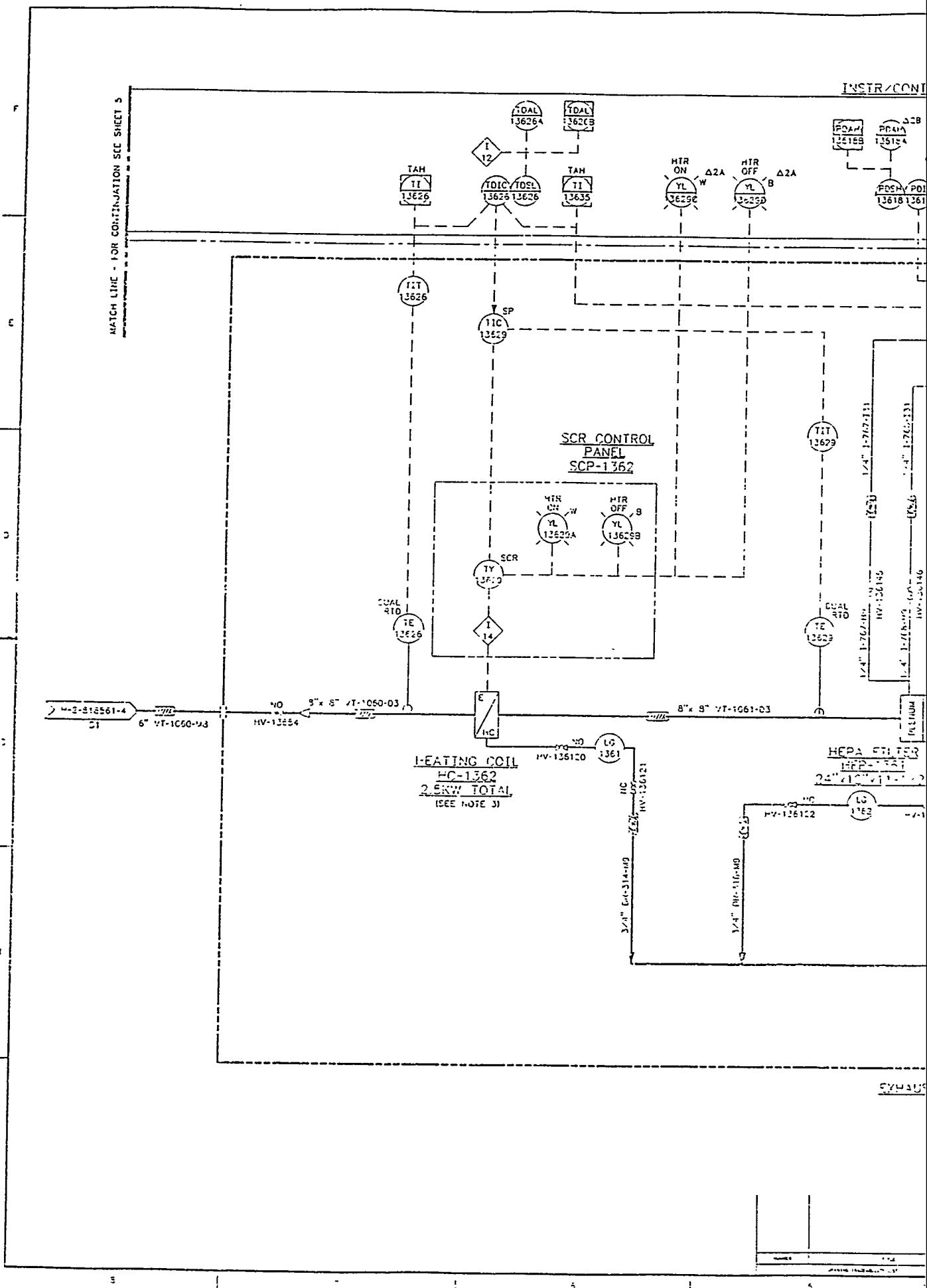
NOTE:

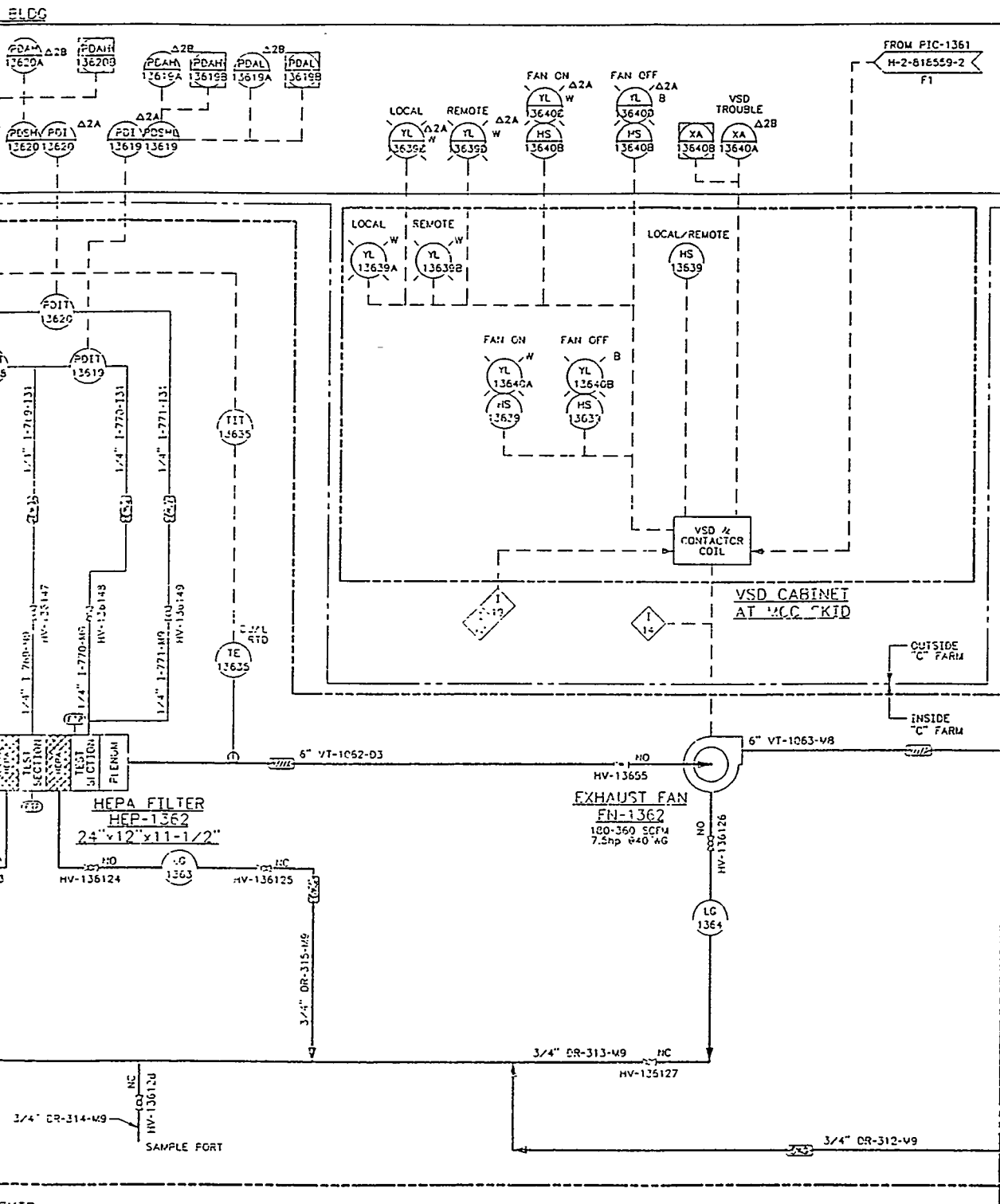
1. FOR NOTES, SEE SHEET 1.

C.D. JONES, PE/H.K. CHOUDHRY, PE

| | | | |
|---|--|--|--|
| DESIGNED BY: J.L. BRINKLEY
CHECKED BY: SEE DR/AT FORM
DATE: SEE DR/AT FORM
DRAWN BY: K. CHOUDHRY | | PROJECT: W-320, TANK 241-C-106 SLUTTING
SHEET: 5 OF 7
H-2-818561 | |
| U.S. DEPARTMENT OF ENERGY
RICHMOND OPERATIONS OFFICE
ICF KAISER HANFORD COMPANY | | PRELIMINARY | |

H-61/62





HATCH LINE - FOR CONTINUATION SEE SHEET 7

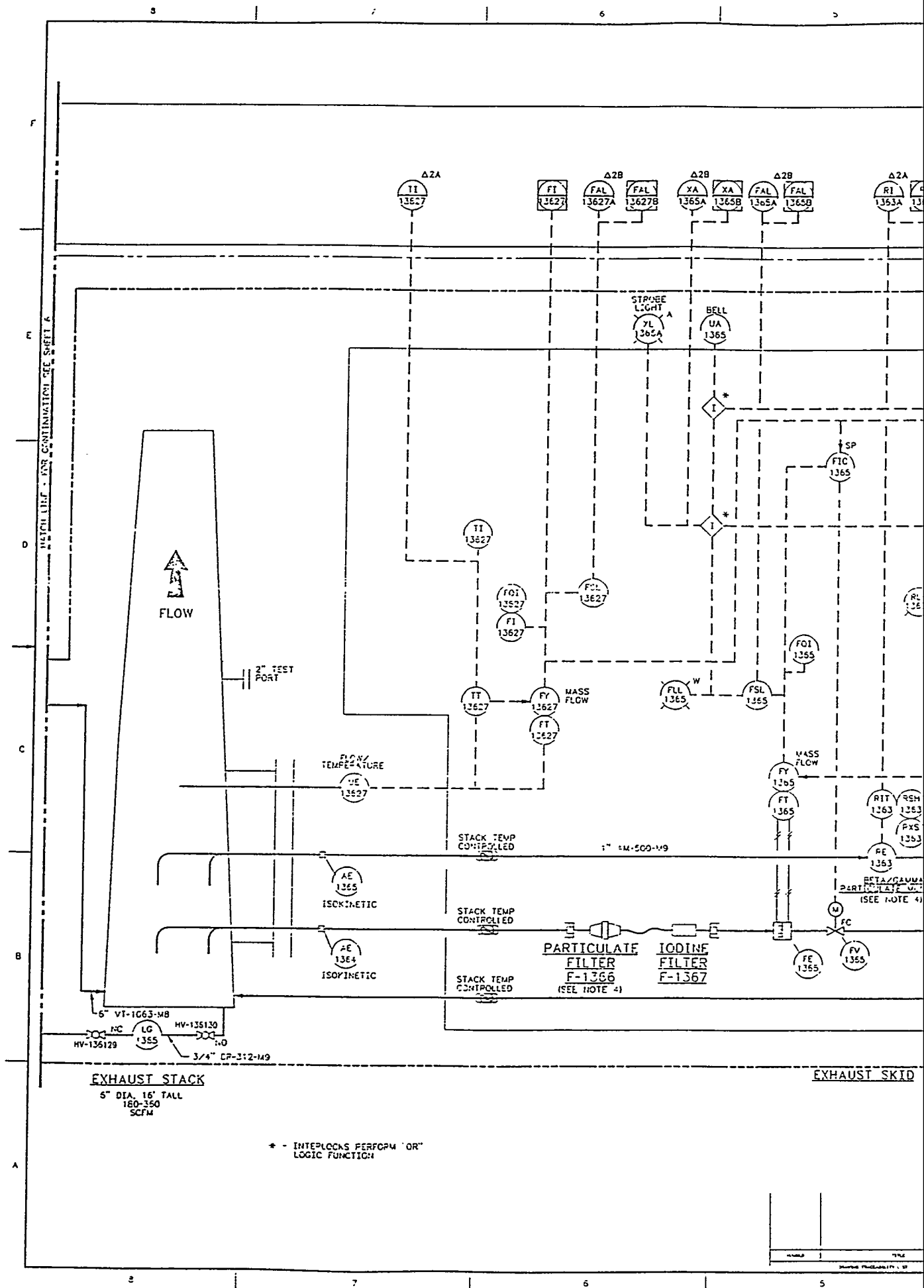
NOTES:

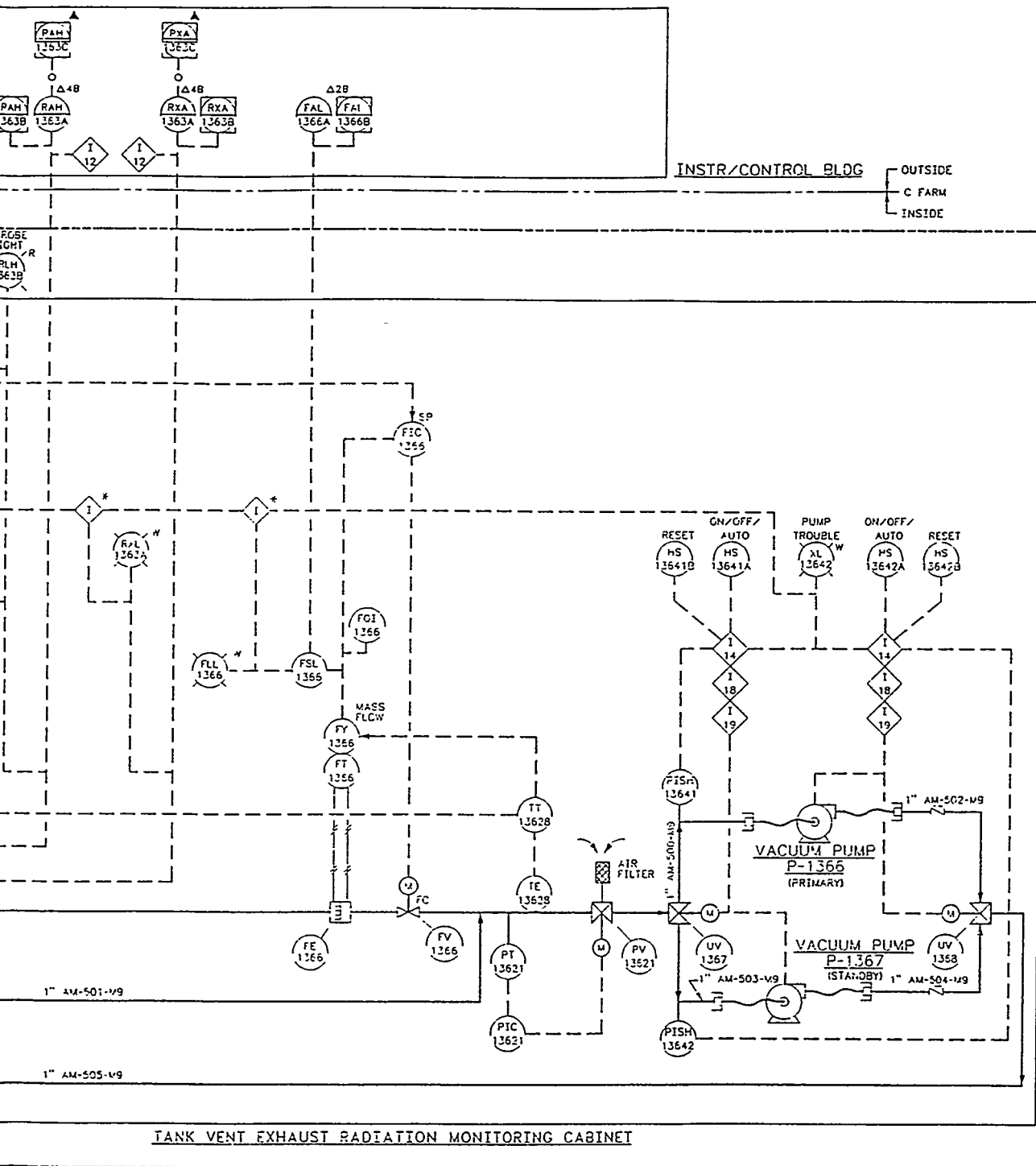
1. FOR NOTES SEE SHEET 1.

P.H. LANGOWSKI, PE/H.K. CHOUDHRY, PE

SKID

| | | | | | | | |
|------------------------------|--|--|--|------------------|--|---|--|
| DESIGNED BY
J.L. BRINKLEY | | CHECKED BY
SEE DR/AT FORM | | DATE
25 | | PROJECT
W-320, TANK 251-C-106 SLUICING | |
| SAFETY
SEE DR/AT FORM | | APPROVED FOR CONSTRUCTION
H.K. CHOUDHRY | | DATE
12/25/84 | | SHEET
6 OF 7 | |
| TITLE
HVAC | | DESCRIPTION
HVAC | | REVISION
1.0 | | DRAWN BY
J.L. BRINKLEY | |
| SCALE
1" = 1'-0" | | PLOT SCALE
1" = 1'-0" | | KENCAD/PROF. CO. | | H-63/64 | |





NOTES:

1. FOR NOTES SEE SH 1.

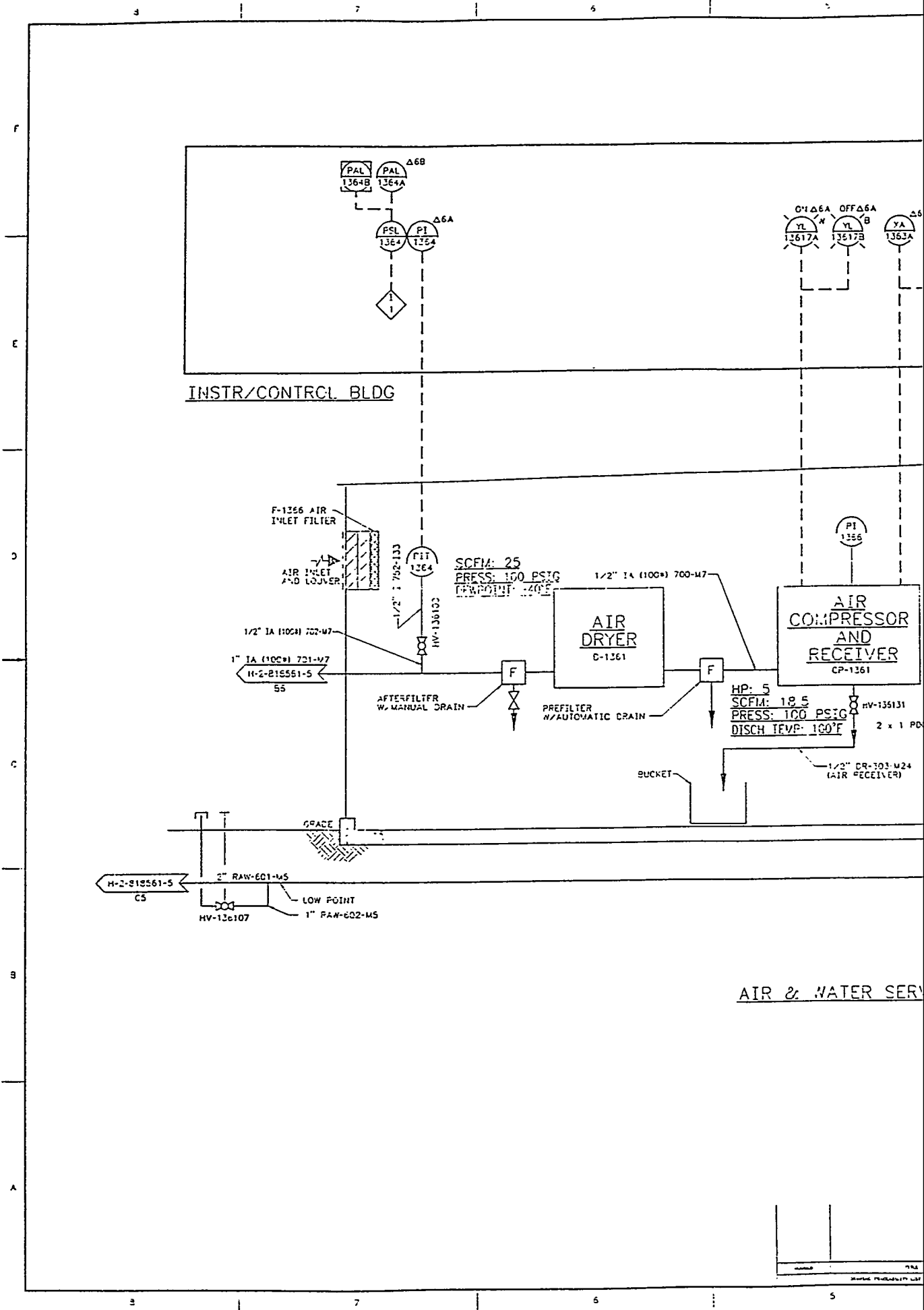
H.K. CHOUDHRY, PE

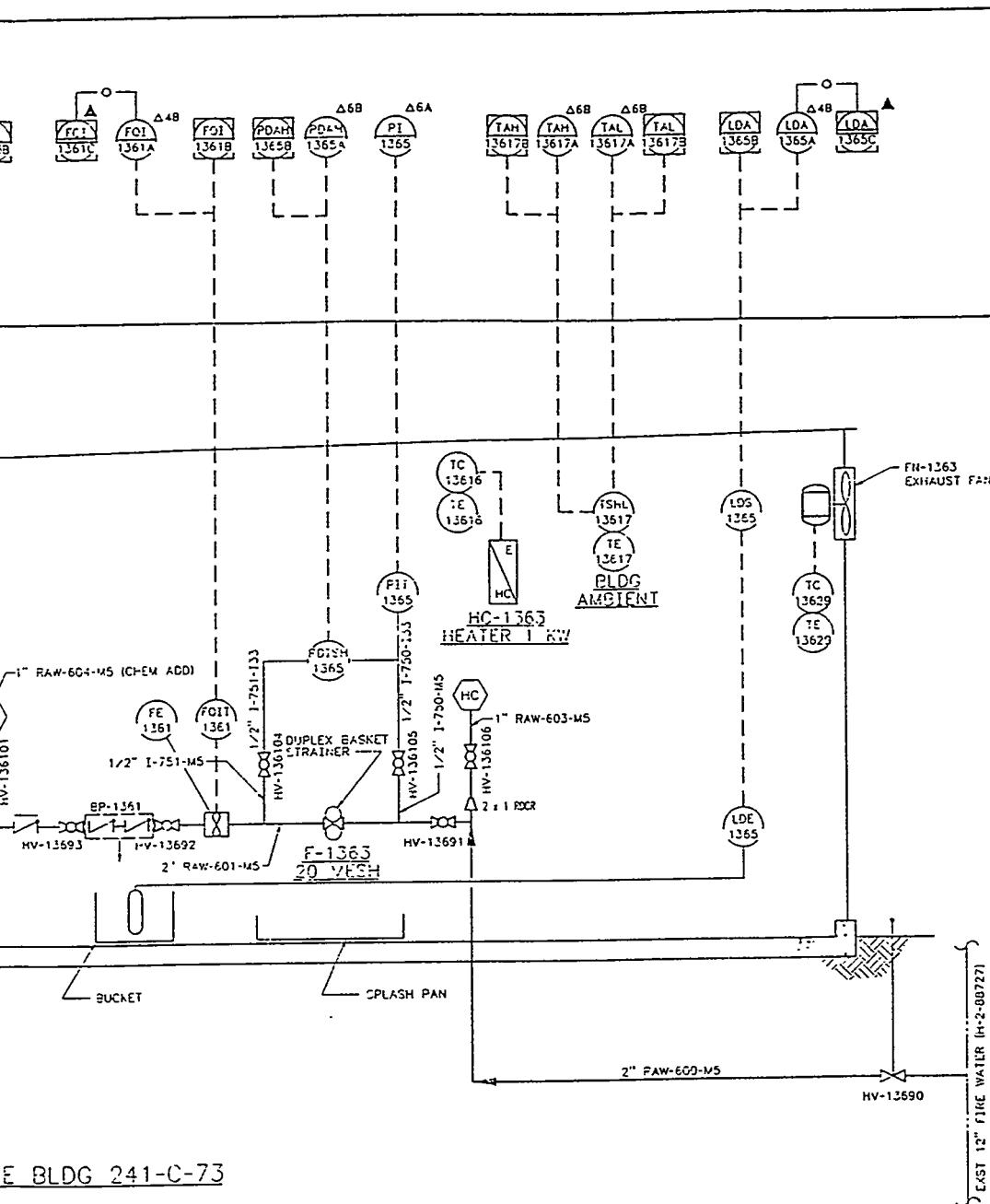
| | | | | | |
|---------------------------|--|----------------|--|---|--|
| DESIGNED BY J.L. BRINKLEY | | SAFETY CLASS 3 | | REV PRELIMINARY | |
| CHECKED BY | | DATE | | U.S. DEPARTMENT OF ENERGY | |
| DRAWN BY | | DATE | | RICHMOND OPERATIONS OFFICE | |
| SURVEY SEE DR/AT FORM | | DATE | | ICF KAISER HANFORD COMPANY | |
| DIMENSIONS SEE CR/AT FORM | | DATE | | PROJECT W-320 | |
| EQUIPMENT SEE CR/AT FORM | | DATE | | P & ID | |
| DRAWN BY K. CHOUDHRY | | DATE | | TK 241-C-106 HVAC | |
| REVISIONS | | DATE | | PROJECT W-320, TANK 241-C-106 SLUICINGS | |
| REV 1 | | DATE | | SIZE 11x17 | |
| REV 2 | | DATE | | F 241-C | |
| REV 3 | | DATE | | H-2-818561 | |
| REV 4 | | DATE | | A | |
| REV 5 | | DATE | | SCALE NONE | |
| REV 6 | | DATE | | JOB NO. E24139 | |
| REV 7 | | DATE | | SHEET 7 OF 7 | |
| REV 8 | | DATE | | TYPED BY | |
| REV 9 | | DATE | | DATE 02-01-81 | |
| REV 10 | | DATE | | TYPED BY | |

2 PLOT SCALE: 1=1

KENCAD/PROFLOW 1

H-65/66



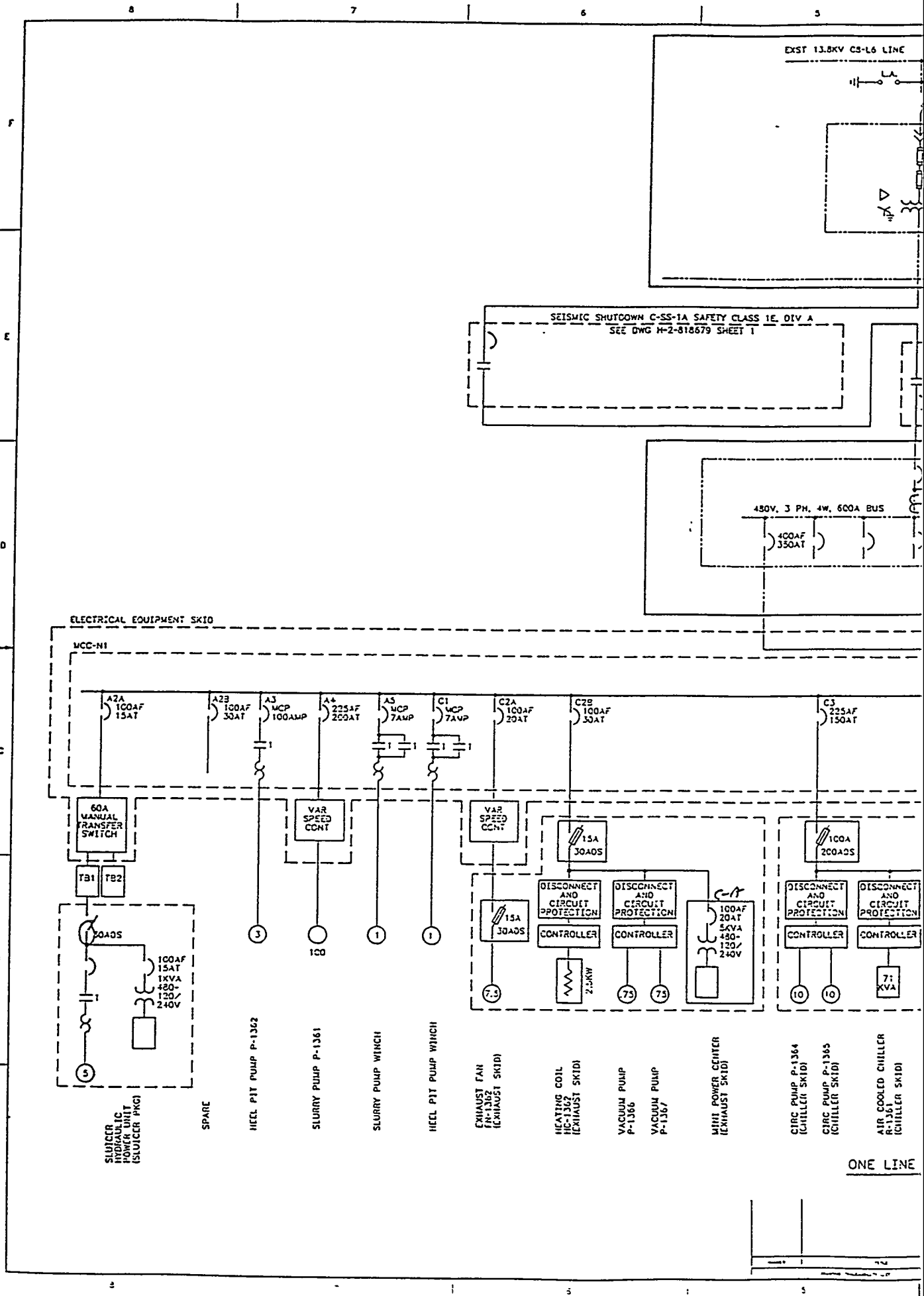


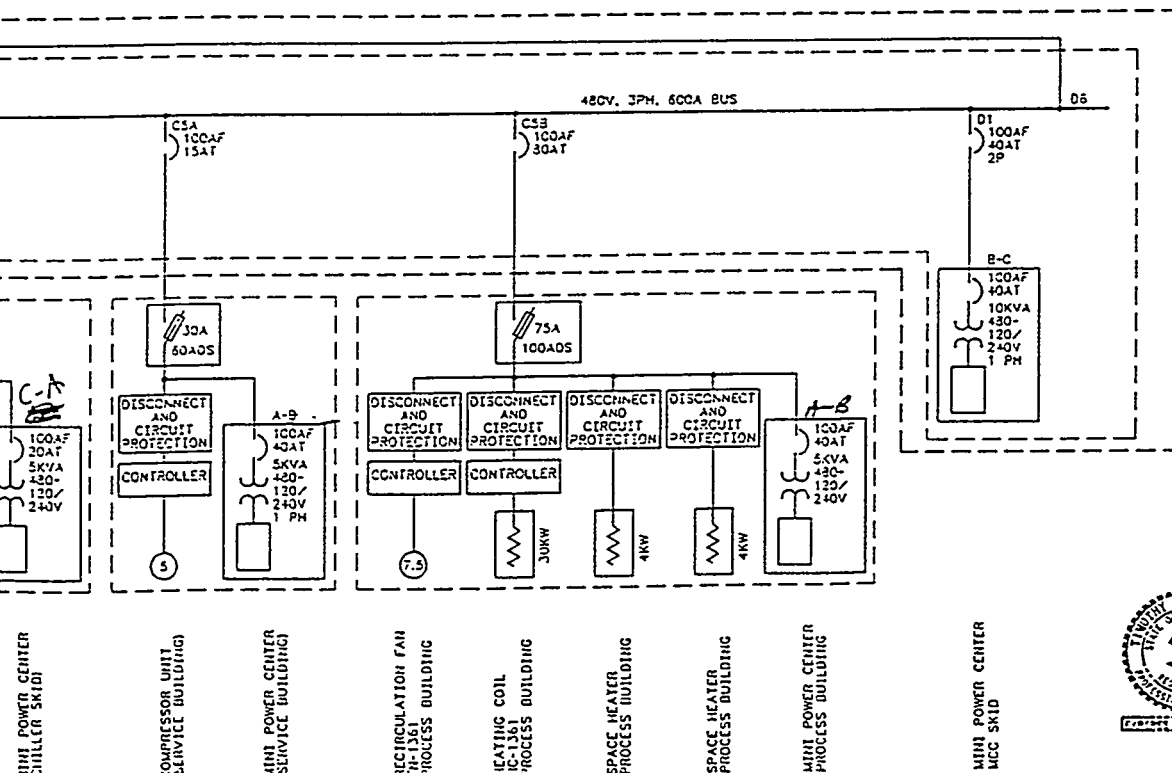
NOTES:

1. FOR LEGENDS, EQUIPMENT IDENTIFICATION AND DETAILS, SEE DRAWING H-2-518558 SH 1 THRU 3.
2. FOR INTERLOCK SCHEDULE, SEE H-2-818558, SH 4.

C.D. JONES, PE/H.K. CHOUDHRY, PE

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------|--|----------|--|-----------|--|------------------|--|------------|--|-----------|--|------------------|--|---------------|--|-----------|--|------------------|--|------------|--|-----------|--|------------------|--|
| H-2-518558 DRAWING LIST | | REV. NO. | | REV. DATE | | REV. DESCRIPTION | | REV. BY | | REV. DATE | | REV. DESCRIPTION | | REV. BY | | REV. DATE | | REV. DESCRIPTION | | REV. BY | | REV. DATE | | REV. DESCRIPTION | |
| H-2-518558 | | 1 | | 11-11-73 | | 1 | | C.D. JONES | | 11-11-73 | | 1 | | H.K. CHOUDHRY | | 11-11-73 | | 1 | | C.D. JONES | | 11-11-73 | | 1 | |
| H-2-518558 | | 2 | | 11-11-73 | | 2 | | C.D. JONES | | 11-11-73 | | 2 | | H.K. CHOUDHRY | | 11-11-73 | | 2 | | C.D. JONES | | 11-11-73 | | 2 | |
| H-2-518558 | | 3 | | 11-11-73 | | 3 | | C.D. JONES | | 11-11-73 | | 3 | | H.K. CHOUDHRY | | 11-11-73 | | 3 | | C.D. JONES | | 11-11-73 | | 3 | |
| H-2-518558 | | 4 | | 11-11-73 | | 4 | | C.D. JONES | | 11-11-73 | | 4 | | H.K. CHOUDHRY | | 11-11-73 | | 4 | | C.D. JONES | | 11-11-73 | | 4 | |
| H-2-518558 | | 5 | | 11-11-73 | | 5 | | C.D. JONES | | 11-11-73 | | 5 | | H.K. CHOUDHRY | | 11-11-73 | | 5 | | C.D. JONES | | 11-11-73 | | 5 | |
| H-2-518558 | | 6 | | 11-11-73 | | 6 | | C.D. JONES | | 11-11-73 | | 6 | | H.K. CHOUDHRY | | 11-11-73 | | 6 | | C.D. JONES | | 11-11-73 | | 6 | |
| H-2-518558 | | 7 | | 11-11-73 | | 7 | | C.D. JONES | | 11-11-73 | | 7 | | H.K. CHOUDHRY | | 11-11-73 | | 7 | | C.D. JONES | | 11-11-73 | | 7 | |
| H-2-518558 | | 8 | | 11-11-73 | | 8 | | C.D. JONES | | 11-11-73 | | 8 | | H.K. CHOUDHRY | | 11-11-73 | | 8 | | C.D. JONES | | 11-11-73 | | 8 | |
| H-2-518558 | | 9 | | 11-11-73 | | 9 | | C.D. JONES | | 11-11-73 | | 9 | | H.K. CHOUDHRY | | 11-11-73 | | 9 | | C.D. JONES | | 11-11-73 | | 9 | |
| H-2-518558 | | 10 | | 11-11-73 | | 10 | | C.D. JONES | | 11-11-73 | | 10 | | H.K. CHOUDHRY | | 11-11-73 | | 10 | | C.D. JONES | | 11-11-73 | | 10 | |
| H-2-518558 | | 11 | | 11-11-73 | | 11 | | C.D. JONES | | 11-11-73 | | 11 | | H.K. CHOUDHRY | | 11-11-73 | | 11 | | C.D. JONES | | 11-11-73 | | 11 | |
| H-2-518558 | | 12 | | 11-11-73 | | 12 | | C.D. JONES | | 11-11-73 | | 12 | | H.K. CHOUDHRY | | 11-11-73 | | 12 | | C.D. JONES | | 11-11-73 | | 12 | |
| H-2-518558 | | 13 | | 11-11-73 | | 13 | | C.D. JONES | | 11-11-73 | | 13 | | H.K. CHOUDHRY | | 11-11-73 | | 13 | | C.D. JONES | | 11-11-73 | | 13 | |
| H-2-518558 | | 14 | | 11-11-73 | | 14 | | C.D. JONES | | 11-11-73 | | 14 | | H.K. CHOUDHRY | | 11-11-73 | | 14 | | C.D. JONES | | 11-11-73 | | 14 | |
| H-2-518558 | | 15 | | 11-11-73 | | 15 | | C.D. JONES | | 11-11-73 | | 15 | | H.K. CHOUDHRY | | 11-11-73 | | 15 | | C.D. JONES | | 11-11-73 | | 15 | |
| H-2-518558 | | 16 | | 11-11-73 | | 16 | | C.D. JONES | | 11-11-73 | | 16 | | H.K. CHOUDHRY | | 11-11-73 | | 16 | | C.D. JONES | | 11-11-73 | | 16 | |
| H-2-518558 | | 17 | | 11-11-73 | | 17 | | C.D. JONES | | 11-11-73 | | 17 | | H.K. CHOUDHRY | | 11-11-73 | | 17 | | C.D. JONES | | 11-11-73 | | 17 | |
| H-2-518558 | | 18 | | 11-11-73 | | 18 | | C.D. JONES | | 11-11-73 | | 18 | | H.K. CHOUDHRY | | 11-11-73 | | 18 | | C.D. JONES | | 11-11-73 | | 18 | |
| H-2-518558 | | 19 | | 11-11-73 | | 19 | | C.D. JONES | | 11-11-73 | | 19 | | H.K. CHOUDHRY | | 11-11-73 | | 19 | | C.D. JONES | | 11-11-73 | | 19 | |
| H-2-518558 | | 20 | | 11-11-73 | | 20 | | C.D. JONES | | 11-11-73 | | 20 | | H.K. CHOUDHRY | | 11-11-73 | | 20 | | C.D. JONES | | 11-11-73 | | 20 | |
| H-2-518558 | | 21 | | 11-11-73 | | 21 | | C.D. JONES | | 11-11-73 | | 21 | | H.K. CHOUDHRY | | 11-11-73 | | 21 | | C.D. JONES | | 11-11-73 | | 21 | |
| H-2-518558 | | 22 | | 11-11-73 | | 22 | | C.D. JONES | | 11-11-73 | | 22 | | H.K. CHOUDHRY | | 11-11-73 | | 22 | | C.D. JONES | | 11-11-73 | | 22 | |
| H-2-518558 | | 23 | | 11-11-73 | | 23 | | C.D. JONES | | 11-11-73 | | 23 | | H.K. CHOUDHRY | | 11-11-73 | | 23 | | C.D. JONES | | 11-11-73 | | 23 | |
| H-2-518558 | | 24 | | 11-11-73 | | 24 | | C.D. JONES | | 11-11-73 | | 24 | | H.K. CHOUDHRY | | 11-11-73 | | 24 | | C.D. JONES | | 11-11-73 | | 24 | |
| H-2-518558 | | 25 | | 11-11-73 | | 25 | | C.D. JONES | | 11-11-73 | | 25 | | H.K. CHOUDHRY | | 11-11-73 | | 25 | | C.D. JONES | | 11-11-73 | | 25 | |
| H-2-518558 | | 26 | | 11-11-73 | | 26 | | C.D. JONES | | 11-11-73 | | 26 | | H.K. CHOUDHRY | | 11-11-73 | | 26 | | C.D. JONES | | 11-11-73 | | 26 | |
| H-2-518558 | | 27 | | 11-11-73 | | 27 | | C.D. JONES | | 11-11-73 | | 27 | | H.K. CHOUDHRY | | 11-11-73 | | 27 | | C.D. JONES | | 11-11-73 | | 27 | |
| H-2-518558 | | 28 | | 11-11-73 | | 28 | | C.D. JONES | | 11-11-73 | | 28 | | H.K. CHOUDHRY | | 11-11-73 | | 28 | | C.D. JONES | | 11-11-73 | | 28 | |
| H-2-518558 | | 29 | | 11-11-73 | | 29 | | C.D. JONES | | 11-11-73 | | 29 | | H.K. CHOUDHRY | | 11-11-73 | | 29 | | C.D. JONES | | 11-11-73 | | 29 | |
| H-2-518558 | | 30 | | 11-11-73 | | 30 | | C.D. JONES | | 11-11-73 | | 30 | | H.K. CHOUDHRY | | 11-11-73 | | 30 | | C.D. JONES | | 11-11-73 | | 30 | |
| H-2-518558 | | 31 | | 11-11-73 | | 31 | | C.D. JONES | | 11-11-73 | | 31 | | H.K. CHOUDHRY | | 11-11-73 | | 31 | | C.D. JONES | | 11-11-73 | | 31 | |
| H-2-518558 | | 32 | | 11-11-73 | | 32 | | C.D. JONES | | 11-11-73 | | 32 | | H.K. CHOUDHRY | | 11-11-73 | | 32 | | C.D. JONES | | 11-11-73 | | 32 | |
| H-2-518558 | | 33 | | 11-11-73 | | 33 | | C.D. JONES | | 11-11-73 | | 33 | | H.K. CHOUDHRY | | 11-11-73 | | 33 | | C.D. JONES | | 11-11-73 | | 33 | |
| H-2-518558 | | 34 | | 11-11-73 | | 34 | | C.D. JONES | | 11-11-73 | | 34 | | H.K. CHOUDHRY | | 11-11-73 | | 34 | | C.D. JONES | | 11-11-73 | | 34 | |
| H-2-518558 | | 35 | | 11-11-73 | | 35 | | C.D. JONES | | 11-11-73 | | 35 | | H.K. CHOUDHRY | | 11-11-73 | | 35 | | C.D. JONES | | 11-11-73 | | 35 | |
| H-2-518558 | | 36 | | 11-11-73 | | 36 | | C.D. JONES | | 11-11-73 | | 36 | | H.K. CHOUDHRY | | 11-11-73 | | 36 | | C.D. JONES | | 11-11-73 | | 36 | |
| H-2-518558 | | 37 | | 11-11-73 | | 37 | | C.D. JONES | | 11-11-73 | | 37 | | H.K. CHOUDHRY | | 11-11-73 | | 37 | | C.D. JONES | | 11-11-73 | | 37 | |
| H-2-518558 | | 38 | | 11-11-73 | | 38 | | C.D. JONES | | 11-11-73 | | 38 | | H.K. CHOUDHRY | | 11-11-73 | | 38 | | C.D. JONES | | 11-11-73 | | 38 | |
| H-2-518558 | | 39 | | 11-11-73 | | 39 | | C.D. JONES | | 11-11-73 | | 39 | | H.K. CHOUDHRY | | 11-11-73 | | 39 | | C.D. JONES | | 11-11-73 | | 39 | |
| H-2-518558 | | 40 | | 11-11-73 | | 40 | | C.D. JONES | | 11-11-73 | | 40 | | H.K. CHOUDHRY | | 11-11-73 | | 40 | | C.D. JONES | | 11-11-73 | | 40 | |
| H-2-518558 | | 41 | | 11-11-73 | | 41 | | C.D. JONES | | 11-11-73 | | 41 | | H.K. CHOUDHRY | | 11-11-73 | | 41 | | C.D. JONES | | 11-11-73 | | 41 | |
| H-2-518558 | | 42 | | 11-11-73 | | 42 | | C.D. JONES | | 11-11-73 | | 42 | | H.K. CHOUDHRY | | 11-11-73 | | 42 | | C.D. JONES | | 11-11-73 | | 42 | |
| H-2-518558 | | 43 | | 11-11-73 | | 43 | | C.D. JONES | | 11-11-73 | | 43 | | H.K. CHOUDHRY | | 11-11-73 | | 43 | | C.D. JONES | | 11-11-73 | | 43 | |
| H-2-518558 | | 44 | | 11-11-73 | | 44 | | C.D. JONES | | 11-11-73 | | 44 | | H.K. CHOUDHRY | | 11-11-73 | | 44 | | C.D. JONES | | 11-11-73 | | 44 | |
| H-2-518558 | | 45 | | 11-11-73 | | 45 | | C.D. JONES | | 11-11-73 | | 45 | | H.K. CHOUDHRY | | 11-11-73 | | 45 | | C.D. JONES | | 11-11-73 | | 45 | |
| H-2-518558 | | 46 | | 11-11-73 | | 46 | | C.D. JONES | | 11-11-73 | | 46 | | H.K. CHOUDHRY | | 11-11-73 | | 46 | | C.D. JONES | | 11-11-73 | | 46 | |
| H-2-518558 | | 47 | | 11-11-73 | | 47 | | C.D. JONES | | 11-11-73 | | 47 | | H.K. CHOUDHRY | | 11-11-73 | | 47 | | C.D. JONES | | 11-11-73 | | 47 | |
| H-2-518558 | | 48 | | 11-11-73 | | 48 | | C.D. JONES | | 11-11-73 | | 48 | | H.K. CHOUDHRY | | 11-11-73 | | 48 | | C.D. JONES | | 11-11-73 | | 48 | |
| H-2-518558 | | 49 | | 11-11-73 | | 49 | | C.D. JONES | | 11-11-73 | | 49 | | H.K. CHOUDHRY | | 11-11-73 | | 49 | | C.D. JONES | | 11-11-73 | | 49 | |
| H-2-518558 | | 50 | | 11-11-73 | | 50 | | C.D. JONES | | 11-11-73 | | 50 | | H.K. CHOUDHRY | | 11-11-73 | | 50 | | C.D. JONES | | 11-11-73 | | 50 | |
| H-2-518558 | | 51 | | 11-11-73 | | 51 | | C.D. JONES | | 11-11-73 | | 51 | | H.K. CHOUDHRY | | 11-11-73 | | 51 | | C.D. JONES | | 11-11-73 | | 51 | |
| H-2-518558 | | 52 | | 11-11-73 | | 52 | | C.D. JONES | | 11-11-73 | | 52 | | H.K. CHOUDHRY | | 11-11-73 | | 52 | | C.D. JONES | | 11-11-73 | | 52 | |
| H-2-518558 | | 53 | | 11-11-73 | | 53 | | C.D. JONES | | 11-11-73 | | 53 | | H.K. CHOUDHRY | | 11-11-73 | | 53 | | C.D. JONES | | 11-11-73 | | 53 | |
| H-2-518558 | | 54 | | 11-11-73 | | 54 | | C.D. JONES | | 11-11-73 | | 54 | | H.K. CHOUDHRY | | 11-11-73 | | 54 | | C.D. JONES | | 11-11-73 | | 54 | |
| H-2-518558 | | 55 | | 11-11-73 | | 55 | | C.D. JONES | | 11-11-73 | | 55 | | H.K. CHOUDHRY | | 11-11-73 | | 55 | | C.D. JONES | | 11-11-73 | | 55 | |
| H-2-518558 | | 56 | | 11-11-73 | | 56 | | C.D. JONES | | 11-11-73 | | 56 | | H.K. CHOUDHRY | | 11-11-73 | | 56 | | C.D. JONES | | 11-11-73 | | 56 | |
| H-2-518558 | | 57 | | 11-11-73 | | 57 | | C.D. JONES | | 11-11-73 | | 57 | | H.K. CHOUDHRY | | 11-11-73 | | 57 | | C.D. JONES | | 11-11-73 | | 57 | |
| H-2-518558 | | 58 | | 11-11-73 | | 58 | | C.D. JONES | | 11-11-73 | | 58 | | H.K. CHOUDHRY | | 11-11-73 | | 58 | | C.D. JONES | | 11-11-73 | | 58 | |
| H-2-518558 | | 59 | | 11-11-73 | | 59 | | C.D. JONES | | 11-11-73 | | 59 | | H.K. CHOUDHRY | | 11-11-73 | | 59 | | C.D. JONES | | 11-11-73 | | 59 | |
| H-2-518558 | | 60 | | 11-11-73 | | 60 | | C.D. JONES | | 11-11-73 | | 60 | | H.K. CHOUDHRY | | 11-11-73 | | 60 | | C.D. JONES | | 11-11-73 | | 60 | |
| H-2-518558 | | | | | | | | | | | | | | | | | | | | | | | | | |

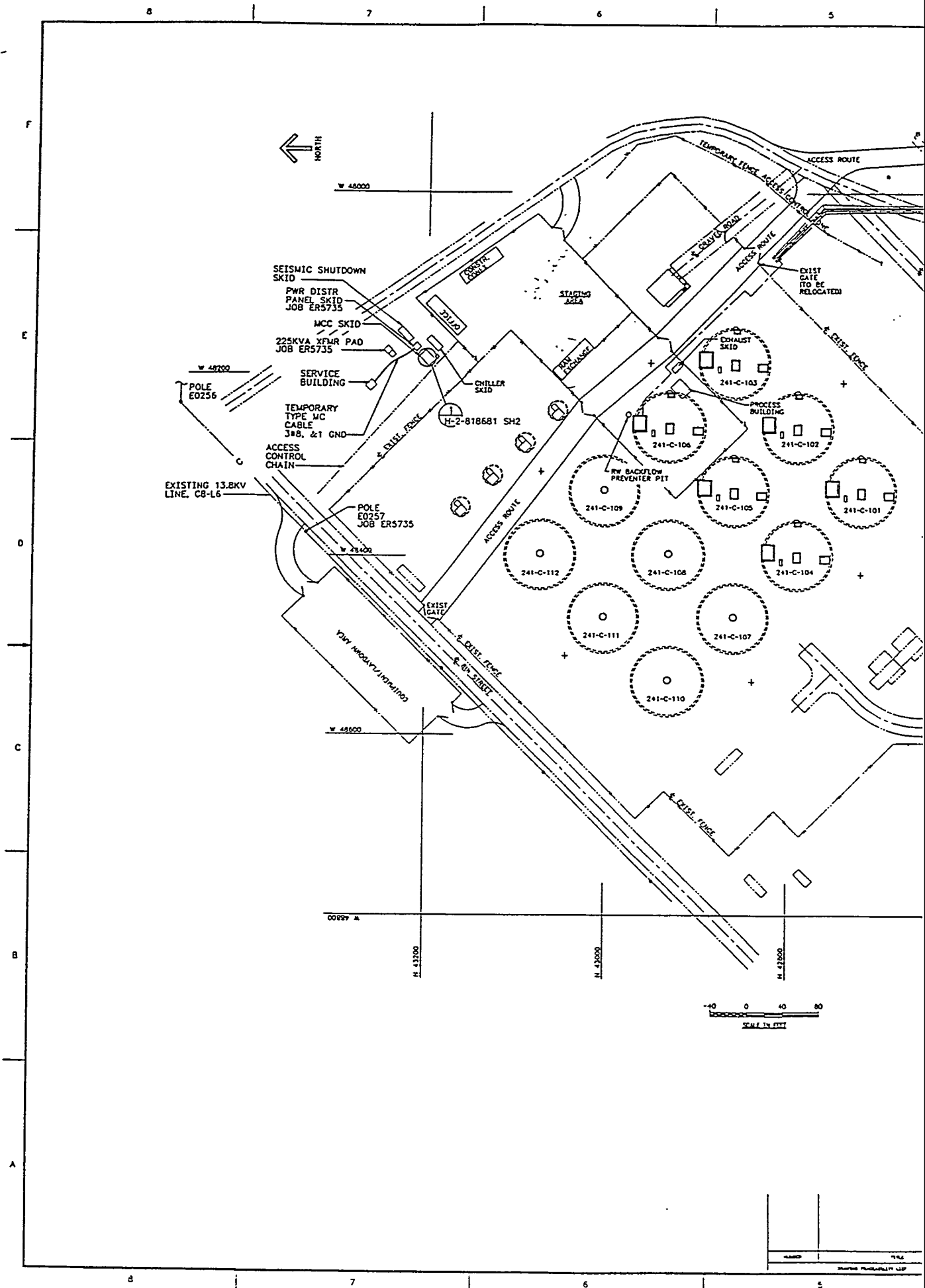




AGRAM (106-C SLUICING)

[illegible]

СХС #1

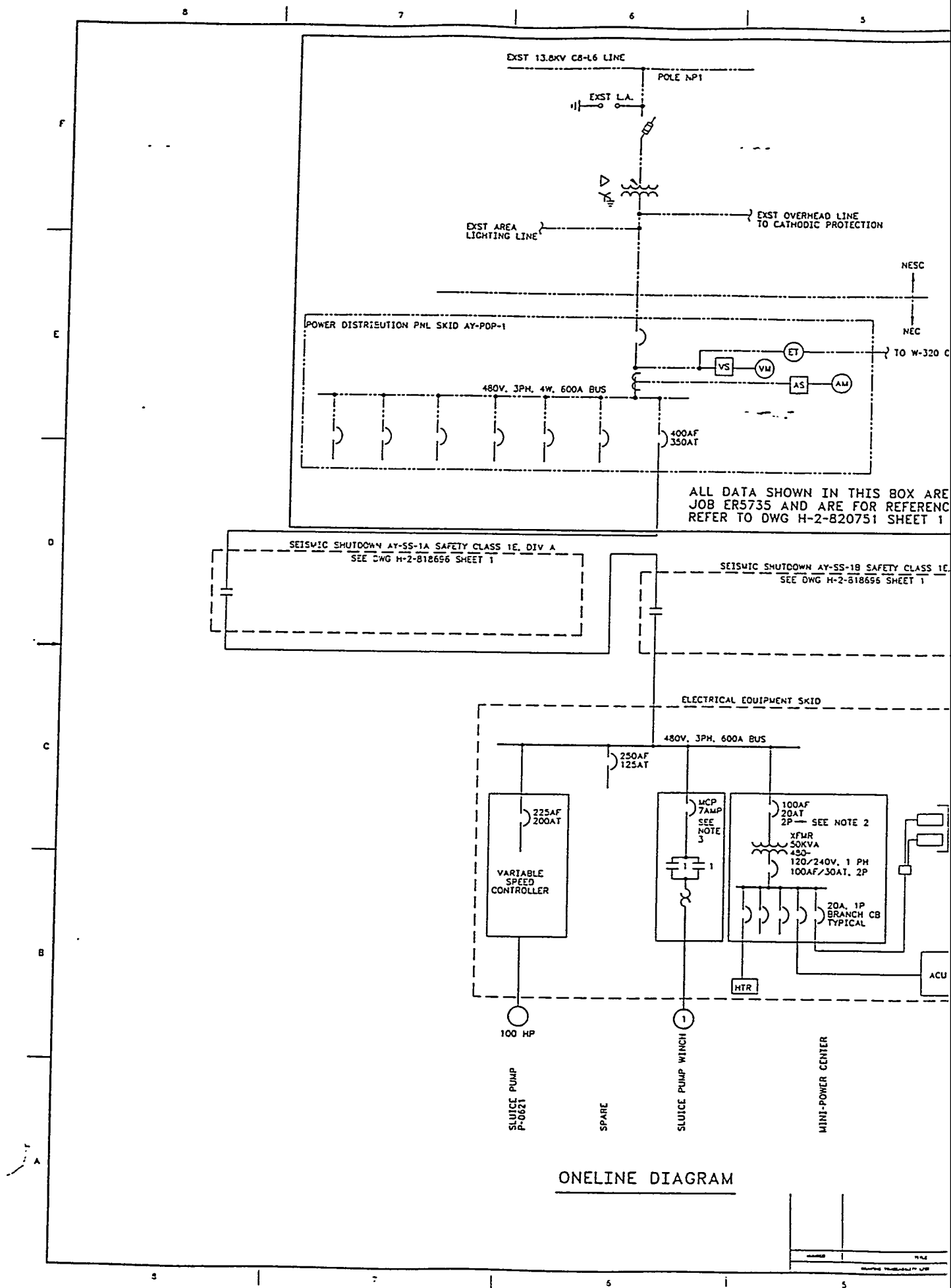




1. SYMBOLS PER ANSI Y14.15 AND/OR Y32.2.

8

3



RT OF
ONLY

AKER
ER.
PLIES

1. SYMBOLES PER ANSI Y14.15 AND/OR Y32.2.
2. 2 POLE CIRCUIT BREAKER WHEPE SHOWN.
3. MOTOR CIRCUIT PROTECTOR W/CONTINUOUS CURRENT RATING.

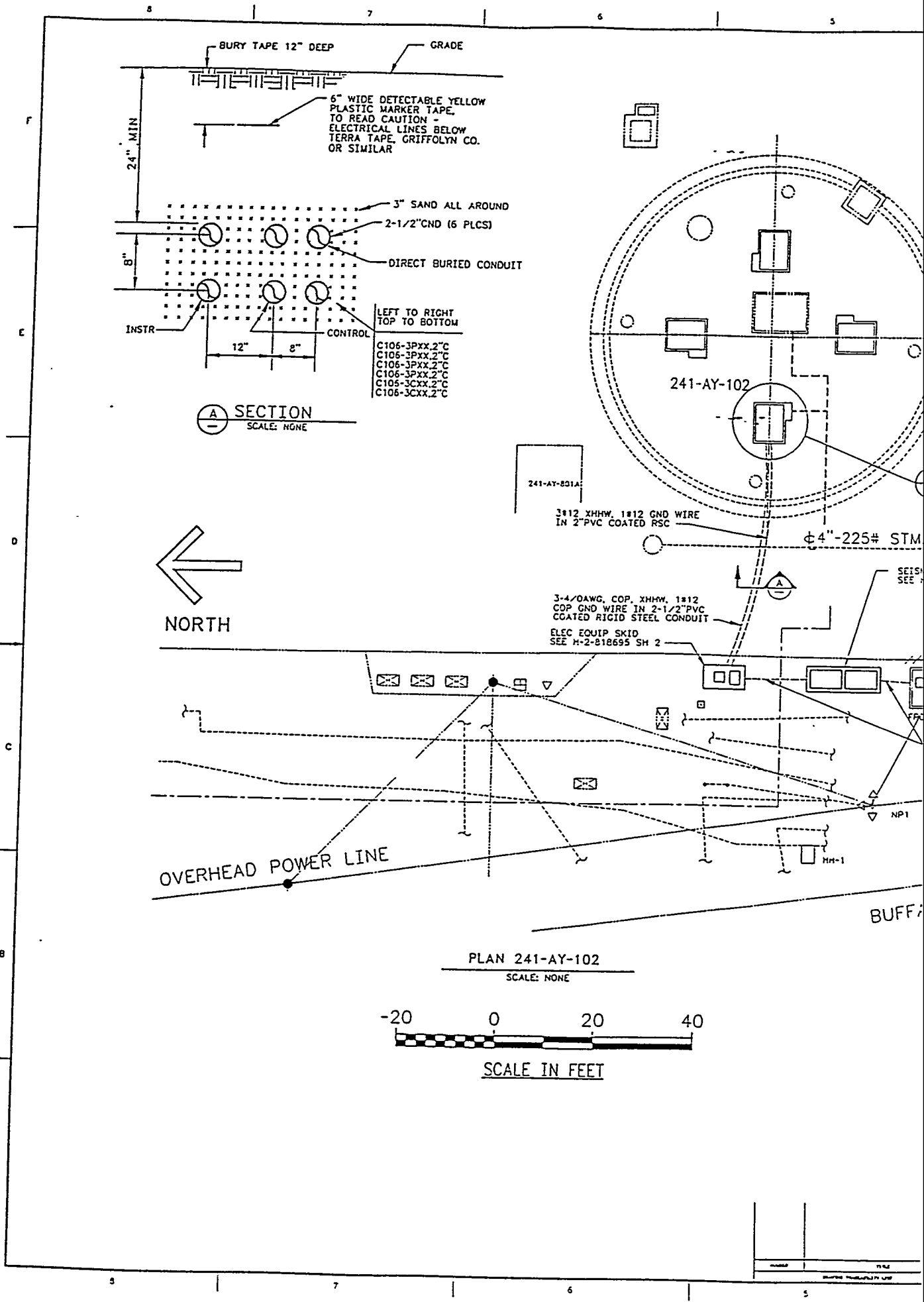
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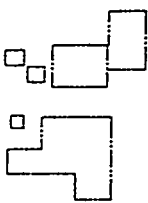
PKG #3

2 PLOT SCALE: 1 = 1

КЕЧСАД

H-73 / 74





SCALE: NONE

NOTES:

1. SYMBOLS PER ANSI Y14.15 AND/OR Y32.2.
2. 3-1/2" PVC COATED RIGID STEEL CONDUIT, WITH 4-1/C #350kcmil.
3. INSTALL PLASTIC MARKER TAPE ABOVE ALL UNDERGROUND CONDUIT RUNS.

SHUTDOWN SYSTEM ENCLOSURE
18696 SH 2
- DISTRIBUTION PANEL AY-FOP-1 (EXIST)
[SERVICE ENTRANCE
AND METER (EXIST)]

MO-825

350ccmil, COP XHHW, 1#1/0
P AND WIRE IN 3" PVC
ATED RIGID STEEL CONDUIT

D AVE



ESTIMOS 11/19/72

| | | | | | | | |
|--|--|--|--|--|--|--|--|
| | | | | | | PRELIMINARY
DATE _____
BY _____ | |
| | | | | | | RELEASED KB KNOWLES JES SAFETY ENGINEER
DATE 08-11-79 BY J. DEL ROSARIO JR.
REASON FOR REVIEW: SEE DR/AT FORM
APPROVED: SEE DR/AT FORM
DISAPPROVED: SEE DR/AT FORM
LINE CODE: _____ | |
| | | | | | | U.S. DEPARTMENT OF ENERGY
RICHMOND OPERATIONS OFFICE
ICF KAISER HANFORD COMPANY
ELECTRICAL
AY-FARM
PLAN AND DETAILS | |
| W-320 TANK 241-C-106 SLUICING | | | | | | PROJECT NO. W-320 TANK 241-C-106 SLUICING
DRAWING NO. F-200C 8001
SHEET NO. H-2-818694 0 | |
| DESCRIPTION: B818694A LOW BOSS ZJ-1B-AACB2:12 ON N | | | | | | SCALE: 1" = 4'-0"
MATERIAL: WML | |

PKG #3

H-75/76

| INTERLOCK SCHEDULE | | | |
|--------------------|--|---|------------------------------------|
| INTERLOCK | EVENT | ACTION | DWG NO/SH NO |
| 1 | A. SLUICE PIT 241-C-050
LEAK DETECTED | * SHUT OFF HEEL PUMP P-1362 | H-2-818559 SH 2 |
| | B. HEEL PIT 241-C-068
LEAK DETECTED | * SHUT OFF SLURRY PUMP P-1361 | H-2-818559 SH 3 |
| | C. TANK AY-102
HIGH VACUUM (EXCESS VAC) | * SHUT OFF SLUICE PUMP P-0621 | H-2-818560 SH 4 |
| | D. TANK AY-102
HIGH LEVEL | | H-2-818560 SH 4 |
| | E. SLUICE PIT 241-A-020
LEAK DETECTED | | H-2-818560 SH 5 |
| | F. PUMP PIT 241-AY-02A
LEAK DETECTED | | H-2-818560 SH 6 |
| | G. FLUSH WATER
RADIATION DETECTED | | H-2-818561 SH 5 |
| | H. LOSS OF VALVE CONTROL
INSTRUMENT AIR PRESS | | H-2-818562 SH 1 |
| | I. SLURRY LINE
4" CL-100-W9
LEAK DETECTED | | H-2-818559 SH 4 |
| | J. SUPERHEAT LINE
4" SH-200-W9
LEAK DETECTED | | H-2-818559 SH 6 |
| | K. PUMP PIT 241-C-06A
LEAK DETECTED | | H-2-818559 SH 6 |
| | L. TANK AY-102
LOSS OF VACUUM | | H-2-818560 SH 4 |
| | M. LOSS OF HVAC AT AY-102 | SEE NOTE 9 | |
| | N. LOSS OF CONTROL PM POWER
(LOSS OF MONITOR/CONTROL) | | H-2-818559 SH 6 |
| | O. TANK C-106 LOSS OF
VACUUM (LOW-LOW VAC) | | |
| | P. FLUSH WATER
PRESSURE HIGH | | H-2-818559 SH 2
H-2-818561 SH 5 |
| 2 | A. PUMP P-1361 DISCHARGE
SOLIDS CONTENT HIGH | * SHUT OFF SLURRY PUMP P-1361 | H-2-818559 SH 6 |
| 3 | A. PUMP P-0621 DISCHARGE
SOLIDS CONTENT HIGH
B. LINE ALL W-300 C-106A
POWER | * SHUT OFF SLUICE PUMP P-0621 | H-2-818560 SH 5
H-2-818559 SH 6 |
| 4 | A. PUMP P-1361 DISCHARGE
SOLIDS CONTENT HIGH
(ONLY APPLIES WHEN
MODE SWITCH IS IN MODE
A, C, OR D POSITIONS) | * SHUT OFF SLURRY PUMP P-1361 | H-2-818559 SH 5
H-2-818559 SH 6 |
| 5 | A. FLOW MODE A-F
(SEE TABLE 1) | * ESTABLISH SLURRY AND SLUICE PUMP
VALVE LINE-UP | H-2-818559 SH 6 |
| 6 | A. FLOW MODE G
(SEE TABLE 1) | * ESTABLISH HEEL AND SLUICE PUMP
VALVE LINE-UP | H-2-818559 SH 6 |
| 7 | A. FLOW MODE F-H
(SEE TABLE 1) | * ALL VALVES AC
* HEEL, SLURRY, AND SLUICE PUMP
PERMISSIVES OFF | H-2-818559 SH 6 |
| 8 | A. SEISMIC ACTIVITY AS
DETECTED BY C-FAH
SEISMIC DETECTORS | * SHUT DOWN MCC'S THAT POWER PUMPS, VAC,
AND ARSS SLURRY TRANSFER SYSTEM | H-2-818559 SH 1 |
| 9 | A. COOLING WATER SUPPLY TO
CONDENSER FLOW LOW-LOW | * SHUT DOWN AIR COOLED CHILLER SYSTEM | H-2-818561 SH 2 |
| 10 | A. PRIMARY CIRC PUMP
P-1364 SHUT DOWN | * START UP STANDBY CIRC PUMP P-1365 | H-2-818561 SH 2 |
| 11 | A. RECIRC FAN FN-1361
SHUT DOWN | * SHUT OFF HEATING COIL HC-1361 | H-2-818561 SH 3 |
| 12 | A. HIGH PRESSURE DIFF
ACROSS BOTH EXHAUST
FILTERS HEP-1361 AND
HEP-1362 (70-80 SEC) | * SHUT DOWN EXHAUST FAN FN-1362 | H-2-818561 SH 6 |
| | B. ROTATECH MONITOR
FE-1363 FAILURE
(70-80 MIN) | | H-2-818561 SH 7 |
| | C. HIGH RADIATION
RELEASED FROM EXHAUST
STACK | | H-2-818561 SH 7 |
| | D. TANK C-106
HIGH VACUUM (EXCESS VAC) | | H-2-818561 SH 6 |
| | E. LOSS OF CONTROL PM POWER
(LOSS OF MONITOR/CONTROL) | | H-2-818559 SH 6 |
| 13 | A. RECIRC FAN FN-1361
HIGH CURRENT | * SHUT DOWN RECIRC FAN FN-1361 | H-2-818561 SH 3 |
| | B. LOSS OF CONTROL PM POWER
(LOSS OF MONITOR/CONTROL) | | H-2-818562 SH 1 |
| 14 | A. EXHAUST FAN FN-1362
SHUT DOWN | * SHUT OFF HEATING COIL HC-1362
* SHUT OFF HEEL PUMP P-1362
* SHUT OFF SLURRY PUMP P-1361
* SHUT OFF SLUICE PUMP P-0621
* SHUT DOWN VAC PUMPS (STACK MONITOR SYS) | H-2-818561 SH 6
H-2-818561 SH 7 |
| 15 | A. CIRC PUMP P-1364 OR
P-1365 DISCHARGE
PRESSURE LOW | * START STANDBY CIRC PUMP P-1365 OR
P-1364 | H-2-818561 SH 6 |

| INTERLOCK | |
|-----------|--------------------------------------|
| 16 | A. C-106 (D
QUAKE IN
POSITION) |
| 17 | A. SEISMIC
DETECTED
SEISMIC |
| 18 | A. PRIMARY
SHUTDOWN |
| 19 | A. PRIMARY
PUMP (ST
SYSTEM) |

| ONLY CRIT | |
|----------------|-----|
| TAG NUMBER | |
| AAH-1361C | C- |
| AAH-1362C | C- |
| LDA-13610C | TK |
| AAH-0671C | AF |
| AAH-0621C | AF |
| LDA-1365C | CE |
| AFH-AY102A-1D | LK |
| FAH-AY102A-1D | LK |
| FAH-AY102-1C | CA |
| FAL-AY102B-1C | CA |
| LAH-AY102-1C | 241 |
| LDA-102-21/22B | TK |
| AA-1361B | TK |
| FAH-1361C | TK |
| FALL-1361C | TK |
| FAH-1362C | TK |
| FAA-1363C | TK |
| FST-1361C | CE |
| LDA-13612C | PRO |
| LDA-1370C | PRO |

| FLOW MODE | DESCR | HA |
|-----------|----------|----|
| A | TEMP ECL | |
| B | TEMP ECL | |
| C | TEMP ECL | |
| D | TEMP ECL | |
| E | SLUICING | |
| F | SLUICING | |
| G | SLUICING | |
| RAV | FLUSHING | |

INTERLOCK SCHEDULE

| EVENT | ACTION | DWG NO./SH NO |
|----------------------------------|---|-----------------|
| HYDRA-UP | * PREVENTS STARTING SLURRY AND SLUICE PUMPS | H-2-818559 SH 2 |
| HYDRA-AS FARM CRS | * SHUT DOWN MCC'S THAT POWER PUMPS AND WRS SLUICING TRANSFER SYSTEM | H-2-818560 SH 7 |
| SLURRY PUMP | * STARTUP STANDBY VACUUM PUMP | H-2-818561 SH 7 |
| SLURRY VACUUM UNIT/STOPPING DOWN | * SHUT DOWN EXHAUST FAN | H-2-818561 SH 7 |

TMACS MONITORING SUMMARY

ALARMS/PARAMETERS WILL BE MONITORED BY THE TMACS SYSTEM

2750-E BUILDING

| DESCRIPTION | DWG NO./SH NO |
|--|-----------------|
| SEISMIC SYSTEM TRIP DIV A | H-2-818559 SH 1 |
| SEISMIC SYSTEM TRIP DIV B | H-2-818559 SH 1 |
| LEAK DETECTED | H-2-818559 SH 2 |
| SEISMIC SYSTEM TRIP DIV A | H-2-818560 SH 7 |
| SEISMIC SYSTEM TRIP DIV B | H-2-818560 SH 7 |
| BUILDING 241-C-73 LEAK DETECTED | H-2-818562 SH 1 |
| SLURRY PIT 102A W/FLOW FACTOR HI | H-2-818560 SH 4 |
| SLURRY PIT 102A RAD LEVEL HI | H-2-818560 SH 4 |
| SLURRY TANK VACUUM HI | H-2-818560 SH 4 |
| SLURRY TANK VACUUM LO | H-2-818560 SH 4 |
| SLURRY TANK LEVEL HI | H-2-818560 SH 4 |
| SLURRY PUMP PIT 02A/SLUICE PIT 02E LEAK DETECTED | H-2-818560 SH 5 |
| HVAC SYSTEM SHUTDOWN | H-2-818561 SH 3 |
| VACUUM HI | H-2-818559 SH 2 |
| VACUUM LOW/LOW | H-2-818559 SH 2 |
| EXHAUST STACK PFD HI | H-2-818561 SH 7 |
| EXHAUST STACK PFD FAIL | H-2-818561 SH 7 |
| BLDG 241-C-73 FAN WATER FLOW | H-2-818562 SH 1 |
| BUILDING 241-C-91 SLURRY LEAK DETECTED | H-2-818561 SH 3 |
| BUILDING 241-C-91 SLURRY LEAK DETECTED | H-2-818561 SH 3 |

TABLE 3 **

| HV-1362 | HV-1363 | HV-1364 | HV-1365 | HV-1366 | HV-1367 | HV-1368 | HV-1369 | HV-1370 |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| | | | | | X | X | X | |
| | | | | | | | X | |
| | X | | | | X | X | X | |
| X | | | | | X | X | X | |
| X | | | | | X | | X | |
| | X | X | X | | X | | X | |
| | | | X | X | | | X | |
| AC | AC | AC | AC | AC | AC | AC | AC | AC |

** * FOR DETAILED DESCRIPTION OF FLOW MODES SEE DWG H-2-818622
 AC = ADMINISTRATIVELY CONTROLLED
 X = CLOSED

NOTE:

FOR GENERAL NOTES AND LEGEND SEE SHEET 1

H.K. CHOUDHRY, PE/C.D. JONES, PE

| | | | | | | | |
|--|--|--------------|--|-----------------|--|--------------|--|
| DESIGNED BY J.L. BRINKLEY | | DATE 11/1/81 | | PROJECT CLASS 3 | | SCALE 1"=10' | |
| CHECKED BY | | DATE | | PROJECT CLASS | | SCALE | |
| SAFETY SEE CR/AT FORM | | DATE | | PROJECT CLASS | | SCALE | |
| DWG. SEE CR/AT FORM | | DATE | | PROJECT CLASS | | SCALE | |
| TANK DATA SEE CR/AT FORM | | DATE | | PROJECT CLASS | | SCALE | |
| TANK DATA K. CHOUDHRY | | DATE | | PROJECT CLASS | | SCALE | |
| APPROVED FOR REVIEW NO. 11 | | DATE | | PROJECT CLASS | | SCALE | |
| APPROVED FOR CONSTRUCTION | | DATE | | PROJECT CLASS | | SCALE | |
| PROJECT NO. W-320, TANK 241-C-105 SLUICING | | DATE | | PROJECT CLASS | | SCALE | |
| F 241-C 3582 | | DATE | | PROJECT CLASS | | SCALE | |
| H-2-818558 | | DATE | | PROJECT CLASS | | SCALE | |
| A | | DATE | | PROJECT CLASS | | SCALE | |

2 PLOT SCALE: 1"=1' KENCAD

H-25/26