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Functions, Requirements, and Specifications for Replacement of the Computer Automated Surveillance System (CASS)

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Functions, Requirements, and Specifications for Replacement of the Computer Automated Surveillance System (CASS)

RPP-5366

Revision 0

Approval Designator: E,S,Q

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Richland, Washington**

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1.0 SCOPE

1.1 Overview

This functions, requirements and specifications document defines the baseline requirements and criteria for the design, purchase, fabrication, construction, installation, and operation of the system to replace the Computer Automated Surveillance System (CASS) alarm monitoring.

1.2 Background

The CASS, as described in the Tank Farms Safety Analysis Report, HNF-SD-WM-067, Rev 1, was designed to provide central, computerized surveillance of the Hanford waste storage tanks and their associated facilities. CASS consisted of six remote computers that received temperature, alarms, raw water usage, and liquid level signals. The remote computers communicated with the Central Surveillance Computer (CSC) located in Building 2750E in the 200E Area. CASS provided no controls, interlocks, or automatic action based on the signals it received. An operator at the central CASS/TMACS Facility, manned on a 24-hour basis, monitored the system and advised field operators of alarm conditions. The CASS was developed in a closed architecture and the system was maintained beyond its life expectancy causing the hardware and software to become obsolete. An Unreviewed Safety Question (USQ-TF-98-0829) Screening and Determination found that CASS could be removed from service since alternative monitoring means (manual monitoring and data entry) were available to meet surveillance requirements. The CASS was officially retired on February 25, 1999.

1.3 CASS System Description

The CASS provided tank farm monitoring. Field detection and monitoring instrumentation systems were essentially the same for all individual tanks within the tank farms. Instruments sent data to microcomputers in the appropriate instrument buildings. All measured values were converted to electrical signals before transmission to CASS computers. Most monitored data was transmitted automatically to the CASS; however, some data was measured and recorded manually and maintained at each farm without input to CASS.

Signals were monitored and displayed on panel boards within the associated instrument building. Each tank had an associated local panel board, transmitter enclosure, and assigned portion of the pressure switch rack. Some signals were transmitted to the 242-A Evaporator control room for the 200 East Area, and to the 242-S control room for the 200 West Area, as well as to the DST instrument buildings.

Typical process parameters continuously monitored by the CASS at time of decommissioning:

- Remote computer communication failures
- Leak detection pit alarms (high radiation, high liquid level)
- Tank pressure alarms (high pressure and vacuum)
- Leak detectors on tank annulus floor
- Exhaust fan failure alarms
- Radiation detection units (annulus exhaust CAMs, HVAC exhaust stack CAMs, instrument building panel alarms)
- Process line, encasement, process pit, and cleanout box leak detectors
- Failure of liquid level monitoring equipment

Analog parameters originally scanned by CASS on an hourly basis:

- Actual liquid level measurements
- Temperature

Note: Analog signals originally monitored by CASS have been transferred to an alternate system. The remaining signals to be moved to the replacement system are comprised only of alarm (discrete) points.

Instrument panel boards displayed or recorded the monitored process conditions in various areas of the tank farms.

Separate CASS program files were kept for data categories and were held in the program's 32-day historical file. Data was transferred daily to the permanent retention file. The CASS reports contained information either received automatically or manually entered through a computer terminal. A few readings (selected liquid level and weight factor) were not CASS files. These readings were manually measured on each shift and then manually recorded and retained by tank farm and evaporator process control personnel. Reports were generated on standardized report forms. Each tank farm could select and customize the data contained in the reports.

TABLE 1
LISTING OF CASS ALARMS

Table 1 is a current estimate of the number of CASS alarms that are to be transferred. Alarm Equipment ID, Activating Device, CASS ID, Parameter Description, CASS Message, and Safety Classification are contained in Appendix B tables.

Substation	Building	Number of Alarms
A	241-A -271	46
	204-AR	12
	241-AW-271	46
	241-AP-271	64
	242-A	68
B	241-BY-254	12
C	241-CR-271	6
	241-AN-271	59
S	241-SX-271	13
	242-S	35
	241-SY-271	22
T	242-T	17
U	241-U-271	0
TOTAL		400

NOTE: All above CASS alarm inputs were monitored in 2750E.

2.0 APPLICABLE DOCUMENTS

Design requirements applicable to The System come from government and non-government source documents and various codes and standards. Each document (of the exact section identified) is invoked by one or more requirements of this specification and represents a part of this specification to the extent specified.

2.1 Government Documents

DOE Order 6430.1A, 1989, *General Design Criteria*

DOE Order 4330.4B, 1994, *Maintenance Management Program, U.S. Department of Energy*

MIL-STD-1472E, *Human Engineering Design Criteria for Military systems, Equipment and Facilities*, U.S. Department of Defense

UCRL-15673, 1985, *Human factors Design Guidelines for Maintainability of DOE Nuclear Facilities*

NUREG 0700, Rev. 1, *Guidelines for Control Room Design Reviews, Nuclear Regulatory Commission Regulatory Guide*

2.2 Non-Government Documents

LMH-SD-WM-SFR-006, Draft, *System Functional Requirements: Tank Monitoring And Control System (TMACS) Software Project*

LMH-PRO-097, Rev 0, *Engineering Design and Evaluation*

LMH-PRO-222, Rev. 1, *Quality Assurance Records*

LMH-PRO-224, Rev. 1, *Document Control*

LMH-PRO-1819, Rev. 1, *PHMC Engineering Requirements*

HNF-IP-0842, Volume II, Section 6.1 Rev. 0, *Tank Farm Operations Equipment Labeling*

HNF-4211, Draft, *Functions and Requirements for Tank Monitor And Control System (TMACS)*

WHC-SD-WM-TI-671, Rev. 0, *TMACS System Description*

HNF-SD-WM-WP-344, Rev. 0, *Computer Automated Surveillance System (CASS) Retirement Plan*

HNF-SD-WM-SEL-040, Rev. 1, *TWRS Facility Safety Equipment List*

HNF-SD-WM-067, Rev. 1, *Tank Farms Safety Analysis Report*

HNF-IP-0842, Vol. IV, Section 4.14, Rev. 2b, *Tank farm Operations Equipment Labeling and Master Equipment List Control*

PNNL-11107, *Hanford Site Climatological Data Summary*, 1995

FM, *Approval Guide*, Factory Mutual System

Unreviewed Safety Question Tracking No. TF-98-0829 rev. 1, *Remove Computer Automated Surveillance System (CASS) from Operation*

3.0 FUNCTIONS AND REQUIREMENTS

3.1 Definition

The CASS alarm monitoring replacement system (hereafter referred to as "the system") shall be capable of receiving field generated signals for approximately 400 discrete alarm input signals. The system shall only monitor inputs and will provide no control functions.

3.2 Characteristics

3.2.1 Performance Characteristics

3.2.1.1 Alarm Processing

3.2.1.1.1 The system shall be capable of receiving and processing approximately 400 alarm input signals, with capability to expand by up to 50% with no degradation in performance.

3.2.1.1.2 The system shall have the capability to enable or disable alarm processing for individual sensors.

Note: The above is currently accomplished by the System Administrator.

3.2.1.1.3 The system shall be capable of displaying sensor (alarm) states.

3.2.1.1.4 Discrete sensor states shall include:

- Alarm Condition
- Normal Condition
- Out of service

- 3.2.1.1.5 The Operator shall be visually notified when an alarm changes state. As a minimum the notification shall contain:
- Sensor Description
 - Sensor State
 - Date/Time of change
- 3.2.1.1.6 The visual state change notification shall be persistent until the operator acknowledges the notification and the alarm returns to the normal state.
- 3.2.1.1.7 The Operator shall be audibly notified upon an alarm condition.
- 3.2.1.1.8 The audible alarm shall respond as listed in Table 2.
- 3.2.1.1.9 Each alarm shall have a color associated with each as listed in Table 2.
- 3.2.1.1.10 As a minimum, the system shall allow assignments of display colors as listed in Table 2.
- 3.2.1.1.11 Alarm state changes and operator acknowledgements shall be logged to an event recorder to provide a hard copy record and to a computer storage device.
- 3.2.1.1.12 The event recorder shall print alarm state changes and operator acknowledgements in the same order as the events occurred.
- 3.2.1.1.13 Each event printed shall include a date and time reference.

3.2.2 External Interface Requirements

- 3.2.2.1 The system shall be capable of fully communicating to remote shift operations with tank farm HMIs via the HLAN.
- 3.2.2.2 The system shall be capable of communicating with field equipment for the purpose of monitoring discrete alarm conditions.
- 3.2.2.3 The system shall be capable of polling selected discrete points at least once per minute.

3.2.3 Alarm Management

The system shall perform the following alarm management functions

- 3.2.3.1 Display alarm status and reset for any discrete point.
- 3.2.3.2 Display system alarm for communication errors and unsuccessful polls.
- 3.2.3.3 Alarm information on the alarm summary display shall include
 - Date
 - Time
 - Tag Descriptor
 - Alarm status with acknowledgement
- 3.2.3.4 Audible alarm is silenced upon alarm acknowledgement.
- 3.2.3.5 Alarm status shall be displayed on a monitor to provide the Operator with a graphic of the local annunciator panel, a process related graphic (tank farm layout), or both.
- 3.2.3.6 The system shall log an operator's acknowledgement and alarm return to normal.
- 3.2.3.7 All system alarms shall respond in the manner listed in Table 2:

TABLE 2
SYSTEM ALARM RESPONSE

EVENT	SYSTEM ALARM
Event initiates an enabled alarm	Red or yellow flashing symbol (NOTE 1)
Operator acknowledges alarm at system	Non-flashing red or yellow symbol
Event alarm recovers prior to acknowledge	Green flashing symbol
Event alarm recovers after acknowledge	Non-flashing green symbol (NOTE 2)
Non-normal operating mode (i.e. loss of communication, Enraf in Non-operational mode)	White symbol (NOTE 3)
System Administrator disables alarm	Gray symbol (NOTE 4)

- Note 1: An alarm condition is associated with either red or yellow. A red alarm indicates the highest priority while yellow indicates an alert point. Yellow does not require immediate operator action.
- Note 2: The system alarm returns to steady green after the system scans the input and processes the signal. The system scan rate determines how quickly the system responds after the alarm condition clears.
- Note 3: A white symbol indicates communications have been lost with the field equipment or the signal is out of range. White is technically not an indicator of an alarm but rather indicates status of sensor is unknown and may require an Operator response. Associated field alarms, if applicable, may continue to operate.
- Note 4: Gray indicates the decision has been made not to process the alarm input to the system. In this case only the field alarms, if applicable, will continue to function.

3.2.4 Project Quality Factors

3.2.4.1 Maintainability

- 3.2.4.1.1 The design of equipment shall incorporate the objective of efficient maintainability. The testing and maintenance of the system and its restoration to operational effectiveness shall be achieved at minimum cost with a minimum level of support services. The UCRL-15673, *Human Factors Design Guidelines for Maintainability of DOE Nuclear Facilities*, and DOE Order 4330.4B, *Maintenance Management Program* shall be considered for system design.

3.2.4.2 Design Life

- 3.2.4.2.1 The system shall be designed to operate for a minimum of 35 years.

Note: It is expected that failures will occur over this period which will require equipment replacement and that future technological advances may dictate additional replacements to enhance system operation/reliability.

3.2.4.3 Reliability

- 3.2.4.3.1 Equipment shall be designed to function reliably for at least three years before repair/replacement.
- 3.2.4.3.2 Systems and associated instrumentation and controls shall be designed, where practical, to provide for the detection of faults to systems, structures, and components as necessary in order to minimize the risks associated with faulty operation to plant, personnel, and environment.

3.2.5 Environmental Conditions

3.2.5.1 Induced Environments

3.2.5.1.1 Radiation Tolerance

3.2.5.1.1.1 This section is not applicable. The system will be located in a controlled area for normal daily monitoring.

3.2.5.2 Natural Environments

3.2.5.2.1 All equipment will be located inside climate controlled buildings and will not be subject to outside environmental conditions. Equipment shall be designed to withstand the following conditions:

- **Relative Humidity:**

Highest monthly mean relative humidity:	80%
Daily change:	30%

- **Temperature:**

Inside temperature range:	10°C to 35°C (50°F to 95°F)
Outside ambient air temperature range:	- 32°C to 46°C (-27°F to 115°F)

3.2.6 Transportability

3.2.6.1 This section is not applicable

3.2.7 Flexibility and Expansion

3.2.7.1 The system shall be of an open-ended design allowing expansion of future project requirements.

3.3 Design and Construction

3.3.1 Materials

- 3.3.1.1 Telecommunication devices, alarm devices, data processing equipment, and telephone modem stations shall be housed in fire-resistant structures and located outside areas subject to explosion, fire, flood, chemical fumes, excessive dust, vibration, dampness, high noise levels, and high electrical interference.
- 3.3.1.2 Electrical materials and equipment shall be UL or FM tested, with label attached, for the purpose intended, whenever such products are available. Where there are no UL or FM listed products of the type required, testing and certification by another nationally recognized testing agency may be acceptable.

3.3.2 Electromagnetic Radiation

The design shall consider the effects of electromagnetic radiation on the signal conditioning equipment.

3.3.3 Identification and Marking

- 3.3.3.1 New equipment and/or modifications to existing equipment shall be labeled in a standardized format in accordance with HNF-IP-0842, Volume II, Section 6.1, *Tank Farm Operations Equipment Labeling*.

3.3.4 Workmanship

This section is not applicable

3.3.5 Interchangeability

This section is not applicable

3.3.6 Safety

3.3.6.1 Nuclear Safety

3.3.6.1.1 Safety Classification

Note: Refer to Section 5.1 for safety classification definitions

Note: The safety classifications (GS, SS, SC) of equipment providing inputs to the CASS replacement system are listed in Appendix B tables. The determination of Safety Classifications was made by the appropriate Technical Authority, Design Authorities, and Operations, and with reference to HNF-SD-WM-SEL-040, TWRS Facility Safety Equipment List. New or modified equipment that is required to support safety class equipment shall meet the following requirements.

3.3.6.1.1.1 Safety class instrumentation and control systems shall provide audible and visual alarms.

3.3.6.1.1.2 The design of safety class instrumentation and controls shall provide suitable redundancy and diversity to ensure that safety functions can be completed, when required, and that no single failure will result in the loss of the protective functions.

3.3.6.1.1.3 The design of safety class instrumentation and control systems shall provide for the periodic in-place testing and calibration of instrument channels and interlocks.

3.3.6.2 Industrial and Occupational Safety

This section is not applicable

3.3.6.3 Natural Phenomena Hazards

3.3.6.3.1 The replacement system is not required to perform any safety function during or after the occurrence of extreme natural phenomena events (e.g., earthquake, high wind, tornado, snow fall, ash fall, etc). The system shall be designed to meet requirements of LMH-PRO-097 for performance category one.

3.3.7 Human Engineering

- 3.3.7.1 Warning and alarm systems shall be designed, installed, and tested to ensure they can be heard in the ambient conditions of the area for which they are intended.
- 3.3.7.2 Displays shall provide the information about system status and parameter values which is needed to meet task requirements. Continuous status, rather than on-demand information, shall be displayed for important parameters. Displays shall indicate whether they reflect demand or actual status.
- 3.3.7.3 Each display device, including meters, CRTs, LCDs, consoles, and other electronic or mechanical media shall be formatted and designed to ensure both the display and display content are readable, understandable, and accessible.
- 3.3.7.4 Failure of a display of any type shall easily be recognized and shall not affect equipment or system performance unless alternate means exist to accomplish system performance.
- 3.3.7.5 Warning and annunciator systems shall alert personnel to problems or abnormal conditions and shall provide sufficient time to respond appropriately to the problem. General warning guidelines are found in MIL-STD-1472E, Section 5.3. for the special case of control room annunciators, see NUREG 0700, Section 6.3. for auditory signal guidelines see NUREG 0700, Section 6.2.

3.4 Documentation

- 3.4.1 Records, documents, and drawing control pertinent to design functions shall be in accordance with LMH-PRO-222, and LMH-PRO-224. Drafting standards for drawings and interface control shall be in accordance with LMH-PRO-1819.
- 3.4.2 Operations and maintenance drawings (as-built essential drawings) shall be prepared as system master drawings showing as-built configuration changes in accordance with HNF-IP-0842, Volume IV, Section 4.14.
- 3.4.3 A Master Equipment List (MEL) consisting of an electronic database for SSCs shall be generated in accordance with HNF-IP-0842, Volume IV, Section 4.14. The MEL shall contain such information as unique equipment labels, drawing references, procedures, vendor information, safety classifications, nameplate data, etc.

3.5 Maintenance

- 3.5.1 The system design shall provide for routine maintenance, repair, or replacement of equipment subject to failure. SSC shall be designed to allow inspection, maintenance, and testing to ensure their continued functioning, readiness for operation, and accuracy.
- 3.5.2 Testing performed after turnover, such as calibrations, functional tests, etc. shall be performed in accordance with existing applicable RPP procedures.

3.6 Personnel and Training

- 3.6.1 Personnel assigned to operate or maintain the system shall be trained for the tasks for which they will perform.

4.0 QUALITY CONFORMANCE INSPECTIONS/TESTING

- 4.1 Inspections shall be performed on system hardware representative of the approved production design for the purposes of verifying that the design meets the requirements of this specification, subject to the design verification procedure identified in LMH-PRO-1819, Section 2.9.1. Inspection of the system design to assure compliance with the requirements of Section 3 shall be by examination, demonstration, test, and/or analysis, at level of assembly defined in Appendix A. Definitions of examination, demonstration, test, and analysis are as follows:
 - 4.1.1 Examination is an element of inspection consisting of investigation without the use of special laboratory equipment or procedures to determine compliance with requirements. An acceptable method is through design verification.
 - 4.1.2 Demonstration is an element of inspection that is limited to readily observable functional operation to determine compliance with requirements. This element of inspection does not require use of special equipment or sophisticated instrumentation.
 - 4.1.3 Test is an element of inspection that employs technical means including, but not limited to, the evaluation of functional characteristics by use of special equipment or instrumentation, simulation techniques, and the application of established principles and procedures to determine compliance with requirements. The analysis of data derived from test is an integral part of this inspection.
 - 4.1.4 Analysis is an element of inspection, taking the form of the processing of accumulated results and conclusions, intended to provide proof that verification of a requirement has been accomplished. The analytical results may be comprised of a compilation of interpretation of existing information or derived from lower level examination, tests, demonstrations, or analyses. An acceptable method through design verification.

- 4.2 Field verification of System performance/design features and acceptance inspection of construction is called-out in Section 2.9.2 of LMH-PRO-1819. In addition to these inspections, which take place during the construction/turn-over lifecycle phase, the following requirements shall be implemented.
- 4.3 The following testing requirements apply to the qualification of the system and components. These test requirements correlate to the qualification of the design to the noted Section 3.0 requirements of this specification. Appendix A defines the method for verifying Section 3.0 requirements.
 - 4.3.1 On-site acceptance testing shall be required for the system and components. Tests shall be specified to demonstrate that each function and important parameter is implemented.
 - 4.3.2 Initial testing shall be performed during or after installation by the responsible organization or company. Results shall be documented and provided to Operations/Maintenance upon request.
 - 4.3.3 Prior to final turnover, the equipment shall be proven acceptable by Operations through the performance of Acceptance Test Procedures (ATPs). Tests shall be performed in accordance with WHC-SD-WM-ATP-023 and HNF-3967.

5.0 NOTES

5.1 Definitions

- 5.1.1 General Service (GS) SSC – Structures, systems, and components (SSC) not classified as either Safety Class or Safety Significant.
- 5.1.2 Safety Class (SC) SSC – A SSC that prevents or mitigates releases to the public that would otherwise exceed the offsite radiological risk guidelines, or to prevent a nuclear criticality. Those SSCs that support the safety function of a SC SSC are also SC.
- 5.1.3 Safety Significant (SS) SSC – A SSC that prevents or mitigates releases of radiological materials to onsite workers and toxic chemicals to the offsite public and onsite workers. Safety significant also describes worker safety SSCs that protect the facility worker from serious injury (or fatality) from hazards not controlled by institutional safety programs. Those SSCs that support the safety function of an SS SSC are also SS.
- 5.1.4 Shall – Denotes a requirement.

6.0 ACRONYMS AND ABBREVIATIONS

AC	Alternating Current
ADP	Automated Data Processing
ARP	Alarm Response Procedure
ATP	Acceptance Test Procedure
DOE	U.S. Department of Energy
CAM	Continuous Air Monitor
CASS	Computer Automated Surveillance System
CRT	Cathode Ray Tube
CSC	Central Surveillance Computer
DC	Direct Current
DST	Double Shell Tank
FM	Factory Mutual
GS	General Service
HEPA	High Efficiency Particulate Air
HMI	Human Machine Interface
HVAC	Heating, Ventilation and Air Conditioning
I&C	Instrument and Control
ID	Identification
I/O	Input/Output
IEEE	Institute of Electrical and Electronics Engineers
LCD	Liquid Crystal Display
MEL	Master Equipment List
MIL-STD	Military Standard
ORP	Office of River Protection
OTP	Operational Test Procedure
SC	Safety Class
SEL	Safety Equipment List
SS	Safety Significant
SSC	Structures, Systems, and Components
SST	Single Shell Tank
TMACS	Tank Monitor And Control System
TWRS	Tank Waste Remediation System
TSR	Technical Safety Requirements
UL	Underwriters Laboratories
UPS	Uninterruptible Power Supply
WFD	Waste Feed Delivery

APPENDIX A

QUALITY CONFORMANCE INSPECTION MATRIX

TABLE A-1
QUALITY CONFORMANCE INSPECTION MATRIX (Page 1 of 11)

Section	Function/Requirement	Source Document	Remarks Suggested Test Methods	Inspection Element				
				E X A M	D E M O	T E S T	A N A L	N/ A
3.2.1.1.2	The system shall have the capability to enable or disable alarm processing for individual sensors	HNF-SD-WM-SFR-006 Section 3.1.2.1	Verified under ATP HNF-3967			X		
3.2.1.1.3	The system shall be capable of displaying sensor (alarm) states	HNF-SD-WM-SFR-006 Section 3.1.2.3	Verified under ATP HNF-3967 with simulated inputs			X		
3.2.1.1.4	Discrete sensor states shall include alarm condition, normal condition, and out of service	HNF-SD-WM-SFR-006 Section 3.1.2.7	Verified under ATP HNF-3967			X		
3.2.1.1.5	The Operator shall be visually notified when an alarm changes state. As a minimum the notification shall contain: sensor description, sensor state, date/time of change	HNF-SD-WM-SFR-006 Section 3.1.2.8	Verified under ATP HNF-3967			X		
3.2.1.1.6	The visual state change notification shall be persistent until the operator acknowledges the notification and the alarm returns to normal state	HNF-SD-WM-SFR-006 Section 3.1.2.9	Verified under ATP HNF-3967			X		
3.2.1.1.7	The Operator shall be audibly notified upon an alarm condition	HNF-SD-WM-SFR-006 Section 3.1.2.10	Verified under ATP HNF-3967					X

TABLE A-1
QUALITY CONFORMANCE INSPECTION MATRIX (Page 2 of 11)

Section	Function/Requirement	Source Document	Remarks Suggested Test Methods	Inspection Element				
				E X A M	D E M O	T E S T	A N A L	N A
3.2.1.1.8	The audible alarm shall respond as listed in Table 2.	Engineering judgement			X			
3.2.1.1.9	Each alarm shall have a color associated with each as listed in Table 2.	HNF-SD-WM-SFR-006 Section 3.1.2.12	Verified under ATP HNF-3967			X		
3.2.1.1.10	As a minimum, the system shall allow assignments of display colors as listed in Table 2.	WHC-SD-WM-TI-671 Section 4.4	Verified under ATP HNF-3967			X		
3.2.1.1.11	Alarm state changes and operator acknowledgements shall be logged to an event recorder to provide a hard copy record and to a computer storage device	Engineering judgement	Verified under ATP 023		X			
3.2.1.1.12	The event recorder shall print alarm state changes and operator acknowledgements in the same order as the events occurred	Engineering judgement	Verified under ATP 023		X			
3.2.1.1.13	Each event printed shall include a date and time reference	Engineering judgement	Verified under ATP 023		X			

TABLE A-1
QUALITY CONFORMANCE INSPECTION MATRIX (Page 3 of 11)

Section	Function/Requirement	Source Document	Remarks Suggested Test Methods	Inspection Element				
				E X A M	D E M O	T E S T	A N A L	N A
3.2.2.1	The system shall be capable of fully communicating by remote shift operations with tank farm HMIs via the HLAN or a functionally equivalent communications network.	Engineering judgement				X		
3.2.2.2	The system shall be capable of communicating with field equipment for the purpose of monitoring discrete alarm conditions	HNF-SD-WM-WP-344 Section 4.6.2	Verified under OTP			X		
3.2.2.3	The system shall be capable of polling selected alarms at least once per minute.	By direction of Technical Authority				X		
3.2.3.1	Display alarm status and reset for any discrete point	HNF-4211 Section 4.2.1.2.3	Verified under ATP HNF-3967			X		
3.2.3.2	Display system alarm for communication errors and unsuccessful polls	HNF-4211 Section 4.2.1.2.3	Verified under ATP HNF-3967			X		

TABLE A-1
QUALITY CONFORMANCE INSPECTION MATRIX (Page 4 of 11)

Section	Function/Requirement	Source Document	Remarks Suggested Test Methods	Inspection Element				
				E X A M	D E M O	T E S T	A N A L	N A
3.2.3.3	Alarm information on the alarm summary display shall include Date, Time, Tag Descriptor, Alarm status with acknowledgement	HNF-4211 Section 4.2.1.2.3	Verified under ATP HNF-3967			X		
3.2.3.4	Audible alarm is silenced upon alarm acknowledgement	HNF-4211 Section 4.2.1.2.3	Verified under ATP HNF-3967			X		
3.2.3.5	Alarm status shall be displayed on a monitor to provide the Operator with a graphic of the local annunciator panel, a process related graphic (tank farm layout), or both	HNF-SD-WM-WP-344 Section 4.6.2	Verified under OTP		X			
3.2.3.6	The system shall log an operator's acknowledgement and alarm return to normal	HNF-4211 Section 4.2.1.2.3				X		
3.2.3.7	All system alarms shall respond in the manner listed in Table 2	Engineering judgement	See table 2			X		

TABLE A-1
QUALITY CONFORMANCE INSPECTION MATRIX (Page 5 of 11)

Section	Function/Requirement	Source Document	Remarks Suggested Test Methods	Inspection Element				
				E A M	D E M O	T E S T	A N A L	N A
3.2.4.1.1	Design of equipment shall incorporate the objective of efficient maintainability. The surveillance, testing, and maintenance of the system and its restoration to operational effectiveness shall be achieved at minimum cost with a minimum level of support services	DOE Order 6430.1A Section 1300-12.4.10						X
3.2.4.2.1	The system shall have a minimum design life of 35 years	Derived from review of specifications for the Master Pump Shutdown project which specifies a design life of 35 years		X				
3.2.4.3.1	Equipment shall be designed to function reliably for at least three years before repair/replacement	Selected by Technical Authority as a realistic goal for design purposes		X				
3.2.4.3.2	Systems and associated instrumentation and controls shall be designed to provide for the detection of faults to systems, structures, and components as necessary in order to minimize the risks associated with faulty operation to plant, personnel, and environment.	DOE Order 6430.1A Section 1660-99.02		X				

TABLE A-1
QUALITY CONFORMANCE INSPECTION MATRIX (Page 6 of 11)

Section	Function/Requirement	Source Document	Remarks Suggested Test Methods	Inspection Element				
				E A M	D E M O	T E S T	A N A L	N A
3.2.5.2.1	All equipment will be located inside climate controlled buildings and will not be subject to outside environmental conditions. Equipment shall be designed to withstand the following conditions:	PNNL-11107	Inside temperatures are estimated	X				
3.2.7.1	The system shall be of an open-ended design allowing expansion of the number of monitoring points due to future project requirements	Engineering judgement		X				
3.3.1.1	Telecommunication devices, alarm devices, data processing equipment, and telephone modem stations shall be housed in fire-resistant structures and located outside areas subject to explosion, fire, flood, chemical fumes, excessive dust, vibration, dampness, high noise levels, and high electrical interference	DOE Order 6430.1A Section 0200-99.8.1		X				

TABLE A-1
QUALITY CONFORMANCE INSPECTION MATRIX (Page 7 of 11)

Section	Function/Requirement	Source Document	Remarks Suggested Test Methods	Inspection Element				
				E X A M	D E M O	T E S T	A N A L	N A
3.3.1.2	Electrical materials and equipment shall be UL or FM tested, with label attached, for the purpose intended, whenever such products are available. Where there are no UL or FM listed products of the type required, testing and certification by another nationally recognized testing agency may be acceptable	DOE Order 6430.1A Section 1605-1	Verified under NEC code Inspection in work package	X				
3.3.3.1	New equipment and/or modifications to existing equipment shall be labeled in a standardized format in accordance with HNF-IP-0842, Volume II, Section 6.1	HNF-IP-0842 Volume II, Section 6.1		X				
3.3.6.1.1.1	Safety class instrumentation and control systems shall provide audible and visual alarms	DOE Order 6430.1A Section 1660-99.0.2	Verified under ATP			X		
3.3.6.1.1.2	The design of safety class instrumentation and controls shall provide suitable redundancy and diversity to ensure that safety functions can be completed, when required, and that no single failure will result in the loss of the protective functions	DOE Order 6430.1A Section 1660-99.0.2	Verified during design review				X	

TABLE A-1
QUALITY CONFORMANCE INSPECTION MATRIX (Page 8 of 11)

Section	Function/Requirement	Source Document	Remarks Suggested Test Methods	Inspection Element				
				E X A M	D E M O	T E S T	A N A L	N A
3.3.6.1.1.3	The design of safety class instrumentation and control systems shall provide for the periodic in-place testing and calibration of instrument channels and interlocks	DOE Order 6430.1A Section 1660-99.0.2	Verified during design review	X				
3.3.7.1	Warning and alarm systems shall be designed, installed, and tested to ensure they can be heard in the ambient conditions of the area for which they are intended	DOE Order 6430.1A Section 1300-6.5.5	Verified under (TBD)			X	X	
3.3.7.2	Displays shall provide the information about system status and parameter values which is needed to meet task requirements. Continuous status, rather than on-demand information, shall be displayed for important parameters. Displays shall indicate whether they reflect demand or actual status.	DOE Order 6430.1A Section 1300-12.4.6	Verified under (TBD)	X				

TABLE A-1
QUALITY CONFORMANCE INSPECTION MATRIX (Page 9 of 11)

Section	Function/Requirement	Source Document	Remarks Suggested Test Methods	Inspection Element				
				E X A M	D E M O	T E S T	A N A L	N A
3.3.7.3	Each display device, including meters, CRTs, LCDs, consoles, and other electronic or mechanical media shall be formatted and designed to ensure both the display and display content are readable, understandable, and accessible	DOE Order 6430.1A Section 1300-12.4.6		X				
3.3.7.4	Failure of a display of any type shall easily be recognized and shall not affect equipment or system performance unless alternate means exist to accomplish system performance.	DOE Order 6430.1A Section 1300-12.4.6				X		
3.3.7.5	The warning and annunciator system shall alert personnel to problems or abnormal condition and shall provide sufficient time to respond appropriately to the problem	DOE Order 6430.1A Section 1300-12.4.8 MIL-STD-1472E Section 5.3 NUREG 0700, Section 6.2 NUREG 0700, Section 6.3		X				

TABLE A-1
QUALITY CONFORMANCE INSPECTION MATRIX (Page 10 of 11)

Section	Function/Requirement	Source Document	Remarks Suggested Test Methods	Inspection Element				
				E X A M	D E M O	T E S T	A N A L	N A
3.4.1	Records, documents, and drawing control pertinent to design functions shall be in accordance with LMH-PRO-222, and LMH-PRO-224. Drafting standards for drawings and interface control shall be in accordance with LMH-PRO-1819	LMH-PRO-222 LMH-PRO-224 LMH-PRO-1819						X
3.4.2	Operation and maintenance drawings (as-built essential drawings) shall be prepared as system master drawings showing as-built configuration changes in accordance with HNF-IP-0842, Volume IV, section 4.14	HNF-IP-0842 Volume IV, Section 4.14						X
3.4.3	A master Equipment List (MEL) consisting of an electronic database for SSCs shall be generated in accordance with HNF-IP-0842, Volume IV, Section 4.14. The MEL shall contain such information as unique equipment labels, drawing references, procedures, vendor information, safety classifications, nameplate data, etc	HNF-IP-0842 Volume IV, Section 4.14						X

TABLE A-1
QUALITY CONFORMANCE INSPECTION MATRIX (Page 11 of 11)

Section	Function/Requirement	Source Document	Remarks Suggested Test Methods	Inspection Element					
				E X A M	D E M O	T E S T	A N A L	N A	
3.5.1	The system design shall provide for routine maintenance, repair, or replacement of equipment subject to failure. SSC items shall be designed to allow inspection, maintenance, and testing to ensure their continued functioning, readiness for operation, and accuracy	HNF-IP-0842 Volume IV, Section 4.14		X					
3.5.2	Testing performed after turnover, such as calibrations, functional tests, etc. shall be performed in accordance with existing applicable River Protection Project procedures	Engineering Judgement						X	
3.6.1	Personnel assigned to operate or maintain the system shall be trained for the tasks for which they will perform	Engineering Judgement			X				

APPENDIX B

ALARM IDENTIFICATION AND SAFETY CLASSIFICATION TABLES

Table B-1, Safety Classification Of The AN-Tank Farm CASS Alarms

Farm: AN, Building 241-AN-271 - CASS Substation "C"
REF DWG: H-2-71959, H-2-71560

EQUIPMENT ID NO. (AN271-)	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
ANN-101 (ARP-T-221-00101)						
-	-	1203	-	AN Farm Alarm Panel Power Off	GS	
WSTA-WFA-131	AN271-WSTA-WFAS-131	1204	Hi Level Leak Detector Pit 01C	TK 101 -AN Leak Detection Pit - WT. Factor Hi	GS	
WST-PAH-111	AN271-WST-PSH-111	1205	Hi Pressure Tank 101 (Low Vacuum)	TK 101 -AN - PRESSURE HIGH	GS	
WST-PAL-111	AN271-WST-PSL-111	1206	Low Pressure Tank 101 (Hi Vacuum)	TK 101 -AN - PRESSURE LOW	GS	
WSTA-LDA-151	LDK101-2, LDK101-3, LDK-101-4	1207	Annulus Leak Detected Tank 101	TK 101 -AN ANNULUS LEAK	SC	
WSTA-RAH-101	K-RAN-EXH-101-1	1347	CAM Alarm Tank 101 Annulus	TK 101 -AN Annulus Exhaust - Radiation Hi or Detector Failure	SC	SEL lists as WSTA-RAH -111A
WST-LAH-131	LAK-101-1	1210	Hi Level Tank 101	TK 101 -AN - Liquid Level Hi	GS	
WT-RAH-801	K-SP-241-AN	1350	Hi Rad Alarm Service Water Pit	AN Farm Service Pit-Radiation Hi or Detector Failure	GS	
ANN-102 (ARP-T-221-00102)						
-	-	1221	-	AN Farm Alarm Panel Power Off	GS	
WSTA-WFA-132	AN271-WSTA-WFAS-132	1222	Hi Level Leak Detector Pit 02C	TK 102 -AN Leak Detection Pit - WT. Factor Hi	GS	
WST-PAH-112	AN271-WST-PSH-112	1223	Hi Pressure Tank 102 (Low Vacuum)	TK 102 -AN - PRESSURE HIGH	GS	
WST-PAL-112	AN271-WST-PSL-112	1224	Low Pressure Tank 102 (Hi Vacuum)	TK 102 -AN - PRESSURE LOW	GS	
WSTA-LDA-152	LDK102-2, LDK102-3, LDK-102-4	1225	Annulus Leak Detected Tank 102	TK 102 -AN ANNULUS LEAK	SC	SEL lists as WSTA-LDA -151
WSTA-RAH-102	K-RAN-EXH-102-1	1363	CAM Alarm Tank 102 Annulus	TK 102 -AN Annulus Exhaust - Radiation Hi or Detector Failure	SC	SEL lists as WSTA-RAH -112A
WST-LAH-132	LAK-102-1	1226	Hi Level Tank 102	TK 102 -AN - Liquid Level Hi	GS	
VTA-RAH-910	K-RAN-EXH-K2	1364	Hi Rad Alarm Annulus Exh Stack	AN Tank Farm Annulus Exhaust Fan - Radiation Hi or Detector Failure	GS	
VTP-RAH-510	K-RAN-EXH-K1	1365	Hi Rad Alarm Primary Exh Stack	AN Tank Farm Vessel Exhaust Fan - Radiation Hi or Detector Failure	GS	SEL DATABASE

Table B-1, Safety Classification Of The AN-Tank Farm CASS Alarms - cont.

Farm: AN, Building 241-AN-271 - CASS Substation "C"
REF DWG: H-2-71959, H-2-71560

EQUIPMENT ID NO. (AN271-)	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
ANN-103 (ARP-T-221-00103)						
-	-	1227	-	AN Farm Alarm Panel Power Off	GS	
WSTA-WFA-133	AN271-WSTA-WFAS-133	1230	Hi Level Leak Detector Pit 03C	TK 103-AN Leak Detection Pit - WT. Factor Hi	GS	
WST-PAH-113	AN271-WST-PSH-113	1243	Hi Pressure Tank 103 (Low Vacuum)	TK 103-AN - PRESSURE HIGH	GS	
WST-PAL-113	AN271-WST-PSL-113	1244	Low Pressure Tank 103 (Hi Vacuum)	TK 103-AN - PRESSURE LOW	GS	
WSTA-LDA-153	LDK103-2, LDK103-3, LDK-103-4	1245	Annulus Leak Detected Tank 103	TK 103-AN ANNULUS - LEAK	SC	SEL DATABASE
WSTA-RAH-103	K-RAN-EXH-103-1	1144	CAM Alarm Tank 103 Annulus	TK 103-AN Annulus Exhaust - Radiation Hi or Detector Failure	SC	SEL lists as WSTA-RAH-113A
WST-LAH-133	LAK-103-1 (Probe Disconnected)	1246	Hi Level Alarm Out-of-Service (Probe Disc)	TK 103-AN - Liquid Level Hi	GS	
VTA-XA-910	K-RAN-EXH-K2	1364	Annulus Exh Stack CAM Failure	AN Tank Farm Annulus Exhaust Fan - Radiation Hi or Detector Failure	GS	
VTP-XA-510	K-RAN-EXH-K1	1365	Primary Exh Stack CAM Failure	AN Tank Farm Vessel Exhaust Fan - Radiation Hi or Detector Failure	GS	
ANN-104 (ARP-T-221-00104)						
-	-	1247	-	AN Farm Alarm Panel Power Off	GS	
WSTA-WFA-134	AN271-WSTA-WFAS-134	1250	Hi Level Leak Detector Pit 04C	TK 104-AN Leak Detection Pit - WT. Factor Hi	GS	
WST-PAH-114	AN271-WST-PSH-114	1261	Hi Pressure Tank 104 (Low Vacuum)	TK 104-AN - PRESSURE HIGH	GS	
WST-PAL-114	AN271-WST-PSL-114	1262	Low Pressure Tank 104 (Hi Vacuum)	TK 104-AN - PRESSURE LOW	GS	
WSTA-LDA-154	LDK104-2, LDK104-3, LDK-104-4	1263	Annulus Leak Detected Tank 104	TK 104-AN ANNULUS LEAK	SC	SEL DATABASE
WSTA-RAH-104	K-RAN-EXH-104-1	1147	CAM Alarm Tank 104 Annulus	TK 104-AN Annulus Exhaust - Radiation Hi or Detector Failure	SC	SEL lists as WSTA-RAH-114A
WST-LAH-134	LAK-104-1 (Probe Disconnected)	1264	Hi Level Alarm Out-of-Service(Probe Disc)	TK 104-AN - Liquid Level Hi	GS	

Table B-1, Safety Classification Of The AN-Tank Farm CASS Alarms - cont.

Farm: AN, Building 241-AN-271 - CASS Substation "C"
REF DWG: H-2-71959, H-2-71560

EQUIPMENT ID NO. (AN271-)	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
ANN-105 (ARP-T-221-00105)						
-	-	1265	-	AN Farm Alarm Panel Power Off	GS	
WSTA-WFA-135	AN271-WSTA-WFAS-135	1266	HI Level Leak Detector Pit 05C	TK 105-AN Leak Detection Pit - WT. Factor HI	GS	
WST-PAH-115	AN271-WST-PSH-115	1267	HI Pressure Tank 105 (Low Vacuum)	TK 105-AN - PRESSURE HIGH	GS	
WST-PAL-115	AN271-WST-PSL-115	1270	Low Pressure Tank 105 (HI Vacuum)	TK 105-AN - PRESSURE LOW	GS	
WSTA-LDA-155	LDK105-2, LDK105-3, LDK105-4	1303	Annulus Leak Detected Tank 105	TK 105-AN ANNULUS LEAK	SC	SEL DATABASE
WSTA-RAH-105	K-RAN-EXH-105-1	1161	CAM Alarm Tank 105 Annulus	TK 105-AN Annulus Exhaust - Radiation HI or Detector Failure	SC	SEL lists as WSTA-RAH-115A
WST-LAH-135	LAK-105-1 (Probe Disconnected)	1304	HI Level Alarm Out-of-Service (Probe Disc)	TK 105-AN - Liquid Level HI	GS	
ANN-106 (ARP-T-221-00106)						
-	-	1305	-	AN Farm Alarm Panel Power Off	GS	
WSTA-WFA-136	AN271-WSTA-WFAS-136	1306	HI Level Leak Detector Pit 06C	TK 106-AN Leak Detection Pit - WT. Factor HI	GS	
WST-PAH-116	AN271-WST-PSH-116	1307	HI Pressure Tank 106 (Low Vacuum)	TK 106-AN - PRESSURE HIGH	GS	
WST-PAL-116	AN271-WST-PSL-116	1310	Low Pressure Tank 106 (HI Vacuum)	TK 106-AN - PRESSURE LOW	GS	
WSTA-LDA-156	LDK106-2, LDK106-3, LDK106-4	1321	Annulus Leak Detected Tank 106	TK 106-AN ANNULUS LEAK	SC	SEL DATABASE
WSTA-RAH-106	K-RAN-EXH-106-1	1163	CAM Alarm Tank 106 Annulus	TK 106-AN Annulus Exhaust - Radiation HI or Detector Failure	SC	SEL lists as WSTA-RAH-116A
WST-LAH-136	LAK-106-1	1322	HI Level Tank 106	TK 106-AN - Liquid Level HI	GS	SEL DATABASE
VTA-PDAL-710	K-241-AN-DPS-2	1324	Low Air Flow A Train Annulus Exh	AN Tank Farm Exhaust Fan - K2-5-1 Failure	GS	
VTA-PDAL-810	K-241-AN-DPS-3	1325	Low Air Flow B Train Annulus Exh	AN Tank Farm Exhaust Fan - K2-5-2 Failure	GS	

Table B-1, Safety Classification Of The AN-Tank Farm CASS Alarms - cont.

Farm: AN, Building 241-AN-271 - CASS Substation "C"
 REF DWG: H-2-71959, H-2-71560

EQUIPMENT ID NO. (AN271-)	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
ANN-107 (ARP-T-221-00107)						
-	-	1326	-	AN Farm Alarm Panel Power Off	GS	
WSTA-WFA-137	AN271-WSTA-WFAS-137	1327	HI Level Leak Detector Pit 07C	TK 107-AN Leak Detection Pit - WT. Factor HI	GS	
WST-PAH-117	AN271-WST-PSH-117	1330	HI Pressure Tank 107 (Low Vacuum)	TK 107-AN - PRESSURE HIGH	GS	
WST-PAL-117	AN271-WST-PSL-117	1343	Low Pressure Tank 107 (HI Vacuum)	TK 107-AN - PRESSURE LOW	GS	
WSTA-LDA-157	LDK107-2, LDK107-3, LDK-107-4	1344	Annulus Leak Detected Tank 107	TK 107-AN ANNULUS LEAK	SC	SEL DATABASE
WSTA-RAH-107	K-RAN-EXH-107-1	1165	CAM Alarm Tank 107 Annulus	TK 107-AN Annulus Exhaust - Radiation HI or Detector Failure	SC	SEL lists as WSTA-RAH-117A
WST-LAH-137	LAK-107-1 (Probe Disc.)	1345	HI Level Tank 107 (Probe Disc.)	TK 107-AN - Liquid Level HI	GS	
ANN-101A (ARP-T-221-0101A)						
-	-	1166	-	AN Farm Alarm Panel Power Off	GS	
WT-LDA-126	KLDK-01E-1	1167	Leak Detected SN Receiver, Pit 01E	Receiver Pit 241-AN-01E-Leak	SC	BIO SECTION 5.3.2.18
WT-LDA-125	LDK-01D-1	1170	Leak Detected COND Receiver, Pit 01D	Receiver Pit 241-AN-01D-Leak	GS	Ron Tucker to verify

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Table B-2, Safety Classification Of The AW - Tank Farm CASS Alarms

Farm: AW, Building 241-AW-271 - CASS Substation "A"
REF DWG: H-2-70362, H-2-90928

EQUIPMENT ID NO. (AW271-)	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
ANN-101 (ARP-T-231-00101)						
-	-	2003	-	AW Farm Alarm Panel Power Off	GS	
WSTA-WFA-131	AW101-WSTA-WFAS-131	2004	Hi Level Leak Detector Pit 01C	TK 101-AW Leak Detection Pit - WT, Factor HI	GS	
WST-PAH-111	AW271-WST-PSH-111	2005	Hi Pressure Tank 101 (Low Vacuum)	TK 101-AW - PRESSURE HIGH	GS	
WST-PAL-111	AW271-WST-PSL-111	2006	Low Pressure Tank 101 (Hi Vacuum)	TK 101-AN - PRESSURE LOW	GS	
WSTA-LDA-151	LDK101-2, LDK101-3, LDK-101-4	2007	Annulus Leak Detected Tank 101	TK 101-AW ANNULUS LEAK DETECTOR-LEAK	SC	SEL DATABASE
WSTA-RAH-101A	K-RAN-EXH-101-1	2123	CAM Alarm Tank 101 Annulus	TK 101-AW Annulus Exhaust - Radiation HI or Detector Failure	SC	SEL DATABASE
WT-RAH-801	K-SP-241-AW	2124	Hi Rad Alarm Service Water Pit	AW Farm Service Pit-Radiation HI or Detector Failure	GS	
ANN-102 (ARP-T-231-00102)						
-	-	2010	-	AW Farm Alarm Panel Power Off	GS	
WSTA-WFA-132	AW102-WSTA-WFAS-132	2021	Hi Level Leak Detector Pit 02C	TK 102-AW Leak Detection Pit - WT, Factor HI	GS	
WST-PAH-112	K-PAS-102-2	2022	Hi Pressure Tank 102 (Low Vacuum)	TK 102-AW - PRESSURE HIGH	GS	
WST-PAL-112	AW271-WST-PSL-112	2023	Low Pressure Tank 102 (Hi Vacuum)	TK 102-AW - PRESSURE LOW	GS	
WSTA-LDA-152	LDK102-2, LDK102-3, LDK-102-4	2024	Annulus Leak Detected Tank 102	TK 102-AW ANNULUS LEAK DETECTOR-LEAK	SC	SEL DATABASE
WSTA-RAH-102A	K-RAN-EXH-102-1	2127	CAM Alarm Tank 102 Annulus	TK 102-AW Annulus Exhaust - Radiation HI or Detector Failure	SC	Not in SEL Database, assume like TK 101-AW
VTP-XA-510B	K-RAN-EXH-K1A	2143	Primary Exh Stack CAM Failure and HI	AW Farm Vessel Exhaust - Radiation HI or Detector Failure	GS	SEL DATABASE
VTP-RAH-510B	K-RAN-EXH-K1		Rad Alarm Primary Exh Stack			
VTA-RAH-910C	K-RAN-EXH-K2	2130	Hi Rad Alarm Annulus Exh Stack	AW Farm Annulus Exhaust - Radiation HI or Detector Failure	GS	

Table B-2, Safety Classification Of The AW -Tank Farm CASS Alarms - cont.

Farm: AW, Building 241-AW-271 - CASS Substation "A"
REF DWG: H-2-70362, H-2-90928

EQUIPMENT ID NO. (AW271-)	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
ANN-103 (ARP-T-231-00103)						
-	-	2025	-	AW Farm Alarm Panel Power Off	GS	
WSTA-WFA-133	AW103-WSTA-WFAS-133	2026	Hi Level Leak Detector Pit 03C	TK 103-AW Leak Detection Pit - WT. Factor HI	GS	
WST-PAH-113	AW271-WST-PSH-113	2027	Hi Pressure Tank 103 (Low Vacuum)	TK 103-AW - PRESSURE HIGH	GS	
WST-PAL-113	AW271-WST-PSL-113	2030	Low Pressure Tank 103 (Hi Vacuum)	TK 103-AW - PRESSURE LOW	GS	
WSTA-LDA-153	LDK103-2. LDK103-3. LDK-103-4	2043	Annulus Leak Detected Tank 103	TK 103-AW ANNULUS LEAK DETECTOR- LEAK	SC	SEL DATABASE
WSTA-RAH-103A	K-RAN-EXH-103-1	2145	CAM Alarm Tank 103 Annulus	TK 103-AW Annulus Exhaust - Radiation HI or Detector Failure	SC	SEL DATABASE
ANN-104 (ARP-T-231-00104)						
-	-	2044	-	AW Farm Alarm Panel Power Off	GS	
WSTA-WFA-134	AW104-WSTA-WFAS-134	2045	Hi Level Leak Detector Pit 04C	TK 104-AW Leak Detection Pit - WT. Factor HI	GS	
WST-PAH-114	AW271-WST-PSH-114	2046	Hi Pressure Tank 104 (Low Vacuum)	TK 104-AW - PRESSURE HIGH	GS	
WST-PAL-114	AW271-WST-PSL-114	2047	Low Pressure Tank 104 (Hi Vacuum)	TK 104-AW - PRESSURE LOW	GS	
WSTA-LDA-154	LDK104-2. LDK104-3. LDK-104-4	2050	Annulus Leak Detected Tank 104	TK 104-AW ANNULUS LEAK DET - LEAK	SC	SEL DATABASE
WSTA-RAH-104A	K-RAN-EXH-104-1	2150	CAM Alarm Tank 104 Annulus	TK 104-AW Annulus Exhaust - Radiation HI or Detector Failure	SC	Not in SEL Database, assume like TK 103-AW

Functions, Requirements, and Specifications for Replacement of the
Computer Automated Surveillance System (CASS)

Table B-2, Safety Classification Of The AW -Tank Farm CASS Alarms - cont.

Farm: AW, Building 241-AW-271 - CASS Substation "A"
REF DWG: H-2-70362, H-2-90928

EQUIPMENT ID NO. (AW271-)	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
ANN-105 (ARP-T-231-00105)						
-	-	2061	-	AN Farm Alarm Panel Power Off	GS	
WSTA-WFA-135	AW105-WSTA-WFAS-135	2062	Hi Level Leak Detector Pit 05C	TK 105-AW Leak Detection Pit - WT. Factor Hi	GS	
WST-PAH-115	AW271-WST-PSH-115	2063	Hi Pressure Tank 105 (Low Vacuum)	TK 105-AW - PRESSURE HIGH	GS	
WST-PAL-115	AW271-WST-PSL-115	2064	Low Pressure Tank 105 (Hi Vacuum)	TK 105-AW - PRESSURE LOW	GS	
WSTA-LDA-155	LDK105-2, LDK105-3, LDK-105-4	2065	Annulus Leak Detected Tank 105	TK 105-AW ANNULUS LEAK DETECTOR - LEAK	SC	SEL DATABASE
WSTA-RAH-105A	K-RAN-EXH-105-1	2162	CAM Alarm Tank 105 Annulus	TK 105-AW Annulus Exhaust - Radiation Hi or Detector Failure	SC	SEL DATABASE
ANN-106 (ARP-T-231-00106)						
WSTA-WFA-136	AW106-WSTA-WFAS-136	2066	Hi Level Leak Detector Pit 06C	TK 106-AW Leak Detection Pit - WT. Factor Hi	GS	
WST-PAH-116	AW271-WST-PSH-116	2067	Hi Pressure Tank 106 (Low Vacuum)	TK 106-AW - PRESSURE HIGH	GS	
WST-PAL-116	AN271-WST-PSL-116	2070	Low Pressure Tank 106 (Hi Vacuum)	TK 106-AW - PRESSURE LOW	GS	
WSTA-LDA-156	LDK106-2, LDK106-3, LDK-106-4	2104	Annulus Leak Detected Tank 106	TK 106-AW ANNULUS LEAK DET. - LEAK	SC	SEL DATABASE
WSTA-RAH-106A	K-RAN-EXH-106-1	2121	CAM Alarm Tank 106 Annulus	TK 106-AW Annulus Exhaust - Radiation Hi or Detector Failure	SC	SEL DATABASE
VTA-PDAL-710	K-241-AW-DPS-2	2106	Low Air Flow A Train Annulus Exh	AW Farm TK Exhaust Fan - K2-5-1 Failure (DIFF PRESSURE LOW)	GS	
VTA-PDAL-810	K-241-AW-DPS-3	2107	Low Air Flow B Train Annulus Exh	AW Farm TK Exhaust Fan - K2-5-2 Failure (DIFF PRESSURE LOW)	GS	

Table B-2, Safety Classification Of The AW -Tank Farm CASS Alarms - cont.

Farm: AW, Building 241-AW-271 - CASS Substation "A"
REF DWG: H-2-70362, H-2-90928

EQUIPMENT ID NO. (AW271-)	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
ANN-AUX (ARP-T-231-AUX)						
-	-	2103	-	AW Farm Alarm Panel Power Off	GS	
VTP-XA-310A	K-241-AW-DPS-1/ K-241-AW-DPS-4	2105	Fan Failure A & B Train Primary EXH	AW Farm TK Exhaust Fan - K1-5-1 Failure (DIFF PRESSURE LOW)	GS	
VT-A-XA-910B	FA-EXH-K2	NA	CAM Failure Annulus EXH Stack	NA	GS	PUT ON TMACS
VT-A-RAH-910B	RA-EXH-K2	NA	Hi Rad Alarm Annulus Exh Stack	NA	GS	PUT ON TMACS
CASS EQUIPMENT ALARMS & MISC CASS ALARMS (241-AW-271)						
-	TBD	2163	-	241-A-302A Alarm Panel Power Off	GS	
-	TBD	2164	-	241-A-302A Leak Detection - Pump Pit Leaking	SC	
CASS EQUIPMENT ALARMS & AW FARM ALARMS (242-A)						
-	K-241-AW-ANN	1446	-	AW-Farm Alarm	GS	
LDS-AW-SL	K-241-AW-SLP	1447	-	AW-Farm SN Encasement Lines 167 or 168 - Leak	GS	
LDS-AW-SN	K-241-AW-SNP	1450	-	AW-Farm SN Encasement Line - Leak	GS	
LDS-AW-SN269	K-241-AW-SN-269	1461	-	AW-Farm SN 269 Encasement Line - Leak	GS	
LDS-AW-SN270	K-241-AW-SN-270	1462	-	AW-Farm SN 270 Encasement Line - Leak	GS	
LDS-AW-DR	K-241-AW-DRP	1463	-	AW-Farm Drain Encasement Line 361 - Leak	GS	
LDS-SP-AW	LD1-SP-AW-1, LD2-SP-AW-1	1464	-	AW-Farm Service Pit - Leak	GS	
LDS-COB-AW	K-241-AW-COB-A	1465	-	AW-Farm COB Common Alarm - Leak	SC	
LDS-AW-PP	K-241-AW-PP-A	1466	-	AW-Farm Process Pits Common Alarm - Leak	SC	

Farm: AP, Building 241-AP-271 - CASS Substation "A"
REF DWG: H-2-90476, H-2-90507

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Table B-3, Safety Classification Of The AP -Tank Farm CASS Alarms - cont.

Farm: AP, Building 241-AP-271 - CASS Substation "A"
REF DWG: H-2-90476, H-2-90507

EQUIPMENT ID NO. (AP271-)	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
ANN-104 (ARP-T-271-00104)						
-	-	2662	-	AP Farm Alarm Panel 104 Power Off	GS	
WST-PAH-114A	KPS-104-1	2663	Hi Pressure Tank 104	TK 104-AP - PRESSURE HIGH (Loss of Vacuum)	GS	
WST-PAL-114	KPS-104-2	2664	Low Pressure Tank 104	TK 104-AP - PRESSURE LOW (Excess Vacuum)	GS	
WST-LAH-104	LD1-104-2	2665	Hi Level Tank 104	TK 104-AP - Liquid Level Hi	GS	SEL DATABASE
WSTA-LDA-124	LDK104-2, LDK104-3, LDK-104-4	2666	Annulus Leak Detected Tank 104	TK 104-AP ANNULUS LEAK DETECTOR - LEAK DETECTED	SC	SEL DATABASE
WSTA-FAL-104	K2	2670	CAM 104 Flow Alarm (Low)	TK 104-AP Annulus Vent Duct - Radiation Monitor Flow Low	GS	
ANN-105 (ARP-T-271-00105)						
-	-	2203	-	AP Farm Alarm Panel 105 Power Off	GS	
WST-PAH-115A	KPS-105-1	2204	Hi Pressure Tank 105	TK 105-AP - PRESSURE HIGH (Loss of Vacuum)	GS	
WST-PAL-115	KPS-105-2	2205	Low Pressure Tank 105	TK 105-AP - PRESSURE LOW (Excess Vacuum)	GS	
WST-LAH-105	LD1-105-2	2206	Hi Level Tank 105	TK 105-AP - Liquid Level Hi	GS	SEL DATABASE
WSTA-LDA-125	LDK105-2, LDK105-3, LDK-105-4	2207	Annulus Leak Detected Tank 105	TK 105-AP ANNULUS LEAK DETECTOR - LEAK DETECTED	SC	SEL DATABASE
WSTA-WFAH-115	WSTA-WFS-115	2210	PIT-05C HIGH LEVEL ALARM	TK 105-AP Leak Detection Pit - High Wt Factor	GS	
WSTA-FAL-105	K3	2221	CAM 105 Flow Alarm (Low)	TK 105-AP Annulus Vent Duct - Radiation Monitor Flow Low	GS	
ANN-106 (ARP-T-271-00106)						
-	-	2222	-	AP Farm Alarm Panel 106 Power Off	GS	
WST-PAH-116A	KPS-106-1	2223	Hi Pressure Tank 106	TK 106-AP - PRESSURE HIGH (Loss of Vacuum)	GS	
WST-PAL-116	KPS-106-2	2224	Low Pressure Tank 106	TK 106-AP - PRESSURE LOW (Excess Vacuum)	GS	
WST-LAH-106	LD1-106-2	2225	Hi Level Tank 106	TK 106-AP - Liquid Level Hi	GS	SEL DATABASE
WSTA-LDA-126	LDK106-2, LDK106-3, LDK-106-4	2226	Annulus Leak Detected Tank 106	TK 106-AP ANNULUS LEAK DETECTOR - LEAK DETECTED	SC	SEL DATABASE
WSTA-FAL-106	K3	2230	CAM 106 Flow Alarm (Low)	TK 106-AP Annulus Vent Duct - Radiation Monitor Flow Low	GS	

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Computer Automated Surveillance System (CASS)

Table B-3, Safety Classification Of The AP -Tank Farm CASS Alarms - cont.

Farm: AP, Building 241-AP-271 - CASS Substation "A"
REF DWG: H-2-90476, H-2-90507

EQUIPMENT ID NO. (AP271-)	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
ANN-107 (ARP-T-271-00107)						
WST-PAH-117A	KPS-107-1	2243		AP Farm Alarm Panel 107 Power Off	GS	
WST-PAL-117	KPS-107-2	2244	Hi Pressure Tank 107	TK 107-AP - PRESSURE HIGH (Loss of Vacuum)	GS	
WST-LAH-107	LD1-107-2	2245	Low Pressure Tank 107	TK 107-AP - PRESSURE LOW (Excess Vacuum)	GS	
	LDK107-2	2246	Hi Level Tank 107	TK 107-AP - Liquid Level Hi	GS	SEL DATABASE
WSTA-LDA-127	LDK107-3, LDK-107-4	2247	Annulus Leak Detected Tank 107	TK 107-AP ANNULUS LEAK DETECTOR - LEAK DETECTED	SC	SEL DATABASE
WSTA-FAL-107	K2	2261	CAM 107 Flow Alarm (Low)	TK 107-AP Annulus Vent Duct - Radiation Monitor Flow Low	GS	
ANN-108 (ARP-T-271-00108)						
		2262		AP Farm Alarm Panel 108 Power Off	GS	
WST-PAH-118A	KPS-108-1	2263	Hi Pressure Tank 108	TK 108-AP - PRESSURE HIGH (Loss of Vacuum)	GS	
WST-PAL-118	KPS-108-2	2264	Low Pressure Tank 108	TK 108-AP - PRESSURE LOW (Excess Vacuum)	GS	
WST-LAH-108	LD1-108-2	2265	Hi Level Tank 108	TK 108-AP - Liquid Level Hi	GS	SEL DATABASE
WSTA-LDA-128	LDK108-2, LDK108-3, LDK-108-4	2266	Annulus Leak Detected Tank 108	TK 108-AP ANNULUS LEAK DETECTOR - LEAK DETECTED	SC	SEL DATABASE
WSTA-FAL-108	K2	2270	CAM 108 Flow Alarm (Low)	TK 108-AP Annulus Vent Duct - Radiation Monitor Flow Low	GS	
ANN-AUX (ARP-T-271-AUX)						
		2303		AP Farm Auxiliary Alarm Panel - Power Off	GS	
WT-LAH-231	KHL-ANNUL-1	2304	Annulus Pump Pit Sumps Level Alarm (Hi)	AP Farm Annulus Pump Pit Sumps - Hi Level	GS	
WSTA-LAH-114	KHL-LDP-1	2305	Pit 03C and 05C Sump Hi Level	AP Farm Leak Detection Pump Pits- Sump Level Hi	GS	

Table B-3, Safety Classification Of The AP -Tank Farm CASS Alarms - cont.

Farm: AP, Building 241-AP-271 - CASS Substation "A"
REF DWG: H-2-90476, H-2-90507

EQUIPMENT ID NO. (AP271-)	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
WT-LDXA-201	KLD-PP-2	2306	Central Pump Pits Leak Detector Failure Alarm	AP Farm Central Pump Pits - Leak Detector Failure Alarm	SC	
WT-LDXA-202	KLD-ANNUL-2	2307	Annulus Pump Pit Leak Detector Failure Alarm	AP Farm Annulus Pump Pit Leak Detectors Failure	GS	
WT-LDXA-209	KLD-LDP-2	2310	Leak Detector Pits Leak Detector Failure Alarm	AP Farm Leak Detection Pump Pits - Leak Detectors Failure	GS	
WT-LDXA-225	KLD-SL-ENC-2	2321	SL 509/510 Leak Detector Failure Alarm	AP Farm SL 509/510 Encasement Line-Leak Detection Failure	GS	
WT-LDXA-227	KLD-SN-ENC-2	2322	SL 609/610 Leak Detector Failure Alarm	AP Farm SN609/SN610 Encasement Line-Leak Detection Failure	GS	
RW-LAL-141	LL-SP	2323	Water Service Bldg Pit Sump Level Alarm-Low	AP Farm Service Pit Sump-Level Low	GS	
RW-LAL-204	LL-FP	2324	Flush Pit Sump Level Alarm-Low	AP Farm Flush Pit Sump-Level Low	GS	
WT-LDA-223	KLD-GP-1	2250	SN-650 Encasement Leak Detected Alarm	???	GS	
WT-LDXA-210	LD2-03d	2325	Pit 03D Leak Detector Failure Alarm	TK-103-AP Drain Pit-Leak Detector Failure	GS	
WT-LDXA-205	KLD-2	2726	Pit 02D Leak Detector Failure Alarm	AP Farm Pump Pit 02D Leak Detector Failure	SC	
WT-LDXA-206	KLD-4	2727	SL 621 Leak Detector Failure Alarm	Transportable Grout Equipment Line-SN-621 Leak Det Failure	GS	

Table B-3, Safety Classification Of The AP -Tank Farm CASS Alarms - cont.

Farm: AP, Building 241-AP-271 - CASS Substation "A"
 REF DWG: H-2-90476, H-2-90507

EQUIPMENT ID NO. (AP271-)	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
CASS EQUIPMENT ALARMS & AP-FARM ALARMS (242-A)						
RSH-APK11 (MCS TAG NO. TYP)	K-RAN-EXH-K1	2344	-	AP Farm K-1 Primary Exhaust Stack - HI Radiation Detected	GS	
RSH-APK21	K-RAN-EXH-K2	2345	-	AP Farm K-2 Annulus Exhaust Stack - HI Radiation Detected	GS	
LDS-AP-A	KLD-PP-1	2346	-	AP Farm Central Pump Pits - Leak Detected	SC	
LDS-AP-SL	KLD-SL-ENC-1	2347	-	AP Farm SL 509/510 Encasement Line-Leak Detected	GS	
RSH-101AP	K-RAN-101-1	2350	-	TK 101-AP Annulus Exhaust - HI Radiation Detected	SC	
RSH-102AP	K-RAN-102-1	2361	-	TK 102-AP Annulus Exhaust - HI Radiation Detected	SC	
RSH-103AP	K-RAN-103-1	2362	-	TK 103-AP Annulus Exhaust - HI Radiation Detected	SC	
RSH-104AP	K-RAN-104-1	2363	-	TK 104-AP Annulus Exhaust - HI Radiation Detected	SC	
RSH-105AP	K-RAN-105-1	2364	-	TK 105-AP Annulus Exhaust - HI Radiation Detected	SC	
RSH-106AP	K-RAN-106-1	2365	-	TK 106-AP Annulus Exhaust - HI Radiation Detected	SC	
RSH-107AP	K-RAN-107-1	2366	-	TK 107-AP Annulus Exhaust - HI Radiation Detected	SC	
RSH-108AP	K-RAN-108-1	2367	-	TK 108-AP Annulus Exhaust - HI Radiation Detected	SC	
RXS-AP-K11	K-RAN-EXH-K1	2370	-	AP Farm K-1 Primary Exhaust Stack - Rad Monitor Sys Failure	GS	
RXS-APK21	K-RAN-EXH-K2A	2403	-	AP Farm K-2 Annulus Exhaust Stack - Rad Monitor Sys Failure	GS	
LDS-AP-B	KLD-ANNUL-1	2404	-	AP Farm Annulus Pump Pits - Leak Detected	GS	
LDS-AP-SN	KLD-SN-ENC-1	2405	-	AP Farm SN609/SN610 Encasement Line-Leak Detected	GS	
RXS-101AP	K-RAN-101-1A	2406	-	TK 101-AP Annulus Exhaust - Rad Monitor Sys Failure	GS	
RXS-102AP	K-RAN-102-1A	2407	-	TK 102-AP Annulus Exhaust - Rad Monitor Sys Failure	GS	
RXS-103AP	K-RAN-103-1A	2410	-	TK 103-AP Annulus Exhaust - Rad Monitor Sys Failure	GS	
RXS-104AP	K-RAN-104-1A	2421	-	TK 104-AP Annulus Exhaust - Rad Monitor Sys Failure	GS	
RXS-105AP	K-RAN-105-1A	2422	-	TK 105-AP Annulus Exhaust - Rad Monitor Sys Failure	GS	
RXS-106AP	K-RAN-106-1A	2423	-	TK 106-AP Annulus Exhaust - Rad Monitor Sys Failure	GS	
RXS-107AP	K-RAN-107-1A	2424	-	TK 107-AP Annulus Exhaust - Rad Monitor Sys Failure	GS	
RXS-108AP	K-RAN-108-1A	2425	-	TK 108-AP Annulus Exhaust - Rad Monitor Sys Failure	GS	
FSL-APK11	AP271-VTP-FSL-509	2426	-	AP Farm K-1 Primary Exhaust Stack - Flow Low	GS	

Table B-3, Safety Classification Of The AP - Tank Farm CASS Alarms - cont.

Farm: AP, Building 241-AP-271 - CASS Substation "A"
REF DWG: H-2-90476, H-2-90507

EQUIPMENT ID NO. (AP271-)	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
CASS EQUIPMENT ALARMS & AP-FARM ALARMS (242-A)-Cont.						
FSL-APK12	AP271-VTA-FSL-908	2427	-	AP Farm K-2 Annulus Exhaust Stack - Flow Low	GS	
LDS-AP-C	KLD-LDP-1	2430	-	AP Farm Leak Detection Pump Pits- Leak Detected	SC	
LDSAP02DC	KLD-1	2443	-	AP Farm Pump Pit 02D - Leak Detected	SC	
FSL-APK12	KFS-1	2463	-	AP Farm K-1 Primary Exhaust Stack - Record Monitor Flow Low	GS	
FSL-APK22	KFS-2	2464	-	AP Farm K-2 Annulus Exhaust Stack - Record Monitor Flow Low	GS	
LDS-AP-VP	KLD-VP	2465	-	AP Farm Valve Pit - Leak Detected	SC	
FSL-APK13	KFS-3	2510	-	AP Farm K-1 Primary Exhaust Stack - Radiation Monitor Flow Low	GS	
FSL-APK23	KFS-4	2521	-	AP Farm K-2 Annulus Exhaust Stack - Rad Monitor Flow Low	GS	
LDS-AP-FP	KLD-FP	2522	-	AP Farm Flush Pit - Leak Detected	GS	
RSH-AP-SP	K-SP-241-AP-1	2525	-	AP Farm Service Pit - Radiation Hi	GS	
RXS-AP-SP	K-SP-241-AP-2	2526	-	AP Farm Service Pit - Rad Monitor Sys Failure	GS	
YS-AP-K1	K-AP-DPS-1, K-AP-DPS-4	2543	-	AP Farm Primary Exhaust Fans - Not Operating	GS	Operations will monitor if required
YS-AP-K2	K-AP-DPS-2, K-AP-DPS-3	2544	-	AP Farm Annulus Exhaust Fans - Not Operating	GS	
LDS-AP-SP	LD1-SP	2545	-	AP Farm Service Pit - Leak Detected	GS	
LDS-AP03D	LD1-03D	2546	-	TK 103-AP Drain Pit - Leak Detected	GS	

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Computer Automated Surveillance System (CASS)

Table B-4, Safety Classification Of The A -Tank Farm CASS Alarms

Farm: A, Building 241-A-271 - CASS Substation "A"
REF DWG: H-2-44744, H-2-71781

EQUIPMENT ID NO.	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
ANNUNCIATOR A3 (ARP-T-211-00001)						
PA-101-1	KPAS-101-1	1144	TK 101-AV Vacuum Too Low (< 25 inches)	A Farm Alarm Panel - Power Off	GS	
PA101-2	PAS-101-2	1143	101-AV Too Much Vacuum (>3.5 inches)	TK 101-AV Pressure Hi	GS	
LLA-101-1	LLK-101-1	1164	101-AV Hi Liquid Level > 360 inches	TK 101-AV Pressure Low	GS	
FA-101-1	KFS1Y-1/ KR1Y-1	1124	101-AV Air Lift Circulators Low Total Flow Rate < 60 CFM	TK 101-AV Level Hi	SS	SEL DATABASE
WFA-101A-1	WFAAS-101A-1	1162	101-AV Leak Det Pit 101-A sump Hi Liquid Level (> 30" WF)	TK 101-AV Air Circulators - Low Flow	GS	
LDA-101-1	LDK-101-1	1161	101-AV Annulus Leak Det Failed or Detected Liquid	TK 101-AV Leak Detection Pit - Hi Level	GS	
RA-101-AV	S3 / RK-1	1147	101-AV Annulus Air Monitor Detected Hi Radiation in Exh Air	101-AV Annulus Leak Detector - Leak	SC	SEL DATABASE
XA-101-AV	S1/PS-K1-1-2 PS-K1-1-3/M1-3	1145	101-AV Annulus Exhauster is not Operating	101-AV Annulus Vent- Radiation Hi	SC	SEL DATABASE
WFAAS-101B-1	WFAAS-101B-1	1163	101-AV Annulus Leak Det Pit 101B sump Hi Liq Lvl (>30" WF)	101-AV Annulus Vent System Failure	GS	
PA-102-1	KPAS-102-1	1166	102-AV Vacuum Too Low (< 25" Vacuum)	AY Encasement Leak Det Pit - Hi Level	SC	
PA-102-2	PAS-102-1	1165	102-AV Hi Vacuum	TK 102-AV Pressure Hi	GS	
LLA-102-1	LLK-102-1	1206	102-AV Hi Liquid Level (>360")	TK 102-AV Pressure Low	GS	
FA-102-1	KFS2Y-1/ KR2Y-1	1250	102-AV Air Lift Circulators Low Total Flow Rate < 60 CFM	TK 102-AV - Level Hi	SS	SEL DATABASE
WFA-102-1	WFAAS-102-1	1205	101-AV Annulus Leak Det Pit sump Hi Liquid Level (>30" WF)	TK 102-AV Air Circulators - Low Flow	GS	
LDA-102-1	LDK-102-1	1204	102-AV Annulus Leak Det Failed or Detected Liquid	AY Encasement Leak Det Pit - Hi Level	GS	
RA-102-AV	S3 / RK-1	1203	102-AV Annulus Air Monitor Detected Hi Radiation in Exh Air	102-AV Annulus Leak Detector - Leak	SC	SEL DATABASE
XA-102-AV	S1/PS-K2-1-2/ PS-K2-1-3/M2-3	1167	102-AV Annulus Exhauster is not Operating	102-AV Annulus Vent- Radiation Hi	SC	SEL DATABASE
AX271-WST-LAH-132	WFL-132	1121	Hi Level AX-101 Leak Det Pit	102-AV Annulus Vent System Failure	SC	SEL DATABASE
AX271-WST-LAH-142	WFL-142	1122	Hi Level AX-102 Leak Det Pit	TK-101-AX Leak Det Pit - Hi Level	GS	
AX271-WST-LAH-137	WFL-137	1123	Hi Level AX-103 Leak Det Pit	TK-102-AX Leak Det Pit - Hi Level	GS	
AX271-WST-LAH-147	WFL-147	1125	Hi Level AX-104 Leak Det Pit	TK-103-AX Leak Det Pit - Hi Level	GS	
				TK-104-AX Leak Det Pit - Hi Level	GS	

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Functions, Requirements, and Specifications for Replacement of the
Computer Automated Surveillance System (CASS)

Table B-4, Safety Classification Of The A-Tank Farm CASS Alarms - cont.

Farm: A, Building 241-A-271 - CASS Substation "A"
REF DWG: H-2-44744, H-2-71781

EQUIPMENT ID NO.	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
ANNUNCIATOR A4 (ARP-T-211-00002)						
PA-101-1	KPAS-101-1	1223	101-AZ Vacuum Too Low (< 25" Vacuum)	A Farm Alarm Panel - Power Off	GS	
PA-102-1	KPAS-102-1	1245	102-AZ Vacuum Too Low (< 25" Vacuum)	TK 101-AZ Pressure Hi	GS	
LDA-501	LDK-501	1304	501-AZ Cond Valve Pit Leak Detector Failed or Detected Liquid	TK 102-AZ Pressure Hi	GS	
WFA-101/102-1	WFA-101/102-1	1207	101/102 Encasement Leak Det Pit sump - Hi Liq Lvl (>30" WF)	501 AY Valve Pit Leak	GS	
LLA-101-1	LLAS-101-1	1326	101-AZ Hi Liquid Level (>360")	101/102 Encasement Leak Det Pit - Wt Factor Hi	SC	
LLA-102-1	LLAS-102-1	1262	102-AZ Hi Liquid Level (>360")	TK 101-AZ Liquid Level Hi	SS	SEL DATABASE
FA-101-1	KFS12-1/KR1Z-1	1323	101-AZ Air Lift Circulators Low Total Flow Rate < 60 CFM	TK 102-AZ Level Hi	SS	SEL DATABASE
WFA-101-1	WFA-101-1	1247	101-AZ Air Lift Circulators Low Total Flow Rate < 60 CFM	TK 101-AZ Air Circulators - Low Flow	GS	Surveillance req. met by other means
FA-102-1	KFS22-1/KR2Z-1	1265	102-AZ Air Lift Circulators Low Total Flow Rate < 60 CFM	TK 101-AZ Leak Det Pit - Wt Factor Hi	GS	
WFA-102-1	WFA-102-1	1046	102-AZ Annulus Exhauster is not Operating	TK 102-AZ Air Circulators - Low Flow	GS	
FA-AZ-ANNULUS	Multiple Contacts	1322	102-AZ Leak Det Pit sump Hi Liquid Level (>30" WF)	TK 102-AZ Leak Det Pit - Wt Factor Hi	GS	
LDA-101-1	LDK-101-1	1246	101-AZ Annulus Leak Det Failed or Detected Liquid	TK 101-AZ Annulus Exhaust - Failure	GS	
LDA-102-1	LDK-102-1	1263	102-AZ Annulus Leak Det Failed or Detected Liquid	TK 101-AZ Annulus Leak Detector - Leak	SC	SEL DATABASE
WFA-417	HI LL - HI WT FACTOR	1310	241-A-417 Condensate Receiver Hi Liquid Level (>125")	TK 102-AZ Annulus Leak Detector - Leak	SC	SEL DATABASE
RA-101-AZ	RK-101-1	1047	101-AZ Annulus Air Monitor - Hi Radiation in Exhaust Air	TK 417 Wt Factor Hi	GS	
RA-102-AZ	RK-102-1	1243	102-AZ Annulus Rad Monitor - Hi Radiation in Exhaust Air	TK 101-AZ Annulus Vent- Radiation Hi	SC	SEL DATABASE
LDA-4508	LDK-4507/LDK-4508	1330	W4507/PW4508 Leak Det Failed or Detected Liquid	TK 102-AZ Annulus Vent- Radiation Hi	SC	SEL DATABASE
WFA-151-1	KWFA-151-1	1303	151-AZ Catch Tank - Hi Liquid Level (> 59" WF)	AZ Tank Fill PW Lines 4507, 4508- Leak	GS	
ANNUNCIATOR A7 (ARP-T-211-00003)						
LA-702-1	LS-702-1	1224	702-A DE Entrainer Seal Pot Low Liquid Level	TK 151-AZ Wt Factor Hi	GS	
MISC CASS ALARMS & CASS EQUIPMENT ALARMS						
-	TBD	1106	-	A Farm Alarm Panel - Power Off	GS	
-	TBD	1363	-	702A Loss of Seal	GS	
-	TBD	1364	-	241 AX Seal Pot Level - Hi	GS	
-	TBD	1365	-	241 AX Seal Pot Level - Low	GS	
-	TBD	1365	-	241 AX Seal System - Failure	GS	

Table B-4, Safety Classification Of The A -Tank Farm CASS Alarms - cont.

Farm: A, Building 241-A-271 - CASS Substation "A"
REF DWG: H-2-44744, H-2-71781

EQUIPMENT ID NO.	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
CASS EQUIPMENT ALARMS & 244-A LIFT STATION ALARMS (242-A)						
-	TBD	1406	-	Lift Station TK-350-A - Hi Level (LA-350-2)	GS	
PDSL-EF-2	K1-5-1B	1407	-	244A Exhaust Fan or Sample Pump - Failure	GS	
-	TBD	1410	-	241-A-350 PW 481 Process Waste Line - Leak	GS	
-	TBD	1421	-	241-A/A-350-2 Leak Detector - Leak	SC	
-	TBD	1422	-	244A Encasement Line V-232 - Leak Detected	GS	
-	TBD	1423	-	244A Encasement Line V-234 - Leak Detected	GS	
-	TBD	1424	-	244A Encasement Line V-229 - Leak Detected	GS	
-	TBD	1425	-	244A Filter DP - Low	GS	
PDSH-EF-1	PS-1-1, PS-1-2	1426	-	244A Filter DP - Hi	GS	
LDSP	K-PCU-4-2	1427	-	244A Pit - Leak	SC	
CASS EQUIPMENT ALARMS & 244-A LIFT STATION ALARMS (242-A) - Cont.						
-	TBD	1430	-	TK 244-A - Wt. Factor Hi	GS	
-	TBD	1443	-	TK 244-A - Sump Wt. Factor Hi	GS	
-	TBD	1550	-	244A Exhaust Stack - Hi Radiation	GS	
-	TBD	1563	-	TK-244-1 Wt. Factor Low	GS	
CASS EQUIPMENT & AN-FARM ALARMS (242-A)						
LDS-ANSN2	K-241-AN-SNP	1503	-	AN Farm SN Encasement Lines - Leak	GS	
LDS-DR368	K-241-AN-DRP	1504	-	AN Farm Drain Encasement Line 368 - Leak	GS	
LDS-SP-AN	LD1-SP-AN-1 LD2-SP-AN-1	1505	-	AN Farm Service Pit - Leak	GS	
LDS-COBAN	K-241-AN-COBA	1506	-	AN Farm COB Common Alarm - Leak	SC	SEL DATABASE
LDS-AN-PP	K-241-AN-PPA	1507	-	AN Farm Process Pits Common Alarm - Leak	SC	SEL DATABASE

Table B-5, Safety Classification Of The SX -Tank Farm CASS Alarms

Farm: SX, Building 241-SX-271 - CASS Substation "S"
REF DWG: H-2-35832, H-2-71784

EQUIPMENT ID NO.	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
ANN-241-SX-271 (NO ARP)						
-	-	1047	-	SX Farm Alarm Panel - Power Off	GS	
DPA-SX-9	DPS-9	1066	-	SX Farm Filter k1-1-3, k1-2-5 Hi Diff Pressure	GS	
DPA-SX-10	DPS-10	1065	-	SX Farm Filter k1-2-6 - Hi Diff Pressure	GS	
DPA-SX-1	DPS-1	1064	-	SX Farm Filter k1-1-1, k1-2-1 Hi Diff Pressure	GS	
DPA-SX-2	DPS-2	1063	-	SX Farm Filter k1-1-2-2 - Hi Diff Pressure	GS	
SDA-SX-1	K-SX-9-2	1062	-	SX Farm Exhaust Fans Shut Down	GS	
RA-SX-1	K-SX-11-2	1050	-	SX Exhaust Stack - Radiation Hi	GS	SEL DATABASE
FA-SX-1	FA-SX-1	1130	-	SX Farm Sludge Tank Stack Monitor - System Failure	GS	SEL DATABASE
-	-	1044	-	240-S-151 or TK 240-S-302 Leak Detection - Pump Pit or Diversion Box Leak	SC	
-	-	1046	-	240-S-302 Alarm Panel - Power Off	GS	
-	-	1103	-	TK-241-S-302A Leak Detection - Pump Pit Leak	GS	Will be verified manually by OPs if required
-	-	1104	-	240-S-302A Alarm Panel - Power Off	GS	
-	-	1105	-	SX Alarm Panel Power-Fail	GS	

Table B-6, Safety Classification Of The S -Tank Farm CASS Alarms

Farm: S, Building 242-S - CASS Substation "S"
REF DWG: H-2-46436, H-2-71563

EQUIPMENT ID NO.	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
PANEL A (ARP-T-701-0001)						
		1243		242-S Alarm Panel - Power Off	GS	
LDA-PP-1	LLK-PP-1	1245	Floor Drain Trap For the 2440-S Pump Pit Does not Have Enough Water	244 S Pump Pit Drain Trap - Level Low	GS	
WFA-TK-1A	K-4	1246	244-S DCRT Wt Factor Low	244S Catch Tank Wt Factor Low	GS	
WFA-TK-1B	KWFAS-TK-1	1247	244-S DCRT Wt Factor Hi	244S Catch Tank Wt Factor Hi	GS	
LDA-V562	LDK-V562-1 LDK-V562-1A	1261	Leak Detected in the Transfer Line Between 244-S and V.P. 241-SY-A	244-S Encasement Line V562 - Leak	GS	
LDA-V561	K-V561	1250	Leak Detected in the Transfer Line Between 244-S and V.P. 241-SY-B	244-S Encasement Line V561 - Leak	GS	
LDA-V456	LDK-V456-1 LDK-V456-1A	1263	Leak Detected in the Transfer Line Between 241-U-151 and 242-S	244-S Encasement Line V456 - Leak	GS	
LDA-V522	K-V522	1264	Leak Detected in the Transfer Line V522 Between 244-S and 241-S-151	244-S Encasement Line V522 - Leak	GS	
LDA-V560	LDK-V560-1 LDK-V560-1A	1265	Leak Detected in the Transfer Line Between 244-S and 241-S-151	244-S Encasement Line V560 - Leak	GS	
A-FLTRS	PS-1-1 PS-1-2	1266	Hi Flow Through or K1-2-1, K1-3-2, K1-2-2 and/or K1-3-3 HEPA Filters Plugged	244-S HEPA Filters Pressure Drop - Hi	GS	
A-FLTRS-1	K6 / K7	1267	Low Flow or Breach of K1-3-4 and/or K1-3-5 HEPA Filters	244-S HEPA Filters Pressure Drop - Low	GS	
LDA-PP-2	LDK-PP-2 LDK-PP-2A	1303	Leak Detected in The Pump Pit at 244-S	244-S Pump Pit Drain - Hi Level	GS	Operations to manually monitor if required
WFA-S-1	K-WFAS-S-1	1304	Liquid Intrusion Into Vault Area Of 244-S DCRT	244S Sum Wt. Factor - High	GS	
TA-K1-3-1	K-5	1270	Exhaust Intrusion Into Vault Area Of 244-S DCRT	244-S Header K1-4-2 Over Temperature	GS	
RA-EXH-1	KRIAS-EXH-1 (H1)	1350	Exhaust Ventilation Filter Is Overheating	244-S Exh Stack Beta/Gamma Radiation High	GS	SEL DATABASE
RA-EXH-2	KRIAS-EXH-2 (H1)	1361	Exhaust Stack High Beta-Gamma	244-S Exh Stack Alpha-Radiation High	GS	SEL DATABASE
RA-EXH-3	KRIAS-EXH-3 (FAIL)	1362	Exhaust Stack High Alpha	244-S Exh Stack Alpha-Radiation High	GS	
RA-EXH-4	KRIAS-EXH-2 (FAIL)	1363	Exhaust Stack Beta-Gamma System Failure	244-S Exh Stack Beta/Gamma Monitor - Failure	GS	
RA-AS-2	RA1S-AS-1	1365	244-S Vent System Alpha CAM Failure	244-S Exhaust Stack Alpha Monitor - Failure	GS	
RA-AS-1	RA1S-AS-1	1365	244-S Annulus Vent System Failed	244-S Annulus Monitor - Failure	GS	
RA-AS-1	KRIAS-AS-1	1364	244-S Annulus Vent System High Beta-Gamma Rad Levels	244-S Annulus Radiation High	GS	

Table B-6, Safety Classification Of The S -Tank Farm CASS Alarms - cont.

Farm: S, Building 242-S - CASS Substation "S"
REF DWG: H-2-46436, H-2-71563

EQUIPMENT ID NO.	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
PANEL B (ARP-T-701-0002)						
-	-	1143	-	242-S Alarm Panel Power - Off	GS	
WFA-CA1-1A	WFAS-CA1-1/A	1147	Liquid Level in Vapor-Liquid Separator C-A-1 (Evaporator Vessel) Above 165 Inches	242S C-A-1 Wt. Factor-High	GS	
PANEL C (ARP-T-701-0003)						
WFA-SUMP-1A	WFAS-SUMP-1/A	1150	Liquid Level in 242-S Pump Room Sump Above 47 Inches	242S Sump Wt. Factor-High	GS	
-	-	1146	-	242-S Alarm Panel Power - Off	GS	
PA-AN	PS-AN	1164	Low Process Air Pressure and/or Possible Problems	242-S process Air-Low	GS	
PANEL D (ARP-T-701-0004)						
-	-	1305	-	242-S Alarm Panel Power-Off	GS	
DPA-K1-6-1A	DPSH-K1-6-1A	1204	Building Exhaust Filter K1-6-1 Diff Pressure Hi	242S Bldg Exhaust Filters - DP High or Low	GS	
DPA-K1-6-1B	DPSL-K1-6-1		Building Exhaust Filter K1-6-1 Diff Pressure Low			
DPA-K-6-3	DPSL-K1-6-3		Building Exhaust Filter K1-6-3 Diff Pressure Low			
DPA-K-6-2A	DPSH-K1-6-2A		Building Exhaust Filter K1-6-2 Diff Pressure Hi			
DPA-K-6-2B	DPSL-K1-6-2B	1326	Building Exhaust Filter K1-6-2 Diff Pressure Low	242S Bldg Exhaust Filters - DP High or Low	GS	
DPA-K-6-4	DPSL-K1-6-4		Building Exhaust Filter K1-6-4 Diff Pressure Low			
RA-EXH-K1-1	K-K1-1	1326	Indicates High Radiation in Building Exhaust Stack	242S Bldg Exhaust Filters - DP High or Low	GS	
PANEL F (ARP-T-701-0006)						
-	-	1205	-	242-S Alarm Panel Power-Off	GS	
SY242-WSTA-RAH/RXA-101C	H-2-92999-3	1226	Tank 101 Annulus Leak Detection Radiation Alarm (High)/CAM 101 Failure Alarm	TK 101-SY annulus Sample Pump - Failure	SC	SEL DATABASE
SY242-WSTA-RAH/RXA-102C	H-2-92999-3	1227	Tank 102 Annulus Leak Detection Radiation Alarm (High)/CAM 102 Failure Alarm	TK 102-SY annulus Sample Pump - Failure	SC	SEL DATABASE
SY242-WSTA-RAH/RXA-103C	H-2-92999-3	1230	Tank 103 Annulus Leak Detection Radiation Alarm (High)/CAM 103 Failure Alarm	TK 103-SY annulus Sample Pump - Failure	SC	SEL DATABASE
CASS EQUIPMENT ALARMS & MISC CASS ALARMS						
-	-	1366	-	241-S Saltwell Pump - General Alarm	GS	
-	-	1367	-	241-SY VTP-EF-3102 System Trouble Alarm	GS	
-	-	1370	-	241-SY-VTP-EF-3102 Exh System High Radiation	GS	

Table B-7, Safety Classification Of The CR - Tank Farm CASS Alarms

Farm: CR, Building 271-CR - CASS Substation "C"
 REF DWG: H-2-73950, H-2-71783, H-2-73943

EQUIPMENT ID NO.	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
241-C ANNUNCIATOR PANELBOARD CB6 (ARP-T-361-00001)						
-	-	1103	-	CR Vault Alarm Panel - Power Off	GS	
-	-	1104	-	CR Vault Alarm Panel - Power Off	GS	
PA-296-P-16	H-2-95267 SH 3	1106	-	296-P-16 Exhauster Stack Monitor Hi Radiation	GS	
XA-C	H-2-95267 SH 3	1105	-	C Tank Farm - Exhauster Trouble	GS	
XA-296-C-5	H-2-92519 SH 3	1107	-	296-C-5 Stack Monitor - Failure	GS	
RA-296-C-5	H-2-92519 SH 3	1110	-	296-C-5 Stack Monitor - High Radiation	GS	SEL DATABASE

Table B-8. Safety Classification Of The AR -Tank Farm CASS Alarms

Farm: AR, Building 204-AR - CASS Substation "A"
 REF DWG: H-2-70695, H-2-92187

EQUIPMENT ID NO.	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
ANNUNCIATOR "A" (ARP-T-291-00001)						
-	-	1743	-	204AR Alarm Panel - Power Off	GS	
RA-EXH-1A	K21	1745	-	204AR Exhaust Stack-HI Radiation or Detector Failure	GS	SEL DATABASE
RA-UNL-1C	K22	1746	-	204AR RP Car Unload Room Air -HI Radiation or Detector Failure	GS	
RA-UNL-1D	K23	1747	-	204AR RP Car Unload Room Area -HI Radiation or Detector Failure	GS	
LA-TK-1B	K15	1761	-	204AR Catch Tank - Low Level	GS	
LA-TK-1A	K29	1762	-	204AR Catch Tank - HI Level	GS	
LDA-SMP	K19	1763	-	204AR Catch Tank Sump Leak Detector - Leak	SC	
LDA-LIQW-1A	K26	1764	-	204AR VP-241-A-A/ Encasement Line-3" LIQW- 702 Leak or Complex Master Pump Shutdown	SC	
FA-HVAC-1A	PS-HVAC-1	1765	-	204AR Exhaust Fan EF-1 - Failure	GS	
OA-RD-1	KRD-OPEN	1766	-	204AR Out Door Operating Alarm	GS	
RA-UNL-1B	RM-UNL-1C	1750	-	204AR Sample Sink Area -HI Radiation or Detector Failure	GS	
-	K16	1767	-	204-AR Pressure Switch	GS	

Table B-9, Safety Classification Of The BY - Tank Farm CASS Alarms

Farm: BY, Building 241-BY-254 - CASS Substation "B"
REF DWG: H-2-73822,H-2-73605, H-2-70873

EQUIPMENT ID NO.	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
PANEL 244-BX ALARM BOARD (ARP-T-301-00002)						
LDA-1	K-6	1104	Leak Detection in Transfer Line, Pump Pit, Flush Pit, Instr Pit, & Filter Pits	244-BX Vault Xfr Line, Pump Flush, Instrument & Filter Pits - Leak	SC	
LDA-2	K-1	1105	Leak Detected in Sump Pit	244-BX Vault Sump - Leak	GS	
MSA-4	M-4	1106	Exhaust Fan Has Shutdown	244-BX Exhaust Fan Shutdown	GS	
RA-244-BX-2	RK-2	1110	Hi Radiation Detected in Exhaust Stack	244-BX Vault Exhaust Stack - Radiation Hi	GS	SEL DATABASE
RA-244-BX-4	K-3	1121	Beta-Gamma Monitor System for Exhaust Stack Has Failed	244-BX Vault Exhaust Stack Monitor - Failure	GS	SEL DATABASE
LA-244-BX-1	WFK-1	1107	Hi Liquid Level in 244-BX DCRT	244-BX Vault Receiver Tank Liquid Level - Hi	GS	
RA-244-BX-1	RK-1	1122	Hi Radiation Detected by Annulus Radiation Monitor System	244-BX Vault Annulus - Radiation Hi	GS	
RA-244-BX-3	RM-244-BX-1	1123	Annulus Radiation Monitor System Failure	244-BX Vault Annulus Radiation Monitor - Failure	GS	
CASS SUBSTITUTION "B" EQUIPMENT ALARMS & MISC CASS ALARMS						
-	TBD	1103	-	BY Farm Alarm Panel - Power Off	GS	
-	LD1, LD2	1047	-	TK-241-ER-311 Leak Detection-Pump Pit Leak	SC	
-	P5	1050	-	TK-241-ER-311 Compressor Air Pressure - Low	GS	
-	TBD	1061	-	242-ER-311 Alarm Panel - Power Off	GS	

Table B-10, Safety Classification Of The T -Tank Farm CASS Alarms

Farm: T, Building 242-T - CASS Substation "T"
 REF DWG: H-2-73821, H-2-71785

EQUIPMENT ID NO.	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
ANN-242-T (ARP-T-801-001)						
LDA-1	K-6	1043	-	244-TX Leak Det, XFER Line, Pump Flush, Instr and Filter Pits - Leak	SC	
LDA-2	K-1	1044	-	244-TX Sump Pit - Leak	GS	
MSA-4	M-4	1045	-	244-TX Exhaust Fan - Shutdown	GS	
RA-244-TX-2	RK-2	1047	-	244-TX Exhaust Stack - Radiation HI	GS	SEL DATABASE
RA-244-TX-4	RK-5	1050	-	244-TX Exhaust Stack - Monitor Failure	GS	
LA-244-TX-1	WFK-1	1046	-	244-TX Receiver Tank - Level HI	GS	
RA-244-TX-1	RK-1	1061	-	244-TX Annulus - Radiation HI	GS	
RA-244-TX-3	RM-244-TX-1	1062	-	244-TX Annulus - Monitor Failure	GS	
RA-244-TX-5	RK-3	1063	-	244-TX Receiver Tank Neutron Monitor - Radiation HI	GS	
R-244-TX-6	RK-4	1064	-	244-TX Receiver Tank Neutron Monitor - Monitor Failure	GS	
RA-244-TX-7	RK-6	1065	-	244-TX Alpha Stack Monitor - Radiation HI	GS	
RA-244-TX-8	RK-7	1066	-	244-TX Alpha Stack Monitor - Monitor Failure	GS	
ANN-242-T-F (ARP-T-801-001)						
-	-	1105	K2 Exhaust Fan(s) Fail To Operate	242-T Exhaust Fan - Shutdown	GS	
-	-	1106	K2 Exhaust System HI Vacuum Alarm	242-T Exhaust System - Vacuum HI	GS	
RA-K2-5-1	-	1107	BETA/GAMMA Monitor in Alarm	242-T Exhaust Stack - Radiation HI	GS	
RA-K2-5-2	-	1110	Monitor in Alarm Condition	242-T Exhaust Stack Alpha Monitor - Radiation HI	GS	
XA-K2-5-1	-	1121	BETA/GAMMA Monitor in Alarm	242-T Stack Monitor System - Failure	GS	

Table B-11, Safety Classification Of The SY -Tank Farm CASS Alarms

Farm: SY, Building 241-SY-271 - CASS Substation "S"
REF DWG: H-2-37761, H-2-71564

EQUIPMENT ID NO. (SY271-)	ACTIVATING DEVICE	CASS ID	PARAMETER DESCRIPTION	CASS MESSAGE	SAFETY CLASS	REMARKS
ANN-101 (NO ARP)						
WSTA-WFA-104A	K-01C	1403	-	SY Farm Alarm Panel Power Off	GS	
WST-PAH-313	PAS-101-1/PAS-101-1-1	1404	Pit-01C Wt. Factor Alarm	TK-101-SY Leak Detection Pit - Wt. Factor Hi	GS	
WST-PAL-313	PAS-101-2	1405	TK-101 Pressure Alarm Hi	TK-101-SY Pressure Alarm Hi	GS	
WSTA-RAH/RXA-101B	RAS-101-1/RAS-101-1-1	1406	TK-101 Pressure Alarm Low	TK-101-SY Pressure Alarm Low	GS	
WSTA-LDA-107	LDK-101-2A	1462	TK-101 Annulus Leak Detection Radiation Alarm (High)/CAM 101 Failure Alarm	TK-101-SY Annulus Exhaust - Radiation Hi	SC	
VTP-XA-321	K-PS-1-1, K-PS-2-1, K-PS-3-1, K-RAS-EXH-K1-1	1410	TK-101 Annulus Leak Detect Alarm	TK-101-SY Annulus - Leak	SC	SEL DATABASE
		1450	PRI EXH A Train Trouble Alarm	SY Farm Exhauster - Trouble	GS	SEL DATABASE
ANN-102 (NO ARP)						
WSTA-WFA-109A	K-02C	1421	Pit-02C Wt. Factor Alarm	TK-102-SY Leak Detection Pit - Wt. Factor Hi	GS	
WST-PAH-316	PAS-102-1/PAS-102-1-1	1422	TK-102 Pressure Alarm Hi	TK-102-SY Pressure Hi	GS	
WST-PAL-316	PAS-102-2	1423	TK-102 Pressure Alarm Low	TK-102-SY Pressure Low	GS	
WSTA-RAH	RAS-102-1	1465	TK-102 Annulus Leak Detection Radiation Alarm (High)/CAM 102 Failure Alarm	TK-102-SY Annulus Exhaust - Radiation Hi	SC	
WSTA-LDA-112	LDK-102-2A	1425	TK-102 Annulus Leak Detect Alarm	TK-102-SY Annulus - Leak	SC	SEL DATABASE
WT-XA-804	K-241-SY-1	1426	SW Pit Radiation Detection System Fail Alarm	SY-B Valve Pit Limit Switch or Flush Pit Pressure Switch Activated	SC	TBD - Alarm in review, ARP being developed for 241-SY-271
VTA-RAH-910B	K-EXH-K2-1	1466	ANN EXH Stack CAM Sample Remote Radiation Alarm (Hi)	SY Annulus Exhaust - Radiation Hi (Fans Shutdown)	GS	
VTP-RAH-510B	K-EXH-K1-1	1467	PRI EXH A Train Stack Radiation Alarm (Hi)	SY Vessel Exhaust - Radiation Hi (Fans Shutdown)	GS	SEL DATABASE
ANN-103 (NO ARP)						
WSTA-WFA-114A	K-03C	1427	Pit-03C Wt. Factor Alarm	TK-103-SY Leak Detection Pit - Wt. Factor Hi	GS	
WST-PAH-319	PAS-103-1/PAS-103-1-1	1430	TK-103 Pressure Alarm Hi	TK-103-SY Pressure Hi	GS	
WST-PAL-319	PAS-103-2	1443	TK-103 Pressure Alarm Low	TK-103-SY Pressure Low	GS	
WSTA-RAH	RAS-103-1	1503	TK-103 Annulus Leak Detection Radiation Alarm (High)/CAM 103 Failure Alarm	TK-103-SY Annulus Exhaust - Radiation Hi	SC	
WSTA-LDA-117	LDK-103-2A	1445	TK-103 Annulus Leak Detect Alarm	TK-103-SY Annulus - Leak	SC	SEL DATABASE
VTA-FAL-121	FIS-K2-1, FIS-K2-2, FIS-K2-3	1446	ANN EXH Flow Alarm (Lo)	SY Farm Annulus Exhauster - Flow Low	GS	
VTA-XA-720	K-241-SY-4	1447	ANN EXH Fan Failure	SY Farm Tank Pressure - Low	GS	