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7. Abstract

This document discusses inspections which are conducted at the Single-Shell Tank Farm complexes. These inspections are those which meet the Inspection requirements of the Resource Conservation and Recover Act and Washington Administration Code.

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1.0 INTRODUCTION

This document is designed for the Hanford Site Single-Shell Tank (SST) Farms which are identified in the Hanford Site Dangerous Waste Part A Permit Application, section 4.2.2.8.

Completion of this document by October 31, 1990, meets a target date for Tri-Party Agreement Milestone M-23-06. The task to be met by this target date is to "Correlate Procedures to RCRA and Prepare Inspection Plan Matrix." This Matrix describes those inspections that are presently being accomplished which satisfy the Resource Conservation and Recovery Act (RCRA) and Washington Administrative Code (WAC) and, as a result of comparison with these regulations, will provide a means of identifying any existing deficiencies relating to inspections which are required but are not currently administered.

Milestone M-23-11 sets, on its agenda, the task to "Complete Interim Status Corrective Actions for Single-Shell Tanks" by December 31, 1990. Correction of all inspection deficiencies relating to SST Farm facilities on the Hanford Site will satisfy one portion of this Milestone.

2.0 PURPOSE

The purpose of this document is to discuss how the inspection requirements of the RCRA and the WAC are met at the SST Farm facilities. The inspection methods described are those that are currently in use to prevent equipment malfunctions, facility deteriorations, operating errors, and discharges to the environment. These methods demonstrate an inspection schedule which sufficiently identifies and corrects problems before they threaten human health and/or lead to the release of dangerous waste constituents to the environment.

The RCRA and WAC inspection requirements outlined in Section 5 are provided for reference purposes. The inspections discussed in the text which follows Section 5 are those which fulfill the requirements. The inspections described in this document are performed per established procedures. These procedures, their frequencies, the documentation used for record keeping, and the location and documentation retention time are specified in this document.

Note: The regulatory requirements are defined in the RCRA and promulgated in the Code of Federal Regulations (CFR) and the WAC.

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3.0 SCOPE

This document applies to activities conducted at the SST Farm facilities. These activities are conducted to minimize hazards to human health or prevent contamination of the environment. This document specifies the "Inspection Requirements" and outlines how these requirements are met. This plan applies to:

- All monitoring equipment; safety and emergency equipment; security devices; and operating and structural equipment that help prevent, detect, or are used in the response to, hazards posed by dangerous wastes to employees, the public, or the environment.
- All SSTs which are used to treat or store dangerous waste.

4.0 RESPONSIBILITIES

The "Generator," Westinghouse/DOE, is required by RCRA to maintain this document. The Tank Farm Plant System Cognizant Engineers (COG) will be responsible for the update of this document or his/her portion when more than one COG/System exists. Periodic update will allow for review of referenced documents and the appropriate regulations. It will also provide for a review of the retained documentation. This document will be updated when:

- There are changes to applicable environmental regulations.
- The status of the applicable facilities change (e.g. final deactivation/closure as defined in WAC 173-303-610 and 40 CFR 265, SubPart G).
- This document fails to accomplish its intended purpose.
- As directed by management.

The regulations specified in this document were used as a guide in its development. When use of the regulations are required (e.g. for legal purposes/questions of compliance, etc) the most current regulations will be used.

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5.0 INSPECTIONS REQUIREMENTS

Owners or operators of facilities which treat, store, and/or dispose of dangerous wastes and/or mixed wastes (as defined in WAC 173-303) must inspect their facilities to prevent malfunctions and deteriorations, operator errors, and discharges which may cause or lead to the release of dangerous waste constituents to the environment, and\or cause a threat to human health. These inspections must be conducted often enough to identify and correct problems before they harm human health or the environment. Regulations require that a written schedule be developed, implemented, and kept in the facility operating records. The schedule must address both General Facility Inspection and Unit-Specific Inspection Requirements. The General Inspection Requirements refer to inspection of the portions of the Treatment/Storage/Disposal (TSD) facility other than the actual TSD units (containers, tanks, landfills, etc.). Unit-Specific Inspection Requirements refer to the individual units themselves.

5.1 GENERAL FACILITY INSPECTION REQUIREMENTS

WAC 173-303-320 & 40 CFR 265.15 consider the following items:

- Security equipment such as fences, signs, lights, and locks.
- Communication equipment such as radios, intercoms, closed-circuit TV systems, and public address systems.
- Emergency equipment such as spill-control supplies, fire extinguishers, emergency lights, generators, and fire alarms.
- Safety equipment such as eye wash stations, protective shields, first aid equipment, and respirators.
- Operating and structural equipment (such as dikes, sump pumps, etc) that are important in preventing, detecting, or responding to environmental or human health hazardous.
- Other general facility items such as building floors, walls, roofs, elevators, ramps, and vehicles.
- Monitoring equipment such as thermostats, fire detection equipment, and liquid-level, pressure, temperature and flow-measurement devices.

An inspection schedule must be developed which identifies the types of problems looked at during the inspections and it must indicate the frequency of each specific item inspected. The frequency must be based on the rate of possible deterioration of the equipment or item, and on the probability of an environmental or human incident.

Areas subject to spills and above ground portions of tank system must be inspected daily (when in use). Other frequencies are as specified in the Unit-Specific Inspection requirements.

5.2 DOCUMENTATION REQUIREMENTS

As part of the inspection schedule, an inspection log must be maintained. The log must be kept at the facility for at least three years from the date of the inspection. At a minimum, the log must note the following:

- The date of the inspection.
- The time of the inspection.
- The printed name of the inspector.
- The signature of the inspector.
- Notations of the observations made.
- The date and nature of any repair or remedial actions taken as a result of the inspection.*

* Any problems revealed by the inspection must be remedied on a schedule which prevents hazards to the public health and environment. Where a hazard is imminent or has already occurred, remedial action must be taken immediately.

5.3 UNIT-SPECIFIC INSPECTION REQUIREMENTS

WAC 173-303-640(6) & 40 CFR 265.195 (Tank Systems) say that owners and operators must:

- Develop and follow a schedule for inspecting overfill controls. 40 CFR 265.195 requires this inspection once each operating day. It also broadens "overfill controls" to "overfill/spill control equipment (e.g. waste-feed cutoff systems, bypass systems, and drainage systems)."
- Perform daily inspections on above ground portions of the tanks to detect corrosion or releases of wastes.
- Daily review data gathered from monitoring equipment to ensure proper operation of the equipment and the tank system.

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- Perform daily inspections on construction materials and the area immediately surrounding the external accessible portion of the tank system, including the secondary containment system (e.g. dikes), to detect erosion or signs of releases of dangerous waste (e.g. wet spots, dead vegetation). Confirmed releases may be reportable to appropriate authorities.

- Inspect Cathodic protection systems (if present) to ensure proper functioning six months after initial installation and annually thereafter.

- Inspect and/or test, as appropriate, all sources of impressed current on Cathodic protection at least bimonthly (every other month).

- All the above inspections must be documented in the operating record.

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6.0 SINGLE-SHELL TANK FARM INSPECTIONS

This section addresses the manner in which the SSTs meet the RCRA/WAC Inspection Requirements described in Section 5.

6.1 DESCRIPTION

A total of 149 SSTs were built between 1943 and 1964 to store radioactive waste solutions at the Hanford Site. The SSTs are constructed of a carbon steel lining within a reinforced concrete shell. The tanks are topped by an ellipsoidal reinforced concrete dome which, depending on the particular tank farm, lies between six and nine feet underground. One hundred thirty-three of the SSTs have nominal capacities of 500,000 to 1,000,000 gallons (100 series). Sixteen of the tanks are smaller units with a capacity of 55,000 gallons (200 series). Reference may be made to Table 6-2: Single-Shell Tank List, within this section for specific tank capacities. The SSTs are grouped into 12 tank farms consisting of from four to 18 tanks per farm. The SST tank farms were built close to the plants which they served and are therefore scattered through out the 200 East and 200 West areas of the Hanford Site. In the 200 East Area, the SSTs are located in A, AX, B, BX, BY, and C Tank Farms. In the 200 West Area, the SSTs are located in S, SX, T, TX, TY, and U Tank Farms.

The SSTs are now inactive, meaning that no tanks receive waste from any source. The last tank was taken out of service in 1980. The SSTs are scheduled for complete/final deactivation.

The SST deactivation consists of three phases:

1. Interim Stabilization - The volumetric reduction of the tank contents, by removal of supernate and interstitial liquid, to minimize the environmental impact associated with a potential tank failure.

2. Interim Isolation - The establishment of physical barriers between the environment and tank contents to reduce possible pathways of liquid intrusion.

3. Final Deactivation - Long-term isolation or retrieval of the tank contents.

To date, 105 SSTs have been interim stabilized (as of 9/26/90), 58 have been partially isolated, and 91 have been completely interim isolated. Reference may be made to table 6-2: Single-Shell Tank List, in this section for the status of particular tanks.

The integrity classification of these 149 SSTs is based upon a long history of leak detection surveillance data. In the event of deviant data or surveillance criteria violations, appropriate steps are taken to determine if the discrepancy is a measurement anomaly caused by something other than a tank leak or intrusion. The discrepancy may require issuance of one or more reports for documentation or notification (in accordance with WHC-CM-5-5, Procedure GA-2.18). Surveillance data includes waste surface level changes, in-tank temperature, vapor space pressure, psychrometric conditions, and radiological or soil moisture content changes adjacent to and beneath the tank in question. These data are analyzed to ascertain the cause for the anomaly. Evaluation of all the information is the basis for a decision to either declare the tank "sound" (with a 95% or greater confidence) or an "assumed leaker". To date, 83 tanks have been declared sound and 66 tanks are assumed leakers.

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The SSTs may be classified into two groups: Those which require active ventilation systems (exhausters) and those which possess passive ventilation systems (breather filters). The purposes served by the SST ventilation systems include the containment of airborne particulates and, for the active systems, tank cooling by vapor exhaustion. A list of actively ventilated tanks and their associated exhausters is displayed below.

EXHAUSTER	TANKS VENTILATE
296-P-1	241-A-101 through 241-A-106
296-P-16	241-C-105 241-C-106
296-S-15	241-SX-101 through 241-SX-112 241-SX-114

Active ventilation systems are used on SSTs when the heat load is great enough to require cooling. Included in this requirement are:

- Tanks with a total heat load of greater than 40,000 Btu/h.
- Tanks which contain waste projected to boil.
- Tanks which studies predict will reach a peak high temperature that exceeds the maximum allowable operating specifications.

Single-stage high-efficiency particulate air filters (passive ventilation systems) allow atmospheric breathing for all SSTs which require no cooling. Breather filters are designed to allow passage of air at very low differential pressure to minimize pressure changes in the SSTs which might damage the structures.

An in-depth discussion on SSTS and associated facilities can be obtained in the specific facility Safety Analysis Reports (SARs):

FACILITY	SAR
SST ISOLATION	SD-WM-SAR-006
SST STABILIZATION	SD-WM-SAR-034
SST NON-STABILIZED	SD-WM-SAR-022

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TABLE 6-1: SINGLE-SHELL TANK LIST

Tank	Year Removed From Service*	Tank Capacity (gallons)	Stabilization Isolation Status**	Tank Integrity
241-A-101	1980	1,000,000	/PI	Sound
241-A-102	1980	1,000,000	IS/PI	Sound
241-A-103	1980	1,000,000	IS/II	Asmd Leaker
241-A-104	1975	1,000,000	IS/II	Asmd Leaker
241-A-105	1963	1,000,000	IS/II	Asmd Leaker
241-A-106	1980	1,000,000	IS/II	Sound
241-AX-101	1980	1,000,000	/PI	Sound
241-AX-102	1980	1,000,000	IS/II	Asmd Leaker
241-AX-103	1980	1,000,000	IS/II	Sound
241-AX-104	1978	1,000,000	IS/II	Asmd Leaker
241-B-101	1974	500,000	IS/II	Asmd Leaker
241-B-102	1978	500,000	IS/II	Sound
241-B-103	1977	500,000	IS/II	Asmd Leaker
241-B-104	1972	500,000	IS/II	Sound
241-B-105	1972	500,000	IS/II	Asmd Leaker
241-B-106	1977	500,000	IS/II	Sound
241-B-107	1969	500,000	IS/II	Asmd Leaker
241-B-108	1977	500,000	IS/II	Sound
241-B-109	1977	500,000	IS/II	Sound
241-B-110	1971	500,000	IS/II	Asmd Leaker
241-B-111	1976	500,000	IS/II	Asmd Leaker
241-B-112	1977	500,000	IS/II	Asmd Leaker
241-B-201	1971	55,000	IS/II	Asmd Leaker
241-B-202	1977	55,000	IS/II	Sound
241-B-203	1977	55,000	IS/II	Asmd Leaker
241-B-204	1977	55,000	IS/II	Asmd Leaker
241-BX-101	1972	500,000	IS/II	Asmd Leaker
241-BX-102	1971	500,000	IS/II	Asmd Leaker
241-BX-103	1977	500,000	IS/II	Sound
241-BX-104	1980	500,000	IS/PI	Sound
241-BX-105	1980	500,000	IS/II	Sound
241-BX-106	1971	500,000	/PI	Sound
241-BX-107	1977	500,000	IS/PI	Sound
241-BX-108	1974	500,000	IS/II	Asmd Leaker
241-BX-109	1974	500,000	IS/PI	Sound
241-BX-110	1977	500,000	IS/PI	Asmd Leaker
241-BX-111	1977	500,000	/PI	Asmd Leaker
241-BX-112	1977	500,000	IS/PI	Sound

* The last year the tank was capable of receiving waste; actual date of last waste receipt may have been earlier.

** PI denotes "PARTIALLY ISOLATED", II denotes "INTERIM ISOLATED", IS denotes "INTERIM STABILIZED"

TABLE 6-1: SINGLE-SHELL TANK LIST (CONT)

Tank	Year Removed From Service*	Tank Capacity (gallons)	Stabilization Isolation Status**	Tank Integrity
241-BY-101	1971	750,000	IS/II	Sound
241-BY-102	1977	750,000	/PI	Sound
241-BY-103	1973	750,000	/PI	Asmd Leaker
241-BY-104	1977	750,000	IS/PI	Sound
241-BY-105	1974	750,000	/PI	Asmd Leaker
241-BY-106	1977	750,000	/PI	Asmd Leaker
241-BY-107	1974	750,000	IS/II	Asmd Leaker
241-BY-108	1972	750,000	IS/PI	Asmd Leaker
241-BY-109	1979	750,000	/PI	Sound
241-BY-110	1979	750,000	IS/II	Sound
241-BY-111	1977	750,000	IS/PI	Sound
241-BY-112	1978	750,000	IS/PI	Sound
241-C-101	1970	500,000	IS/II	Asmd Leaker
241-C-102	1976	500,000	/PI	Sound
241-C-103	1979	500,000	/PI	Sound
241-C-104	1980	500,000	IS/PI	Sound
241-C-105	1979	500,000	/PI	Sound
241-C-106	1979	500,000	/PI	Sound
241-C-107	1978	500,000	/PI	Sound
241-C-108	1976	500,000	IS/II	Sound
241-C-109	1976	500,000	IS/II	Sound
241-C-110	1976	500,000	/PI	Asmd Leaker
241-C-111	1978	500,000	IS/II	Asmd Leaker
241-C-112	1976	500,000	IS/PI	Sound
241-C-201	1977	55,000	IS/II	Asmd Leaker
241-C-202	1977	55,000	IS/II	Asmd Leaker
241-C-203	1977	55,000	IS/II	Asmd Leaker
241-C-204	1977	55,000	IS/II	Asmd Leaker

* The last year the tank was capable of receiving waste; actual date of last waste receipt may have been earlier.

** PI denotes "PARTIALLY ISOLATED"
IS denotes "INTERIM STABILIZED"
II denotes "INTERIM ISOLATED"

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TABLE 6-1: SINGLE-SHELL TANK LIST (CONT)

Tank	Year Removed From Service*	Tank Capacity (gallons)	Stabilization Isolation Status**	Tank Integrity
241-S-101	1980	750,000	/PI	Sound
241-S-102	1980	750,000	/PI	Sound
241-S-103	1980	750,000	/PI	Sound
241-S-104	1968	750,000	IS/II	Asmd Leaker
241-S-105	1974	750,000	IS/PI	Sound
241-S-106	1979	750,000	/PI	Sound
241-S-107	1980	750,000	/PI	Sound
241-S-108	1979	750,000	/PI	Sound
241-S-109	1979	750,000	/PI	Sound
241-S-110	1979	750,000	/PI	Sound
241-S-111	1972	750,000	/PI	Sound
241-S-112	1974	750,000	/PI	Sound
241-SX-101	1980	1,000,000	/PI	Sound
241-SX-102	1980	1,000,000	/PI	Sound
241-SX-103	1980	1,000,000	/PI	Sound
241-SX-104	1980	1,000,000	/PI	Asmd Leaker
241-SX-105	1980	1,000,000	/PI	Sound
241-SX-106	1980	1,000,000	/PI	Sound
241-SX-107	1964	1,000,000	IS/II	Asmd Leaker
241-SX-108	1962	1,000,000	IS/II	Asmd Leaker
241-SX-109	1965	1,000,000	IS/II	Asmd Leaker
241-SX-110	1976	1,000,000	IS/II	Asmd Leaker
241-SX-111	1974	1,000,000	IS/II	Asmd Leaker
241-SX-112	1969	1,000,000	IS/II	Asmd Leaker
241-SX-113	1958	1,000,000	IS/II	Asmd Leaker
241-SX-114	1972	1,000,000	IS/II	Asmd Leaker
241-SX-115	1965	1,000,000	IS/II	Asmd Leaker

* The last year the tank was capable of receiving waste; actual date of last waste receipt may have been earlier.

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II denotes "INTERIM ISOLATED"

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TABLE 6-1: SINGLE-SHELL TANK LIST (CONT)

Tank	Year Removed From Service*	Tank Capacity (gallons)	Stabilization Isolation Status**	Tank Integrity
241-T-101	1979	500,000	/PI	Sound
241-T-102	1976	500,000	IS/II	Sound
241-T-103	1974	500,000	IS/II	Asmd Leaker
241-T-104	1974	500,000	/PI	Sound
241-T-105	1976	500,000	IS/II	Sound
241-T-106	1973	500,000	IS/II	Asmd Leaker
241-T-107	1976	500,000	/PI	Asmd Leaker
241-T-108	1974	500,000	IS/II	Asmd Leaker
241-T-109	1974	500,000	IS/II	Asmd Leaker
241-T-110	1976	500,000	/PI	Sound
241-T-111	1974	500,000	/PI	Asmd Leaker
241-T-112	1977	500,000	IS/II	Sound
241-T-201	1976	55,000	IS/II	Sound
241-T-202	1976	55,000	IS/II	Sound
241-T-203	1976	55,000	IS/II	Sound
241-T-204	1976	55,000	IS/II	Sound
241-TX-101	1980	750,000	IS/II	Sound
241-TX-102	1977	750,000	IS/II	Sound
241-TX-103	1980	750,000	IS/II	Sound
241-TX-104	1977	750,000	IS/II	Sound
241-TX-105	1977	750,000	IS/II	Asmd Leaker
241-TX-106	1977	750,000	IS/II	Sound
241-TX-107	1977	750,000	IS/II	Asmd Leaker
241-TX-108	1977	750,000	IS/II	Sound
241-TX-109	1977	750,000	IS/II	Sound
241-TX-110	1977	750,000	IS/II	Asmd Leaker
241-TX-111	1977	750,000	IS/II	Sound
241-TX-112	1974	750,000	IS/II	Sound
241-TX-113	1971	750,000	IS/II	Asmd Leaker
241-TX-114	1971	750,000	IS/II	Asmd Leaker
241-TX-115	1977	750,000	IS/II	Asmd Leaker
241-TX-116	1969	750,000	IS/II	Asmd Leaker
241-TX-117	1969	750,000	IS/II	Asmd Leaker
241-TX-118	1980	750,000	IS/II	Sound

* The last year the tank was capable of receiving waste; actual date of last waste receipt may have been earlier.

** PI denotes "PARTIALLY ISOLATED"
IS denotes "INTERIM STABILIZED"
II denotes "INTERIM ISOLATED"

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TABLE 6-1: SINGLE-SHELL TANK LIST (CONT)

Tank	Year Removed From Service*	Tank Capacity (gallons)	Stabilization Isolation Status**	Tank Integrity
241-TY-101	1973	750,000	IS/II	Asmd Leaker
241-TY-102	1979	750,000	IS/II	Sound
241-TY-103	1973	750,000	IS/II	Asmd Leaker
241-TY-104	1974	750,000	IS/II	Asmd Leaker
241-TY-105	1980	750,000	IS/II	Asmd Leaker
241-TY-106	1959	750,000	IS/II	Asmd Leaker
241-U-101	1960	500,000	IS/II	Asmd Leaker
241-U-102	1979	500,000	/PI	Sound
241-U-103	1978	500,000	/PI	Sound
241-U-104	1951	500,000	IS/II	Asmd Leaker
241-U-105	1978	500,000	/PI	Sound
241-U-106	1977	500,000	/PI	Sound
241-U-107	1980	500,000	/PI	Sound
241-U-108	1979	500,000	/PI	Sound
241-U-109	1978	500,000	/PI	Sound
241-U-110	1975	500,000	IS/PI	Asmd Leaker
241-U-111	1980	500,000	/PI	Sound
241-U-112	1970	500,000	IS/II	Asmd Leaker
241-U-201	1977	55,000	IS/II	Sound
241-U-202	1977	55,000	IS/II	Sound
241-U-203	1977	55,000	IS/II	Sound
241-U-204	1977	55,000	IS/II	Sound

* The last year the tank was capable of receiving waste; actual date of last waste receipt may have been earlier.

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II denotes "INTERIM ISOLATED"

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6.2 SECURITY INSPECTIONS

The following describes the security measures, equipment, and warning signs used to control entry to the Farms.

THE HANFORD SITE

The entire Hanford Site is a controlled access facility. The Site maintains an around-the-clock surveillance for protection of government property, classified information, and special nuclear materials. The Hanford Patrol furnishes a regular company of armed guards to provide Site security. Manned barricades are maintained at checkpoints on vehicular access roads leading to the Hanford Site. Vehicle operators wishing to enter the Hanford Site must display a DOE-issued security identification badge before being admitted. Access to the 200 East and 200 West operational areas is further restricted with additional manned barricades.

The A, AX, BX, B, BY, and C SST Farms are located within the 200 East Area. The S, SX, T, TX, TY, and U SST Farms are within the 200 West Area. There are two manned stations leading to the East Area. The West Area has one. All personnel entering or leaving either area must display a DOE-issued security identification badge indicating authorization and must, also, submit to a search of personal items carried into and out of the area.

INSPECTIONS:

Fences and gates, surrounding the site (both East and West Areas), are inspected each shift via procedure WHC-CM-4-21, Section E-13 or E-16. Entries are made in the Daily Activity Log which is kept at the Central Alarm Station in building 2701AB (at PUREX). This log is kept there for one month. This log is subsequently transferred to building 2721E, room 17 and retained there for two years.

THE TANK FARMS

Security within each of the tank farms is further enhanced by six-foot high chain link fences which surround each farm. Gates, which are normally locked, limit personnel access. B, C, T, and U are fenced separately, but A and AX Tank Farms are fenced as a unit, BX and BY Tank Farms are fenced as a unit, S and SX Tank Farms are fenced as a unit, and TX and TY are fenced as a unit. The fences are posted with various signs.

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Applicable postings in 200 East Area note the following:

- Caution, Radiation Area - Surface Contamination.
- Radiation monitoring & operator coverage required before entry. Contact: R.M. Phone # 3-2526 or operations Phone Number 3-2573.
- Contact Tank Farm Surveillance & operations Management prior to entry or exit. For Authorization call: Shift Manager, Phone Number 3-2820, off-shift, Phone Number 3-2689.
- Danger Hazardous Materials (Corrosive). Unauthorized personnel keep out.
- Buffer Zone. Personal survey required when exiting.
- Dome elevation surveys must be taken prior to and immediately following any heavy equipment earth moving activities or any excavations next to benchmarks, to ensure that any damage to benchmarks are identified.
- Caution: Do not exceed 100 ton live load limit on 100 series tank domes. Do not exceed 50 ton live load limit on 200 series tank domes. Any unauthorized sprinkling or backfilling prohibited in this area.

Applicable postings in 200 West Area note the following:

- Caution, Radiation Area - Surface Contamination.
- Danger Hazardous Materials (Corrosive). Unauthorized personnel keep out.
- Buffer Zone. Personal survey required when exiting.
- Dome elevation surveys must be taken prior to and immediately following any heavy equipment earth moving activities or any excavations next to benchmarks, to ensure that any damage to benchmarks are identified.
- Caution: Do not exceed 46 ton live load limit. Present Backyrus & Lima Crane weigh 33 tons if no extra equipment is on domes. Any unauthorized sprinkling or backfilling is prohibited in this area.

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INSPECTIONS:

Requirements for Radiation Postings are specified in WHC-CM-4-10. Proper radiation postings are assured via routines accomplished by Operational Health Physics. These routines are:

FACILITY	TASK NUMBER*	FREQUENCY
C	EW-12	Weekly
S SX	WTF-WD-02	Week Day
TX TY	WFT-WD-05	Week Day
U	WTF-WD-04	Week Day

* Note: Task numbers are subject to change without notice.
Week Day: Tasks are done every Week Day (Monday through Friday).
Weekly: Tasks are done once per Week.

The A, AX, B, BX, BY, and C East Tank Farms inspections are documented on Scheduled Radiation Survey Reports which are kept at Building MO386 (trailer). These reports are transferred, quarterly or when called for, to MO413, Room 104. They are reviewed and sent, after 90 days, to the Records Holding Area (RHA) Office, Building 712, for long term storage. The S, SX, T, TX, TY, and U West Tank Farms inspections are recorded on the same report form as for the East Area, but are kept in the 2723W building. They are also transferred quarterly (or when called for) to MO413, room 104, where they are reviewed and sent, after 90 days, to Records Holding Area (RHA) Office, Building 712, for long term storage.

Plant Operating Procedure TO-040-501 instructs (for Farms A, AX, B, BX, BY, and C) daily checking and changes, as required, of the Radiological postings. In S, SX, T, TX, TY, and U Farms, the posted signs are checked daily per Plant Operating Procedure TO-040-500. These inspections are not documented.

The gates of the farms in the West Area are checked at the end of each day to make sure they are locked. A daily tickler serves as a reminder of the task. The tickler is signed off after the check has been made (daily). It is kept in the 272-WA supply room for an undetermined length of time.

6.3 COMMUNICATION INSPECTIONS

Both telephones and radios are used for communication throughout the tank farm facilities. Communication is maintained between the tank farm control rooms and master control centers located in 242-A (East Area) or 242-S (West Area).

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Radios are usually brought in by personnel, although some control rooms have permanently installed radios. Radios are used as a backup and where telephones are not available. Extra radios are always available in the 272-AW and 272-WA buildings. Telephones are installed in the vicinity of each tank farm. Generally, the telephones are located just outside the tank farm area.

INSPECTIONS:

When a problem is noted with telephones, Telephone Repair is notified at 6-1611. When radios develop problems, Radio Maintenance is notified at 6-6998. Also, spare radios are always available in the shift offices of 272-AW and 272-WA. A monthly tickler is used to inventory the portable radios in the 272-AW (East Area) building. The tickler is signed off and retained in the 272-AW shift office, room 3 for six months.

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6.4 SAFETY AND EMERGENCY EQUIPMENT INSPECTIONS

In each facility within the 200 East and West Areas is a document called a Pre-Fire Plan. This document is updated periodically (depending on the type and function of the facility) by the Fire Department. This document contains Information relating to the type of fire protection systems within the facility, the types of hazards presents, and the recommended fire response strategy.

EMERGENCY ALARM SYSTEMS

The alarm systems in the tank farm facilities include fire alarms and high radiation alarms. The active ventilation systems have continuous area monitors (CAMs). The requirements for testing the fire alarm system is established in the Emergency Plan (WHC-CM-4-1, Section 8.0).

INSPECTIONS:

The fire alarms are tested by the Hanford Fire Department (Refer to Fire Protection Systems below for discussion). For a discussion of the Area radiation monitors refer to section 6.7.5.

CAMs are used throughout all the facilities and interchanged when maintenance is required. The location of a particular CAM is tracked via the log book specified in the PISCES (refer to Section 9.3 for a discussion on PISCES) data base. CAMs are tested, tracked, and maintained via PISCES. The log books are kept in either building 272AW, or building 272WA Instrument Shops, (these log books are kept for at least three years). The procedure and frequency is dependant upon the particular type of CAM unit. Refer to the PISCES data base for the exact procedure and corresponding frequency.

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FIRE PROTECTION SYSTEMS

Fire protection at the farms consists of fire sensing units or manual activation units (pull boxes) connected to Radio Frequency Alarm Recorders (RFARs). Sensing units activate the RFARs which in turn automatically notify the Hanford Fire Department. The systems works off the main power supply or via battery. In addition, a red button is located on the RFAR units which when pushed manually notifies the fire department. These RFARs are located throughout the 200 East and West Areas. For quick location during an emergency, the units are equipped with a continuously-lit red light.

Fire hydrants are installed in the vicinity of all the tank farms. Generally, the hydrants are located just outside the tank farm area.

COMPANY REQUIREMENTS:

WHC-CM-1-3, MANAGEMENT REQUIREMENTS AND PROCEDURES, MRP 5.3, "Fire Protection System Operation, Inspection, Testing, and Maintenance," provides a detailed definition of responsibilities. WHC-CM-4-3, INDUSTRIAL SAFETY MANUAL, VOLUME 1 - STANDARDS & VOLUME 2 - GUIDES, FS-2, "Fire Protection System Inspection, Testing, and Maintenance" contains the detailed inspection, testing, and maintenance information relative to this subject.

INSPECTIONS:

The Fire Systems Maintenance Engineering Unit (under Operational Support Services) manages the fire protection systems using the PISCES system. Job cards are used to perform preventive maintenance. Copies are retained in the files at building 609-G, for a minimum of three years.

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FIRE EXTINGUISHERS

Fire extinguishers are located in each tank farm control room and within the farms, usually by the exhaust stacks.

COMPANY REQUIREMENTS:

WHC-CM-4-3, INDUSTRIAL SAFETY MANUAL, VOLUME 1 - STANDARDS & VOLUME 2 - GUIDES, FP-2, "Portable Fire Extinguishers" provides the requirements and responsibilities for installation and maintenance of portable fire extinguishers.

INSPECTIONS:

The Fire Department functionally tests the fire extinguishers annually to assure reliability. The procedure used is the Hanford Fire Department Procedure A-14. Tags on the extinguisher are initialed and a Fire Department Form BC 6200-077 is filled out. This form is kept on file for at least three years in Building 609-G.

Tank farm operations personnel performs monthly visual inspections which verify that the equipment is in place, readily available, and appears to be in good working order. Procedures TO-040-480, TO-040-501, and TO-040-500 describe the inspection. An Inspection Report Form (number 54-6200-080) is completed and retained by supervision in Building 272AW (East Area), room 4 for three years, and in Building 272WA (West Area) for an unspecified length of time.

The tags on each fire extinguisher are initialed and dated indicating that the visual check was made. Also, for the East Area, there is a monthly tickler which is signed off when the task is completed. The signed off tickler is kept in the shift office, building 272AW, room 3 for six months. For the West area there is a tickler card for the task. The tickler card is signed off after the task is complete. The tickler card is kept in the supply room at 272-WA for an undetermined length of time.

Fire Extinguishers are serviced as required by an outside contractor. After servicing, the contractor places an inspection tag on the item.

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EMERGENCY LIGHTS

There are emergency lights located throughout the Farms and in the Instrument Buildings.

COMPANY REQUIREMENTS:

WHC-CM-4-3, INDUSTRIAL SAFETY MANUAL, VOLUME 1 - STANDARDS, FP-12, "Building Emergency Light Testing and Maintenance" requires monthly testing for a minimum of 30 seconds.

INSPECTIONS:

Currently emergency lights are checked every three months per the preventative maintenance (PM) procedure 2E22003, "EMERGENCY LANTERN INSPECTION," in the East Areas. PM 2W22013, "INSPECTION OF EMERGENCY LANTERNS AND EMERGENCY EXITS" is performed every six months in the West Area. Data sheets are completed and returned to the Maintenance Manager for evaluation and placed on file, for three years, in the Production Control Planner's office at building 272AW, room 8 (for the East Area), or 272WA, room 8 (for the West Area).

Emergency lanterns are also checked monthly per Plant Operating Procedure TO-040-500 and TO-040-501. The data sheets illustrated in the procedures are used for documentation. These data sheets are returned to supervision. The East area data sheet are retained in building 272AW, room 4 for three years.

The preventive maintenance procedures discussed here are now in draft. These procedures are being changed to direct that monthly visual inspection be made of the power cord, lamps, relays, and batteries. The lights will be tested for a minimum of 30 seconds monthly and for 1-1/2 hours annually. When these procedures are in place, it is expected that operations personnel will no longer be required to inspect these lights since their inspections will be redundant and not as extensive as that performed by maintenance personnel.

ELECTRICAL POWER BACK UP GENERATOR

Backup power to A and AX Tank Farms is supplied by on site generators. Backup power to S and SX Tank Farms is supplied by emergency power generators located at the West Area power plant. These generators start automatically when a power failure is sensed.

Generators are not immediately available at B, BX, BY, C, T, TX, TY Tank Farms. However, portable generators are available for use at the tank farms. Fleet Management (at 6-9502) maintains a list of these available portable generators and there locations.

INSPECTIONS:

The inspection of the generators for A and AX farms are covered in Double Shell Tank Farm Inspection Plan Matrix (document number WHC-SD-WM-EV-055). The inspection and the maintenance of the generators for S and SX Tank Farms are performed by operators at the West Area power plant.

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SAFETY SHOWERS

There are no safety showers immediately available in the Tank Farm Areas. However, a safety shower station exists in the 401 Condenser Building which is within the Aging Waste Facility (applicable for A and AX Tank Farms only).

COMPANY REQUIREMENTS:

WHC-CM-4-3, INDUSTRIAL SAFETY MANUAL, VOLUME 1 - STANDARDS & VOLUME 2 - GUIDES, G-6, "Safety Showers" provides the requirements and responsibilities for the use of, and the maintenance of, portable and fixed safety showers.

It is the employees responsibility to functionally test the closest safety shower prior to the start of any job in which a safety shower is, or may be, required. Safety showers shall be functionally tested weekly to flush the lines and to verify proper operation. Records shall be maintained to verify compliance with testing procedures.

INSPECTIONS:

A weekly tickler is used as a reminder to inspect the shower in the 401 Condenser building. A tag on the unit is signed and dated noting the inspection was completed. The tickler is signed off to show task completion and retained in the shift office, building 272AW, room 3 (for the East Area) for six months.

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EYEWASHES

There are no eyewash stations in the East Area SST Farms. However, portables are available from the 272AW store room. These are brought on site when it is known that they may be needed (e.g. when working with chemicals). In the West Area, there are eyewashes in the 242-S Evaporator Building. Reference can be made to the Contingency Plan (WHC-IP-0263-TF) for locations. Portables are available in the storeroom of Building 272WA.

COMPANY REQUIREMENTS:

WHC-CM-4-3, INDUSTRIAL SAFETY MANUAL, VOLUME 1 - STANDARDS & VOLUME 2 - GUIDES, G-11, "Eyewash Apparatus" provides the requirements and responsibilities for the use and maintenance of eyewash apparatus.

It is the employees responsibility to functionally test the closest eyewash apparatus prior to the start of the job. Eyewash apparatus shall be tested monthly. The potable water provided for the apparatus shall be routinely flushed or changed according to manufacturer's specifications (most common frequencies are specified in the referenced volume 2 manual).

INSPECTIONS:

The portables are checked prior to each use. Plant Operating Procedures TO-040-500 and TO-040-501 are also used to inspect these on a monthly basis. Tags are completed on the unit documenting the day the task was performed. The MONTHLY INSPECTION OF PORTABLE EYEWASH BOTTLES DATA SHEET is completed.

PROTECTIVE CLOTHING/RESPIRATORY PROTECTION

A variety of protective clothing and respirator equipment is available. The Contingency Plan (WHC-IP-0263-TF) may be referenced for types and locations.

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COMPANY REQUIREMENTS:

WHC-CM-4-3, INDUSTRIAL SAFETY MANUAL, VOLUME 3 - PROGRAMS, Section 11, "Respiratory Protection" provides a maintenance program designed to ensure that respiratory protective equipment is kept sanitary and in good operating condition. Devices stored for emergency use shall be inspected monthly and/or after each use. Emergency use Self-Contained Breathing Apparatus (SCBAs) shall be checked weekly to assure the cylinder is fully charged. SCBAs shall be serviced every 2 years by the fire department. All respiratory devices except SCBA and supplied-air hoods are required to be recycled through the Respiratory Cleaning and Maintenance Facility (MO-412) promptly upon being used, or upon expiration of the enclosed 12-month "Shelf Life" card.

INSPECTIONS:

Required training in the use of all this equipment instructs thorough inspection of these items for serviceability before each use. It is the responsibility of the wearer to guarantee that the emergency use SCBAs cylinder is fully charged before each use. If the cylinder needs charging or serviced the Respiratory Protection Technicians picks up the cylinders and ships them to the SCBA Technician at the fire station where the cylinders are inspected and filled.

Plant Operating Procedures TO-040-501 (East Area) requires that all used masks and dirty laundry (protective clothing) are picked up daily. Clean laundry is also restocked. In the West Area, a daily tickler is used as a reminder to stock SWP clothing and change out laundry bags. The tickler is initialed as complete and kept in the 272WA supply room for an undetermined length of time.

6.5 INSPECTIONS OF OPERATING AND STRUCTURAL EQUIPMENT

TANK STRUCTURE

The SSTs are constructed of carbon steel, American Society for Testing and Materials (ASTM) A283 Grade C or ASTM A201 Grade C (241-AX Farm), lining the bottom and sides of a reinforced concrete shell. The bottoms of most tanks are slightly dished. The tanks are below grade with at least 6 ft. of soil cover, which provides shielding and minimizes radiation exposure to personnel. Inlet and overflow lines are located near the top of the liner. Access to the tanks is provided by risers penetrating the domes of the tanks. Risers vary in diameter from 4 to 42 inches.

All SSTs are inactive and are in various stages of isolation and stabilization processes as outlined in Section 6.1 of this plan.

Operating and structural equipment that are important in preventing, detecting, or responding to, environmental or human health hazardous are monitored with the equipment described below in Section 6.7.

IN-TANK PHOTOGRAPHIC INSPECTIONS:

Periodically, it is desirable to see the inside of a waste storage tank to observe sludge, corrosion, salt cake, equipment, or, in general, the conditions of the tank itself. Inspections of this type are special non-routine operations designed to provide a record of the interior conditions of the tank. Since it is not possible for personnel to enter the tanks, other methods are utilized for visual inspection.

Plant Operating Procedure (SOP) TO-020-140 outlines the method of taking photographs inside the tank. In-tank photographs are taken on a non-regular basis. Proofs/prints are filed by tank number. Record copies of negatives are retained by Boeing Computer Services Richland (6-7291). Files of prints and videos are maintained in building 2750E, Room C104. Retention is for as long as they are needed.

TANK DOME ELEVATION INSPECTIONS

Periodic surveys of Hanford Site Storage Tank Dome elevations are long-term surveillance requirements. Because changes in the tank dome elevations could be indications of concrete cracking and/or yielding of the reinforcing steel, surveillance is required to provide the basis for early alert to a failure condition. Tanks being jet pumped can have large salt cake deposits hanging on equipment which is suspended from the dome of the tank. With the liquid buoyancy removed, an increased stress can be induced on the dome. Tank dome elevation surveys are taken to measure any indication of a tank dome collapse. The method used for monitoring tank structural stability is a scheduled survey of reference and dome-attached bench marks. A dome deflection greater than the maximum criteria may indicate excessive dome loading or possible structural failure.

Tank dome deflection measurements are taken and recorded at least once every two years for all of the applicable tanks, except those equipped with dome suspended airlift circulators. Tank dome deflection measurements are taken annually for tanks with dome suspended airlift circulators, since salt cake encrustations on the airlift circulators could load the domes. Elevation surveys are also taken when required during jet pumping (ref: WHC-SD-WM-TI-357).

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Tank dome elevation data is generated by the Kaiser Engineer Hanford survey crews and received on Single-Shell Tank Dome Elevation Survey Data Sheets. These data sheets are given to Waste Management Plant Engineering (WMPE) who, within 5 working days, deliver the completed dome survey sheets to Tank Farm Surveillance Analysis & Support (TFSA&S) where they are compiled into Tank Dome Logbooks retained in office for 10 years.

6.6 INSPECTIONS OF OTHER GENERAL FACILITY ITEMS

Routine Housekeeping is accomplished daily per POP TO-040-500 and TO-040-501. These procedures require daily routines which are accomplished at the tank farms (both East and West). Applicable tasks are:

- Pick up and package all miscellaneous waste per TO-100-030 and make arrangements for pickup.
- Pick up and bag all tumbleweeds.
- Sweep the floors.
- Empty trash containers.
- Notify personnel of any transfers or open excavations in the area. Control entry of personnel in and out of the area.
- Notify supervision of any maintenance needs or unusual conditions.
- Check for any unusual radiological conditions* and notify supervision and record it in the appropriate tank farm log book. If new conditions are found notify supervision immediately.

* Exposure and contamination readings are taken by Health Physics

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6.7 INSPECTION AND DATA REVIEW OF MONITORING INSTRUMENTATION

Visual inspections are not possible, for the most part, in the tank farms because of the high radiation levels present and because of the need to limit radiological exposure to personnel. Monitoring instrumentation is therefore used, wherever possible, to assure conditions are not developing which might present a danger to human health or to the environment. This Section presents this instrumentation, explains its use, and provides an explanation of how it is maintained. The active instrumentation associated with the SSTs are listed in Appendix II of this document. This list was developed from the PISCES data base which is discussed in Section 9.3.

Leak detection control data that is necessary for the evaluation of tank integrity is collected from a variety of instrumentation. This Section, also includes a description of the data generated from these instruments, discusses data review, and identifies documentation and its retention.

Note: WHC-SD-WM-TI-357, "Waste Storage Tank Status and leak Detection Criteria" is the sole documented authority for leak detection criteria. WHC-SD-WM-TI-357 is continually updated and contains the current action criteria and surveillance frequencies. The frequencies, basis, and action criteria which are discussed below are cited only as necessary to the discussion of this document. Where a specification limit is cited, the reader should use the most recent revision of WHC-SD-WM-TI-357 and not what is written here.

Table 6-2 below was created from WHC-SD-WM-TI-357 and is provided for cross-reference purposes in determining which of the leak detection systems discussed below apply to which Tank Farm.

Note: Level detection is available for each tank as discussed below in Section 6.7.1, but is only used as a leak detection method for the Tank Farms that show it in Table 6-2. See Table 6-3 for additional level detection information provided in the tanks. See Table 6-4 for additional Liquid Observation Well information provided. See Table 6-5 for additional information on Laterals. Additional information on Drywells can be obtained in WHC-SD-WM-TI-357.

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TABLE 6-2: LEAK DETECTION MATRIX

Tank Farm	Tanks Per Farm	Leak Detection
A	6	Liquid Level Drywells Laterals Liquid Observation Wells
AX	4	Liquid Level Dry Wells Leak Detection Pits Liquid Observation Wells
B	4	Liquid Level
B	12	Liquid Level Drywells Liquid Observation Wells
BX	12	Liquid Level Drywells Liquid Observation Wells
BY	12	Liquid Level Drywells Liquid Observation Wells
C	4	Liquid Level
C	12	Liquid Level Drywells
S	12	Liquid Level Drywells Liquid Observation Wells
SX	15	Liquid Level Drywells Laterals Liquid Observation Wells
T	4	Liquid Level
T	12	Liquid Level Drywells Liquid Observation Wells
TX	18	Liquid Level Drywells Liquid Observation Wells
TY	6	Liquid Level Drywells Liquid Observation Wells
U	4	Liquid Level
U	12	Liquid Level Drywells Liquid Observation Wells

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6.7.1 WASTE SURFACE LEVEL MEASUREMENTS

All the Waste Storage Tanks are equipped with conductivity electrodes for the detection of the waste surfaces. The electrodes are attached to calibrated steel tapes that hang suspended from reel housings permanently affixed to dedicated tank risers. Readout of a surface level is dependent upon the type of system in place.

The first, designated as a "manual tape," consists of a reel mounted calibrated steel tape to which a 2.875 inch diameter ring segment ('doughnut') or a .378 inch diameter rod ('pencil') is attached. To obtain a surface level measurement, the operator must first attach a portable DC meter and then manually lower the electrode to the point where the electrical continuity is indicated by instrument needle deflection. The tape is calibrated to give a direct reading of distance to the nearest 0.25 inch above the bottom elevation reference point. The reading is taken by sighting along a crossbar mounted on the reel housing (another type ["Flake"] has a sight line scribed into the plexiglass window).

The second system, designated as an "automatic gauge," differs from the manual device to the extent that a control system automatically adjusts the electrode (plummet) position at the air/waste surface interface at intervals of 60-90 seconds to give a readout of inches above the tank instrument bottom. The display is to the nearest 0.1 inch (xxx.x inches).

All of the Single Shell Waste Storage Tanks are now inactive, and due to the success of the liquid removal programs, the waste surfaces in many tanks are no longer liquid or even conductive. Therefore, the classification and continued use of the instrument as a leak/intrusion detection device is strongly dependent upon individual instrument behavior and assessment of what type of surface the electrode is contacting. Assignment of a tank to specific increase/decrease criteria is based upon independent reviews by both Tank Farm Surveillance and Tank Farm Plant Engineering. The following criteria have been empirically developed through tank-by-tank evaluation and review of available surface measurement information:

<u>Decrease</u>

- -0.5 inch (automatic gauge)/-1.0 inch (manual tape): The limit is two times the established instrument measurement precision, and is applied to tanks where photographic interpretation shows the electrode to be in contact with an unobstructed and clear liquid surface.

- -1.0 inch (automatic gauge)/-2.0 inch (manual tape): Applied to tanks wherein the electrode is contacting an unstable floating crust as confirmed by in-tank photography and fluctuations in the liquid level data.

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- -3.0 inch (automatic gauge or manual tape): Applied to tanks where the electrode is contacting a solid surface that is conductive (i.e. not dry solids). Decrease limit has been derived through assessment of in-tank photographs. The only exceptions are Tanks 241-SX-103 and 241-SX-104, for which a limit of -5.0 inch has been assigned on the basis of evaluation of the range of variance seen in the waste surface level measurements. The larger limits apply to tanks in which the electrodes are touching down within surface indentations whose walls are approaching an angle of 90 degrees.

- No decrease criterion (both instrument types): Assigned to tanks wherein the electrode contacts a solid surface that may or may not be dry. Level monitoring in such tanks is no longer determined to be a viable leak detection method, and its sole applicability is for the detection of liquid intrusions. Definition of a "no decrease criterion" is based upon instrument behavior, in-tank photographic assessment, and surface level data review.

  Note: There are a number of tanks that have no formal decrease criteria, but for which a -10.0 inch limit has been input into CASS. These tanks are equipped with automatic gauges, and the purpose of the limit is to alert operating personnel in the event that the tape is unwinding in search for a conductive surface (zeroing out). Such tanks are candidates for conversion to the 'Intrusion' mode described below.

- No decrease criterion (automatic gauges): Certain tanks are equipped with automatic gauges that have been modified for service in an 'Intrusion' operation mode. Gauges operating in this mode do not automatically break and then reestablish surface contact ('bob'). Instead, they remain suspended in a fixed position approximately 1.0 inch above the solid waste surface and thus serve only as a liquid intrusion detector. Tanks whose gauges are in the 'Intrusion' mode have been designated on the basis of photographic review of the waste surface and analysis of their surface level measurement histories.

<u>Increase</u>

- +1.0 inch to +3.0 inch (automatic gauge and manual tape): Limit is dependent upon the nature of the waste surface, which could be unobstructed clear liquid, floating foam or crust, or exposed solids.

  Note: The one exception is a 0.5 inch increase limit assigned by management directive to a small number of tanks that are classed as being both Interim Stabilized and Interim Isolated, but which have also been identified as subject to liquid intrusion. The limit is designed to provide an early notification that an intrusion is occurring.

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Depending upon the tank status and waste surface level histories, Single Shell Tanks are monitored hourly (automatic gauges connected to the Computer Automated Surveillance System - CASS), daily (manual tapes or automatic gauges in the 'manual' mode), weekly, monthly, or quarterly. The following frequencies/basis apply:

Daily: Applied where special surveillance is required.

Weekly: Applied to tanks equipped with manual tapes or manual automatic gauges, and which are neither Interim Stabilized nor Interim Isolated. The weekly schedule was designated on the basis of a statistically most probable leak rate to be in the range of 0.1 inch/week (0.03 gallons/minute).

Note: The weekly most probable leak rate is less than the established instrument precision (+/-0.25 inch for the automatic gauge and +/-0.5 inch for the manual tape).

Monthly: Applied to tanks that have been declared Interim Stabilized and Partially Isolated. These tanks have had as much liquid removed as is technically and economically practical and liquid intrusion has been minimized.

Quarterly: Applied to tanks that have been declared Interim Stabilized and Interim Isolated. These tanks have had as much liquid removed as is technically and economically practical and liquid intrusion has been minimized to the maximum extent possible.

Table 6-3 below shows the present surface level instrumentation for each SST and the frequency of field surface level readings.

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TABLE 6-3: SURFACE LEVEL MEASUREMENTS

TANK	SURFACE LEVEL FIELD READING FREQUENCY*	ACTIVE** SURFACE LEVEL INSTRUMENTATION	Stabilization Isolation Status
241-A-101	weekly	manual tape	/PI
241-A-102	weekly	intrusion mode FIC	IS/PI
241-A-103	monthly	intrusion mode FIC	IS/II
241-A-104	quarterly	manual tape	IS/II
241-A-105	quarterly	manual tape	IS/II
241-A-106	quarterly	intrusion mode FIC	IS/II
241-AX-101	weekly	intrusion mode FIC	/PI
241-AX-102	quarterly	manual tape	IS/II
241-AX-103	monthly	auto FIC on CASS	IS/II
241-AX-104	quarterly	manual tape	IS/II
241-B-101	quarterly	intrusion mode FIC	IS/II
241-B-102	quarterly	auto FIC on CASS	IS/II
241-B-103	quarterly	intrusion mode FIC	IS/II
241-B-104	quarterly	manual tape	IS/II
241-B-105	quarterly	manual tape	IS/II
241-B-106	quarterly	auto FIC on CASS	IS/II
241-B-107	quarterly	manual tape	IS/II
241-B-108	quarterly	intrusion mode FIC	IS/II
241-B-109	quarterly	manual tape	IS/II
241-B-110	quarterly	manual tape	IS/II
241-B-111	quarterly	intrusion mode FIC	IS/II
241-B-112	quarterly	auto FIC on CASS	IS/II
241-B-201	quarterly	manual tape	IS/II
241-B-202	quarterly	manual tape	IS/II
241-B-203	quarterly	manual tape	IS/II
241-B-204	quarterly	manual tape	IS/II
241-BX-101	quarterly	manual tape	IS/II
241-BX-102	quarterly	manual tape	IS/II
241-BX-103	quarterly	auto FIC on CASS	IS/II
241-BX-104	weekly	auto FIC on CASS	IS/PI
241-BX-105	monthly	intrusion mode FIC	IS/II
241-BX-106	weekly	FIC read manually	/PI
241-BX-107	weekly	auto FIC on CASS	IS/PI
241-BX-108	quarterly	manual tape	IS/II
241-BX-109	monthly	auto FIC on CASS	IS/PI
241-BX-110	monthly	manual tape	IS/PI
241-BX-111	weekly	manual tape	/PI
241-BX-112	weekly	auto FIC on CASS	IS/PI

* Frequency applies to manual measurements (MT,MF) which are baseline values.

** Present configuration may change.

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TABLE 6-3: SURFACE LEVEL MEASUREMENTS (CONT)

TANK	SURFACE LEVEL FIELD READING FREQUENCY*	ACTIVE** SURFACE LEVEL INSTRUMENTATION	Stabilization Isolation Status
241-BY-101	monthly	manual tape	IS/II
241-BY-102	weekly	manual tape	/PI
241-BY-103	weekly	manual tape	/PI
241-BY-104	monthly	manual tape	IS/PI
241-BY-105	weekly	manual tape	/PI
241-BY-106	weekly	manual tape	/PI
241-BY-107	quarterly	manual tape	IS/II
241-BY-108	monthly	manual tape	IS/PI
241-BY-109	weekly	auto FIC on CASS	/PI
241-BY-110	monthly	manual tape	IS/II
241-BY-111	monthly	manual tape	IS/PI
241-BY-112	monthly	manual tape	IS/PI
241-C-101	quarterly	manual tape	IS/II
241-C-102	weekly	intrusion mode FIC	/PI
241-C-103	weekly	auto FIC on CASS	/PI
241-C-104	weekly	auto FIC on CASS	IS/PI
241-C-105	weekly	auto FIC on CASS	/PI
241-C-106	weekly	auto FIC on CASS	/PI
241-C-107	weekly	auto FIC on CASS	/PI
241-C-108	quarterly	manual tape	IS/II
241-C-109	quarterly	manual tape	IS/II
241-C-110	weekly	manual tape	/PI
241-C-111	quarterly	manual tape	IS/II
241-C-112	weekly	manual tape	IS/PI
241-C-201	quarterly	manual tape	IS/II
241-C-202	quarterly	manual tape	IS/II
241-C-203	quarterly	manual tape	IS/II
241-C-204	quarterly	manual tape	IS/II

* Frequency applies to manual measurements (MT,MF) which are baseline values.

** Present configuration may change.

TABLE 6-3: SURFACE LEVEL MEASUREMENTS (CONT)

TANK	SURFACE LEVEL FIELD READING FREQUENCY*	ACTIVE** SURFACE LEVEL INSTRUMENTATION	Stabilization Isolation Status
241-S-101	weekly	intrusion mode FIC	/PI
241-S-102	weekly	auto FIC on CASS	/PI
241-S-103	weekly	auto FIC on CASS	/PI
241-S-104	monthly	auto FIC on CASS	IS/II
241-S-105	weekly	intrusion mode FIC	IS/PI
241-S-106	weekly	auto FIC on CASS	/PI
241-S-107	weekly	auto FIC on CASS	/PI
241-S-108	weekly	intrusion mode FIC	/PI
241-S-109	weekly	intrusion mode FIC	/PI
241-S-110	weekly	intrusion mode FIC	/PI
241-S-111	weekly	auto FIC on CASS	/PI
241-S-112	weekly	intrusion mode FIC	/PI
241-SX-101	weekly	intrusion mode FIC	/PI
241-SX-102	weekly	intrusion mode FIC	/PI
241-SX-103	weekly	auto FIC on CASS	/PI
241-SX-104	weekly	intrusion mode FIC	/PI
241-SX-105	weekly	intrusion mode FIC	/PI
241-SX-106	weekly	auto FIC on CASS	/PI
241-SX-107	quarterly	manual tape	IS/II
241-SX-108	quarterly	manual tape	IS/II
241-SX-109	quarterly	manual tape	IS/II
241-SX-110	quarterly	manual tape	IS/II
241-SX-111	quarterly	manual tape	IS/II
241-SX-112	quarterly	manual tape	IS/II
241-SX-113	quarterly	manual tape	IS/II
241-SX-114	quarterly	manual tape	IS/II
241-SX-115	quarterly	manual tape	IS/II

* Frequency applies to manual measurements (MT,MF) which are baseline values.

** Present configuration may change.

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TABLE 6-3: SURFACE LEVEL MEASUREMENTS (CONT)

TANK	SURFACE LEVEL FIELD READING FREQUENCY*	ACTIVE** SURFACE LEVEL INSTRUMENTATION	Stabilization Isolation Status
241-T-101	weekly	auto FIC on CASS	/PI
241-T-102	quarterly	auto FIC on CASS	IS/II
241-T-103	quarterly	auto FIC on CASS	IS/II
241-T-104	weekly	manual tape	/PI
241-T-105	monthly	intrusion mode FIC	IS/II
241-T-106	quarterly	intrusion mode FIC	IS/II
241-T-107	weekly	auto FIC on CASS	/PI
241-T-108	quarterly	manual tape	IS/II
241-T-109	monthly	intrusion mode FIC	IS/II
241-T-110	weekly	intrusion mode FIC	/PI
241-T-111	quarterly	auto FIC on CASS	/PI
241-T-112	quarterly	auto FIC on CASS	IS/II
241-T-201	quarterly	manual tape	IS/II
241-T-202	quarterly	manual tape	IS/II
241-T-203	quarterly	manual tape	IS/II
241-T-204	quarterly	manual tape	IS/II
241-TX-101	quarterly	auto FIC on CASS	IS/II
241-TX-102	quarterly	manual tape	IS/II
241-TX-103	quarterly	intrusion mode FIC	IS/II
241-TX-104	quarterly	auto FIC on CASS	IS/II
241-TX-105	quarterly	manual tape	IS/II
241-TX-106	quarterly	manual tape	IS/II
241-TX-107	quarterly	auto FIC on CASS	IS/II
241-TX-108	quarterly	intrusion mode FIC	IS/II
241-TX-109	quarterly	intrusion mode FIC	IS/II
241-TX-110	quarterly	manual tape	IS/II
241-TX-111	quarterly	manual tape	IS/II
241-TX-112	quarterly	manual tape	IS/II
241-TX-113	quarterly	manual tape	IS/II
241-TX-114	quarterly	manual tape	IS/II
241-TX-115	quarterly	manual tape	IS/II
241-TX-116	quarterly	manual tape	IS/II
241-TX-117	quarterly	manual tape	IS/II
241-TX-118	quarterly	intrusion mode FIC	IS/II

* Frequency applies to manual measurements (MT,MF) which are baseline values.

** Present configuration may change.

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TABLE 6-3: SURFACE LEVEL MEASUREMENTS (CONT)

TANK	SURFACE LEVEL FIELD READING FREQUENCY*	ACTIVE** SURFACE LEVEL INSTRUMENTATION	Stabilization Isolation Status
241-TY-101	quarterly	intrusion mode FIC	IS/II
241-TY-102	quarterly	auto FIC on CASS	IS/II
241-TY-103	quarterly	intrusion mode FIC	IS/II
241-TY-104	quarterly	auto FIC on CASS	IS/II
241-TY-105	quarterly	manual tape	IS/II
241-TY-106	quarterly	manual tape	IS/II
241-U-101	quarterly	manual tape	IS/II
241-U-102	weekly	intrusion mode FIC	/PI
241-U-103	weekly	auto FIC on CASS	/PI
241-U-104	quarterly	manual tape	IS/II
241-U-105	weekly	auto FIC on CASS	/PI
241-U-106	weekly	auto FIC on CASS	/PI
241-U-107	weekly	auto FIC on CASS	/PI
241-U-108	weekly	intrusion mode FIC	/PI
241-U-109	weekly	auto FIC on CASS	/PI
241-U-110	monthly	intrusion mode FIC	IS/PI
241-U-111	weekly	intrusion mode FIC	/PI
241-U-112	quarterly	manual tape	IS/II
241-U-201	quarterly	manual tape	IS/II
241-U-202	quarterly	manual tape	IS/II
241-U-203	quarterly	manual tape	IS/II
241-U-204	monthly	manual tape	IS/II

* Frequency applies to manual measurements (MT,MF) which are baseline values.
** Present configuration may change.

INSPECTIONS:

The instrumentation used for measuring liquid levels are managed and tracked via the preventive maintenance and PISCES systems discussed in Sections 9.1, 9.2, and 9.3.

WHC-CM-5-7, Tank Farm Surveillance & Operations Administration, Section 4.1 provides the instructions that Tank Farm Surveillance Analysis and Support (TFSA&S) personnel follow in reviewing, logging, analyzing, and reporting of the Tank Farm liquid level surveillance data.

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Tank liquid level data is derived from two sources:

- One is generated by the field operator taking manual tape liquid level readings in the field. For inactive tanks, such as the SSTs, manual readings are taken daily, weekly, monthly, and quarterly, as deemed necessary by predictive analysis based on past liquid level record (WHC-SD-WM-TI-357 gives the frequency in which the Single Shell surface level measurements are taken). These readings are recorded on a liquid level data sheet, signed off by the Tank Farms Surveillance Operations shift manager, and delivered to the CASS office (for a discussion of CASS refer to Section 9.4) for pickup for TFSA&S (ref: WHC-SD-TI-357).

- The second source is from CASS. These are generated from automatic "Food Instrument Corporation" (FIC) liquid level measurement devices that are connected to CASS (for a discussion of CASS refer to Section 9.4). These liquid levels are scanned hourly by CASS. Alarm messages occur if an input limit is exceeded. All anomalies are field checked (ref: WHC-SD-TI-357).

TFSA&S responsibilities include:

- Processing the data.

- Analyzing and plotting the compiled information for trend evaluation within one working day.

- The correct response to out-of criteria data.

- Scheduling rechecks within 24 hours.

- Rescheduling missed tank liquid level notifications.

- Maintaining auditable records.

If automatic FIC devices are out-of-service, and if field readings cannot be obtained for the prescribed frequency stated in WHC-SD-WM-TI-357, a TFSA&S discrepancy report shall be written (refer to Section 9.5 for corrective actions).

Logbooks are compiled from liquid level data sheets. These books are maintained as a continuous record of readings. Remarks that explain changes in liquid level readings (transfers, instrument status, etc.) are also recorded, whenever known. TFSA&S retains the logbooks and Baseline Change Authorizations indefinitely in Building 2750E, room C103. The original data sheets and CASS daily reports are retained in Building 2750E, room C103, for two years, then they are sent to the Records Holding Area (RHA) office in Building 712 for long term storage.

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6.7.2 INTERSTITIAL LIQUID LEVEL CHANGES

Since the waste surfaces in many of the Single Shell Tanks are no longer liquid, and in some cases no longer conductive, an alternate method for the detection of interstitial liquid change has been developed. This capability is a requirement, because the volume of drainable liquid within the solids matrix may be substantial even after Interim Stabilization. Timely response to an intrusion event is of equal importance, because the intrusion would not be observed until the liquid has reached the solids surface and thus substantially increasing the tanks liquid level volume.

Interstitial liquid monitoring is provided by in-tank Liquid Observation Dry Wells (LOWs). LOWs are constructed of fiberglass reinforced epoxy-polyester resin or ethylene tetra fluoro ethylene sized to extend to within 1 inch of the tank bottom liners. The wells are sealed at the bottom ends and have a nominal outside diameter of 3.5 inches. Monitoring is provided by the periodic insertion of mobile van mounted probes. The following probe types are used to obtain profile scans within the LOWs:

- Neutron Probe: The basic component of this assemble are a fast neutron source and a slow neutron (thermal) detector that measures moisture content of the surrounding medium in terms of detector response. The principle of operation is that the slow neutron flux density in the vicinity of the probe is mainly effected by hydrogen content (i.e. aqueous solution). The fast neutron source is contained in a detachable sealed capsule that is stored in a special cask when not in use.

- Gamma Probe: This probe is a lead shielded highly collimated detector whose applicability is based upon the assumption that the major gamma emitters are in the liquid waste. Changes incurred by leakage or intrusion can thus be observed as movement of the gamma profile as liquid changes take place.

- Acoustic Probe: This probe consists of broad-band lead metaniodate transducers for the transmission and reception of an acoustic signal. The principle of operation is the reflection differences in signal amplitudes as effected by the impedance characteristics of the encountered media. The probe requires a coupling solution to provide a path for the ultrasonic pulse to and from the fiberglass inner surface. The use of this probe has been severely restricted, because inner surface roughness problems have precluded the proper coupling. The use of the probe is therefore limited to special investigations initiated by changes observed through use of the other two probes.

The following response action criteria and its basis apply.

- o -0.3 foot: This limit is based upon 1.5 times the precision of the interpretation method (approximately +/-0.2 foot). The error is the estimated measurement capacity of the surveillance instrumentation technique (+/-0.1 foot) plus the error introduced by the interpretation technique (+/-0.1 foot). Precision of the interpretation method was derived at by a special test involving comparison of evaluation results independently reported by five different individuals.

- o +0.4 foot: This limit is twice the precision of the interpretation method. The difference between the decrease and increase limits is based upon an administrative judgement that a tank leak is of overriding importance.

The schedule applied to the LOW surveillance program is every six weeks. This is based upon the time required to detect a liquid loss within 1.5 times the combined precision of the interpretation method which is +/-0.2 foot. Using the statistically most probable leak rate of 0.03 gallons per minute and a porosity of the salt cake of 0.35 percent, the maximum change which could occur over a five week period would be in the range of 0.13 foot. This is considered acceptable because a lesser change would be well below the detection threshold. In addition, if an interstitial liquid level decrease of 0.2 foot is observed, a temporary monthly schedule may be put into effect until the tank is determined to be sound.

A total of 57 tanks have a Liquid Observation Well in place for interstitial liquid level surveillance. The criterion applied to the selection of a tank was a potential to contain more than 50,000 gallons of interstitial liquid without being detected by routine waste surface level monitoring. The tanks equipped with in-tank Liquid Observation Wells and the monitoring frequency are displayed in Tables 6-4 below (the * and ** used in the table is defined as):

* The use of the neutron and gamma probes are alternated every six weeks. The frequency does not apply to the acoustic probe, which is used as a support tool for special investigations.

** Probe types: gamma (6), neutron (7), acoustic (8).

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TABLE 6-4: IN-TANK LIQUID OBSERVATION WELLS

Tank Number	Riser	LOW Number	Frequency*	Probe Type**
241-A-101	19	10-01-69	Quarterly	6,7,8
241-A-103	19	10-03-69	Quarterly	6,8
			Monthly	7
241-AX-101	9-A	11-01-60	Quarterly	6,7,8
241-B-104	6	20-04-70	Quarterly	6,7,8
241-B-105	5	20-05-71	Quarterly	6,7,8
241-BX-111	5	21-11-68	Quarterly	6,7,8
241-BY-101	9-A	22-01-63	Quarterly	6,7,8
241-BY-102	1	22-02-63	Quarterly	6,7,8
241-BY-103	10-A	22-03-66	Quarterly	6,7,8
241-BY-104	10-C	22-04-66	Quarterly	6,7,8
241-BY-105	10-B	22-05-66	Quarterly	6,7,8
241-BY-106	10-B	22-06-66	Quarterly	6,7,8
241-BY-107	7	22-07-69	Quarterly	6,7,8
241-BY-109	12-B	22-09-60	Quarterly	6,7,8
241-BY-110	3	22-10-69	Quarterly	6,7,8
241-BY-111	1	22-11-63	Quarterly	6,7,8
241-BY-112	15	22-12-65	Quarterly	6,7,8
241-S-101	2	40-01-66	Quarterly	6,7,8
241-S-102	5	40-02-63	Quarterly	6,7,8
241-S-103	2	40-03-66	Quarterly	6,7,8
241-S-105	14	40-05-61	Quarterly	6,7,8
241-S-106	4	40-06-72	Quarterly	6,7,8
241-S-108	16	40-08-65	Quarterly	6,7,8
241-S-109	8	40-09-60	Quarterly	6,7,8
241-S-110	2	40-10-66	Quarterly	6,7,8
241-S-111	16	40-11-65	Quarterly	6,7,8
241-S-112	8	40-12-60	Quarterly	6,7,8

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TABLE 6-4: IN-TANK LIQUID OBSERVATION WELLS (CONT)

Tank Number	Riser	LOW Number	Frequency*	Probe Type**
241-SX-101	14	41-01-61	Quarterly	6,7,8
241-SX-102	14	41-02-61	Quarterly	6,7,8
241-SX-103	14	41-03-61	Quarterly	6,7,8
241-SX-104	14	41-04-61	Quarterly	6,7,8
241-SX-105	16	41-05-65	Quarterly	6,7,8
241-SX-106	14	41-06-61	Quarterly	6,7,8
241-T-104	1	50-04-61	Quarterly	6,7,8
241-T-110	5	50-10-68	Quarterly	6,7,8
241-T-111	7	50-11-67	Quarterly	6,7,8
241-TX-102	3	51-02-69	Quarterly	6,7,8
241-TX-106	11-A	51-06-69	Quarterly	6,7,8
241-TX-108	9	51-08-63	Quarterly	6,7,8
241-TX-109	3	51-09-69	Quarterly	6,7,8
241-TX-110	13	51-10-60	Quarterly	6,7,8
241-TX-111	11-A	51-11-69	Quarterly	6,7,8
241-TX-112	12	51-12-60	Quarterly	6,7,8
241-TX-113	4	51-13-60	Quarterly	6,7,8
241-TX-114	7	51-14-69	Quarterly	6,7,8
241-TX-115	9-A	51-15-63	Quarterly	6,7,8
241-TX-117	7	51-17-69	Quarterly	6,7,8
241-TX-118	5	51-18-63	Quarterly	6,7,8
241-TY-103	3	52-03-69	Quarterly	6,7,8
241-U-102	2	60-02-62	Quarterly	6,7,8
241-U-103	19	60-03-70	Quarterly	6,7,8
241-U-105	19	60-05-70	Quarterly	6,7,8
241-U-106	9	60-06-63	Quarterly	6,7,8
241-U-107	19	60-07-70	Quarterly	6,7,8
241-U-108	19	60-08-70	Quarterly	6,7,8
241-U-109	9	60-09-63	Quarterly	6,7,8
241-U-111	19	60-11-70	Quarterly	6,7,8

INSPECTIONS:

The instrumentation used for measuring LOW levels are managed and tracked via the preventive maintenance and PISCES systems discussed in Sections 9.1, 9.2, and 9.3.

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Data is generated by the field operator using a drywell van equipped with gamma, neutron, and acoustic probes to scan in-tank LOWs. The LOW data is computer-stored and transmitted via the CASS substations to the central computer at 2750E building. The processed data consists of a computer plot and a summary report, listing the LOW number, transfer date, van number, probe type, and baseline date. Neutron probe scan information is used as basis for criteria definition. Gamma scan information is evaluated for profile changes indicating possible tank leakage or intrusions. The acoustic probe is used only as a support tool for special investigations. Liquid Observation Wells are monitored alternately by neutron and gamma probes every 6 weeks.

A LOW baseline is a representative profile (in the form of a plot) of the readout obtained by monitoring a LOW with a gamma, neutron, or acoustic probe and is required to provide a reference for future data analysis. Baselines will be adjusted periodically and temporary baselines may be established when first monitored.

The maximum permissible interstitial liquid level change from a LOW baseline, as established in WHC-SD-WM-TI-357, is a decrease of 0.3 feet or an increase of 0.4 feet. All LOW data are evaluated for conformance to these limits. Exceeding of these limits shall require initiation of a trend analysis review by TFSA&S to define any correlation between different LOW probe types and other structural changes in the saltcake. Also, any such deviation shall require immediate notification of the Manager, Tank Farms, and the Manager, Tank Farm Surveillance Analysis and Support.

WHC-CM-5-7, Tank Farm Surveillance & Operations Administration, Section 4.2 provides the instructions that Tank Farm Surveillance Analysis and Support (TFSA&S) personnel follow in reviewing, logging, analyzing, and reporting LOW surveillance data. Criteria violations are reported in either a discrepancy report or an unusual occurrence report.

The LOW data log books are compiled from the CASS LOW summary report. TFSA&S retain the LOW data log Books, CASS LOW computer plots, and baseline change authorizations indefinitely in Building 2750E, Room C103. The LOW summary reports are retained in Building 2750E, Room C103, for one year, then sent to the Records Holding Area (RHA) office in Building 712 for long term storage.

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6.7.3 LEAK DETECTION PITS

The primary method of leak detection in the AX Single Shell Tank Farm complex is by leak detection pits. Leak detection pits detect and recover solution leakage through the tank's steel liner. Such leakage is collected in slots in the concrete foundation beneath the tank liner. These slots are plumbed to drain to the leak detection pits which are located adjacent each tank in AX Farm. Leak detection wells consists of two major components:

- The first consists of a 24 inch schedule 20 pipe section that extends from a grade level pump pit (used to route liquid from the leak detection pit to a designated receiver tank) to a point adjacent to and below the tank concrete foundation. Three instrument air dip tube assemblies are mounted on the inside and are used to measure solution weight factor and specific gravity. Readout is provided at the panel-boards in the instrument building. A fourth tube is welded at its end and houses a thermocouple installed to within 3 inches of the bottom of the pit. This equipment is connected to the Computer Automated Surveillance System (for a discussion of CASS refer to Section 9.4).

- The second is a radiation dry well external to the larger leak detection pit and which terminates at a point adjacent to the bottom of the pit. A radiation detector is located at the bottom of the radiation dry well.

The following response action criteria and its basis apply:

- A weight factor increase of 8 inches accompanied by a corresponding radiation level increase as stated below. Changes are based upon weight factor histories and experiences with the periodic effect of non-contaminated water intrusions, where small volumes represent a significant weight factor difference (a 1 inch change = 1.9 gallons).

- Radiation level increases are set at 3 times normal background levels. The data variability indicate an intrusion measurement capability of +/-1.5 times the established background level. The limit is significantly less than that which would be expected upon entry of radioactive waste solutions.

- There is no criteria temperature. Temperature within a leak detection pit is provided for use in conjunction with special studies relating to other anomalies.

- There is no criteria stated for specific gravity. The entry of radioactive waste is, however, expected to exhibit a significant effect upon the density of the water normally maintained within the leak detection pit.

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INSPECTIONS:

The instrumentation used for in leak detection pits are managed and tracked via the preventive maintenance and PISCES systems discussed in Sections 9.1, 9.2, and 9.3.

Leak-detection pit data are generated by the field operator, Tank Farm Surveillance and Operations (TFS&O), who obtain the readings in the field. The data consists of weight factor, specific gravity, and radiation readings. These readings are recorded daily on a leak-detection pit data sheet, signed off by the TFS&O shift manager, and delivered to the CASS office for pick up by TFSA&A. These readings are reviewed daily.

Data for leak detection pits is tabulated and plotted daily by TFSA&S for trend analysis. Criteria for minimum and maximum liquid levels, as well as for maximum radiation levels, are defined in SD-WM-TI-357. Criteria violations are reported in either a discrepancy report or an unusual occurrence report.

WHC-CM-5-7, Tank Farm Surveillance & Operations Administration, Section 4.9 provides the instructions that Tank Farm Surveillance Analysis and Support (TFSA&S) personnel follow in reviewing, logging, analyzing, and reporting leak-detection pit surveillance data.

Logbooks are compiled from field data sheets. TFSA&S retain the logbooks and Baseline Change Authorizations indefinitely in Building 2750E, room C103. The original data sheets are retained in the office for two years, then they are sent to the Records Holding Area (RHA) office in building 712 for long term storage.

ALARMS:

In addition to the data discussed above, real time alarms for the AX Tank Farm leak detection pits annunciate at CASS. Refer to Section 9.4 for a discussion of CASS and Appendix I for a listing of the CASS alarms.

6.7.4 EXTERNAL LEAK DETECTION DRYWELLS

Leak Detection Drywells are used to monitor the underground Single Shell storage tanks for possible liquid leaks and to track the movement of radionuclides in the soil. There are a total of 755 Dry Wells in the Hanford Site tank farms. The wells are vertically buried, open-bottomed, mild-steel casings of either 6- or 8-inch diameter that range in depth from 75 feet to 150 feet. Most drywells are located within 6-10 feet from the outer walls of the tank, but a small number are at more remote (peripheral) locations within each farm.

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Tank leak surveillance using these wells is provided by the periodic insertion of mobile van mounted gamma radiation or neutron sensors to produce a scan profile of radiation or soil moisture level as a function of well depth. The van mounted equipment integrates the sensor response for one data interval (1.0 foot), and then repeats the action to form a series of data points. The series of data points is then automatically plotted to form the profile scan.

Several Drywell Vans are used and their equipment configurations (power source, draw works, probe types, and electronic data processing and readout components) are functionally interchangeable. Four sensor types are used. Three monitor gamma radiation and the fourth monitors the neutron response to the moisture contained in the surrounding environment.

A special study was undertaken to develop a scientific and technically valid basis for establishing an external leak detection drywell monitoring frequency schedule. The drywell response time equation subsequently created by the study was used to develop a monitoring frequency schedule for each external drywell. Derivation of the equation was based upon the following:

- Variation in dose rate as a function of time.
- Variation in dose attenuation by the soil.
- Response of radiation sensor as the dose rate changes.
- Leak source - drywell distance.
- Leak rate.
- Geometry of soil wetted by the leak.
- Soil hydrologic properties.
- Assumption the Ruthenium-106 is the predominant soluble isotope that moves with the water front.

All of the external drywells have been evaluated in accordance with this monitoring frequency equation, and each has been placed in one of the following categories:

- Weekly
- Fortnightly
- Every third week
- Monthly
- Quarterly
- Annually

Safety Analysis Report SD-WM-SAR-034 specifies that drywell monitoring of all of the applicable tanks shall be taken and recorded per frequencies specified in SD-WM-TI-357 (latest revision). The Technical Basis for establishing drywell monitoring frequencies can be found in RHO-ST-34, "A Scientific Basis for Establishing Drywell Monitoring Frequencies, and SD-WM-SAR-034, "Stabilization of Single-Shell Waste Storage Tanks Safety Analysis Report.

INSPECTION:

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The instrumentation used for obtaining drywell radiation profiles is managed and tracked via the preventive maintenance and PISCES systems discussed in Sections 9.1, 9.2, and 9.3.

Drywell data are generated by the field operator using a van equipped to scan the external dry wells surrounding the SSTs. Primary data are computer-stored and transmitted via CASS substations to the central computer at 2750E building.

Readings are taken on a regular schedule that varies from weekly to quarterly depending on the particular drywell and the particular associated tank. Nonstabilized tanks containing more than 30,000 gallons of drainable liquid are monitored weekly and biweekly. Interim stabilized tanks containing more than 30,000 gallons of drainable liquid are monitored monthly. Interim stabilized or partially isolated tanks containing less than 30,000 gallons of drainable liquid are monitored quarterly. Interim stabilized/isolated tanks are monitored yearly.

The drywell monitoring is done per plant operating procedure TO-040-330 at the frequency specified by WHC-SD-WM-TI-357.

If data cannot be analyzed within one working day, TFSA&S management must be notified to determine the action to be taken.

Discrepant data must comply with drywell limits in SD-WM-TI-357.

Baselines are representative profiles of activity in drywells and consist of a computer plot, as well as numerical data in counts/second (C/S). The TFSA&S engineers must notify TFSA&S management of established baselines that no longer seem valid; these will be reviewed and changed individually with final approval from the Manager, TFSA&S; and the Single-Shell Plant Engineering Manager.

TFSA&S obtains the Drywell Summary Report from CASS. From the drywell Summary Report the data is compiled into the Drywell Data Book. Computer plots of this data is review by TFSA&S and compared against baselines maintained for each drywell in the Drywell Data Book.

The Drywell Data books, one computer plot per drywell annually, and the baseline change authorizations are kept by TFSA&S in Building 2750E, Room C103, indefinitely. The balance of the Drywell Summary Reports and the drywell computer plots are retain in Building 2750E, Room C103, for one year, then sent to the Records Holding Area (RHA) office in building 712 for long term storage.

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6.7.5 EXTERNAL LEAK DETECTION LATERALS

Lateral leak detection systems are to be found in only two tank farms: 241-A and 241-SX. In the 241-A Tank Farm, laterals are under all six tanks. In the 241-SX Tank Farm, only the following nine tanks have laterals in place:

Tank 241-SX-105	Tank 241-SX-111
Tank 241-SX-107	Tank 241-SX-112
Tank 241-SX-108	Tank 241-SX-114
Tank 241-SX-109	Tank 241-SX-115
Tank 241-SX-110	

The laterals are 4-inch inside diameter steel pipes located 8 to 10 feet below the tank's concrete base. A 3-inch diameter tubing is inserted into the laterals to create an annulus. The tubes rise to instrument enclosures through vertical caissons adjacent to the tanks being served (two or three tanks per caisson in the 241-SX farm and three per caisson in the 241-A farm). There are three laterals per tank, and the horizontal portions extend in a fan-like manner under and beyond the tank.

To monitor the laterals, a radiation detector is pneumatically driven down and out to the extremity of the tube, and then it is retracted by a cable mechanism. A radiation profile scan is obtained during the withdrawal. The instrument readout system records total gamma response for each 1.05 feet of travel and presents the data in the form of an x-y chart profile. In addition, the instrumentation for ten of the tanks has been modified to permit data storage in a monitoring van computer for transmittal to CASS (reference Section 9.4).

Two probe types are in use for leak detection lateral monitoring. They are the High-Sensitivity Geiger-Muller (Green GM), and High Level Geiger-Muller (Red GM).

The monitoring frequency requirements are as follows:

- Annually: Applies to tanks declared to be both Interim Stabilized and Interim Isolated.
- Quarterly: Applies to tanks which are Interim Stabilized but not Interim Isolated.
- Every Three Weeks: Applies to tanks not yet stabilized and have a liquid level decrease monitoring system in place.
- Weekly: Applies to tanks that are neither Interim Stabilized nor Interim Isolated and have no surface level decrease criteria in place.

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Table 6-5, below, shows the monitoring frequency and what type of probe is used.

TABLE 6-5: LATERAL MONITORING SCHEDULE

A FARM							
Tank	Laterals	Probe*	Frequency	Tank	Laterals	Probe*	Frequency
101	14-01-01 14-01-02 14-01-03	Green Green Green	Weekly Weekly Weekly	102	14-02-01 14-02-02 14-02-03	Green Green Green	Weekly Weekly Weekly
103	14-03-01 14-03-02 14-03-03	Green Green Green	Quarterly Quarterly Quarterly	104	14-04-01 14-04-02 14-04-03	Green Green Green	Yearly Yearly **
105	14-05-01 14-05-02 14-05-03	Red Red Red	Yearly Yearly Yearly	106	14-06-01 14-06-02 14-06-03	Green Green Green	Yearly Yearly Yearly
SX FARM							
Tank	Laterals	Probe*	Frequency	Tank	Laterals	Probe*	Frequency
105	44-05-01 44-05-02 44-05-03	Green Green Green	Weekly Weekly Weekly	107	44-07-01 44-07-02 44-07-03	Red Red Red	Yearly Yearly Yearly
108	44-08-01 44-08-02 44-08-03	Red Red Red	Yearly Yearly Yearly	109	44-09-01 44-09-01 44-09-01	Red Red Red	Monthly Monthly Monthly
110	44-10-01 44-10-02 44-10-03	Green Green Green	Yearly Yearly Yearly	111	44-11-01 44-11-02 44-11-03	Green Green Green	Yearly Yearly Yearly
112	44-12-01 44-12-02 44-12-03	Green Red Green	Yearly Yearly Yearly	114	44-14-01 44-14-02 44-14-03	Green Green Green	Yearly Yearly Yearly
115	44-15-01 44-15-02 44-15-03	Red Green Red	Yearly Yearly Yearly				

* Green: High Sensitivity Geiger Mueller Probe (GM-1)
Red: High Level Geiger Mueller Probe (GM-2)

** Not monitored (obstruction in lateral).

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INSPECTIONS:

The instrumentation used for measuring lateral liquid levels are managed and tracked via the preventive maintenance and PISCES systems discussed in Sections 9.1, 9.2, and 9.3.

Data for the tanks that have laterals are generated by the field operator assigned to this task by Tank Farm Surveillance & Operations (TFS&O) management. To monitor the laterals, a radiation detector is pneumatically driven down and out to the extremity of the tube, and then it is retracted by a cable drive mechanism. A radiation profile scan is obtained during the withdrawal. The instrument readout system records total gamma response for each 1.05 feet of travel and presents the data in the form of an X-Y chart profile. In addition, the instrumentation for 10 of the tanks has been modified to permit data storage in a monitoring van computer for transmittal via CASS substations to the central computer at 2750E building. Secondary data are logged on a graph chart recorder located inside the lateral instrument buildings. The chart recorder provides an instantaneous read-out graph and is used as the primary data for the laterals under the remaining five tanks that do not have computer data.

Nonstabilized tanks are monitored weekly. Interim stabilized/partial isolated tanks are monitored quarterly. Interim stabilized/isolated tanks are monitored yearly. Laterals may also be monitored more often per special requirements.

The instantaneous read-out graphs generated by the field operator must be delivered to TFSA&S by shifts end unless otherwise instructed. If the prescribed time requirement is exceeded, the manager of TFSA&S must be notified.

A baseline is a representative profile of activity in a lateral, and contains a computer plot or graph chart, as well as numerical data in counts/second (c/s) or counts/minute (c/m). The action criteria for leak-detection laterals are:

1. Activity <12 c/s must increase 10 c/s from an established baseline and also exceed 12 c/s.

2. Activity >12 c/s must increase 50% from an established baseline.

3. The peaks resulting from the probe making the turn at approximately 70 feet and the source at approximately 20 feet are exempt from these criteria.

4. Laterals associated with tanks categorized as Assumed Leaker will be monitored for migration of activity, and lateral criterion limits will not apply except in cases where new radiation peaks appear.

The lateral data books are log books comprising of instantaneous readout graphs, probe calibration data, and receipt and processing information. TFSA&S retains the lateral data books, logbooks, special computer plots, and baseline change authorizations indefinitely in Building 2750E, Room C103. The lateral summary reports and lateral computer plots are retained in Building 2750E, Room C103, for one year, then sent to the Records Holding Area (RHA) office in Building 712 for long term storage.

6.7.6 WASTE TANK TEMPERATURES

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Analysis shows that waste temperatures of less than 350°F will allow safe maintenance of SST structural integrity. Temperatures in excess of 350°F will contribute to stress-corrosion cracking and eventually may result in concrete overstress. The minimum temperature for chemical reaction in tanks containing ferrocyanide is 400°F, which is well above the maximum temperature allowed in these tanks. Reference may be made to WHC-SD-WM-357 for the maximum temperature criteria for individual high heat-load tanks (>40,000 Btu/hr) and tanks containing ferrocyanide.

Tank monitoring provides data to establish temperature trends for high-heat tanks. Sufficient time is provided by the trend analysis to allow recovery actions to be taken before reaching the tank tensile yield strength. Tank temperatures in high heat load tanks are monitored to assure temperatures do not reach 300°F. Tanks which contain ferrocyanide are monitored to maintain minimum allowable temperatures as determined by analysis (ref: WHC-SD-WM-TI-357). The remainder of SSTs do not require cooling and are only monitored for temperature for as long as the thermocouple tree remains operational.

Safety Analysis Report SD-WM-SAR-006 specifies that tanks containing waste with a heat load of greater then 40,000 Btu/hr shall be monitored at least every 45 days. Operating Specification Document OSD-T-151-00013 states that high heat-load tanks shall be monitored at least every 38 days. Current practice is to monitor high heat-load tanks and ferrocyanide tanks monthly. All other SSTs are monitored biannually. All temperature data taken manually is input to the CASS the day they are taken.

Applicable Plant Operating Procedures for tank temperature monitoring may be found in documents TO-040-020, TO-040-025, and TO-040-650.

Replaceable thermocouple trees are installed to measure waste temperatures in tanks with a high heat load history (>40,000 Btu/hr). If two or more probes on a tree fail, operability is restored as soon as practical, not to exceed three months, provided temperature monitoring is still maintained. Thermocouple trees in tanks with less than 40,000 Btu/hr heat load are not replaced as they fail, but data is taken for as long as possible.

SST temperature data is obtained and recorded using portable digital thermocouple read-out instruments. Temperature readout on these instruments is in °F and the individual instruments are labeled for use in conjunction with a specific thermocouple type (type E, J or K for SSTs). Tables 6-4 and 6-5 below gives the frequency at which these temperatures are taken for tanks containing ferrocyanide and for high heat load tanks. These tables also show the thermocouple type and maximum temperature allowed for these SSTs.

TABLE 6-6: TEMPERATURE MONITORING OF TANKS CONTAINING FERROCYANIDE

Tank Number	Monitoring Frequency	Reading Method	Maximum Temperature Criteria (°F)	Thermocouple Type
241-BX-102	monthly	manual	104	J
241-BX-106	monthly	manual	105	J
241-BX-110	monthly	manual	104	J
241-BX-111	monthly	manual	108	J
241-BY-101	monthly	manual	122	J
241-BY-103	monthly	manual	122	J
241-BY-104	monthly	manual	167	J
241-BY-105	monthly	manual	151	J
241-BY-106	monthly	manual	163	J
241-BY-107	monthly	manual	123	J
241-BY-108	monthly	manual	133	J
241-BY-110	monthly	manual	159	E
241-BY-111	monthly	manual	119	J
241-BY-112	monthly	manual	149	J
241-C-108	monthly	manual	115	J
241-C-109	monthly	manual	115	J
241-C-111	monthly	manual	101	J
241-C-112	monthly	manual	119	J
241-T-101	monthly	manual	110	J
241-TX-118	monthly	manual	120	J
241-TY-101	monthly	manual	110	J
241-TY-103	monthly	manual	103	J

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TABLE 6-7: TEMPERATURE MONITORING OF TANKS WITH HIGH HEAT LOAD

Tank Number	Monitoring Frequency	Reading Method	Maximum Temperature Criteria (°F)	Thermocouple Type
241-A-104	monthly	on CASS	300	J
241-A-105	monthly	on CASS	300	E
241-C-105	monthly	manual	300	E
241-C-106	monthly	manual	300	E J
241-SX-107	monthly	on CASS	300	J
241-SX-108	monthly	on CASS	300	J
241-SX-109	monthly	on CASS	300	J
241-SX-110	monthly	on CASS	300	J
241-SX-111	monthly	on CASS	300	J
241-SX-112	monthly	on CASS	300	J

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INSPECTIONS:

The instrumentation used for measuring tank temperatures are managed and tracked via the preventive maintenance and PISCES systems discussed in Sections 9.1, 9.2, and 9.3.

Temperature data is analyzed at least quarterly, to determine if any SST shows an increasing waste temperature trend. Peak temperatures are predicted for any SST showing a temperature rise which is significantly out of the historical norm since deactivation.

Temperature data for high heat load tanks are evaluated for compliance with the limits stated above. If those limits are exceeded or compromised then the following actions are taken:

1. Failure to monitor a high heat load tank within the prescribed frequency of 38 days is an Operating Specification Document violation, and an Occurrence Report will be issued by Tank Farm Operations in accordance with WHC-CM-5-5, procedure GA-2.18.

2. Exceeding the maximum criteria of 300°F in high heat load tanks is an Operation Specification Document violation, an Occurrence Report will be issued by TFSA&S in accordance with WHC-CM-5-5, procedure GA-2.18

3. Failure to restore operability with three months is an Operation Specification Document violation, and an Occurrence Report will be issued by Tank Farm Operations in accordance with WHC-CM-5-5.

4. A temperature reading which is inconsistent with the historical norm of the high heat load tank will result in a Discrepancy Report being issued by TFSA&S. Other anomalies may also result in a Discrepancy Report being issued.

Failure to monitor a tank containing ferrocyanide on a monthly schedule will result in a Discrepancy Report being issued by TFSA&S.

Logbooks are compiled from field data sheets. TFSA&S retain the logbooks in building 2750E, room C103 for 10 years. The original temperature data sheets are retained in the office for two years, then they are sent to the Records Holding Area (RHA) office in building 712 for long term storage.

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6.7.7 TANK VAPOR SPACE PRESSURE

Tank vapor space pressures are limited to prevent structural damage due to excess tension or compression. For actively ventilated tanks a pressure gauge is installed at the tank side inlet of each exhauster. For passively ventilated tanks a seal loop is installed.

Safety Analysis Report SD-WM-SAR-006 states that for actively ventilated SSTs the exhauster inlet pressure shall be recorded at least once daily not to exceed 30 hours. For passively ventilated tanks the seal loop fluid status shall be recorded at least once every ten days. For actively ventilated SSTs the exhauster fan(s) shall be designed to produce a vacuum of no more than 7 inch w.g. in associated tanks. For passively ventilated tanks the seal loop shall be provided which evacuates at less than 7.0 inches w.g.
Operating Specifications Document OSD-T-151-00013 specifies that for actively ventilated SSTs that a pressure gauge shall be installed at the tank side inlet of each exhauster. Pressure is to be recorded at least every 24 hours. A seal loop, which evacuates at 4±1 inch w.g., shall be installed on each passively ventilated tank. The seal fluid shall be nonvolatile, with a specific gravity as close to 1.0 as practical. the liquid level shall be maintained at 4.0 ± 1.0 inch w.g., and the seal loop status recorded. Loop fluid levels on passively ventilated tanks shall be checked at least once every 10 days, and refilled if necessary.

INSPECTIONS:

The instrumentation used for measuring tank vapor space pressures are managed and tracked via the preventive maintenance and PISCES systems discussed in Sections 9.1, 9.2, and 9.3.

Loop fluid levels on passively ventilated tanks are check weekly, or more often by special request, and recorded on data sheets per standard operating procedure TO-060-015. The data sheets are transmitted to the Cognizant (COG) Engineer of Single-Shell Tank Process Engineering (SSTPE) via 272-AW within two working days. A copy of the data sheet is sent to Radiological Engineering, room C101, 2750E. Both Tank Farm Operations and SSTPE review these data sheets.

The pressure is recorded every shift on actively ventilated tanks and recorded on appropriate data sheets per standard operating procedures, TO-060-035, TO-060-050, TO-400-120. The data sheets are transmitted to the COG of SSTPE via 272-AW at least once per week, where they are reviewed.

The original data sheets are kept by the COG of SSTPE for three years, then they are sent to the Records Holding Area (RHA) office in building 712 for long term storage.

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6.7.8 PSYCHROMETRICS

Ventilation and air balance personnel take psychrometric surveys on all SST active ventilation systems. Psychrometric information is used as an investigative tool to assist in resolving measurement anomalies. The data is collected to determine evaporation rates which are used to account for liquid loss in the tanks. Wet and dry bulb temperatures are analyzed for these determinations.

INSPECTIONS:

The instrumentation used for measuring pshycrometric data are managed and tracked via the preventive maintenance and PISCES systems discussed in Sections 9.1, 9.2, and 9.3.

The frequency at which psychrometric data is collected is dependent upon individual tank evaporation rates. Readings are taken per a schedule provided for ventilation and air balance by Tank Farm Process Engineering, but may also be taken more frequently by special request.

Logbooks are compiled from Ventilation Balance Reports and computer calculations. Ventilation Balance Reports are in work packages in the 200E and 200W facilities and are retained in Building 2750E, Room C102, for one year before being forwarded to the Records Holding Area (RHA) office in building 712 for long term storage. The psychrometric data logbooks are retained in Building 2750E, Room C102, for three years, after which they are sent to RHA.

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6.7.9 ABOVE GROUND CONTAMINATION RADIATION MONITORING

Overall surveillance of radiation levels in the tank farm is provided by pole mounted area radiation monitors (ARMs). Catastrophic releases of radioactive waste from the tanks would be detected by these proportional type radiation probes. The area monitors are mounted on poles about 20 feet above ground and are sensitive to gamma radiation in the range of 0.1 to 10.0 mR/h. Each probe has an audible alarm and a warning light. The radiation levels detected by each monitor are recorded continuously. Audible and visual alarms are provided at each detector location, and a reset push button is located at each alarm. Readout instrumentation is located in the tank farm instrument buildings as noted in table 6-9. Radiation levels exceeding 5 mrem/h above normal background activity will trip the alarm and send a signal to the farm transmitter. The transmitter will then send the signal to the console and surveillance loop reader located at 242-A Evaporator Building for East Area and 242-S Evaporator Building for West Area, where printouts of the specific station are recorded. Any signal picked up on the surveillance loop is transmitted to the CASS, at 2750E for printout and audible alarm.

TABLE 6-8: AREA RADIATION ALARM SYSTEMS

Tank Farm	Detector Locations	Location of Instrumentation	Location of General Annunciator
241-A	2	241-A-271	242-A
241-AX	2	241-A-271	242-A
241-B	5	241-BY-301	242-A
241-BX	5	241-BY-301	242-A
241-BY	5	241-BY-301	242-A
241-C	5	241-CR-271	242-A
241-S	6	241-S-271	242-S
241-SX	6	241-S-271	242-S
241-T	5	241-T-701	242-S
241-TX	8	241-T	242-S
241-TY	3	242-T	242-S
241-U	4	241-U-271	242-S

INSPECTIONS:

The Area Radiation Monitors used for measuring overall tank farm radiation levels are managed and tracked via the preventive maintenance and PISCES systems discussed in Sections 9.1, 9.2, and 9.3.

When the Health Physics personnel (200 East Area) conduct their scheduled radiation surveys in each of SST farms they note the highest peak of the Area Radiation Monitor. The highest peak taken for the day is recorded on a Scheduled Radiation Survey Report. If the reading is above three mrem the reason for the high radiation count is investigated and will be resolved.

The East Tank Farms Scheduled Radiation Survey Reports are kept at Building M0386 (trailer). These reports are transferred, quarterly or when called for, to M0413, Room 104. They are reviewed and sent, after 90 days, to the Records Holding Area (RHA) Office, Building 712, for long term storage. The West Tank Farms inspections are recorded on the same report form as for the East Area, but are kept in the 2723W building. They are also transferred quarterly (or when called for) to M0413, room 104, where they are reviewed and sent, after 90 days, to RHA.

6.8 DAILY INSPECTION OF AREAS SUBJECT TO SPILLS

The possibility may exist for spills during maintenance/equipment removal, jumper positioning, or pumping operations. In this case, the spill is immediately reported. Actions taken are described in the Contingency Plan (WHC-IP-0263-TF).

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6.9 DAILY INSPECTIONS OF OVERFILL CONTROLS

There are three reasons why daily overfill inspections are deemed unnecessary at SSTs.

1. Tank Isolation: SSTs no longer receive waste. They are scheduled for complete deactivation. Each tank farm is isolated from active facilities as a unit, along with its directly associated diversion boxes. The tanks themselves remain undisturbed. Process pipelines are isolated at the nearest diversion box, and utility lines and pipes are disconnected as near as possible to main supplies. In-tank equipment in risers is abandoned in place where possible, but certain equipment that is an obstruction to surveillance or that cannot be sealed is removed. Basic surveillance equipment (surface level sensor, thermocouple) is retained, and an observation port is cleared on each tank for in-tank photographs. A breather filter is installed on each tank that does not normally use an active ventilation system. Unneeded instrument and electrical enclosures are removed. All above ground tank risers are sealed, and underground risers are excavated to 3-feet underground and sealed. Pits and miscellaneous equipment are covered with polyurethane foam and a vapor barrier to provide the primary seal.

2. Salt well pumping - Salt well pumping is to remove as much liquid as is possible from the storage tanks, thus leaving essentially all solids in the storage tanks. This is an ongoing project.

3. Liquid Level Instrumentation - Liquid level instrumentation is maintained in operable condition for monitoring liquid intrusion. Baseline manual tapes or FIC's are used for liquid level monitoring. Special instrumentation to be installed on dry wells is being developed which will permit monitoring of the liquid level in the salts. Liquid observation wells are used to detect tank intrusions.

INSPECTIONS:

All of the single shell waste storage tanks are now inactive, and due to the success of the liquid removal programs, the daily inspection and maintenance of overfill controls is no longer necessary. Regardless of this fact, tank liquid levels are monitored per the schedule described in section 6.7. Refer to this section for a description of the monitoring equipment and for the data gathered from this monitoring equipment.

Additional applicable inspections are discussed in section 8, <u>Transfer and Routing Facility Inspections</u>.

6.10 DAILY INSPECTIONS OF ABOVE GROUND PORTIONS OF THE TANKS

Tank risers, riser cover blocks, pump pit cover blocks, and tank exhaust system structures are the only portions of the tank farm tank systems which are above ground. Due to the radioactive nature of the waste, radiation surveys are the most effective method to inspect above ground portions of the tank system for waste releases. Health Physics personnel conduct various scheduled radiation surveys in each of SST farms.

INSPECTIONS:

TASK DESCRIPTION	FREQUENCY	FARM	TASK #
Perform daily source checks of all facility assigned radiation survey instrumentation. Perform a contamination smear survey of all facility step-off pads.	Daily	A AX B BX BY C	ED-02 ED-07 ED-17
Perform a direct and random smear survey of the change rooms, control rooms, lunch rooms, store rooms, and step off pads (entrance into S farm) Perform a random direct survey of SWP Clothing.	Daily	S	WTF-D-01
Perform a random direct and smear survey of the floor, step off pads, instrument panel, table, and any other equipment in the buildings.	Daily	U	WTF-D-05
Perform a smear and direct survey of the floor, laundry and step off pads in the walk-through shacks and at the tank farm entrances.	Each week day	S SX	WTF-WD-01
Perform a dose rate survey on exhauster ducts, breather air filters, general area and verify all high radiation boundaries in tank farms. Pay particular attention to risers, pits, exhauster ducts, and breather filters for abnormal dose rates and contamination levels.	Each Week Day	S SX	WTF-WD-02

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TASK DESCRIPTION	FREQUENCY	FARM	TASK #
Perform a direct and smear survey of the floors, step off pads and laundry inside the walk-through shacks. Perform a dose rate survey on breather air filters and general area and verify all high radiation boundaries in the tank farm.	Each Week Day	T	WTF-WD-03
Perform a dose rate survey on exhauster ducts, breather air filters, general area and verify all high radiation boundaries in tank farms. Perform a random direct and smear survey of floors, step off pads, and laundry bags inside the walk-through shacks. Record and update radiological status maps.	Each Week Day	TX TY U	WTF-WD-05
Using standard survey techniques, perform contamination surveys of the following areas: Control Room, Change Room, Clean SWP clothing and Laundry Room.	Weekly	A AX	EW-03
Using standard survey techniques perform contamination survey of the following: Control room, exhauster pad, tank farm entrances commonly used.	Weekly	B BX BY C	EW-47 EW-52
Perform dose rate and smear survey of all active and isolated pits, observation ports, FICs, exhausters, and other miscellaneous equipment.	Weekly	S SX	WTF-W-01
Perform a dose rate and a random direct and smear survey of the floors and miscellaneous equipment in the buildings.	Weekly	SX T	WTF-W-05

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TASK DESCRIPTION	FREQUENCY	FARM	TASK #
Perform dose rate and smear surveys of all active and isolated valve pits, pump pits, observation ports, F.I.C.s, exhausters, and other miscellaneous equipment. Readings shall be recorded and the Facility radiological status map update.	Weekly	T TX TY U	WTF-W-04 WTF-W-03 WTF-W-02

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Note: Task numbers are subject to change without notice. The common traffic areas (i.e., step-off pads, tank farm control rooms, exhauster pads, and tank farm entrances/walk-through shacks) are surveyed more frequently (daily or weekly) than other portions of the tank farm. Radiological contamination from a waste release, if one were to occur, would accumulate, in these common areas, due to foot traffic and would most likely be detected by the surveys conducted in these areas.

The A, AX, B, BX, BY, and C East Tank Farms inspections are documented on Scheduled Radiation Survey Reports which are kept at Building MO386 (trailer). These reports are transferred quarterly or when called for, to MO413, Room 104. They are reviewed and sent, after 90 days, to the Records Holding Area (RHA) Office, Building 712, for long term storage. The S, SX, T, TX, TY, and U West Tank Farms inspections are recorded on the same report form as for the East Area, but are kept in the 2723W building. They are also transferred quarterly (or when called for) to MO413, room 104, where they are reviewed and sent, after 90 days, to RHA.

6.11 CATHODIC PROTECTION INSPECTIONS

The SST during construction had non-energized cathodic protection installed which required no schedule maintenance. This system is considered to marginally effective even though it is still in place. Cathodic because of the location of the system underground it is not practical to inspected these systems. The structures that are protected, and the corresponding inspections are discuss in the "Double Shell Tank Farm Inspection Plan Matrix" (Document number WHC-SD-WM-EV-055).

6.12 ANCILLARY EQUIPMENT INSPECTIONS

Ancillary facilities and equipment for SSTs are related to saltwell pumping/interim stabilization activities. These are discussed in Chapter 8, "Transfer and Routing Facilities Inspection".

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7.0 MISCELLANEOUS TANK INSPECTIONS

This section discusses the manner in which the miscellaneous tank systems meet the RCRA/WAC Inspection Requirements presented in Section 5. To avoid duplication, only those inspections which are different from those covered in Section 6 above are covered here.

The miscellaneous tanks systems covered in this section are those which are related to the interim stabilization of the SSTs but were not covered in the Double Shell Tank Inspection Plan (WHC-SD-WM-EV-055). The tank systems included here are the 244-BX Double Contained Receiver Tank (DCRT), the 244-U DCRT, and the 244-CR Vault.

The 244-U DCRT is currently inactive. This facility has not been used (waste has never been put into it) to date. It is therefore exempt from the RCRA/WAC Inspection Requirements until it becomes active.

7.1 SECURITY INSPECTIONS

Security on the Hanford site remains the same as discussed in Section 6.2. The 244-CR Vault and 244-BX DCRT are within the 200 East Area. The 244-U DCRT is located within the 200 West Area.

Existing security and warning signs for the individual facilities are as follows:

- The 244-U DCRT is located to the South & East of U Farm, on the Northwest corner of 16th street and Camden Ave., in the 200 West Area. It is surrounded with a chain link fence and posted as the West Tank Farms as described in Section 6.2.

- The 244-BX DCRT is located in BX Farm next to Tank 241-BX-102. It is encircled by the BX and BY Tank Farm chain link fence and is posted as described in Section 6.2.

- 244-CR Vault is located south of C Farm and north of 7th street in the 200 East Area. The vault is an underground structure covered with concrete cover blocks. It is surrounded with a chain link fence with is posted as the Tank Farms in the East Area (see Section 6.2).

INSPECTIONS:

Requirements for radiation postings are specified in WHC-CM-4-10. Proper radiation posting is assured via routines accomplished by Operational Health Physics. These routines are:

FACILITY	TASK NUMBER*	FREQUENCY
244-CR	EW-12	Weekly
244-U	WTF-WD-04	Weekdays

* Note: Task numbers are subject to change without notice.

Inspections are documented on Scheduled Radiation Survey Reports (refer to Section 6.2).

In addition, housekeeping procedures are used to inspect the fences and locks (refer to Section 6.2).

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7.2 INSPECTIONS OF MONITORING INSTRUMENTATION

THE DCRTS

The 244-BX and 244-U Double Contained Receiver Tanks (DCRTs) are short-term storage facilities. They are used for interim storage of liquid wastes, as pits for waste transfer operations, and as drains for transfer lines. Structurally, DCRTs are comprised of a primary tank surrounded by a secondary containment vessel (called tank vault) with access ports, on top, for pumps; instrumentation; ventilation; and piping. The primary tank is located within the tank vault, separated by an annular space. The bottom of the tank vault is sloped to a sump for leak collection and detection. The tank vault is designed to contain leakage from failure of the primary tank.

Alarms for high liquid level, leak detection, and high radiation levels annunciate locally and at general annunciator panel boards at continuously manned facilities. An alarm indicates trouble. To find the trouble, an operator goes to the alarm panel which pinpoints the problem. Appendix I contains a listing of alarms which annunciate at CASS (refer to Section 9.4 for a discussion of CASS).

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THE 244-CR VAULT

The 244 CR Vault is in standby condition, except for Tank CR-003. This tank is the proposed receiver tank for waste transfers from C Farm. Tank CR-003 is one of four tanks in the structure. The entire structure is built of reinforced concrete. Two large, 40,000 gallon tanks (CR-011 and CR-001) are each housed in their own cell. These cells measure 22 feet by 26 feet and are 29 feet high. The other two tanks (CR-003 and CR-004), 15,000 gallons each, are also enclosed in their own individual cells. These cells measure 16 feet by 20 feet and are 19 feet high. All of the dividing walls, side walls, slabs, and cover blocks in the entire CR Vault are made of two-foot-thick concrete. The cover slab is perforated to permit piping and personnel access. Each tank vault or cell is equipped with a 2 by 3 foot sump which is 1 foot deep.

7.2.1 DCRT LIQUID/WASTE LEVEL INSTRUMENTATION

Each tank is equipped with a dip tube assembly which measures specific gravity and weight factors. A manual tape is also available for measuring liquid level. Maximum liquid level limits are set in the DCRTs to prevent overfilling. The maximum limit for both 244-BX and 244-U is 144 inches. High liquid levels as measured by the dip tubes are interlocked to shut down all pumping inputs.

INSPECTIONS/REQUIREMENTS:

Either instrumentation on the dip tube assemblies or manual tapes are in use and functioning properly at all times (when liquid is contained within the primary tanks).

Tank liquid levels are recorded daily on data sheets during non-transfer operations and when there is liquid contained within the primary tank (Section 7.5 discusses evaluation of the gathered data).

Liquid levels and material balance calculations associated with the tanks are taken during the first half hour after beginning a transfer and every 2-hours thereafter.

- If the dip tubes are not functioning properly during transfers, on site liquid level readings are accomplished at the established frequencies.

The instrumentation used for measuring liquid levels are managed and tracked via the preventive maintenance and PISCES systems discussed in Sections 9.1, 9.2, and 9.3.

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7.2.2 DCRT LEAK DETECTION INSTRUMENTATION

Liquid level measuring devices and leak detectors are installed in the sumps in the annular spaces to detect leaks from the primary tanks. To prevent floating, the primary tank liquid levels in the sump are kept below a maximum limit of 18 inches.

The annular space of all the DCRTs are monitored for radiation levels. High radiation indicates the presence of mixed fission products which could mean an accumulation of liquid in the sump from a leak in the system. High radiation or monitor failure automatically signals a shutdown of the pumps in corresponding systems.

INSPECTIONS/REQUIREMENTS:

The following requirements are met at the DCRTs when liquid is contained within the primary tank:

- At least one system of instrumentation for determining if a leak has occurred to the annulus of the DCRTs is in use and functioning properly at all times. This means that either the sump liquid level instrumentation or the annulus CAM is working. In order for the CAM to be in use and operating, the annulus ventilation system shall also be functioning properly.
  - If all annulus leak detection capability is lost, a manual liquid level device is installed and monitored daily.
- At least one of the following data is recorded daily on data sheets (Section 7.5 discusses evaluation of the gathered data):
  - Sump liquid level data.
  - Annulus Radiation level data.

The instrumentation used for the annulus leak detection and the leak detection pits are managed and tracked via the preventive maintenance and PISCES systems discussed in Sections 9.1, 9.2, and 9.3.

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7.2.3 DCRT PUMP PIT AND TRANSFER LINES

Each DCRT contains a pump pit through which waste is transferred into and out of the tanks. These pits contain leak detection instrumentation. The pits are plumbed to drain into the tank. Activation of this leak detector might indicate the pump is leaking during a transfer operation.

The transfer lines are provided with test risers to detect leakage in the pipe encasement. Leak detection instrumentation is also provided in these lines.

INSPECTIONS:

The leak detection instrumentation is managed and tracked via the preventive maintenance and PISCES systems discussed in Sections 9.1, 9.2, and 9.3.

The instrumentation for transfer lines that will not be used for at least six months may have their status changed to a Non-Calibration Mode. Calibration, while in this status, is not required. The status shall be changed back to the calibration mode before these lines are placed back into service. The instruments will be calibrated, and verifications made as to whether the instruments are functioning properly or not.

7.2.4 244-CR VAULT INSTRUMENTATION

Both the CR-003 tank and sump contain dip tube assemblies to measure weight factors (WF) and specific gravity (SpG). This instrumentation is interlocked to shut down pumping operations upon occurrence of high WF or high SpG.

INSPECTIONS:

WF and SpG data are taken daily for tank CR-003. Daily WF data is also taken in the sump for tank CR-003. Section 7.5 discusses the evaluation of this data.

The WF SpG instrumentation are managed and tracked via the preventive maintenance and PISCES systems discussed in Sections 9.1, 9.2, and 9.3.

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7.3 DAILY INSPECTION OF OVERFILL CONTROLS

A rigid system of controls and procedures for protecting against overflowing the tanks is used during transfer processes. A short specific procedure, work plan, and/or work procedure is written for any transfer made under Plant Operating Procedure (POP) TO-025-001. The minimum requirements are identified and include (these are not inclusive - reference procedure):

- The route and tanks involved.
- The transfer material balance discrepancy allowed.
- Estimated time of arrival of the waste at the receiver tank.
- A schematic or tabulated description of the waste transfer route.
- Identification of at least two non-leaking block valves downstream of the liquid flow path.
- A list of all interconnected tanks.
- The catch tanks for all diversion boxes, diverter stations, and valve pits that the primary transfer route goes through.
- A list, table or data sheet for required data which are to be taken prior to, during, and after the transfer including the frequency at which the data are taken.

Further discussion on applicable inspections used to prevent overfilling the tanks is presented in Section 8.

7.4 DAILY INSPECTIONS OF ABOVE GROUND PORTIONS OF THE TANKS

As with the Tank Farms; risers, riser cover blocks, pump pit cover blocks, and tank exhaust system structures are the only portions of the tank systems which are above ground. Radiation surveys are accomplished to inspect the above ground portions of the tank system for waste releases. Health Physics personnel conduct these various scheduled radiation surveys.

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INSPECTIONS:

The Scheduled Radiation Survey Task description, number, and frequency for each of the radiologically surveys conducted is as follows:

DESCRIPTION	FREQUENCY	DCRT	TASK #
Perform daily source check of all facility assigned radiation survey instrumentation. Perform a contamination smear survey of all facility step-off pads.	Daily	244-CR	ED-17
Using standard survey techniques, perform contamination surveys on the following areas: control room, exhauster pads and entrances.	Weekly	244-CR	EW-52
Perform gaseous effluent sampling and monitoring system operability inspection (Stack Pacs) per WHC-CM-4-13,Procedure 5.2.2.6	Weekly	244-CR	EW-27
Perform a dose rate survey on all exhauster ducts, breather air filters, and general area and verify all radiological boundaries. Walk through to detect any off-standard conditions such as equipment failures, alarms, boundary ropes down, etc. Update radiological survey maps.	Daily	244-U	WTF-WD-04
Verify proper operation of the exhaust system components. Read and record all CAM readings. Perform a daily source check of all facility assigned radiation survey instrumentation. Read and record area radiation monitor readings. Perform contamination smears of all facility step-off pads. Record data as applicable on the attached task data sheet. Complete Scheduled Radiation Survey Report.	Daily	244-BX	ED-07

Note: Task Numbers are subject to change without notice.

The Scheduled Radiation Surveys are documented on Scheduled Radiation Survey Reports (refer to Section 6.10).

7.5 DAILY REVIEW OF DATA GATHERED FROM MONITORING INSTRUMENTATION

Data are obtained daily for the following (refer to Section 7.2 for a discussion of the monitoring instruments):

SYSTEM	DATA
244-BX Tank	Liquid Level/Weight Factor/Specific Gravity
244-BX Annular Sump	Weight Factor/Specific Gravity
244-CR-003 Tank	Weight Factor/Specific Gravity
244-CR-003 Annular Sump	Weight Factor

INSPECTIONS:

Surveillance data are recorded to data sheets. They are signed off by the Tank Farm Surveillance and Operations shift manager, and delivered to the CASS office for pick up by Tank Farm Surveillance Analysis and Support (TFSA&S) personnel. TFSA&A personnel tasks are to:

- Process the data.
- Analyze the compiled information and plot it for trend evaluation within one working day.
- Correct response to out-of criteria data.
- Schedule rechecks within 24 hours.
- Reschedule missed tank liquid level notifications within 24 hours.
- Maintain auditable records.

Baselines are established and used as reference points by which to evaluate the data. Tanks exceeding these baseline criteria are investigated and reported to Management for action.

ALARMS:

In addition to the data discussed above, abnormal conditions such as leaks, high radiation levels, and high liquid levels will activate alarms. These alarms are monitored by CASS. Refer to Section 9.4 for a discussion of CASS and Appendix I for a listing of the alarms.

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8.0 TRANSFER AND ROUTING FACILITY INSPECTIONS

This chapter discusses the manner in which the transfer and routing facilities used in transfers of waste from the SSTs meet the RCRA/WAC Inspection Requirements presented in Chapter 5.0. To avoid duplication the inspections discussed here include inspections of the monitoring instrumentation; inspections of the transfer connections; inspections of the direct buried transfer pipe lines; and inspections made before, during, and after transfers. All the other applicable inspections are as discussed in Section 6.

The facilities covered in this chapter are pump pits, valve pits, and piping. The list below displays the facilities discussed in this chapter and include which area of the Hanford Site they are located within. These facilities are those which are involved in the proposed routing (and alternative routing) of further SST waste in the on-going tank stabilization and interim isolation process. Proposed transfer and routing facilities for SST waste are:

VALVE PITS	LOCATION
241-C	200 East
241-S-A	200 West
241-S-B	200 West
241-S-C	200 West
241-S-D	200 West
241-SX-A	200 West
241-SX-B	200 West
241-U-A	200 West
241-U-B	200 West
241-U-C	200 West
241-U-D	200 West

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PUMP PITS/DISTRIBUTER PITS	LOCATION
A-101-01H Distribution Pit	200 East
A-101-01B Pump Pit	200 East
AX-101-01A Distribution Pit	200 East
BX-111 Saltwell Pump Pit	200 East
BY-102-02A Pump Pit	200 East
BY-103-03A Pump Pit	200 East
BY-105-05A Pump Pit	200 East
BY-106-06A Pump Pit	200 East
BY-109-09A Pump Pit	200 East
C-102-02B Pump Pit	200 East
C-103-03B Pump Pit	200 East
C-107 Saltwell Pump Pit	200 East
C-110 Saltwell Pump Pit	200 East
T-101 Saltwell Pit	200 West
T-104 Saltwell Pit	200 West
T-107 Saltwell Pit	200 West
T-110 Saltwell Pit	200 West
T-111 Saltwell Pit	200 West
S-101-01A Distribution Pit	200 West
S-101-01A Pump Pit	200 West
S-102-02B Distribution Pit	200 West
S-102-02A Pump Pit	200 West
S-103-03A Pump Pit	200 West
S-106-06A Pump Pit	200 West
S-107-07A Pump Pit	200 West
S-108-08A Pump Pit	200 West
S-109-09A Pump Pit	200 West
S-110-10A Pump Pit	200 West
S-111-11A Pump Pit	200 West
S-112-12A Pump Pit	200 West
SX-101-01A Pump Pit	200 West
SX-102-02B Pump Pit	200 West
SX-103-03B Pump Pit	200 West
SX-104-04A Pump Pit	200 West
SX-105-05A Pump Pit	200 West
SX-106-06A Pump Pit	200 West
U-102-02B Pump Pit	200 West
U-103-03B Pump Pit	200 West
U-105-05B Pump Pit	200 West
U-106-06B Pump Pit	200 West
U-107-07B Pump Pit	200 West
U-108-08B Pump Pit	200 West
U-109-09B Pump Pit	200 West
U-111-11B Pump Pit	200 West

8.1 INSPECTIONS OF MONITORING INSTRUMENTATION

This section discusses the monitoring systems that are used at the Transfer and Routing Facilities.

VALVE PITS

Valve pits contain the valved jumpers that connect the process pipelines from the SST pump pits in the farm to each other and to other facilities. The routing of waste between tanks and other facilities is determined by the positioning of these valves. Valve pits are located within tank farms and are therefore subjected to all general tank farm monitoring and inspections. A list of all the valve pits used for single-shell waste transfers is presented in Section 8.0. The valve pits are equipped with leak detection instrumentation.

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PUMP PITS/DISTRIBUTER PITS

Pump pits are used to remove waste from their associated tanks. Distribution pits are facilities which can route SST waste from tanks to other routing facilities. All pump pits and distribution pits are situated above SSTs within the tank farms. A list of all the pump pits and distribution pits used for waste transfers and their locations are presented in Section 8.0. The pump/distribution pits are equipped with leak detection instrumentation.

PIPING

Piping is installed between tank pump pits, valve pits, and the DCRTs. During stabilization efforts of SSTs, waste is transferred through the valve pits to the DCRTs. The routing of these wastes, downstream of the valve pits, is determined by the jumper connection configuration within the valve pits. Additional piping directs the waste to the DCRTs for further routing to its eventual destination. The transfers are thoroughly discussed in Double Shell Tank Farm Inspection Plan Matrix (WHC-SD-WM-EV-055). These pipes are buried underground at a sufficient depth to provide radiation shielding. Some piping are direct buried and some are encased. Safety features associated with the encased lines include either a series of swab risers or leak detectors. Other direct buried lines do not have these features however. Inspections of the direct buried lines is covered below in Section 8.2.

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INSPECTIONS:

The leak detection instrumentation are managed and tracked via the Preventive maintenance and PISCES systems discussed in Sections 9.1, 9.2, and 9.3.

8.2 INSPECTIONS OF DIRECT BURIED LINES

Operating Specification Document (OSD) OSD-T-151-00010 covers the pressure testing requirements of direct buried transfer pipelines transfer lines located within the 200 East and 200 West Areas.

There are a number of pipelines which cannot be pressure tested, and are therefore not covered in this OSD. Generically; these lines are (not inclusive - see OSD) drain lines from valve pits, diversion boxes, catch tanks, leak detection pits, and ventilation systems; and cascade lines into the sides of tanks.

Testing frequency limits are established. These limits were determined by considering the original design parameters and soil concentrations and then comparing these to known chemical corrosion data. These established limits help assure the integrity of the pipeline before use.

The testing frequency is determined by the age of the pipeline under question. This age limit begins at the time of ground backfill. Pressure testing limits are as follows:

AGE OF LINE	LIMIT
0-2 Years	No pressure test required.
2-5 Years	Pressure test every year.
After 5 Years	Pressure test every six months.

* No pressure test is required on pipelines which are out of service. A pressure test will be required on these lines prior to reuse.

** If the cross-site line has been out of service for a period longer than one year, a pressure test will be required on it prior to reuse.

Documentation is done by the procedural data sheet in procedure TO-140-170 and via the Job Control System (J4 Form). This system is discussed in Section 9.1.

8.3 INSPECTIONS OF TRANSFER CONNECTIONS

The integrity of jumper heads, rigid and flexible jumpers and associated valves and fittings is indicated by leak checking prior to the initial transfer through a given transfer route. Standard Operating Procedure TO-140-010 provide the necessary instructions and is summarized below.

INSPECTIONS:

It is preferable to accomplish the leak check using raw water, rather than process waste solution. However, process solution may be used for the leak check if it is impossible to temporarily install a flush head in the system to add raw water can to the whole route. Also, with waste minimization becoming an issue, process solution may be used because the use of raw water will increase waste quantities contrary to waste minimization.

The beginning liquid levels of the shipping tank, the receiving tank, and any intermediate catch tank are recorded along with the beginning raw water meter reading (if water is used) on data sheets provided for the transfer operation. When the water has been received at the far end of the route, as indicated by hearing water entering the tank and/or sufficient water has been metered into the line to exceed the estimated line holdup, the water is turned off. The liquid level of the receiver tank is recorded along with the raw water meter readings, if available, on the data sheets.

All the cover blocks for each new connection in the route are removed and the connections are visually inspected for leakage. Repairs are performed as required and the procedure is repeated until no leaks are detected.

A final material balance for leak check is calculated and recorded on the provided data sheet. If the transfer follows the check within 24 hours, and the material balance is within the set criteria, this data sheet is continued for the transfer procedure. If not, it is completed with a notation "Leak Check Only" put on it and forwarded by the end of the shift to 242-S for West area and 272-AW for East area. This is the same data sheet discussed in Section 8.2.1 and is retained at Tank Farm Process Engineering in building 2750E, room A103.

8.4 INSPECTIONS BEFORE, DURING, AND AFTER WASTE/LIQUID TRANSFERS

To prevent overfilling the tanks and to help prevent leakage during any process operation associated with waste transfers, special procedures are prepared. These procedures provide written, stepwise instructions for the safe and efficient operation of the equipment and facilities which will be involved. Presented below is a summary of the safeguards which are put into place before, during, and after transfers are made.

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PRE-TRANSFER INSPECTIONS

Before transfer begins the following is accomplished (not inclusive - reference POP TO-025-001):

- o Transfer system leak detectors are verified as operable (not failed) and current calibration/functional test documentation is in place. If not, all applicable diversion boxes/catch tanks, process and pump pits are constantly surveyed with portable conductivity probes during the transfer.
  - Verification includes a visual check for failure lights or alarms, and the presence of maintenance tags.
  - Transfers are terminated if leak detection capability cannot be provided or is lost.
  - Constant surveillance is required for transfers through boxes or pits not having a leak detection device or not having a leak detection device verified as operable.
- o A transfer line pressure test is performed to assure the line integrity before any pumping occurs. Pressure testing frequency limits are discussed in section 8.2.
- o All area radiation monitors (for direct buried lines only), applicable pit leak detectors, and interconnecting and catch tank liquid measuring devices are ensured to be functioning.
- o Current status of both shipping and receiving tanks are reviewed. This includes a check for a steady liquid level for the past 24 hours (to ensure the receiving tank is not leaking).
- o The volume of solution being transferred is confirmed so the sending/receiving tank levels will not exceed their current tank maximum/minimum operating limits.
- o Liquid levels in all catch tanks associated with the transfer route are verified to be within permissible limits.
  - Both automatic and manual readings are taken when available.
- o Valve positions are physically verified and secured.
- o All Transfer Data Sheets are filled out. Supervision then signs and dates them, thus authorizing the transfer (refer to POST-TRANSFER INSPECTIONS below for files and retention).

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TRANSFER INSPECTIONS

During the transfer, the following is accomplished (not inclusive - reference POP TO-025-001):

- The estimated solution arrival time at the receiving tank as indicated by the Specific Transfer Procedure is checked. Determination is made that it arrives within + 10 percent of the estimated time by one of the following methods (supervision is contacted if it doesn't):
  - Listening at the receiving tank.
  - Noting change of radiation levels in the vicinity of the transfer box or pump pit.
  - Noting a change of the tank's liquid level.
- The CASS (for a discussion of CASS refer to Section 9.4) operator begins monitoring liquid levels on the receiving tank every 5 minutes starting when the sending tank has decreased by an amount equivalent to line holdup. They also contact supervision if receipt of waste has not been noted within the allowed time.
- The following are recorded prior to starting the transfer, one-half hour and one hour after starting the pump, and each two hours thereafter or more frequently if directed by supervision:
  - Shipping and receiving tank levels (taken as close together as possible for mass balance calculations - no more than 10 minutes apart).
  - Applicable catch tank and interconnecting tank liquid levels.
  - Diversion box and diverter station catch tank liquid levels.
  - Additional readings as requested by supervision.

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- The following are recorded 1 hour after shutting off the pump:
  - Shipping and receiving tank liquid levels.
  - Applicable catch tank and interconnecting tank liquid levels.
- Mass balance calculations are accomplished and compared to the discrepancies allowed in the specific transfer procedure. If limits are exceeded, supervision is contacted immediately.
- Supervision reviews all Transfer Data Sheets for completeness and accuracy of calculations and initials for approval, twice per shift (refer to POST-TRANSFER INSPECTIONS below for files and retention).
- The transfer is stopped if (not inclusive - reference POP TO-025-001):
  - Evidence of a leak is noted in the pump pits.
  - Upon activation of a leak detector or area radiation monitor alarm associated with the transfer.
  - A liquid level increase from an unknown source greater than specified limits in a diversion box catch tank or any interconnected tank associated with the transfer route.
  - The specified liquid level is reached in the receiver tank.
  - Maximum liquid level is reached in the receiver tank.
- Supervision is notified immediately if:
  - There is an no indication that the solution has arrived at the receiver tank within + 10 percent of the projected time.
  - Specified liquid level is reached in the receiver tank.
  - Maximum liquid level is reached in the receiver tank.
  - The liquid level material balance between the shipping and receiving tanks, is greater than the stated material balance discrepancy, as calculated.
  - Indication of erratic malfunctioning instruments.
  - Pump oil reservoir level alarm is activated.

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POST-TRANSFER INSPECTIONS

After the transfer, the following is accomplished (not inclusive - reference POP TO-025-001):

- The pump is locked out per WHC-CM-5-7, EQUIPMENT LOCK AND TAG.
- Final liquid levels are recorded one hour after pump shutdown or when receiving tank levels have stabilized on Waste Tank or Specific Transfer Data Sheet.
- All valves are returned to position specified in the Specific Transfer Procedure.
- Supervision reviews all material balance data and initials, to certify that the data are consistent and contain no entry or calculation errors.
- The Transfer Data Sheets are forwarded to Tank Farm Plant Engineering where they are retained in an auditable file. The files are maintained in building 2750E, room A103. They are filed here for at least one year or until sufficient files are collected and then they are sent to the Retention Holding Area Office for long term storage.

9.0 FACILITY INTEGRITY MANAGEMENT STRATEGY

This section describes the activities performed in maintaining normal operations. In addition, when problems develop, it specifies the system used for corrective action tracking and resolution.

9.1 MAINTENANCE

The strategy used in maintenance and repair is a combination of preventive maintenance, predictive maintenance, and run-to-failure philosophy based on cost effectiveness and feasibility of application to each group of documented equipment, as determined by facility technical support organizations and plant management.

Preventive Maintenance is selected where the economic impact to schedule and/or the cost for repair or replacement of equipment exceeds the cost of preventive maintenance, and where the useful life and reliability of the equipment can be extended through its application. Preventive maintenance is also selected when high reliability is required to meet health, safety, or environmental regulations. Preventive maintenance is performed in accordance with standard written instruction and is scheduled into the normal operation plan.

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Predictive maintenance is selected for specific pieces of equipment where objective data has been established to accurately predict failure and where the consequence of unplanned failure exceeds the benefit of maximum economic life through run-to-failure. Anticipated major repairs are performed in accordance with written instructions prepared in advance of the actual repair and scheduled to meet operating requirements.

Run-to-failure (or corrective maintenance) in many cases is the only reasonable option available. This is deemed acceptable where the consequence of unplanned failure does not risk health, safety, environmental regulations, or plant production capability. Unanticipated repairs are performed in accordance with written instructions, which are prepared after the failure and scheduled on a priority basis consistent with operating requirements. Spare equipment and general replacement plans are used to minimize disruption of planned work and delays in operating schedules caused by unanticipated repairs.

Work is performed and documented following the Job Control System which is described in WHC-CM-8-8, "Job Control System Control System." Impact level 1, 2, and 3 original records are retained by Quality Assurance. Impact Level 4 are kept in Building 272 AW for the East Area and Building 272 WA for the West Area.

WHC-CM-8-2, 200 Area Support Services, Section 301.0, "Index of Maintenance Procedures" provides for an index on maintenance procedures. The index is a list of all maintenance procedures used in the 200 Area operating facilities. It is updated quarterly and is available by contacting the Procedure Coordinator, Maintenance Engineering Administration and Analysis. It is maintained and controlled IAW WHC-CM-8-2, 102.1, "Document Control."

9.2 PREVENTIVE MAINTENANCE

The Standard Preventive Maintenance Program, which establish procedures for performing repetitive checks/tests of equipment and/or systems including minor repairs or adjustments, are detailed in WHC-CM-8-2, Section 502.0, "Preventive Maintenance."

Preventive maintenance procedures are those working level procedures that describe the performance of preventive maintenance. Preventive maintenance (PM) is predictive, periodic, or planned maintenance. These are defined as (according to WHC-CM-8-2, 103.0, Work Control System):

Predictive - continuous or periodic monitoring and diagnosing of equipment to forecast failure.

Periodic - routinely scheduled maintenance on equipment to prevent breakdown, including instrument calibration and lubrication.

Planned - maintenance performed prior to equipment failure. Planned maintenance can be initiated by predictive or periodic maintenance.

The Production Control planner or designated clerk at each facility maintains a Preventive Maintenance (PM) file for that facility which contains the following:

The computer-generated PM index and schedule for each month.

The completed PM Data Sheets. The completed PM Data Sheets are the official record of performance of preventive maintenance work.

The Maintenance Engineering Administration and Analysis (MEA&A) clerk issues monthly reports to assist management in administering and monitoring the PM program. These reports specify the PMs completed and those that are overdue, and for what reason.

WHC-CM-8-2, 200 Area Support Services, Section 501.0, "Index of Preventive Maintenance Procedures" provides for an index on preventive maintenance procedures. The index is a list of all preventive maintenance procedures used in the 200 Area operating facilities. It is updated quarterly and is available by contacting the Procedure Coordinator, Maintenance Engineering Administration and Analysis. It is maintained and controlled in accordance with WHC-CM-8-2, 102.1, "Document Control."

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9.3 CALIBRATIONS

The Plant Instrumentation Calibration and Control System (PICCS) applies to tools, gages, instruments, and other measuring and test equipment (M&TE) used in facilities operated by Defense Waste Management. The PICCS also applies to the M&TE designated as Group 1 by Calibration Control Authorities in other facilities in the 200 East and West Areas. The PICCS does not apply to chemical standards, radiological sources, and hand-held radiation survey instruments.

PICCS consists of five subsections:

1. Labeling requirement as prescribed in Section 203.0 of WHC-CM-8-2.

2. The Plant Instrumentation Surveillance, Calibration and Evaluation System (PISCES) as prescribed in Section 204.0 of WHC-CM-8-2.

3. The Maintenance Instrumentation Calibration System (MICS) as prescribed in Section 205.0 of WHC-CM-8-2. This Section does not apply to M&TE which are permanently installed plant instrumentation.

4. Monthly recall of M&TE requiring periodic calibration/verification are prescribed in Section 206.0 of WHC-CM-8-2.

5. Standardization of data elements pertaining to M&TE as prescribed in Section 207.0 of WHC-CM-8-2.

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PISCES

Calibrations are managed and tracked by PISCES. PISCES (Plant Instrumentation Surveillance, Calibration and Evaluation System) is the system established to support the calibration and control of measuring and test equipment (M&TE). This program utilizes a computerized data base to document and forecast plant installed instrument and equipment calibrations and verifications. The system utilizes read-only computer database files and produces hard-copy reports for the calibration status of all instrumentation within the files.

Calibration Control Authorities (CCAs) determine the assignment of measuring and test equipment (M&TE) to groups, applications, and calibration types; specify calibration intervals and other calibration and verification requirements; and approve initial input and changes to calibration requirements in the PISCES databases. Calibration requirements, including range, accuracy, type of calibration and frequency of calibration, are included in the specification for procurement of all new M&TE. All newly acquired items of M&TE are calibrated prior to initial use or installation. The calibration status of each item of M&TE, thereafter, is provided by use of either the computer database file and/or with labels.

Maintenance Engineering Administration and Analysis (MEA&A) provides overall management and administration of PISCES and is responsible for producing and distributing PISCES reports as required. Plant Production Control Managers & Maintenance Managers ensure that job cards and reports are completed and submitted in a timely manner.

The computerized database is maintained with records applicable to the calibration and control of M&TE calibrated by plant personnel. The database is updated at least monthly.

PISCES generates monthly reports which list:

- The calibrations scheduled to be performed during the upcoming month.
- Those items which were scheduled but for which MEA&A did not receive a completed PISCES Calibration Job Card
- The calibrations completed during the previous month. Items on this list for more than 3 months are included on a special report sent to level 3 and 4 managers.
- The instrument that were found to be out of tolerance during the calibration.

The calibration job card is the official record of the completion of calibration performed by Westinghouse personnel. The Manager of Maintenance Engineering Administration & Analysis maintains a computerized, up-to-date index of calibration procedures. The index is updated quarterly and available by contacting the Procedure Coordinator, Maintenance Engineering Administration and Analysis.

9.4 CASS

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The Computer Automated Surveillance System (CASS) is established and maintained to provide continuous centralized surveillance of the Hanford underground waste storage tanks and their associated structures. This system includes several microprocessors located at various tank farm substations, a central microprocessor and minicomputer installed in Room B-107 of Building 2750-East, and the CASS Operation's terminals in Room B-105 of Building 2750-East. The terminals are manned at all times.

Microprocessors collect data generated by liquid level gauges, thermocouples, and a wide range of process and leak detection monitoring devices. Alarms such as high radiation, tank and exhauster pressures, high liquid level and weight factor, and those which report the failure of critical equipment items are monitored. Liquid levels are automatically monitored every hour. These are compared to baseline values and any out-of-limit conditions are immediately reported to operations personnel. Additional liquid levels are taken manually and entered into CASS from remote terminals.

The central unit handles communications to and from the microprocessors; collects and compares data; and issues a variety of routine, out-of-limits, and alarm reports to the central and remote terminals.

Each field microprocessor continuously monitors its alarm sensors and a change in state of the alarm is reported immediately to the central operations microprocessor. The central microprocessor is responsible for handling all communications between stations. It also monitors for failures in the system. All alarm changes received by the central unit are transmitted immediately to the user terminals.

Routine reports with frequencies from hourly to weekly are generated on a scheduled basis and printed out of the remote terminals. In addition to the scheduled reports, operations personnel can request other, non-scheduled reports which describe the status of specific concern areas. Current liquid levels and alarm status can be obtained at any time on a demand basis.

Generally, alarms are provided as an operation/process aide. They inform control people that an operational or surveillance limit has been exceeded or is about to be exceeded if no corrective action is taken. Corrective actions are identified in Standard/Plant Operating Procedures. Additionally, operators are trained on the operation and responses of the various facilities they operate.

If an alarm sounds, operators must take some action, whether corrective or operational. At times the limits are exceeded on purpose (e.g. start-up, shutdown, special operational mode, etc.). When the alarm goes off, the operators must still respond.

In unmanned facilities; in standby, shutdown, or otherwise unmanned; alarm response is still required. Important alarms are transmitted to manned facilities. When they annunciate, an operator is immediately dispatched to investigate. When a facility is placed in standby or shutdown modes, unimportant or meaningless alarms are deactivated. Only the alarms that require a response are kept active.

Below is a partial listing of the reports/alarms generated by CASS and the response that is taken. A listing of applicable CASS alarms is provided in Appendices I.

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ALARM STATUS CHANGE

This is a real time alarm. It is a completely automatic report. The substation microcomputers continuously monitor the status of the alarms. It monitors both contact changes from open to closed and from closed to open. When the substation detects a change in the contact status, it reports the change to the host computer. The host computer checks to see if the alarm is operational, i.e. not in the defective list. The host computer then outputs an alarm report.

The CASS operator notifies supervision of an alarm generated from the facility and initials the CASS terminal printout. The alarms are checked immediately at the point of annunciation. Response is as directed by supervision.

DAILY ALARM SUMMARY REPORT

This report is automatically generated daily. This report lists alarms whose status has changed during the previous 24 hours and the alarms which are currently active.

DEFECTIVE ALARM SUMMARY REPORT

This report is automatically generated daily. It lists all alarms that have been declared defective (Cass ignores alarms classified as defective). The date and time the alarm was declared defective is also reported.

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ROUTINE LIQUID LEVEL REPORTS

These reports list current liquid level measurements. CASS operator reviews the report within four hours of printout, comparing current values to the established baseline value. Discrepancies are reported to supervision. Explanations for discrepancies are recorded on the printout. Readings exceeding liquid level criteria are checked by an operator in the field.

Only the central operator receives the total report. Remote terminals at 242-A, 272-AW, 242-S and TGE receive data only for their respective areas.

Instrument failures occasionally occur. In such cases supervision ensures that manual readings are obtained in the field at least daily.

LIQUID LEVEL ALARM REPORT

This report is generated every hour and contains the following messages:

- Equipment failures.
- Tanks whose liquid levels have increased or decreased more than their allowable limits.
- Tanks whose liquid levels are above maximum or below minimum allowable levels.
- All tanks that have an inoperative baseline.
- Tanks whose liquid levels have increased enough to make contact with the suspended plummet in intrusion mode.
- Tanks with intrusion mode plummet equipment failures.

The CASS operator reviews and initials this report. The operator reports any condition (listed on the report) which has not previously been reported to supervision.

200-EAST/200W TANK LIQUID LEVEL REPORT

These reports are printed out hourly (except at 0300, 0700, 1100, 1500, 2100 and 2300 hours) at the 242-A and 242-S terminals, respectively. The purpose of this report is to permit hourly surveillance of any set of selected tanks. The operator reviews and initials the data at the remote terminal.

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TFO LIQUID LEVEL EXCEPTION REPORT

This report is generated on the hour at 242-S, 242-A, and at the CASS Central Facility. It reports any liquid levels that have exceeded the pre-established baseline. Supervision is notified of any discrepancies that have not been previously reported during the current shift.

200-EAST/200-WEST TANK LIQUID LEVEL HISTORY REPORT

This report is made at 0300, 1100, and 2100 hours and provides a short historical summary of liquid levels of selected tanks. The 200-East and 200-West reports are printed at the 242-A and 242-S remote printers, respectively, and both are received at the CASS Central Facility.

These reports are reviewed and initialed when printed. Supervision is notified of any discrepancies that have not been previously reported during the current shift.

Reports generated at the Central Operations CASS Terminal are placed in boxes addressed for pickup at the beginning of the 8-4 shift by Tank Farm Surveillance Analysis & Support (TFSA&S) representatives.

9.5 CORRECTIVE ACTIONS

The requirements and responsibilities for the management of corrective actions to assure timely and effective resolution of adverse conditions are established in WHC-CM-1-3, Management Requirements and Procedures, MRP5.1 "Corrective Action Management System." Elements described within this procedure ensure management attention to open items and provide steps for preventing recurrence of the adverse condition. Line organizations are responsible for identification and completion of corrective actions as described in policy WHC-CM-1-3, MRP 5.14, "Event, Critique, and Unusual Occurrence Reporting."

The Quality Safety Trending System (QST) system is used as the central database to monitor and track the status of corrective actions. The system is administered by Quality Safety Data Management (QSDM). Each department/division representative shall enter data directly to the QST system per desk instructions provided in the QST User's Manual.

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APPENDIX I: CASS ALARM MATRIX

FACILITY	CASS ALARM TYPE
241-A	FARM ALARM PANEL POWER-OFF
241-A	COMPLEX STORAGE TANKS VACUUM-HIGH
241-A	AREA RADIATION HIGH: AX FARMS
241-A	LEAK: ALL SLUICE PITS;.....A FARM
241-A	FARM RAW WATER PRESSURE LOW
241-A	FARM ALARM PANEL POWER-OFF
241-A	FARM PANEL POWER-OFF
241-A	LEAK: ALL PUMP PITS;.....A FARM(EXCEPT105A)
241-A	FARM ALARM PANEL POWER-OFF
241-A	FARM ALARM PANEL POWER-OFF
241-A	FARM ALARM PANEL POWER-OFF
241-A	FARM ALARM PANEL POWER-OFF
241-A	AREA RADIATION HIGH: PROBES A-3
241-A-701	PROCESS AIR-PRESSURE LOW
241-A-702	LOSS OF SEAL
241-A-702	ISOLATION VALVE PIT LEAK DETECTED
241-A-702	FAN INLET-VACUUM LOW
241-A-702	STACK MONITOR-FAILURE
241-A-702	STACK-RADIATION HIGH
241-A-702	INSTRUMENT AIR-PRESSURE LOW
241-AX-101	LEAK DETECTION PIT-RADIATION HIGH
241-AX-101	LEAK DETECTION PIT-LEVEL HIGH
241-AX-102	LEAK DETECTION PIT-RADIATION HIGH
241-AX-102	LEAK DETECTION PIT-LEVEL HIGH
241-AX-103	LEAK DETECTION PIT-LEVEL HIGH
241-AX-103	LEAK DETECTION PIT-RADIATION HIGH
241-AX-104	LEAK DETECTION PIT-RADIATION HIGH
241-AX	LEAK: ALL PUMP PITS;.....AX FARM
241-AX	SEAL POT LEVEL-HIGH
241-AX	SEAL POT LEVEL-LOW
241-AX	SEAL SYSTEM-FAILURE
241-AX	AREA RADIATION HIGH: A FARMS
241-AX	AREA RADIATION HIGH: PROBES AX-3,4

APPENDIX I: CASS ALARM MATRIX (Cont)

FACILITY	CASS ALARM TYPE
241-TY	AREA RADIATION HIGH:.....TY FARM
241-TY	FARM AREA RADIATION MONITORS-RADIATION HIGH
241-U	LEAK: PUMP PITS, VALVE PITS, COB BOXES;..U FARM
241-U	FARM SERVICE PIT-RADIATION HIGH
241-U	FARM AREA RADIATION MONITORS-FAILURE
241-U	FARM ALARM PANEL POWER-OFF
241-U	AREA RADIATION HIGH:.....U FARM

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APPENDIX II: SINGLE-SHELL TANK INSTRUMENTATION

TABLE A.1.0: TANK LIQUID LEVEL DETECTION

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LIT 102A	6-TF-27 FUNCTIONAL TEST 7-GN-38	03M	SAFETY	A0041 1
LIT 103A	6-TF-27 FUNCTIONAL TEST 6-TF-27	03M	SAFETY	A0018 1
LIT 106A	6-TF-27 FUNCTIONAL TEST 7-GN-38	03M	SAFETY	A0042 1

TABLE A.2.0: DISTRIBUTER PIT LEAK DETECTION

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LDA DP241A 01H 1	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	A0243 2
LDE DP241A 01H 1	7-GN-42 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	A0243 1
LDA DP 06D 1	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	A0233 2
LDE DP 060 1	N/A FUNCTIONAL TEST 7-GN-38	01M	SAFETY	A0233 1

TABLE A.2.1: PUMP PIT LEAK DETECTION

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LDA PP 06C	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	A0234 2
LDE PP 06C	N/A FUNCTIONAL TEST 7-GN-38	01M	SAFETY	A0234 1

TABLE A.2.2: TEST RISER LEAK DETECTION

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LDA TR A 23	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	A0236 2
LDA TR A 24	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	A0235 2
LDE TR A 23	N/A FUNCTIONAL TEST 7-GN-38	01M	SAFETY	A0236 1
LDE TR A 24	7-GN-42 OVERALL CALIBRATION 7-GN-38	01M	SAFETY	A0235 1

TABLE A.2.3: COB BOX LEAK DETECTION

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LDA COB A 1	N/A SPECIAL CHECK 7-GN-38	02M	SAFETY	A0223 2
LDE COB A 1	N/A FUNCTIONAL TEST 7-GN-38	02M	SAFETY	A0223 1

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TABLE A.2.3: COB BOX LEAK DETECTION (Cont.)

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LDA COB A 2	N/A SPECIAL CHECK 7-GN-38	02M	SAFETY	A0224 2
LDE COB A 2	N/A FUNCTIONAL TEST 7-GN-38	02M	SAFETY	A0224 1
LDA COB A B	N/A SPECIAL CHECK 7-GN-38	02M	SAFETY	A0225 2
LDE COB A B	N/A FUNCTIONAL TEST 7-GN-38	02M	SAFETY	A0225 1
LDA COB A 4	N/A SPECIAL CHECK 7-GN-38	02M	SAFETY	A0226 2
LDE COB A 4	N/A FUNCTIONAL TEST 7-GN-38	02M	SAFETY	A0226 1
LDA COB A 10	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	A0230 2
LDE COB A 10	N/A FUNCTIONAL TEST 7-GN-38	01M	SAFETY	A0230 1
LDA COB A 11	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	A0231 2
LDE COB A 11	N/A FUNCTIONAL TEST 7-GN-38	01M	SAFETY	A0231 1

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TABLE A.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RA L 241A 1	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	A0039 3
RAMP 241A 1	N/A FUNCTIONAL TEST 7-GN-38	01M	SAFETY	A0039 2
RE 241A 11	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	A0039 1

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TABLE AX.1.0: TANK LIQUID LEVEL DETECTION

INSTRUMENT		PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LIT	101AX	6-TF-27 FUNCTIONAL TEST 6-TF-27	03M	SAFETY	AX179 1
LLA	101	N/A SPECIAL CHECK 7-GN-42	12M	OP AID	AX055 2
LLE	101SYS	N/A OPERABILITY CHECK 7-GN-42	06M	SAFETY	AX051 1
LLIS	101	N/A SPECIAL CHECK 7-GN-42	06M	SAFETY	AX051 3
LIT	103AX	6-TF-27 FUNCTIONAL TEST 6-TF-27	03M	SAFETY	AX180 1
LLA	103AX	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	AX137 3
LLE	103AX SYS	N/A OPERABILITY CHECK 7-GN-42	01M	SAFETY	AX137 1
LLE	103SYS	N/A OPERABILITY CHECK 7-GN-42	06M	SAFETY	AX071 1
LLE	104SYS	N/A OPERABILITY CHECK 7-GN-42	06M	SAFETY	AX083 1

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TABLE AX.1.1: SEAL POT LEVEL DETECTION

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
HLA 1	N/A SPECIAL CHECK N/A	06M	SAFETY	AX144 3
HLA 2	N/A SPECIAL CHECK N/A	06M	SAFETY	AX144 5
HLE	N/A PRECALIBRATED 7-GN-38	06M	SAFETY	AX144 1
HLK 1	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	AX144 2
HLK 2	N/A FUNCTIONAL TEST N/A	06M	SAFETY	AX144 4
LLA 1	N/A SPECIAL CHECK N/A	06M	SAFETY	AX145 3
LLE	N/A OPERABILITY CHECK 7-GN-38	06M	SAFETY	AX145 1
LLK 1	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	AX145 2

TABLE AX.2.3: COB BOX LEAK DETECTION

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LDA COB AX 12	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	AX181 2
LDE COB AX 12	N/A FUNCTIONAL TEST 7-GN-38	01M	OSR	AX181 1

TABLE AX.2.3: COB BOX LEAK DETECTION (Cont.)

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LDA COB AX 13	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	AX182 2
LDE COB AX 13	N/A FUNCTIONAL TEST 7-GN-38	01M	SAFETY	AX182 1
LDA COB AX 14	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	AX183 2
LDE COB AX 14	N/A FUNCTIONAL TEST 7-GN-38	01M	OSR	AX183 1
LDA COB AX 15	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	AX184 2
LDE COB AX 15	N/A FUNCTIONAL TEST 7-GN-38	01M	OSR	AX184 1
LDA COB AX 16	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	AX185 2
LDE COB AX 16	N/A FUNCTIONAL TEST 7-GN-38	01M	OSR	AX185 1
LDA COB AX 17	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	AX186 2
LDE COB AX 17	N/A FUNCTIONAL TEST 7-GN-38	01M	OSR	AX186 1
LDA COB AX 18	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	AX187 2

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TABLE AX.2.3: COB BOX LEAK DETECTION (Cont.)

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LDE COB AX 18	N/A FUNCTIONAL TEST 7-GN-38	01M	OSR	AX187 1
LDA COB AX 19	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	AX188 2
LDE COB AX 19	N/A FUNCTIONAL TEST 7-GN-38	01M	OSR	AX188 1

TABLE AX.3.0: LEAK DETECTION PIT RADIATION DETECTION

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
CRM 101AX	PSCP-3-038 OVERALL CALIBRATION 7-GN-38	06M	SAFETY	AX130 1
PAD 101AX	PSCP-3-051 OVERALL CALIBRATION 7-GN-38	06M	SAFETY	AX130 2
RE 101AX	PSCP-3-019 PRECALIBRATED N/A	06M	OP AID	AX126 1
RE 001	N/A PRECALIBRATED N/A	12M	OP AID	AX058 1
RIAS 001	N/A FUNCTIONAL TEST 7-GN-38	01M	OP AID	AX058 2
CRM 102AX	PSCP-3-038 OVERALL CALIBRATION 7-GN-38	06M	SAFETY	AX131 1
PAD 102AX	PSCP-3-051 OVERALL CALIBRATION 7-GN-38	06M	SAFETY	AX131 2

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TABLE AX.3.0 LEAK DETECTION PIT RADIATION DETECTION (Cont.)

INSTRUMENT		PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RE	102AX	PSCP-3-019 PRECALIBRATED N/A	06M	OP AID	AX127 1
RE	002	N/A PRECALIBRATED N/A	12M	OP AID	AX068 1
RIAS	002	N/A FUNCTIONAL TEST 7-GN-38	01M	OP AID	AX068 2
CRM	103AX	PSCP-3-038 OVERALL CALIBRATION 7-GN-38	06M	SAFETY	AX132 1
PAD	103AX	PSCP-3-051 OVERALL CALIBRATION 7-GN-38	06M	SAFETY	AX132 2
RE	103AX	PSCP-3-019 PRECALIBRATED N/A	06M	OP AID	AX128 1
RE	003	N/A PRECALIBRATED N/A	12M	OP AID	AX079 1
RIAS	003	N/A FUNCTIONAL TEST 7-GN-38	01M	OP AID	AX079 2
CRM	104AX	PSCP-3-038 OVERALL CALIBRATION 7-GN-38	06M	OP AID	AX133 1
PAD	104AX	PSCP-3-051 OVERALL CALIBRATION 7-GN-38	06M	SAFETY	AX133 2
RE	104AX	PSCP-3-019 PRECALIBRATED N/A	06M	OP AID	AX129 1

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TABLE AX.3.0 LEAK DETECTION PIT RADIATION DETECTION (Cont.)

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RE 004	N/A PRECALIBRATED N/A	12M	OP AID	AX093 1
RIAS 004	N/A FUNCTIONAL TEST 7-GN-38	01M	OP AID	AX093 2

TABLE AX.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RA L 241 AX 21	N/A SPECIAL CHECK N/A	01M	SAFETY	AX176 3
RAMP 241AX 2	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	AX176 2
RE 241AX 21	N/A PRECALIBRATED N/A	01M	SAFETY	AX176 1

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TABLE B.1.0: TANK LIQUID LEVEL DETECTION

INSTRUMENT		PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LIT	101B	6-TF-27 FUNCTIONAL TEST 7-GN-38	03M	SAFETY	B0169 1
LIT	102B	6-TF-27 FUNCTIONAL TEST 6-TF-27	03M	SAFETY	B0163 1
LLA	102B	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	B0152 3
LLE	102B SYS	N/A OPERABILITY CHECK 7-GN-42	01M	SAFETY	B0152 1
LLI	102B	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	B0152 2
LIT	103B	6-TF-27 FUNCTIONAL TEST 6-TF-27	03M	SAFETY	B0164 1
LLA	103B	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	B0153 3
LLE	103B SYS	N/A OPERABILITY CHECK 7-GN-42	01M	SAFETY	B0153 1
LLI	103B	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	B0153 2
LIT	106B	6-TF-27 FUNCTIONAL TEST 6-TF-27	03M	SAFETY	B0165 1
LLA	106B	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	B0154 3

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TABLE B.1.0: TANK LIQUID LEVEL DETECTION (Cont.)

INSTRUMENT			PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LLE	106B	SYS	N/A OPERABILITY CHECK 7-GN-42	01M	SAFETY	B0154 1
LLI	106B		N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	B0154 2
LLA	108B		N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	B0155 3
LLE	108B	SYS	N/A OPERABILITY CHECK 7-GN-42	01M	SAFETY	B0155 1
LLI	108B		N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	B0155 2
LLI	111B		N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	B0156 2
LLA	111B		N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	B0156 3
LLE	111B	SYS	N/A OPERABILITY CHECK 7-GN-42	01M	SAFETY	B0156 1
LIT	112B		6-TF-27 FUNCTIONAL TEST 6-TF-27	03M	SAFETY	B0168 1
LLI	112B		N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	B0157 2

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TABLE B.1.0: TANK LIQUID LEVEL DETECTION (Cont.)

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LLA 112B	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	B0157 E
LLE 112B SYS	N/A OPERABILITY CHECK 7-GN-42	01M	SAFETY	B0157 1

TABLE B.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RA L 241 B 1	N/A SPECIAL CHECK N/A	01M	SAFETY	B0162 3
RE 241B 1	N/A PRECALIBRATED N/A	01M	SAFETY	B0162 1
RR 241B 1	PSCP-4-030 OVERALL CALIBRATION 7-GN-38	6M	SAFETY	B0160 4
RA L 241 B 2	N/A SPECIAL CHECK N/A	01M	SAFETY	B0161 3
RE 241B 2	N/A PRECALIBRATED N/A	01M	SAFETY	B0161 1
RA L 241 B 3	N/A SPECIAL CHECK N/A	01M	SAFETY	B0160 3
RE 241B 3	N/A PRECALIBRATED N/A	1M	SAFETY	B0160 1
RA L 241 B 4	N/A SPECIAL CHECK N/A	01M	SAFETY	B0159 3

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TABLE B.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING (Cont)

INSTRUMENT			PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RE	241B	4	N/A PRECALIBRATED N/A	1M	SAFETY	B0159 1
RAL	241B	5	N/A SPECIAL CHECK N/A	01M	SAFETY	B0158 3
RE	241B	51	N/A PRECALIBRATED N/A	1M	SAFETY	B0158 1

TABLE BX.1.0: TANK LIQUID LEVEL DETECTION

INSTRUMENT			PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LIT	103BX		6-TF-27 FUNCTIONAL TEST 6-TF-27	03M	SAFETY	BX121 1
LIT	105BX		6-TF-27 FUNCTIONAL TEST 6-TF-27	03M	SAFETY	BX123 1
LIT	106BX		6-TF-27 FUNCTIONAL TEST 6-TF-27	03M	SAFETY	BX124 1
LIT	107BX		N/A FUNCTIONAL TEST 6-TF-27	03M	SAFETY	BX125 1
SGAS	241BX	107 1	PSCP-6-011 LIMITED CALIBRATION 7-GN-38	12M	OP. AID	BX042 1
SGIC	241BX	107 1	N/A FUNCTIONAL TEST 7-GN-38	12M	OP. AID	BX042 2
SGT	241BX	107A	PSCP-6-008 OVERALL CALIBRATION 7-GN-38	12M	OP. AID	BX034 1

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TABLE BX.1.0: TANK LIQUID LEVEL DETECTION (Cont.)

INSTRUMENT			PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
SGT	241BX	107B	PSCP-6-008 OVERALL CALIBRATION 7-GN-38	12M	OP. AID	BX038 1
SGT	241BX	107C	PSCP-6-008 OVERALL CALIBRATION PM 14634 7-GN-38	06M	OP. AID	BX036 1
WFT	241BX	107A	PSCP-6-008 OVERALL CALIBRATION 7-GN-38	12M	OP. AID	BX035 1
WFT	241BX	107B	PSCP-6-008 OVERALL CALIBRATION 7-GN-38	12M	OP. AID	BX039 1
WFT	241BX	107C	PSCP-6-008 OVERALL CALIBRATION PM 14634 7-GN-38	06M	OP. AID	BX037 1
LIT	109BX		6-TF-27 FUNCTIONAL TEST 6-TF-27	03M	SAFETY	BX127 1
SGAS	241BX	109 1	PSCP-6-181 LIMITED CALIBRATION 7-GN-38	12M	OP. AID	BX057 1
SGIC	241BX	109 1	N/A FUNCTIONAL TEST 7-GN-38	12M	OP. AID	BX057 2
SGT	241BX	109 1	PSCP-1-008 OVERALL CALIBRATION 7-GN-38	12M	OP. AID	BX049 1
WFT	241BX	109 1	PSCP-1-008 OVERALL CALIBRATION PM 14634 7-GN-38	06M	OP. AID	BX052 1
SGAS	241BX	110 1	PSCP-6-011 LIMITED CALIBRATION 7-GN-38	12M	OP. AID	BX072 1

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TABLE BX.1.0: TANK LIQUID LEVEL DETECTION (Cont.)

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
SGIC 241BX 110 1	N/A FUNCTIONAL TEST 7-GN-38	02M	OP. AID	BX072 2
SGT 241BX 110 1	N/A OVERALL CALIBRATION 7-GN-38	12M	OP. AID	BX064 1
WFT 241BX 110C	N/A OVERALL CALIBRATION PM 14634 7-GN-38	06M	OP. AID	BX067 1
SGAS 241BX 111 1	PSCP-6-011 LIMITED CALIBRATION 7-GN-38	12M	OP. AID	BX087 1
SGIC 241BX 111 1	N/A FUNCTIONAL TEST 7-GN-38	12M	OP. AID	BX087 2
SGT 241BX 111 1	PSCP-1-008 OVERALL CALIBRATION 7-GN-38	12M	OP. AID	BX079 1
WFT 241BX 111 1	PSCP-1-008 OVERALL CALIBRATION PM 14634 7-GN-38	06M	OP. AID	BX082 1
LIT 112BX	6-TF-27 FUNCTIONAL TEST 6-TF-27	03M	SAFETY	BX128 1
SGAS 241BX 112 1	PSCP-6-011 LIMITED CALIBRATION 7-GN-38	12M	OP. AID	BX102 1
SGIC 241BX 112 1	N/A FUNCTIONAL TEST 7-GN-38	12M	OP. AID	BX102 2

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TABLE BX.1.0: TANK LIQUID LEVEL DETECTION (Cont.)

INSTRUMENT			PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
SGT	241BX	112 1	N/A OVERALL CALIBRATION 7-GN-38	12M	OP. AID	BX094 1
WFT	241BX	112C	N/A OVERALL CALIBRATION PM 14634 7-GN-38	06M	OP. AID	BX097 1

TABLE BX.2.4: PUMP PIT LEAK DETECTION

INSTRUMENT			PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LDA	241BX	1	N/A SPECIAL CHECK 7-GN-42	01M	OP. AID	BX002 6
LDA	241BX	2	N/A SPECIAL CHECK 7-GN-42	01M	OP. AID	BX002 D
LDE	241BX	107 1	N/A FUNCTIONAL TEST 7-GN-42	01M	SAFETY	BX029 1
LDK	241BX	107 1	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	BX029 2
LDK	241BX	107 2	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	BX029 A
LDE	241BX	109 1	N/A FUNCTIONAL TEST 7-GN-42	01M	SAFETY	BX044 1
LDK	241BX	109 1	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	BX044 2

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TABLE BX.2.4: PUMP PIT LEAK DETECTION (Cont.)

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LDK 241BX 109 2	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	BX044 A
LDE 241BX 110 1	N/A FUNCTIONAL TEST 7-GN-42	01M	SAFETY	BX059 1
LDK 241BX 110 1	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	BX059 2
LDK 241BX 110 2	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	BX059 A
LDE 241BX 111 1	N/A FUNCTIONAL TEST 7-GN-42	01M	SAFETY	BX074 1
LDK 241BX 111 1	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	BX074 2
LDK 241BX 111 2	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	BX074 A
LDE 241BX 112 1	N/A FUNCTIONAL TEST 7-GN-42	01M	SAFETY	BX089 1
LDK 241BX 112 1	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	BX089 2
LDK 241BX 112 2	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	BX089 A

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TABLE BX.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RA L 241BX 11	N/A SPECIAL CHECK N/A	01M	SAFETY	BX120 3
RAMP 241BX 11	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	BX120 2
RE 241BX 11	N/A PRECALIBRATED N/A	01M	SAFETY	BX120 1
RA L 241BX 21	N/A SPECIAL CHECK N/A	01M	SAFETY	BX119 3
RAMP 241BX 21	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	BX119 2
RE 241BX 21	N/A PRECALIBRATED N/A	01M	SAFETY	BX119 1
RA L 241BX 31	N/A SPECIAL CHECK N/A	01M	SAFETY	BX118 3
RE 241BX 31	N/A PRECALIBRATED N/A	01M	SAFETY	BX118 1
RAL 241BX 41	N/A SPECIAL CHECK N/A	01M	SAFETY	BX117 3
RAMP 241BX 41	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	BX117 2
RE 241BX 41	N/A PRECALIBRATED N/A	01M	SAFETY	BX117 1
RA L 241BX 51	N/A SPECIAL CHECK	01M	SAFETY	BX116 3

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TABLE BX.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING (Cont)

INSTRUMENT			PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RAMP	241BX	31	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	BX118 2
RAMP	241BX	51	PSCP-3-063 FUNCTIONAL TEST 7-GN-38 N/A	01M	SAFETY	BX116 2
RE	241BX	51	N/A PRECALIBRATED N/A	01M	SAFETY	BX116 1

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TABLE BY.1.0: TANK LIQUID LEVEL DETECTION

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LIT 109BY	6-TF-27 FUNCTIONAL TEST 6-TF-27	03M	SAFETY	BY022 1

TABLE BY.2.1: PUMP PIT LEAK DETECTION

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LDE 241BY 102 1	N/A FUNCTIONAL TEST 7-GN-42	01M	SAFETY	BY029 1
LDE 241BY 103 1	N/A FUNCTIONAL TEST 7-GN-42	01M	SAFETY	BY044 1
LDK 241BY 103 1	N/A SPECIAL CHECK 7-GN-42	06M	SAFETY	BY044 2
LDK 241BY 103 2	N/A SPECIAL CHECK 7-GN-42	06M	SAFETY	BY044 A
LDE 241BY 105 1	N/A FUNCTIONAL TEST 7-GN-42	01M	SAFETY	BY074 1
LDE 241BY 106 1	N/A FUNCTIONAL TEST 7-GN-42	01M	SAFETY	BY089 1
RA L 241BY 11	N/A SPECIAL CHECK N/A	01M	SAFETY	BY188 3
RAMP 241BY 11	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	BY188 2
RE 241BY 11	N/A PRECALIBRATED N/A	01M	SAFETY	BY188 1

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TABLE BY.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RA L 241BY 21	N/A SPECIAL CHECK N/A	01M	SAFETY	BY187 3
RAMP 241BY 21	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	BY187 2
RE 241BY 21	N/A PRECALIBRATED N/A	01M	SAFETY	BY187 1
RA L 241BY 31	N/A SPECIAL CHECK N/A	01M	SAFETY	BY186 3
RAMP 241BY 31	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	BY186 2
RE 241BY 31	N/A PRECALIBRATED N/A	01M	SAFETY	BY186 1
RA L 241BY 41	N/A SPECIAL CHECK N/A	01M	SAFETY	BY185 3
RAMP 241BY 41	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	BY185 2
RE 241BY 41	N/A PRECALIBRATED N/A	01M	SAFETY	BY185 1
RA L 241BY 51	N/A SPECIAL CHECK N/A	01M	SAFETY	BY184 3

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TABLE BY.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING (Cont)

INSTRUMENT			PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RAMP	241BY	51	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	BY184 2
RE	241BY	5	N/A PRECALIBRATED N/A	01M	SAFETY	BY184 1

TABLE C.1.0: TANK LIQUID LEVEL DETECTION

INSTRUMENT		PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LIT	102C	6-TF-27 FUNCTIONAL TEST 6-TF-27	03M	SAFETY	C0012 1
LIT	103C	6-TF-27 FUNCTIONAL TEST 60TF-27	03M	SAFETY	C0013 1
LIT	104C	6-TF-27 FUNCTIONAL TEST 6-TF-27	03M	SAFETY	C0014 1
LIT	105C	6-TF-27 FUNCTIONAL TEST 6-TF-27	03M	SAFETY	C0015 1
LIT	106C	6-TF-27 FUNCTIONAL TEST 6-TF-27	03M	SAFETY	C0016 1
LIT	107C	6-TF-27 FUNCTIONAL TEST 6-TF-27	03M	SAFETY	C0017 1

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TABLE C.2.1: PUMP PIT LEAK DETECTION

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LDA 102C	N/A SPECIAL CHECK 7-GN-38	02M	SAFETY	C0018 3
LDE 102C	N/A FUNCTIONAL TEST 7-GN-42	02M	SAFETY	C0018 1
LDK 102C	N/A SPECIAL CHECK 7-GN-38	02M	SAFETY	C0018 2
LDA 103C	N/A SPECIAL CHECK 7-GN-38	02M	SAFETY	C0019 3
LDE 103C	N/A FUNCTIONAL TEST 7-GN-42	02M	SAFETY	C0019 1
LDK 103C	N/A SPECIAL CHECK 7-GN-38	02M	SAFETY	C0019 2

TABLE C.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RA L 241C 11	N/A SPECIAL CHECK N/A	01M	SAFETY	C0005 3
RAMP 241C 11	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	C0005 2
RE 241C 11	N/A PRECALIBRATED N/A	01M	SAFETY	C0005 1
RA L 241C 21	N/A SPECIAL CHECK N/A	01M	SAFETY	C0004 3

TABLE C.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING (Cont)

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RAMP 241C 21	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	C0004 2
RE 241C 21	N/A PRECALIBRATED N/A	01M	SAFETY	C0004 1
RA L 241C 31	N/A SPECIAL CHECK N/A	01M	SAFETY	C0003 3
RAMP 241C 31	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	C0003 2
RE 241C 31	N/A PRECALIBRATED N/A	01M	SAFETY	C0003 1
RA L 241C 41	N/A SPECIAL CHECK N/A	01M	SAFETY	C0002 3
RAMP 241C 41	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	C0002 2
RE 241C 41	N/A PRECALIBRATED N/A	01M	SAFETY	C0002 1
RA L 241C 51	N/A SPECIAL CHECK N/A	01M	SAFETY	C0001 3
RAMP 241C 51	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	C0001 2
RE 241C 51	N/A PRECALIBRATED N/A	01M	SAFETY	C0001 1

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TABLE S.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RAT 38	N/A FUNCTIONAL TEST 7-GN-38	06M	SAFETY	SS003 1
RA L 241 S 11	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	S0078 3
RAMP 241S 11	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	S0078 2
RE 241S 11	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	S0078 1
RA L 241 S 21	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	S0077 3
RAMP 241S 21	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	S0077 2
RE 241S 21	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	S0077 1
RA L 241 S 31	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	S0076 3
RAMP 241S 31	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	S0076 2
RE 241S 31	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	S0076 1
RA L 241 S 41	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	S0075 3

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TABLE S.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING (Cont.)

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RAMP 241S 41	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	S0075 2
RE 241S 41	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	S0075 1
RA L 241 S 51	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	S0074 3
RAMP 241S 51	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	S0074 2
RE 241S 51	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	S0074 1
RA L 241 S 61	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	S0073 3
RAMP 241S 61	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	S0073 2
RE 241S 61	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	S0073 1

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TABLE SX.2.1: PUMP PIT LEAK DETECTION

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LDA 241SX 104 1	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	SX063 1

TABLE SX.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RA L 241 SX 11	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	SX040 3
RAMP 241SX 11	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	SX040 2
RE 241SX 11	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	SX040 1
RA L 241 SX 21	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	SX039 3
RAMP 241SX 21	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	SX039 2
RE 241SX 21	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	SX039 1
RA L 241 SX 31	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	SX038 3
RAMP 241SX 3	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	SX038 2
RE 241SX 31	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	SX038 1

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TABLE SX.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING (Cont.)

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RA L 241 SX 41	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	SX037 3
RAMP 241SX 41	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	SX037 2
RE 241SX 41	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	SX037 1
RA L 241 SX 5	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	SX036 3
RAMP 241SX 51	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	SX036 2
RE 241SX 5	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	SX036 1
RA L 241 SX 61	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	SX035 3
RAMP 241SX 61	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	SX035 2
RE 241SX 61	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	SX035 1
RA L 241 SX 71	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	SX034 3
RAMP 241SX 71	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	SX034 2

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TABLE SX.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING (Cont.)

INSTRUMENT			PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RE	241SX	71	N/A PRECALIBRATED 7-GN-38	06M	SAFETY	SX034 1
RR	241SX	1	PSCP-4-030 OVERALL CALIBRATION 7-GN-38	06M	SAFETY	SX041 1
RR	SX	1	PSCP-3-002 OVERALL CALIBRATION 7-GN-38	06M	SAFETY	SX011 1

TABLE SX.5.0: LATERALS LEAK DETECTION

INSTRUMENT				PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
BS	SX	L1	A1	N/A SPECIAL CHECK 7-GN-38	06M	OP. AID	L0001 6
BT	SX	L1		N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	L0001 5
CP	SX	L1		N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	L0001 3
CRM	SX	L1		PSCP-3-064 OVERALL CALIBRATION 7-GN-38	06M	SAFETY	L0001 B
MCC	SX	L1		N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	L0001 D
MP	SX	L1		N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	L0001 2
PAD	SX	L1		N/A FUNCTIONAL TEST 7-GN-38	06M	SAFETY	L0001 4

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TABLE SX.5.0: LATERALS LEAK DETECTION (Cont.)

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
PI SX L1	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	L0001 C
PM L SX L1	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	L0001 8
PM R SX L1	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	L0001 9
PP SX L1	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	L0001 E
PS SX L1	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	L0001 A
PTPI SX L1	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	L0001 7
R SX L1	PSCP-7-025 FUNCTIONAL TEST 7-GN-38	06M	SAFETY	L0001 G
R SX L1	PSCP-4-103 OVERALL CALIBRATION 7-GN-38	06M	SAFETY	L0001 F
R SX L1	PSCP-4-103 OVERALL CALIBRATION 3-GN-38	06M	SAFETY	L0001 1
CP SX L2	N/A SPECIAL CHECK 7-GN-38	12M	SAFETY	L0002 2
CRM SX L2	PSCP-3-064 FUNCTIONAL TEST 7-GN-38	12M	SAFETY	L0002 Z

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TABLE SX.5.0: LATERALS LEAK DETECTION (Cont.)

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
CRM SX L2	PSCP-7-025 OVERALL CALIBRATION 7-GN-38	12M	SAFETY	L0002 3
MCC SX L2	N/A SPECIAL CHECK 7-GN-38	12M	SAFETY	L0002 5
PP SX L2	N/A SPECIAL CHECK 7-GN-38	12M	SAFETY	L0002 6
PS PI SX L2	N/A SPECIAL CHECK 7-GN-38	12M	SAFETY	L0002 4
R SX L2	PSCP-4-103 OVERALL CALIBRATION 7-GN-38	12M	SAFETY	L0002 1
BS SX L3	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	L0003 6
BT SX L3	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	L0003 5
CP SX L3	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	L0003 3
CRM SX L3	PSCP-3-064 OVERALL CALIBRATION 7-GN-38	06M	SAFETY	L0003 B
DEPTH I	PSCP-7-025 FUNCTIONAL TEST 7-GN-38	06M	SAFETY	L0003 G
HVPS SX L3	N/A FUNCTIONAL TEST 7-GN-38	06M	SAFETY	L0003 A

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TABLE SX.5.0: LATERALS LEAK DETECTION (Cont.)

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
MCC SX L3	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	L0003 D
MP SX L3	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	L0003 2
PAD SX L3	N/A FUNCTIONAL TEST 7-GN-38	06M	SAFETY	L0003 4
PI SX L3	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	L0003 C
PM L SX L3	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	L0003 8
PM R SX L3	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	L0003 9
PP SX L3	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	L0003 E
PTPI SX L3	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	L0003 7
R SX L3	PSCP-4-103 OVERALL CALIBRATION 7-GN-38	06M	SAFETY	L0003 F
R SX L3	PSCP-4-103 OVERALL CALIBRATION 7-GN-38	06M	SAFETY	L0003 1
CP SX L4	N/A SPECIAL CHECK 7-GN-38	12M	SAFETY	L0004 2

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TABLE SX.5.0: LATERALS LEAK DETECTION (Cont.)

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
CRM SX L4	PSCP-3-064 FUNCTIONAL TEST 7-GN-38	12M	SAFETY	L0004 Z
CRM SX L4	PSCP-7-025 OVERALL CALIBRATION 7-GN-38	12M	SAFETY	L0004 3
MCC SX L4	N/A SPECIAL CHECK 7-GN-38	12M	SAFETY	L0004 5
PP SX L4	N/A SPECIAL CHECK 7-GN-38	12M	SAFETY	L0004 6
PS PI SX L4	N/A SPECIAL CHECK 7-GN-38	12M	SAFETY	L0004 4
R SX L4	PSCP-4-103 OVERALL CALIBRATION 7-GN-38	12M	SAFETY	L0004 1

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TABLE T.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RA L 241 T 11	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	T0154 3
RAMP 241T 11	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	T0154 2
RE 241T 11	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	T0154 1
RA L 241 T 21	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	T0153 3
RAMP 241T 21	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	T0153 2
RE 241T 21	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	T0153 1
RA L 241 T 31	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	T0152 3
RAMP 241T 31	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	T0152 2
RE 241T 31	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	T0152 1
RA L 241 T 41	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	T0151 3
RAMP 241T 41	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	T0151 2

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TABLE T.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING (Cont.)

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RE 241T 41	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	T0151 1
RA L 241 T 51	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	T0150 3
RAMP 241T 51	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	T0150 2
RE 241T 51	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	T0150 1

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TABLE TX.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RA L 241 TX 11	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	TX311 3
RAMP 241TX 11	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	TX311 2
RE 242TX 11	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	TX311 1
RAMP 241TX 4	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	TX312 2
RA L 241 TX 51	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	TX310 3
RE 241TX 51	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	TX310 1

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TABLE TY.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RA L 241 TY 11	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	TY071 3
RAMP 241TY 1 1	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	TY071 2
RE 241TY 11	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	TY071 1
RA L 241 TY 21	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	TY070 3
RAMP 241TY 21	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	TY070 2
RE 241TY 21	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	TY070 1
RA L 241 TY 31	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	TY069 3
RAMP 241TY 31	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	TY069 2
RE 241TY 31	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	TY069 1

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TABLE U.2.4: PUMP PIT LEAK DETECTION

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LDA 241U 102 1	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	U0022 3
LDA 241 U 102 2	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	U0022 5
LDK 241U 102	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	U0022 2
LDK 241U 102 2	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	U0022 4
LDA 241 U 103 1	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	U0047 3
LDK 241 U 103 1	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	U0047 2
LDA 241 U 103 2	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	U0048 5
LDK 241 U 103 2	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	U0048 4
LDA 241 U 107 1	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	U0125 3
LDK 241 U 107 1	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	U0125 2
LDA 241 U 111 1	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	U0220 3

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TABLE U.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RAL 241U 11	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	U0227 3
RAMP 241U 11	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	U0227 2
RE 241U 11	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	U0227 1
RA L 241 U 21	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	U0226 3
RAMP 241U 21	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	U0226 2
RE 241U 21	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	U0226 1
RA L 241 U 31	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	U0225 3
RAMP 241U 31	N/A FUNCTIONAL TEST 7-GN-38	01M	SAFETY	U0225 2
RE 241U 31	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	U0225 1
RA L 241 U 41	N/A SPECIAL CHECK 7-GN-38	01M	SAFETY	U0224 3

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TABLE U.4.0: ABOVE GROUND CONTAMINATION RADIATION MONITORING (Cont)

INSTRUMENT			PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RAMP	241U	41	PSCP-3-063 FUNCTIONAL TEST 7-GN-38	01M	SAFETY	U0224 2
RE	241U	41	N/A PRECALIBRATED 7-GN-38	01M	SAFETY	U0224 1

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TABLE DCRT.CR.1: TANK LIQUID LEVEL DETECTION

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
WFA L 003	N/A SPECIAL CHECK 7-GN-38	12M	PRIMARY	CR045 2
WFAS 003	PSCP-6-011 LIMITED CALIBRATIO 7-GN-38	12M	PRIMARY	CR045 1
WFAS 003 2	PSCP-6-066 OVERALL CALIBRATION 7-GN-38	12M	PRIMARY	CR039 1
WFIA 003	N/A FUNCTIONAL TEST 7-GN-38	12M	PRIMARY	CR042 3
WFR 003	PSCP-4-156 OVERALL CALIBRATION 7-GN-38	12M	PRIMARY	CR042 2
WFT 003	PSCP-6-010 OVERALL CALIBRATION 7-GN-38	12M	PRIMARY	CR042 1

TABLE DCRT.CR.2: SUMP LIQUID LEVEL DETECTION

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
WFAS 003 1 2	PSCP-6-006 OVERALL CALIBRATION 7-GN-38	12M	PRIMARY	CR038 1
WFAS L 003	N/A FUNCTIONAL TEST 7-GN-38	12M		CR039 2
WFR 003	PSCP-4-019 OVERALL CALIBRATION 7-GN-38	12M	PRIMARY	CR036 2
WFT SUMP 4	PSCP-6-036 OVERALL CALIBRATION 7-GN-38	12M	PRIMARY	CR036 1

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TABLE DCRT.CR.3: VALVE PIT LEAK DETECTION

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LDE VP	N/A FUNCTIONAL TEST 7-GN-42	02M	SAFETY	CR053 1
LDK VP 1	N/A SPECIAL CHECK 7-GN-42	02M	SAFETY	CR053 3
LLE VP	N/A OPERABILITY CHECK 7-GN-42	12M	OP. AID	CR054 1

TABLE DCRT.CR.4: ABOVE GROUND CONTAMINATION RADIATION MONITORING

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RR 241C 11	PSCP-4-030 OVERALL CALIBRATION 7-GN-38	06M	SAFETY	CR093 1

TABLE DCRT.CR.5: STACK VENTILATION RADIATION MONITORING

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RR 296C 51	PSCP-3-002 OVERALL CALIBRATION 7-GN-38	06M	SAFETY	CR082 1

TABLE DCRT.CR.6: STACK CONTINUOUS AIR MONITOR

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
CAM 1 A	N/A OVERALL CALIBRATION 7-GN-38	06M	SAFETY	CR013 1

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TABLE DCRT.BX.1: 244-BX TANK LIQUID LEVEL DETECTION

INSTRUMENT			PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
HLE	244BX	2	N/A PRECALIBRATED 7-GN-38	12M	PRIMARY	4B068 1
HLS	244BX	2	N/A FUNCTIONAL TEST 7-GN-38	12M	PRIMARY	4B068 2
LA	244BX	1	N/A SPECIAL CHECK 7-GN-38	12M	PRIMARY	4B013 5
LA	244BX	1A	N/A SPECIAL CHECK 7-GN-38	12M	PRIMARY	4B013 4
LAS	244BX	1	PSCP-6-011 LIMITED CALIBRATION 7-GN-38	12M	PRIMARY	4B013 3
LA	244BX	2	N/A SPECIAL CHECK 7-GN-38	12M	PRIMARY	4B013 8
LA	244BX	2A	N/A SPECIAL CHECK 7-GN-38	12M	PRIMARY	4B013 7
LAS	244BX	2	PSCP-6-011 LIMITED CALIBRATION 7-GN-38	12M	PRIMARY	4B013 6
LR	244BX	1	PSCP-6-002 OVERALL CALIBRATION PM 14441 7-GN-38	12M	PRIMARY	4B013 2
LY	244BX	1	PSCP-4-009 OVERALL CALIBRATION PM 14442 7-GN-38	12M	PRIMARY	4B013 1

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TABLE DCRT.BX.1: 244-BX TANK LIQUID LEVEL DETECTION (Cont)

INSTRUMENT			PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
SGR	244BX	1	PSCP-4-001 OVERALL CALIBRATION PM 14441 7-GN-38	12M	PRIMARY	4B002 2
SGT	244BX	1	PSCP-6-002 OVERALL CALIBRATION PM 14441 7-GN-38	12M	PRIMARY	4B002 1
SLE	244BX	1	N/A PRECALIBRATED 7-GN-38	12M	PRIMARY	4B067 1
SLI	244BX	1	PSCP-4-091 FUNCTIONAL TEST 7-GN-38	12M	PRIMARY	4B067 2
WFR	244BX	1	PSCP-4-001 OVERALL CALIBRATION PM 14441 7-GN-38	12M	PRIMARY	4B001 2
WFT	244BX	1	PSCP-6-002 OVERALL CALIBRATION PM 14441 7-GN-38	12M	PRIMARY	4B001 1

TABLE DCRT.BX.2: 244-BX ANNULUS SUMP LIQUID LEVEL

INSTRUMENT			PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LLE	244BX	1	N/A OPERABILITY CHECK 7-GN-38	06M	SAFETY	4B056 1
LLI	244BX	1	N/A FUNCTIONAL TEST 7-GN-38	06M	SAFETY	4B056 2

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TABLE DCRT.BX.3: 244-BX ANNULUS SUMP LEAK DETECTION

INSTRUMENT			PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LDA	244BX	2	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	4B058 2
LDA	244BX	2A	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	4B058 1
LDA	244BX	3	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	4B057 2
LDA	244BX	3A	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	4B057 1
LDE	244BX	SP	N/A FUNCTIONAL TEST 7-GN-42	02M	SAFETY	4B053 1

TABLE DCRT.BX.4: 244-BX ANNULUS RADIATION/LEAK DETECTION

INSTRUMENT			PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RA	244BX	1	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	4B072 2
RA	244BX	1A	N/A SPECIAL CHECK 7-GN-38	06M	BACKUP	4B072 1
RA	244BX	2	N/A SPECIAL CHECK 7-GN-38	12M	BACKUP	4B073 2
RA	244BX	2A	N/A SPECIAL CHECK 7-GN-38	12M	BACKUP	4B073 1
RA	244BX	3	N/A SPECIAL CHECK 7-GN-38	12M	BACKUP	4B071 2

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TABLE DCRT.BX.4: 244-BX ANNULUS RADIATION/LEAK DETECTION

INSTRUMENT			PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
RA	244BX	3A	N/A SPECIAL CHECK 7-GN-38	12M	BACKUP	4B071 3
RA	244BX	4A	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	4B083 1
RR	244BX	1	PSCP-4-001 OVERALL CALIBRATION PM 14444 7-GN-38	06M	SAFETY	4B017 2
RR	244BX	2	PSCP-4-001 OVERALL CALIBRATION PM 14444 7-GN-38	06M	SAFETY	4B016 2

TABLE DCRT.BX.5: 244-BX PUMP PIT LEAK DETECTION

INSTRUMENT			PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LDA	244BX	1	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	4B059 2
LDA	244BX	1A	N/A SPECIAL CHECK 7-GN-38	06M	SAFETY	4B059 1
LDE	244BX	PP	N/A FUNCTIONAL TEST 7-GN-42	02M	SAFETY	4B050 1
LDK	244BX PP	1	N/A SPECIAL CHECK 7-GN-42	02M	SAFETY	4B050 2
LDK	244BX PP	2	N/A SPECIAL CHECK 7-GN-42	02M	SAFETY	4B050 3

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TABLE DCRT.U.1: 244-U TANK LIQUID LEVEL DETECTION

INSTRUMENT			PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LA	244U	1	N/A SPECIAL CHECK N/A	12M	PRIMARY	4U013 5
LA	244U	2	N/A SPECIAL CHECK N/A	12M	PRIMARY	4U013 7
LA	244U	1A	N/A SPECIAL CHECK N/A	12M	PRIMARY	4U013 6
LA	244U	2A	N/A SPECIAL CHECK N/A	12M	PRIMARY	4U013 8

TABLE DCRT.U.2: 244-U SUMP LIQUID LEVEL

INSTRUMENT			PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LLE	244U1	SYS	N/A OPERABILITY CHECK 7-GN-42	01M	SAFETY	4U055 1

TABLE DCRT.U.3: 244-U LEAK DETECTION

INSTRUMENT		PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LDA	3	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	4U083 1
LDA	3A	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	4U083 2

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TABLE DCRT.U.5: 244-U PUMP PIT LEAK DETECTION

INSTRUMENT	PROCEDURE	FREQ	CLASS	PISCES LOOP NO.
LDA 1	N/A SPECIAL CHECK N/A	01M	SAFETY	4U083 3
LDA 1A	N/A SPECIAL CHECK 7-GN-42	01M	SAFETY	4U083 4

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APPENDIX I: CASS ALARM MATRIX (Cont)

FACILITY	CASS ALARM TYPE
241-B-101	LEAK DETECTION PIT-RADIATION HIGH
241-B	AREA RADIATION HIGH: B FARM
241-BX	LEAK: PUMP OUT PIT;.....BX-04A
241-BX	LEAK: FLUSH PIT:.....BX-05A1
241-BX	AREA RADIATION HIGH: BX FARM
241-BX	LEAK: PUMP PIT:.....BX-04C,05A,05B
241-BY	AREA RADIATION HIGH: BY FARM
241-BY	FARM ALARM PANEL POWER-OFF
241-C-104	LEAK: PUMP PIT:.....C-104
241-C	AREA RADIATION HIGH: C FARM
241-C	TANK FARM-EXHAUSTER TROUBLE
241-C	296-C-5 STACK MONITOR-HIGH RADIATION
244-CR	VAULT ALARM PANEL POWER-OFF
244-CR	VAULT ALARM PANEL POWER-OFF
241-S	FARM RAW WATER AND STEAM LINE-RADIATION HIGH OR DETECTOR FAILURE
241-S	AREA RADIATION HIGH:.....S FARM
241-SX	FARM FILTER K1-1-2,K1-2-3-HIGH DIFF. PRESSURE
241-SX	ALARM PANEL POWER-FAIL
241-SX	FARM ALARM PANEL POWER-OFF
241-SX	EXHAUST STACK-RADIATION HIGH
241-SX	FARM FILTER K1-2-2-HIGH DIFF.PRESSURE
241-SX	FARM FILTER K1-1-1,K1-2-1-HIGH DIFF. PRESSURE
241-SX	FARM FILTER K1-2-6-HIGH DIFF. PRESSURE
241-SX	FARM FILTER K1-1-3,K1-2-5-HIGH DIFF. PRESSURE
241-SX	FARM FILTER K1-2-4-HIGH DIFF. PRESSURE
241-SX	FARM EXHAUST FANS SHUT DOWN
241-SX	AREA RADIATION HIGH:.....SX FARM
241-T	FARM AREA RADIATION MONITORS-RADIATION HIGH
241-T	AREA RADIATION HIGH:.....T FARM
241-TX	FARM PROCESS PITS-LEAK (TRANSFER PUMPS OFF)
241-TX	AREA RADIATION HIGH:.....TX FARM
241-TX	FARM AREA RADIATION MONITORS-RADIATION HIGH

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BD-7600-062 (08/91)
Part 1

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ID Number Rev 0

REQUESTOR:

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Project or Program	**Lead Org Code**		**Sponsor Agency (DOE, DOT, NRC, USGS, etc.)**
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Additional Information

BD-7600-062R (08/91)
Part 2

ID Number _____

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