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TWRS CONTROLLED & CLEAN & STABLE FUNCTIONS &
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Tank Waste Remediations System Controlled, Clean, and Stable Functions and Endpoint Criteria for Single-Shell Tank Farms

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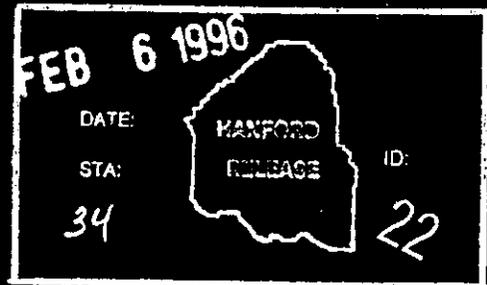
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Abstract: This document provides functions and endpoint criteria to be used for transition of the Single-Shell Tank Farms to the Controlled, Clean and Stable endstate.

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**TANK WASTE REMEDIATION SYSTEM
CONTROLLED, CLEAN, AND STABLE
FUNCTIONS AND ENDPOINT CRITERIA
FOR SINGLE-SHELL TANK FARMS**

January 30, 1996

**Prepared by:
Parsons Engineering Science, Inc.
Richland, Washington**

**Systems Engineering Support
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ACRONYMS

CCS	Controlled, Clean, and Stable
DIL	Drainable Interstitial Liquid
DST	Double-Shell Tank
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy, Richland Operations Office
DPM	Disintegration Per Minute (unit of radioactivity level measurement)
DW	Dangerous Waste
Ecology	Washington State Department of Ecology
FSAR	Final Safety Analysis Report
IMUST(s)	Inactive, Miscellaneous Underground Storage Tank(s)
IOSR(s)	Interim Operating Safety Requirement(s)
ISB	Interim Safety Basis
LCO(s)	Limiting Conditions for Operation(s)
LOW(s)	Liquid Observation Well(s)
MUST	Miscellaneous Underground Storage Tank
PNL	U.S. Department of Energy's Pacific Northwest Laboratory, operated by Battelle Memorial Institute
RA	Radiation Area
RBA	Radiological Buffer Area
RCRA	Resource Conservation and Recovery Act
SE	Systems Engineering
SHMS	Standard Hydrogen Monitoring System
SST	Single-Shell Tank
TFTP	Tank Farm Transition Project
TMACS	Temperature Monitoring and Control System
TPA	Hanford Federal Facilities Agreement and Consent Order or Tri-Party Agreement
TSD	Treatment, Storage, and Disposal
TWRS	Tank Waste Remediation System
URMA	Underground Radioactive Material Area
WAC	Washington Administrative Code
USQ	Unreviewed Safety Question
WHC	Westinghouse Hanford Company

1.0 INTRODUCTION TO CONTROLLED, CLEAN, AND STABLE

To reduce ongoing operational costs, and to reduce risks to public and worker safety, the Tank Farm Transition Projects (TFTP) is transitioning the Single-Shell Tank Farms to an interim endstate, where only limited surveillance and maintenance will be required. Transition to this interim endstate will require upgrading system hardware and infrastructure, and removal of surface contaminants and liquid wastes from the Single-Shell Tank Farms. The resultant condition of these farms will be a Controlled, Clean, and Stable (CCS) endstate. This document provides the criteria to be used for transition of the Single-Shell Tank Farms to the CCS endstate.

The CCS Mission Goals and Objectives were developed to support the Tank Waste Remediation System (TWRS) Mission Goals identified in *TWRS Mission Analysis*, (WHC 1995i). The CCS function elements and endpoint criteria (performance requirements) provide the functional hierarchy and the performance characteristics for meeting the CCS Mission Goals and Objectives.

The CCS Mission Goals and Objectives were developed to meet the TWRS Mission Goal to "Operate and maintain facilities to provide continued safe and environmentally sound storage." The CCS Mission Goals provide specific goals for interim management of deactivated facilities (e.g., Single-Shell Tank Farms) that support the TWRS Mission Goal for safe and environmentally sound storage.

The CCS Mission Objectives identify the approach being taken to meet the CCS Mission Goals. The CCS function elements identify the functions that must be performed to achieve the CCS Mission Objectives. Each function element is directly tied to, and supportive of, one or more of the CCS Mission Objectives. The CCS Endpoint Criteria (performance requirements) define the performance capabilities that must be achieved to satisfy the function elements.

2.0 SYSTEMS ENGINEERING APPROACH FOR CONTROLLED, CLEAN, AND STABLE

2.1 SINGLE-SHELL TANK LIFE CYCLE PLANNING

The *Task Plan for Tank Waste Remediation System Life Cycle Planning* (Parsons 1995) identifies the major activities in the life cycle for the Single-Shell Tank Farms from the present (pre-CCS), until final closure. The TWRS Mission Analysis (WHC 1995i) also discusses the overall life cycle for the Tank Farms. To minimize costs for continued storage of tank waste during the initial operating phase, the Single-Shell Tank Farms will be maintained in a limited surveillance and maintenance mode. This mode will be achieved once the requirements for CCS have been satisfied; therefore, the CCS is, an interim endstate, prior to final transition to the Waste Disposal Programs. After retrieval, the Single-Shell Tank Farms will be closed per the *Single-Shell Tank Closure Work Plan* (DOE-RL 1995c), and the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement or TPA) (DOE-RL 1995a) Milestone M-45-06.

2.2 SYSTEMS ENGINEERING APPROACH

The CCS is an integral part of the Systems Engineering (SE) management approach for the TWRS program. As a part of the SE effort, a Mission Analysis (WHC 1995i) was performed to identify the Mission Goals for TWRS. The CCS approach has been developed to best satisfy the applicable Technical Performance Measures for the Mission Goals contained in the TWRS Mission Analysis. The TWRS Mission Goal that is applicable to the pre-retrieval condition is to provide safe and environmentally compliant storage of the tank waste. The Technical Performance Measures for this TWRS Mission Goal are best satisfied by minimizing operating costs, maximizing overall TWRS operating efficiency, and mitigating tank safety issues to the maximum extent possible. These Technical Performance Measures can be optimized by transitioning the inactive TWRS facilities (i.e., the Single-Shell Tank Farms) to a limited surveillance and maintenance mode. The CCS Mission Goals and Mission Objectives were developed to effect this transition for the Single-Shell Tank Farms.

The "Manage Tank Waste" function (level 3) in the TWRS SE database has four lower level functions (level 4), two of which are applicable to CCS. These two functions are "Store Managed Tank Waste," and "Transfer Managed Tank Waste."

The "Store Managed Tank Waste" function has four lower level functions (level 5), two of which relate to CCS. These two functions are:

- Store SST Waste; and
- Store MUST Waste.

The CCS Function Elements from Section 5.0 and 6.0 are the subfunctions that support these level functions.

The "Transfer Managed Tank Waste" function has six, lower level functions (level 5), two of which relate to CCS. These two functions are:

- Relocate SST Interstitial Liquid; and
- Transfer MUST Waste to DST Storage.

The CCS Function Elements from Section 7.0 are the subfunctions that support these level 5 functions.

The function elements and endpoint criteria provided in this document comprise the performance characteristics (functions, subfunctions, and performance requirements) for CCS. The functional hierarchy and performance characteristics for CCS will be documented in the CCS Design Requirements Document (DRD).

3.0 CONTROLLED, CLEAN, AND STABLE MISSION GOALS AND OBJECTIVES

3.1 CONTROLLED, CLEAN, AND STABLE MISSION GOALS

The CCS Mission Goals were developed to support the TWRS Mission Goal for safe and environmentally sound storage of the tank waste. The Decision Measures and Technical Performance Measures related to this TWRS Mission Goal require that the alternative(s) selected mitigate safety (and environmental) risks to the maximum extent possible, while minimizing future operational and maintenance costs. The CCS Mission Goals have been selected to provide the framework for an alternative that best satisfies the Decision and Performance Measure criteria for the TWRS Mission Goal for safe and environmentally compliant storage.

The CCS Mission Goals are as follows:

- a. Reduce the 200 Area East and West Tank Farm Transition Projects operation and maintenance costs for the Single-Shell Tank Farm System by 50% within five years (based on the out-year projections contained in the Multi-Year Plan of September 1994);
- b. Operate the Single-Shell Tank Farms within the approved safety envelope;
- c. Remove all pumpable tank interstitial liquids and exposed contaminated soil/debris from the Single-Shell Tank Farms; and
- d. Achieve compliance with near-term (pre-retrieval) regulatory requirements.

The last Mission Goal for regulatory compliance requires that the CCS endpoint criteria satisfy certain legal requirements, one of which is to provide leak detection and intrusion monitoring for the SSTs. These requirements, and the references to the source documents, are provided in Section 5.3. The TPA milestones identify the legal framework for interim stabilization of the SSTs. Section 7.0 provides the specifications that must be satisfied for stabilization. There is also an existing agreement with the Washington State Department of Ecology (Ecology) for management of contaminated equipment. The specifics of this agreement are provided in a letter to Ecology on *Management of Contaminated Equipment at the Hanford Site* (DOE-RL 1995b). The requirements for management of contaminated equipment within the Tank Farms are identified in the *TWRS Abandoned Equipment Storage/Disposal Plan* (WHC 1995d) and are included in Section 6.2.

3.2 CONTROLLED, CLEAN, AND STABLE MISSION OBJECTIVES

The CCS Mission Objectives identify the overall approach and methods to be used to meet the CCS Mission Goals in Section 3.1. The CCS Mission Objectives are provided in the following paragraphs.

Objectives for "Controlled:"

- Repair and/or upgrade, as necessary, active and passive safety systems required to be operable by the safety basis authorization documents;

- Provide remote monitoring capability for required instrumentation; and
- Implement the engineering and administrative controls necessary to comply with the TWRS Authorization Basis.

Objectives for “Clean:”

- Clean up surface contamination to the extent necessary to downpost the Tank Farms to Radiological Buffer Area (RBA)/Underground Radioactive Material Area (URMA)/Radiation Area (RA) status;
- Remove and dispose of above-ground abandoned equipment; and
- Place reusable equipment in environmentally compliant storage.

Objectives for “Stable:”

- Remove pumpable interstitial liquid from SSTs and Inactive Miscellaneous Underground Storage Tanks (IMUSTs) within the associated Single-Shell Tank Farm(s) to comply with interim stabilization criteria; and
- Isolate SST and IMUST systems within the associated Single-Shell Tank Farm(s) to comply with intrusion prevention criteria.

4.0 FUNCTION ELEMENTS AND ENDPOINT CRITERIA (PERFORMANCE REQUIREMENTS)

The CCS function elements are those functions that must be performed to meet the CCS Mission Objectives. The endpoint criteria (performance requirements) identify the performance levels required for each function. The function elements and endpoint criteria for the Single-Shell Tank Farms are provided in Sections 5.0 through 7.0.

Tanks, equipment, and structures within the tank farm physical boundaries (fences) are considered to be subject to the CCS criteria. Because the CCS purpose is to transition inactive facilities to a limited surveillance and maintenance mode, active Double-Contained Receiver Tanks (DCRTs) and waste transfer systems are not subject to the CCS criteria at present. In addition, IMUSTs and Tank Farm facilities located adjacent to, but outside of the Single-Shell Tank Farm perimeters, are not presently being transitioned to CCS with the Single-Shell Tank Farms.

5.0 CONTROLLED

The following function elements and endpoint criteria have been established to meet the Mission Objectives for the "controlled" condition.

5.1 MITIGATION OF SAFETY ISSUES

5.1.1 Function Elements

- a. Identify the administrative controls and engineering features for the SSTs and IMUSTs that are necessary to prevent or mitigate accident conditions.

The function element for Mitigation of Safety Issues requires identification of the controls necessary to limit risks. These controls are specified in the TWRS Authorization Basis. At present, the *Hanford Site Tank Farm Facilities Interim Safety Basis (ISB) (WHC 1993)* constitutes the TWRS Authorization Basis; and the controls necessary to limit risks are specified in Section 6.0 of the ISB. The Section 6.0 ISB requirements, and any controls and restrictions identified by the Unreviewed Safety Question (USQ) process, define the boundaries of the Safety Envelope for the SSTs and IMUSTs.

Presently, there is only one open USQ pertaining to the SSTs. This USQ is for the Hydrogen/Flammable Gas safety issue. This USQ is addressed in the ISB, and implementation of the requirements specified in Sections 5.2.2 of this document is adequate for mitigation of this USQ. Although there are no USQs associated with the TWRS-owned IMUSTs, a Safety Evaluation (WHC 1995k) performed as part of the USQ discovery process has identified the need for some additional controls not presently specified in the ISB. Implementation of the administrative controls specified in Section 5.2.2 is also adequate for mitigation of this issue.

5.1.2 Endpoint Criteria

Identification of the requirements that comprise the TWRS Authorization Basis is required to satisfy the function element for Mitigation of Safety Issues. Because the ISB and the USQ identification and evaluation process have properly identified the requirements for the TWRS Authorization Basis, there is no need for lower tier endpoint criteria for Mitigation of Safety Issues.

5.2 AUTHORIZATION BASIS IMPLEMENTATION

5.2.1 Function Elements

Section 6.0 of the ISB, and other safety documentation prepared as part of the USQ process, contain all of the TWRS Authorization Basis requirements. The ISB Section 6.0 requirements that are applicable to the SSTs at present are the Interim Operational Safety Requirements (IOSRs), and the ISB Requirements for Watch-List Tanks. Section 13.3 of the *Operating Specifications for Single-Shell Waste Storage Tanks (WHC 1995b)* provides the TWRS Authorization Basis requirements that are applicable to the IMUSTs. The function elements for implementation of the TWRS Authorization Basis are as follows:

- a. Implement the elements of the *Single-Shell Tank Interim Operational Safety Requirements* (WHC 1994b) that are required to be implemented by the latest TWRS Authorization Basis Implementation Plan;
- b. Implement the administrative controls specified in Section 30.2 of *Operating Specification for Watch-List Tanks* (WHC 1996) for all Watch-List SSTs; and
- c. Implement the administrative controls specified in Section 13.3 of the *Operating Specifications for Single-Shell Waste Storage Tanks* (WHC 1995b) for all IMUSTs.

5.2.2 Endpoint Criteria

The CCS Endpoint Criteria for implementation of the TWRS Authorization Basis for the SSTs are:

- a. Complete the requirements implementation process specified in the TWRS administrative procedures (e.g., WHC-IP-0842) for those requirements in the *Single-Shell Tank Interim Operational Safety Requirements* (WHC 1994b) identified in the most current TWRS Authorization Basis implementation plan [e.g., *Tank Farm Interim Operational Safety Requirements Compliance Implementation Plan* (WHC 1995c)]; and
- b. Complete the requirements implementation process specified in the TWRS administrative procedures (e.g., WHC-IP-0842) and in the Administrative Controls included in the SST IOSRs (e.g., Administrative Control 5.15) for Section 30.2 of *Operating Specification for Watch-List Tanks* (WHC 1996).

The CCS Endpoint Criterion for implementation of the TWRS Authorization Basis for the IMUSTs is:

- c. Complete the requirements implementation process specified in the TWRS administrative procedures (e.g., WHC-IP-0842) for Section 13.3 of the *Operating Specifications for Single-Shell Waste Storage Tanks* (WHC 1995b).

5.3 TANK MONITORING

5.3.1 Function Elements

The function elements developed for Tank Monitoring are, for the most part, based on requirements specified in environmental regulations and the ISB. The requirements for monitoring certain parameters were obtained directly from Federal and State environmental regulations and compliance plans, and from the SST IOSRs. The need for remote monitoring of these parameters is based on the CCS Mission Objective to “provide remote monitoring capability for required instrumentation.” The source documents are listed for that identify the parameters that must be monitored are listed for each function element for Tank Monitoring.

- a. Provide remote, online surface-level monitoring for SSTs (WHC 1995g, WHC 1995f, and WAC 1995);

- b. Provide remote, online, temperature monitoring capability for Watch-List and High-Heat SSTs (U.S. Congress 1990, WHC 1994b, and WHC 1995g);
- c. Provide tank pressure monitoring for actively ventilated SSTs (WHC 1994b); and
- d. Provide remote, tank exhaust-stack radiation alarm capability for actively ventilated SSTs (WHC 1994b).

5.3.2 Endpoint Criteria

5.3.2.1 Level Monitoring.

- a. Remote, tank surface-level monitoring shall be installed and operable in SSTs.

The SST IOSRs (WHC 1994b) and TPA Change Request M-43-94-02 (DOE 1995a) require that all non-stabilized SSTs have leak detection capability. Section 31.2.1.3 of *Operating Specifications for Tank Farm Leak Detection and Single-Shell Tank Intrusion Detection* (WHC 1995j) requires that all SSTs have intrusion monitoring capability. The most reliable way to provide leak detection and intrusion monitoring in the SSTs is by liquid-level indication. Monitoring the tank level by surface-level measurement devices for tanks with liquid or semi-liquid surfaces, and by interstitial-level monitoring devices [e.g., Liquid Observation Wells (LOWs)] for tanks with solid surfaces, provides the required leak detection and intrusion monitoring capability. Intrusion monitoring can also be provided by surface level measurement devices for tanks with solid or semi-liquid surfaces.

Administrative Control 5.23.2 in the SST IOSRs (WHC 1994b) requires that a program be established to implement tank leakage monitoring. This Administrative Control refers to the IOSR Basis, Section B.5.23 for more information on the leakage monitoring requirements. Section B.5.23 refers to *Waste Storage Tank and Leak Detection Criteria* (WHC 1994a) for the specific leakage monitoring requirements for each SST. The document (WHC 1994a) has been superseded by *Technical Bases for Leak Detection Surveillance of Waste Storage Tanks* (WHC 1995f). The SST IOSR leak detection requirements are, therefore, applied to *Technical Bases for Leak Detection Surveillance of Waste Storage Tanks* (WHC 1995f). The leak detection requirements identified in Tables 4.1-1 and 4.1-2 of this document (WHC 1995f) are as follows:

- The liquid level in tanks with liquid or semi-liquid surfaces, where the surface level measurement device is touching a surface that varies with changes in the liquid level, will be monitored with surface level measurement devices. These devices are designated the primary leak detection/intrusion monitoring methods for these tanks. When the surface level measurement equipment is out of service, backup liquid level monitoring for these tanks will be provided by LOWs.
- The liquid level in tanks with solid or semi-liquid surfaces, where the surface level measurement device is touching a surface that does not vary with the liquid level, will be monitored with LOWs. These LOWs are designated the primary leak detection and intrusion monitoring devices for these tanks. If LOWs are out of service or do not exist, surface level measurement devices provide the primary means of intrusion monitoring. For tanks that are stabilized, no formal backup leak surveys are required until the LOWs are placed in service.

Based on the above information, leakage monitoring in stabilized tanks is not a mandatory requirement. Because endpoint criterion 7.1.2 (see Section 7.0) requires that all SSTs (and IMUSTs) be interim-stabilized, leakage monitoring is not required to achieve CCS.

Surface-level monitoring by surface-level detectors satisfies the intrusion monitoring requirements contained in Section 31.2.1.3 of *Operating Specifications for Tank Farm Leak Detection and Single-Shell Tank Intrusion Detection* (WHC 1995j). Surface-level detectors also satisfy the tank level monitoring requirements of LCO 3.1.1 from the SST IOSRs.

All TWRS-owned IMUSTs within the Single-Shell Tank Farm perimeters have been interim-stabilized and isolated. The stabilization criteria derived from *TWRS Administration Manual*, Section 4.1 (WHC 1995e), required pumping of IMUSTs to less than 400 gal of supernatant liquid if pumped to a tank truck, or less than 5,000 gal of supernatant liquid if pumped via overground transfer. Given the small quantities of liquid waste remaining in the IMUSTs, no leakage or intrusion monitoring criteria are considered necessary.

5.3.2.2 Temperature Monitoring.

- a. Remote, temperature monitoring devices shall be installed and operable for Watch-List and High-Heat SSTs, with at least one temperature sensor in the waste and one sensor in the vapor space.

5.3.2.3 Tank Pressure Monitoring.

- a. Tank pressure monitoring systems shall be installed and operable for actively ventilated SSTs.

5.3.2.4 Exhaust Stack Radiation Monitoring.

- a. Remote alarm systems for tank exhaust stack radiation shall be installed and operable on actively ventilated SSTs.

5.4 DATA ACQUISITION AND ANALYSIS

5.4.1 Function Elements

The following function elements have been derived from the SST IOSRs (WHC 1994b), *Tank Farm Instrumentation Upgrade Plan* (WHC 1995g), Public Law 101-510 (U.S. Congress 1990), and TPA Change Request M-43-94-02 (DOE-RL 1995a):

- a. Provide remote monitoring (via TMACS or equivalent) for tank-level (all SSTs), and temperature (Watch-List and High-Heat SSTs);
- b. Provide tank pressure monitoring (actively ventilated SSTs); and
- c. Provide remote alarm capability (via TMACS or equivalent) for all parameters requiring continuous (online) monitoring.

5.4.2 Endpoint Criteria

The instrument strings associated with the sensors identified in Section 5.3.2 shall be tied into TMACS or an equivalent central data acquisition station. The sensing devices required under Section 5.3.2 shall provide monitoring and alarm functions via TMACS or an equivalent system. The parameters required to be monitored and alarmed include the following:

- a. Surface-level measurement for SSTs;
- b. Tank temperature (for Watch-List and High-Heat SSTs);
- c. Tank pressure for actively ventilated SSTs; and
- d. Exhaust-stack radiation (alarm function, only) for actively ventilated SSTs.

6.0 CLEAN

The following function elements and endpoint criteria have been developed to meet the CCS Mission Objectives for the "clean" condition.

6.1 SURFACE SOIL CLEANUP/STABILIZATION

6.1.1 Function Elements

6.1.1.1 Surface Contamination Reduction and Stabilization.

- a. Remove contaminated surface soils, to the extent practical, to allow downposting within the farm perimeter from Contamination Area to URMA and/or RBA classifications. Criteria for down posting are specified in the *Occupational Radiation Protection*, 10CFR 835.603 (CFR 1993) and the *Hanford Site Radiological Control Manual*, HSRCM-1 (PNL 1994).

6.1.1.2 Surface Soils Stabilized.

- a. Stabilize surface soils within the farm boundaries to prevent migration of below-ground contamination to the surface.

6.1.1.3 Access Controls Established.

- a. Restrict access into the farm boundaries by implementing administrative controls (procedures and signs) and engineering controls (chains, ropes, fences, barricades, and alarms) applicable to URMA, RBA, and RA.

6.1.2 Endpoint Criteria

6.1.2.1 Surface Contamination Removal/Stabilization.

- a. Contaminated surface soils shall be removed and/or stabilized by excavation/scraping/resurfacing. The extent of the surface remediation efforts will depend on contamination levels and tank/riser configurations;
- b. Shielding shall be installed where required, and highly radioactive contaminated equipment shall be removed to reduce local and general area radiation levels in all accessible areas within the Tank Farm perimeters. Radiation levels shall be less than 5 mrem/hr at a distance of 30 cm or 12 in. from the radiation source, as required by Table 2-3 of HSRCM-1 (PNL 1994); and
- c. Surface contamination levels shall be reduced to less than 5,000 DPM (Beta/Gamma) per 100 cm² direct (fixed and removable) and less than 1,000 DPM (Beta/Gamma) per 100 cm² removable per Table 2-2 of HSRCM-1 (PNL 1994).

6.1.2.2 Surface Soils Stabilized.

- a. Gravel or other approved soil stabilizing agents will be applied after, or in place of, excavation, depending on contamination levels and depth.

6.1.2.3 Access Controls Established. Requirements and dose rate criteria for posting are identified in the HSRCM-1 (PNL 1994), and *Occupational Radiation Protection*, 10CFR 835.603 (CFR 1993), and are as follows:

- a. A grid survey shall be performed for downposting per the Survey Method for Reposting Outdoor Contamination Areas, Section 3.1.2, Rev. 3 of *Health Physics Procedures* (WHC 1995a), within the farm perimeters;
- b. Administrative controls (i.e., procedures and signs) and engineering controls (i.e., chains, ropes, tapes, fences, barricades, or alarms) shall be in place to control access to the Single-Shell Tank Farm area; and
- c. Each URMA/RBA/RA access point shall be posted with the applicable sign in accordance with the *Hanford Site Radiological Control Manual* (PNL 1994).

6.2 CONTAMINATED EQUIPMENT MANAGEMENT

6.2.1 Function Elements

All above-grade contaminated equipment will be categorized, inventoried, and stored; or designated, packaged, and disposed, as outlined in a letter from J. E. Rasmussen, DOE-RL, to Ecology regarding *Management of Contaminated Equipment at the Hanford Site* (DOE-RL 1995b).

6.2.2 Endpoint Criteria

The Endpoint Criteria for disposition of abandoned equipment are based on the premise that unused contaminated equipment that is above-grade, should be physically removed from the Tank Farms. Waste that is designated as Dangerous Waste (DW) will be moved to a 90-day storage area after the waste container(s) have been filled. The requirements for managing DW are specified in Section 200 (Accumulating Dangerous Waste on Site) of the *Dangerous Waste Regulations*, Chapter 173-303 (WAC 1995).

Below-grade out-of-service and above-grade unusable contaminated equipment that is inaccessible or cannot be removed, will be isolated/sealed to prevent any contamination spread. Contaminated reusable equipment will be placed in an appropriate storage container to protect workers and the environment.

The following requirements were developed using the letter *Management of Contaminated Equipment at the Hanford Site* (DOE-RL 1995b) and the *TWRS Abandoned Equipment Storage/Disposal Plan* (WHC 1995d) as guidance.

- a. Above-ground equipment that is out-of-service and is no longer intended for future use, or that has been abandoned in-place, will be assessed for physical disconnection, packaging, characterization, and segregation for disposal. The necessity of physical disconnection and removal of installed out-of-service equipment shall be determined on a case-by-case basis, per the *Management of Contaminated Equipment at the Hanford Site* (DOE-RL 1995b) and the *TWRS Abandoned Equipment Storage/Disposal Plan* (WHC 1995d). Dangerous waste components will be designated and transported to a permitted Treatment, Storage, and Disposal (TSD) facility.
- b. Out-of-service/abandoned equipment that is inaccessible by plan or design is to be isolated/sealed to prevent spreading contamination to the environment. In general, equipment that is below-grade (i.e., pump and transfer pit) will be dispositioned under RCRA closure of the SSTs, and will not be removed as part of CCS, unless it poses a significant personnel exposure and/or environmental hazard.
- c. Reusable equipment that has a current and/or future purpose or function and is not intended for discard, is to be inventoried and stored for future use. Highly radioactive equipment will be shielded or stored in such a way to minimize personnel radiation exposure. Equipment that had been in contact with tank waste will be stored in an appropriate containment device/container to prevent release of dangerous waste to the environment.

7.0 STABLE

The following function elements and endpoint criteria have been developed to meet CCS Mission Objectives for the "stable" condition.

7.1 INTERIM STABILIZATION

The TPA defines interim stabilization as the removal of pumpable supernatant and interstitial liquid from SST systems into DST systems. As much liquid as practicable will be removed.

Criteria for interim stabilization of the SSTs and IMUSTs are defined in the *TWRS Administration Manual*, WHC-IP-0842, Vol. IV, Section 4.1, Rev 0 (WHC 1995e).

7.1.1 Function Elements

- a. Remove pumpable interstitial liquid from all SSTs and IMUSTS.

7.1.2 Endpoint Criteria

7.1.2.1 Single-Shell Tanks. All SSTs will be pumped until the following conditions are achieved:

- a. Each tank contains less than 50,000 gal of Drainable Interstitial Liquid (DIL), based on either a 45% porosity or on the porosity determined during actual pumping;
- b. Each tank contains less than 5,000 gal of supernatant; and
- c. If a 0.05-gal/min (min)-or-less pumping rate has been reached or if inflow in the saltwell screen is less than 0.05 gal/min and each tank has less than 50,000 gal of DIL.

7.1.2.2 Inactive Miscellaneous Underground Storage Tanks.

- a. Tanks containing low-level radioactive supernatant liquid will be pumped to 400 gal or less (4 in. or less from the bottom, or the solids/sludge level); and
- b. Tanks containing more than 5,000 gal of highly radioactive supernatant will be pumped down via overground piping to an underground tank or receiver vessel where tank trucks cannot be used without dilution.

7.2 INTRUSION PREVENTION

The TPA defines intrusion prevention (interim isolation) as disconnecting, and blanking or capping pipelines from tank systems, and installing barriers to avoid inadvertent liquid addition. Intrusion prevention is complete when the necessary system components are sealed to prevent tank intrusion. The interim isolation criteria for SSTs and IMUSTs are defined in WHC-IP-0842,

Volume IV, Section 4.2 (WHC 1995e). The SSTs isolation criteria are also discussed in the *Single-Shell Tank Isolation Safety Analysis Report* (WHC 1986).

7.2.1 Function Elements

- a. Seal SST and IMUST Systems/components to prevent tank intrusion.

7.2.2 Endpoint Criteria

- a. Risers terminating above-grade or less than 3 ft below-grade shall be sealed;
- b. Confinement cover for pits, cells, vaults, etc., shall be sealed for tanks that have risers terminating in a confined area; and
- c. Pipelines entering any tank, or above-grade structures connected to a tank shall be sealed with closure devices.

8.0 REFERENCES

A Tank Farm is considered to be CCS once the endpoint criteria have been satisfied. This document provides all of the relevant criteria to achieve CCS. References to supporting documents have been provided for information.

CFR, 1993, *Occupational Radiation Protection*, 10CFR 835.603, Code of Federal Regulations, U.S. Department of Energy, Washington, DC.

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WHC, 1994b, *Single-Shell Tank Interim Operational Safety Requirements*, WHC-SD-WM-OSR-005, Rev 0B, Westinghouse Hanford Company, Richland, Washington.

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- WHC, 1995c, *Tank Farm Interim Operational Safety Requirements Compliance Implementation Plan*, WHC-IP-0954, Rev 4, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1995d, *Tank Waste Remediation System (TWRS) Abandoned Equipment Storage/Disposal Plan*, WHC-SD-WM-PLN-098, Rev 0, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1995e, *Tank Waste Remediation System (TWRS) Administration Manual*, WHC-IP-0842, Volume IV, Westinghouse Hanford Company, Richland, Washington.
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- WHC 1995g, *Tank Farm Instrumentation Upgrade Plan*, WHC-SD-WM-WP-132, Rev 5, Westinghouse Hanford Company, Richland, Washington.
- WHC 1995h, *Status Report on Resolution of Waste Tank Safety Issues at the Hanford Site*, WHC-EP-0600, Rev 1, Westinghouse Hanford Company, Richland, Washington.
- WHC 1995i, *Tank Waste Remediation System Mission Analysis*, WHC-SD-WM-MAR-008, Rev 0, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1995j, *Operating Specifications for Tank Farm Leak Detection and Single-Shell Tank Intrusion Detection*, WHC-OSD-T-151-00031, Rev B-1, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1995k, *Unreviewed Safety Question TF-95-0054*, Rev 1, Internal Memorandum, 8M100-WGF-95021, Westinghouse Hanford Company, Richland, Washington.
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