

DOE/RW-0351 P Rev 2

DOC ID: E00000000-00811-1708-00001 Revision 02

WBS: 9.2.1

QA: L

Public Reading Room

0050595

**Civilian Radioactive Waste Management System
Management and Operating Contractor**

Waste Acceptance System Requirements Document

Revision 02

Prepared for:

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DE-AC01-91RW00134

CWM-General

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1. SCOPE

1.1 IDENTIFICATION

This Waste Acceptance System Requirements Document (WA-SRD) describes the functions to be performed and the technical requirements for a Waste Acceptance System for accepting spent nuclear fuel (SNF) and high-level radioactive waste (HLW) into the Civilian Radioactive Waste Management System (CRWMS). The WA-SRD addresses the requirements for the acceptance of bare SNF, SNF loaded in multi-purpose canisters (MPCs), and HLW.

The development and control of the WA-SRD is subject to the requirements of the *OCRWM Quality Assurance Requirements and Description document (QARD)* (DOE/RW-0333P). As part of the technical requirements baseline, it is also subject to *OCRWM Baseline Management Plan (BMP)* (DOE/RW-0381P) controls. The WA-SRD has been revised in accordance with the *CRWMS M&O Technical Document Preparation Plan (TDPP) for the Revision of System Requirements Documents*.

1.2 PURPOSE OF CRWMS REQUIREMENTS DOCUMENTS

1.2.1 CRWMS Requirements Hierarchy

The *OCRWM Program Management System Manual (PMSM)* (DOE/RW-0043) and the *OCRWM Systems Engineering Management Plan (SEMP)* (DOE/RW-0051P) establish the technical document hierarchy (hierarchy of technical requirements and configuration baseline documents) for the CRWMS program. Figure 1-1 illustrates the program-level system requirements documents in this hierarchy. The *CRWMS Requirements Document (CRD)* (DOE/RW-0406P) is the top-level system requirements document. This set of documents establishes the system-level technical requirements to be addressed in the design of the system elements, one of which is Waste Acceptance.

Many of the technical requirements for the CRWMS are documented in the *Nuclear Waste Policy Act of 1982 (NWPAA)* and in a variety of Federal regulations, Department of Energy (DOE) directives and orders, and other Government documents. The CRD establishes the basis for technical requirements for the design and engineering of the CRWMS by summarizing source documentation that must be addressed and by defining the requirements necessary to accomplish the CRWMS mission (See CRD Section 1.2.1 for a detailed technical baseline description). The CRD also defines the CRWMS by identifying top-level functions for each element, defining the top-level system architecture of the CRWMS, and by allocating the functions and requirements to the architectural elements of the system, including Waste Acceptance. In doing so, the CRD establishes the basis for the requirements to be addressed and expanded in the WA-SRD and in the system requirements documents for the other elements.

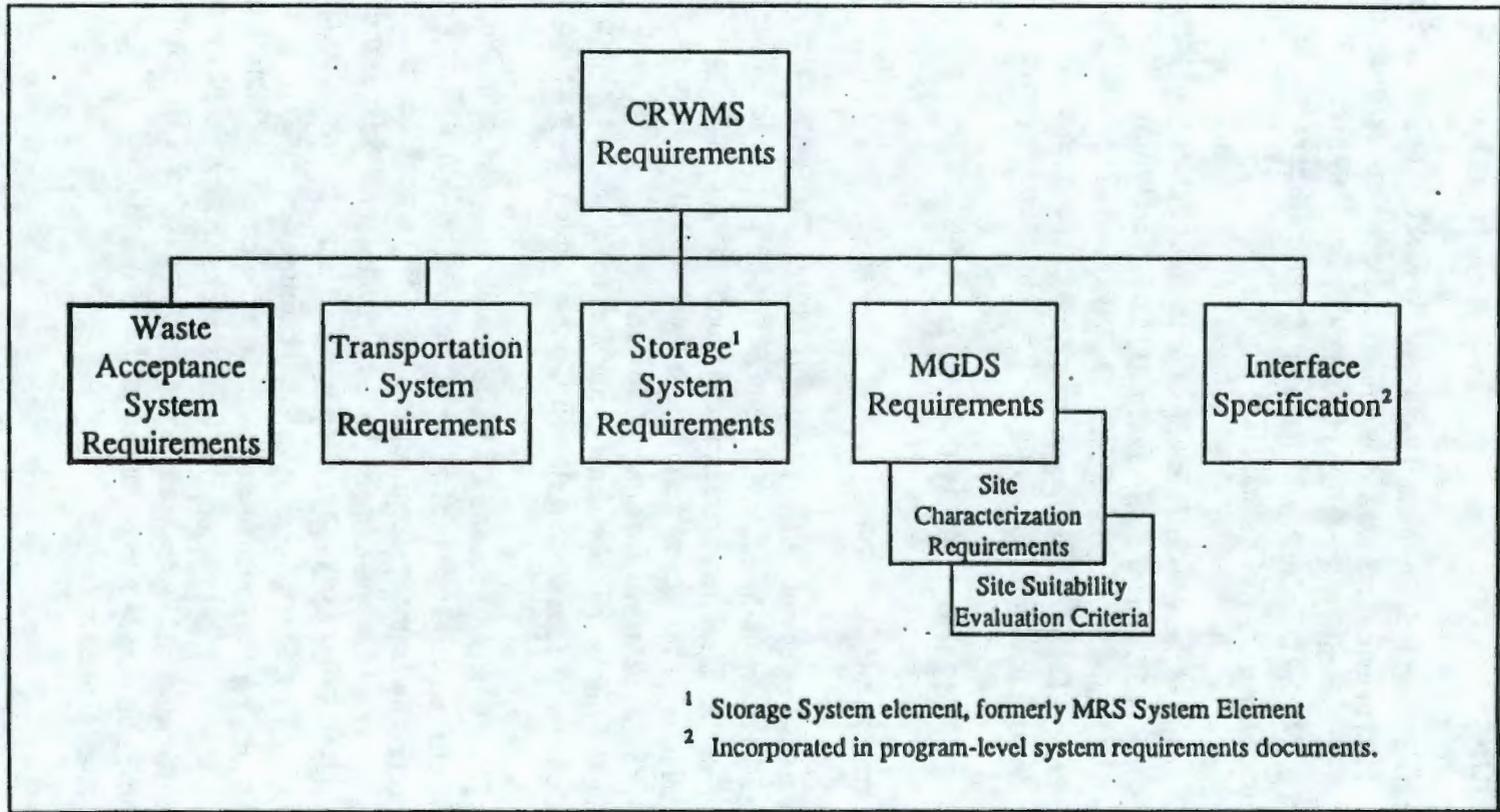


Figure 1-1. Program-level System Requirements Documents

1.2.2 Purpose of WA-SRD

The purpose of this document is to define the system-level requirements for the Waste Acceptance System Element (WA) consistent with the CRD. The document presents an overall description of WA, its functions, its segments, and the requirements allocated to the segments. The system-level interfaces with WA, and the requirements allocated to those interfaces, are also identified.

1.3 CRWMS/WA OVERVIEW

The CRWMS is composed of four system elements. These elements, as identified in the CRD, are Waste Acceptance, Transportation, Storage, and the Mined Geologic Disposal System (MGDS). Separate system-level requirements documents are written for each system element.

While WA is defined as a system element within the CRWMS technical baseline, it is not required to physically handle nuclear waste for transport, storage, or disposal. WA administers the transfer of waste title from the Purchasers/Producers into the CRWMS and maintains material control and accountability of the waste accepted into the CRWMS.

1.3.1 WA Mission

The mission of WA is to manage the acceptance of SNF and HLW into the CRWMS from the Purchasers/Producers of such waste and to account for the inventory of the waste in the CRWMS.

1.3.2 WA Background

The NWPA assigned DOE the responsibility for managing the disposal of SNF and HLW of domestic origin. The process and the schedule for this program were specified initially in the NWPA. Additionally, a Presidential Memorandum dated April 30, 1985, stated that there was no compelling reason to build a separate repository for defense HLW; therefore, the waste will be emplaced in a civilian geologic repository. In the *Nuclear Waste Policy Amendments Act* (1987) (NWPAA), Yucca Mountain, Nevada, was designated for characterization as the candidate site for a geologic repository.

The NWPA defines SNF as the fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing. As used in this document, SNF is defined to include the nonfuel components and hardware as identified in 10CFR961. HLW is defined as the highly radioactive material resulting from the reprocessing of SNF. This includes liquid waste produced directly in reprocessing, any solid material derived from such liquid waste that contains fission products in sufficient concentrations, and other highly radioactive material that has been determined by the Nuclear Regulatory Commission, consistent with the law, to require permanent isolation. As used in this document, HLW is defined to include commercial and defense HLW. The CRWMS will accept both SNF and solidified HLW. In addition, it is the Department's intent to use as a planning basis the placement of some or all DOE-owned SNF in the first geologic repository. However, requirements for such waste are still under development and have not been implemented in this document. Incorporation of DOE SNF

- requirements into the Program baseline will be based on approval of a separate Baseline Change Proposal. Note that the 10CFR60 definition of HLW includes SNF.
- In the NWPA, Congress identified that long-term storage of SNF in Monitored Retrievable Storage (MRS) facilities is a safe and reliable option for management of SNF. In the NWPA, Congress authorized the Secretary of Energy to site, construct, and operate one MRS facility, and as stated in 10CFR72, the MRS facility will have an initial 40-year license term with the option for renewal by the Nuclear Regulatory Commission (NRC). The MRS facility, if built, will provide temporary storage of SNF until the SNF is shipped to the geologic repository for permanent disposal. HLW will be shipped from the Producer sites directly to the geologic repository.

1.3.3 WA Functions

The following list represents the decomposition of the primary function of WA which is to Accept Waste. These functions are further decomposed in Section 3.1 and described in Appendix A. The *Physical System Requirements-Accept Waste* document (DOE/RW-0369) served as a reference for establishing these functions:

- A. **Define Waste Acceptance Criteria.** Determine the conditions necessary to be met by the SNF/HLW, in order for DOE to be able to accept it for disposal including defining standard and nonstandard waste forms.
- B. **Establish Contracts/Agreements.** Develop, execute, and maintain written agreements between DOE and Purchasers/Producers that include terms, conditions, and criteria for waste acceptance and related services, and responsibilities of each party.
- C. **Plan for Waste Acceptance.** Establish and provide the data on SNF and HLW characteristics and the Purchasers/Producers site capabilities and requirements, as well as the CRWMS capabilities and requirements. Sub-functions include: Allocate Waste System Capacity; Identify Waste Location/Characteristics; Define Site Interface Capabilities; and Schedule WA Preparations (e.g. APR, ACR, DCS, and FDS).
- D. **Observe Waste Preparations.** Verify the identified waste to be delivered is in agreement with its corresponding documentation. Verification may be accomplished by certification by the Purchaser/Producer and/or by independent direct methods including observation by DOE representatives.
- E. **Accept Waste Title/Documentation.** Transfer documents between DOE and the Purchaser/Producer at the time of acceptance. Documents include certification of cask transportation readiness. Confirm completeness and compliance, accept title to waste, and turn over to Transportation for off-site removal.
- F. **Resolve Improperly Described Waste.** When a discrepancy is found with the waste after DOE/OCRWM has taken title to it, make arrangements with the Purchaser/Producer to take corrective action and/or appropriate mitigative measures.

- G. Support Fee Collection.** Verify and assess the adequacy of fees paid into the Nuclear Waste Fund (NWF) and recommend adjustment of the fee, if necessary, in order to ensure full cost recovery. Fees for waste disposal services will be paid by the Purchasers/Producers. DOE will regularly review and verify the accuracy of all fees paid into the NWF.
- H. Control and Account for Waste Inventory.** Control, account for, and track the SNF and HLW inventory after it is accepted into the CRWMS and feed any system that tracks material control and accountability (MC&A) data records. Additionally, the SNF and HLW will be tracked prior to acceptance into the CRWMS.

1.3.4 WA Concept

The top-level CRWMS function, "Manage Waste Disposal", means to direct or control any physical activity, operation, or process conducted to accept, and after acceptance, transport, store, or dispose of SNF or HLW. For planning, systems analysis, and conceptual design purposes, Manage Waste Disposal is broken down into four subfunctions that the CRWMS must perform. These are Accept Waste, Transport Waste, Store Waste, and Dispose of Waste. The four corresponding system elements of the CRWMS that have been identified to implement these functions are WA, Transportation, Storage, and MGDS.

Figure 1-2 is a pictorial description of the CRWMS waste flow, which is described in the following paragraphs.

WA has the responsibility of interfacing the CRWMS with the "Purchasers" (owners and generators of SNF from civilian reactors) and "Producers" (owners and generators of HLW). Purchaser is defined in 10CFR961.3 as any person, other than a Federal agency, who is licensed by the Nuclear Regulatory Commission to use a utilization or production facility under the authority of Sections 103 or 104 of the Atomic Energy Act of 1954 (42USC2133, 2134) or who has title to SNF or HLW and who has executed a contract or other contractual agreement with DOE. Purchaser SNF includes Government-owned SNF from commercial industry and civilian development programs. Producer is defined in the CRD as any generator of HLW resulting from atomic energy defense activities or any producer of vitrified commercial HLW.

The WA will maintain records for the waste acceptance capacity, maintain records of the waste locations and characteristics, develop waste acceptance criteria, verify that the waste has been properly described, manage the contract/agreement process with the Purchasers/Producers, develop schedules for waste preparation and waste acceptance activities, verify that the waste is in the proper form for acceptance into the CRWMS, and, finally, accept title to the waste from the Purchasers/Producers. After the waste has been accepted into the CRWMS, it will be delivered by the Transportation system to the MRS facility, if built, or MGDS. WA will maintain material control and accountability for the CRWMS and track the waste inventory through the CRWMS.

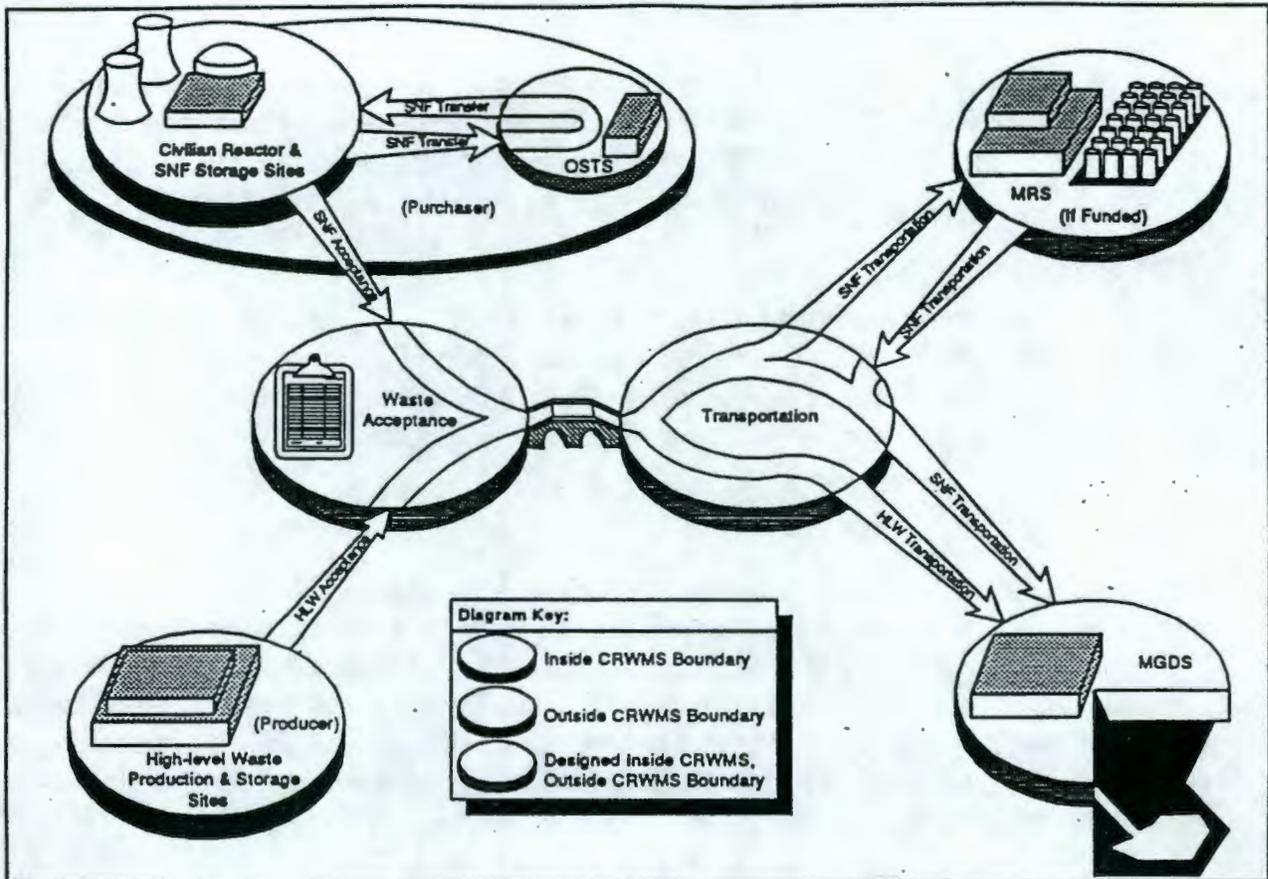


Figure 1-2. CRWMS Waste Flow

1.4 DOCUMENT ORGANIZATION AND DESCRIPTION

1.4.1 Document Organization

The WA-SRD is organized as follows:

- A. **Section 1: Scope.** This section presents the system overview including the WA mission and system concept.
- B. **Section 2: Applicable Documents.** This section identifies documents that are specifically related to various requirements of WA. The documents are included to provide requirement traceability to the source documents and are not to be incorporated as requirements themselves.
- C. **Section 3: Requirements.** This section begins with a system definition and contains all requirements of WA at the system-level except for the preparation for operation requirements in Section 5, and the requirements in the Appendices. Performance characteristics and interface requirements are presented. Documentation and training requirements are addressed. A breakout of requirements for each segment follows these

requirements. Qualification requirements, including requirements for quality assurance, are also provided.

- D. **Section 4: Conformance Verification.** This section addresses conformance verification and includes a cross-reference matrix to define how conformance with each requirement of Sections 3 and 5, and appendices is to be verified.
- E. **Section 5: Preparation for Operations.** This section contains requirements for preparation of the system for waste acceptance and operations.
- F. **Section 6: Notes.** This section contains material that is explanatory in nature and that is nonbinding on WA development.
- G. **Appendices:** Data included in the appendices are binding with regard to WA requirements and may be changed only through the formal document change procedures. The requirements presented in the Appendices are referenced in either Section 3 or 5. This document includes three appendices:
 - Appendix A: WA Function Descriptions
 - Appendix B: WA Allocation of Functions to Architecture
 - Appendix C: WA Allocation of Requirements to Segments

1.4.2 Document Description

The central purpose of the WA-SRD is to establish the system-level technical requirements baseline for WA. As indicated in the outline in Section 1.4.1, Section 3 of the document is the primary location of the requirements, although some appear in Section 5 and the appendices. The requirements and source documents allocated to WA by the CRD are addressed in expanded form. Requirements are included that have been derived to meet the system mission. Section 3.1 establishes the description of the system in terms of functions and segments and the relationship between the two. Sections 3.2 to 3.6 address interface and specialty engineering requirements applicable to WA. Specialty engineering disciplines include system safety, human factors, and security. Section 3.7 contains requirements associated with specific WA segments.

The statement of a requirement is followed by the identification, in square brackets, of the original source document from which the requirement is derived and a trace to the applicable CRD requirement. Additionally, the legal or regulatory basis for requirements is documented on Requirements Backup Sheets (RBS) in the QA record for the WA-SRD; these records are not included within the WA-SRD. These sheets provide a statement of the requirement as it appears in the WA-SRD, a statement of the original source requirement(s) and, where applicable, a rationale for any interpretation of the basic requirement.

A fundamental approach of the WA-SRD is to provide statements of the requirements that give clear engineering direction that are verifiable and do not depend upon the context in which they were originally presented. Inasmuch as the WA is evolving, some of this can only be done on an iterative basis. As a result, some requirements in early versions of requirements documents contain specifics

that are still to be determined and are labeled <TBD>. In other instances; engineering judgment may permit a tentative statement as to information to be used for initial design work. In these instances, the requirement is labeled <TBV> (to be verified).

2. APPLICABLE DOCUMENTS

The documents identified in Sections 2.1 - 2.4 are specifically referred to or have provided the basis for requirements contained in the WA-SRD. These documents are not to be incorporated as requirements themselves.

For each document, the issue in effect on the date of the approval of this requirements document forms a part of the requirements to the degree specified herein. Each lower level design requirements document is to use revisions and issues of source documents that reflect the date of approval of that design requirements document.

Section 2.5 identifies reference materials that have not been used as sources of requirements, but have contributed to the development of the WA-SRD in other ways.

2.1 FEDERAL LAWS AND DOCUMENTS

The following are used as sources of requirements in the WA-SRD.

2.1.1 Laws, Statutes, U. S. Codes, and Treaties

- A. 42USC10101 et.seq. Nuclear Waste Policy Act of 1982 and Nuclear Waste Policy Amendments Act of 1987

2.1.2 Code of Federal Regulations and Executive Orders

- A. 10CFR2 Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders
- B. 10CFR20 Standards for Protection Against Radiation
- C. 10CFR40 Domestic Licensing of Source Material
- D. 10CFR50 Domestic Licensing of Production and Utilization Facilities
- E. 10CFR60 Disposal of High-Level Radioactive Wastes in Geologic Repositories
- F. 10CFR71 Packaging and Transportation of Radioactive Material
- G. 10CFR72 Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste
- H. 10CFR73 Physical Protection of Plants and Materials
- I. 10CFR75 Safeguards on Nuclear Material - Implementation of US/IAEA Agreement

- J. 10CFR707 Workplace Substance Abuse Programs at DOE Sites
- K. 10CFR961 Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste
- L. 29CFR1910 Occupational Safety and Health Standards
- M. 29CFR1926 Safety and Health Regulations for Construction
- N. 29CFR1960 Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters
- O. 30CFR57 Safety and Health Standards--Underground Metal and Nonmetal Mines
- P. 40CFR261 Identification and Listing of Hazardous Waste
- Q. 40CFR262 Standards Applicable to Generators of Hazardous Waste
- R. 41CFR101 Federal Property Management Regulations
- S. 49CFR172 Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
- T. 49CFR173 Shippers--General Requirements for Shipments and Packagings

2.1.3 Other Documents, Orders, and Directives

- A. 52FR31513 Federal Register: Volume 52, Civilian Radioactive Waste Management; Calculating Nuclear Waste Fund Disposal Fees for Department of Energy Defense Program Waste
- B. 55FR22520 Federal Register: Volume 55, Land Disposal Restrictions for Third Third Scheduled Wastes; Determination of BDAT for Certain Mixed Wastes
- C. BCP-00-94-0005 Implementation of the Program Approach
- D. DOE Order 1324.2A Records Disposition
- E. DOE Order 3790.1B Federal Employee Occupational Safety and Health Program
- F. DOE Order 4330.4B Maintenance Management Program
- G. DOE Order 4700.1 Program Management System

H.	DOE Order 5480.28	Natural Phenomena Hazards Mitigation for DOE Facilities	
I.	DOE Order 5481.1B	Safety Analysis and Review System	
J.	DOE Order 6430.1A	General Design Criteria	
K.	DOE/EA-0179	Environmental Assessment Waste Form Selection for Savannah River HLW	
L.	DOE/EH-0256T	DOE Radiological Control Manual	
M.	DOE/RW-0184	Characteristics of Potential Repository Wastes	
N.	DOE/RW-0194P	Records Management Policies and Requirements	
O.	DOE/RW-0316P	Draft Mission Plan Amendment	
P.	DOE/RW-0333P	OCRWM Quality Assurance Requirements and Description	
Q.	DOE/RW-0406P	CRWMS Requirements Document (CRD) (A00000000-00811-1708-00003)	
R.	DOE/RW-0457	Acceptance Priority Ranking & Annual Capacity Report	
S.	DOE/RW-0461	Engineering Drawings and Associated Lists Requirements	
T.	MOA NS/RW	Memorandum of 4/16/92 on Nuclear Safety Requirements	
U.	MOA RW/DP	Memorandum of 7/14/86 of Policy for Shipping Defense High-Level Waste (DHLW) to a Civilian Radioactive Waste Repository	
V.	Presidential Memo	Memorandum of 4/30/85 on Disposal of Defense Waste in a Commercial Repository	
W.	RW-1 Memo	Memorandum of 6/22/95 on Initiation of National Environmental Policy Act requirements for the potential repository at Yucca Mountain, Nevada	
X.	RW-44 Memo	Memorandum of 8/22/95 to J. Carlson (RW-37), on Data Verification Needs for Vitrified High-Level Waste	

2.2 RESERVED

2.3 RESERVED

2.4 NON-GOVERNMENT DOCUMENTS

The following are used as sources of requirements in the WA-SRD.

2.4.1 Reserved

2.4.2 Other Publications

- | | | |
|----|---------------------|--|
| A. | ORNL/Sub/89-SD841/2 | Acceptance of Canisters of High-Level Waste by the Federal Waste Management System |
| B. | UCRL-15673 | Human Factors Design Guidelines for Maintainability of Department of Energy Nuclear Facilities |

2.5 OTHER REFERENCES

In addition to the above source documents, the following program documents were used as reference material for the initial development of this document. These documents have not been used as sources of requirements.

- | | | |
|----|----------------------------|---|
| A. | 10CFR962 | Byproduct Material |
| B. | 40CFR191 | Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level Radioactive Waste and Transuranic Wastes |
| C. | 42USC2001 et.seq. | Atomic Energy Act |
| D. | 42USC6901 et.seq. | Resource Conservation and Recovery Act |
| E. | A00000000-00811-6300-00001 | CRWMS Interface Specification |
| F. | A00000000-01717-0200-00012 | Analysis for Resolution of Issues in TBD/TBR Issue Categories 7, 18, 19 - Design Basis Fuels |
| G. | A00000000-01717-0200-00019 | MPC External Dimensions |
| H. | A00000000-01717-0200-00022 | CRWMS Capabilities Issues |
| I. | A00000000-01717-0200-00023 | January 31, 1998 Issue |
| J. | A00000000-01717-0200-00024 | Throughput Rate Issue |
| K. | A00000000-01717-2200-00001 | Operational Throughput for the Multi-Purpose Canister System |

L.	A00000000-01717-4600-00009	CRWMS M&O Technical Document Preparation Plan (TDPP) for the Revision of System Requirements Documents, Revision 4	
M.	A00000000-01717-6700-00001	Concept of Operations for the Multi-Purpose Canister System	
N.	A20000000-00811-5705-00002	MPC Conceptual Design Report, Revision 0, September 1994	
O.	ANSI N14.5-1987	American National Standard for Leakage Tests on Packages for Shipment of Radioactive Materials	
P.	Compendium Paper	High-Level Nuclear Waste Borosilicate Glass: A Compendium of Characteristics, Draft, September 15, 1992 [Compiled and Edited by: J.C. Cunnane]	
Q.	DOE/RW-0005	Mission Plan for the Civilian Radioactive Waste Management Program	
R.	DOE/RW-0043	Program Management System Manual, Revision 5	
S.	DOE/RW-0051P	System Engineering Management Plan	
T.	DOE/RW-0187	Draft Mission Plan Amendment June 1988	
U.	DOE/RW-0199	Site Characterization Plan	
V.	DOE/RW-0247	Report to Congress on Reassessment of the Civilian Radioactive Waste Management Program	
W.	DOE/RW-0253	Program Cost and Schedule Baseline, Revision 3 September 1992	
X.	DOE/RW-0260	Waste Acceptance Preliminary Specifications for the Defense Waste Processing Facility High-Level Waste Form, Revision 1, July 1989	
Y.	DOE/RW-0261	Waste Acceptance Preliminary Specifications for the West Valley Demonstration Project High-Level Waste Form, Revision 1, January 1990	
Z.	DOE/RW-0270P	Waste Management System Description Document (WMSD), March 1990	

AA.	DOE/RW-0369	Physical System Requirements - Accept Waste, Revision 0, August 31, 1992
AB.	DOE/RW-0381P	Baseline Management Plan
AC.	DOE/RW-0404P	MGDS Requirements Document (MGDS-RD), Revision 02 (B00000000-00811-1708-00002)
AD.	DOE/RW-0420	Storage System Requirements Document (MRS-SRD), Revision 1-DCN01A-i (C00000000-00811-1708-00002)
AE.	DOE/RW-0425	Transportation System Requirements Document (Trans-SRD), Revision 02 (D00000000-00811-1708-00002)
AF.	E00000000-01717-2200-00002	At-Reactor Dry Storage Issues, Revision 1, December 10, 1993
AG.	MTR 10090 (ESD-TR-86-278)	Guidelines for Designing User Interface Software, S.L. Smith and J.N. Mosier
AH.	NRC RG 8.8	NRC Regulatory Guide - Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Is Reasonably Achievable
AI.	NRC RG 8.10	NRC Regulatory Guide - Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable
AJ.	NUREG 1497	Interim Licensing Criteria for Physical Protection of Certain Storage of Spent Fuel
AK.	WHC-EP-0376	Hanford Waste Vitrification Plant Preliminary Waste Form and Canister Description
AL.	WSRC-IM-91-116-0	Defense Waste Processing Facility Waste Form Compliance Plan (U)
AM.	WSRC-TR-90-539	Nuclear Waste Product Consistency Test Method Version 7.0, Savannah River Laboratory [C.M. Jantzen]
AN.	WVDP-185	Waste Form Compliance Plan for the West Valley Demonstration Project High-Level Waste Form

3. REQUIREMENTS

3.1 SYSTEM DEFINITION

Sections 302(a)(1) and 302(a)(5) of the NWPA authorize the Secretary to enter into contracts with the owners and generators of SNF and HLW and take title to their SNF and HLW as expeditiously as practicable upon request, in return for payment of fees.

The functions, function flow diagrams, N-Square diagrams, system description, cross-reference tables of the allocation of functions and requirements to segments, and assumptions to accomplish this task are contained in the following sections.

3.1.1 WA Functions - Accept Waste

With the mission of WA identified as managing the acceptance of SNF and HLW into the CRWMS from the Purchasers/Producers of such waste and to account for the inventory of the waste in the CRWMS, a functional analysis activity was performed to identify the essential functions that the system must perform. *Physical System Requirements - Accept Waste* documented the first iteration of that functional analysis and was used as the primary reference source of the functions for WA identified in this document.

The Accept Waste function includes the activities and requirements for observing and verifying all aspects of the CRWMS readiness to accept waste, provide system-wide safeguards and security coordination, and to account for the inventory of waste in the CRWMS. This includes verification of component availability and delivery schedule, transportation system capacity, and a final verification check that the waste acceptance rate complies with contracts and agreements with Purchaser and Producer. This function is necessary to properly document and receive waste for title transfer, and to ensure the system is prepared to receive and transport waste. Waste Acceptance, in its role as the principal interface between the CRWMS and the Purchaser/Producer, also requests and coordinates the delivery of transportation cask subsystems (at least one of which includes MPCs) to the Purchaser/Producer site from Transportation. Although Waste Acceptance coordinates the activities of Transportation with those of the Purchaser/Producer, Transportation has the responsibility of actually accomplishing transportation to and from the sites.

Functions flowing from the Accept Waste function are listed in Table 3-1 and are depicted in a functional hierarchy in Figure 3-1. The reference numbers following the function title are the function numbers used with the function descriptions contained in Appendix A, Waste Acceptance Function Descriptions. The reference numbers are provided for identification of level of indenture and are not intended to prescribe a sequencing of the identified functions.

Table 3-1. Waste Acceptance Function List

Function Title	Reference Number
Accept Waste	1.1
Define Waste Acceptance Criteria	1.1.1
Establish Contracts/Agreements	1.1.2
Plan for Waste Acceptance	1.1.3
Allocate Waste System Capacity	1.1.3.1
Collect Waste Data	1.1.3.1.1
Rank/Order Waste	1.1.3.1.2
Allocate Annual Capacity to Purchasers/Producers	1.1.3.1.3
Identify Waste Location/Characteristics	1.1.3.2
Evaluate Delivery Commitment Schedule (DCS)	1.1.3.2.1
Evaluate DCS Exchange Requests	1.1.3.2.2
Evaluate Request for Nonstandard Waste Delivery	1.1.3.2.3
Evaluate Final Delivery Schedule (FDS)	1.1.3.2.4
Validate Description of Waste	1.1.3.2.5
Define Site Interface Capabilities	1.1.3.3
Schedule WA Preparations	1.1.3.4
Observe Waste Preparations	1.1.4
Observe Preliminary Waste Preparations	1.1.4.1
Observe Waste Preparations & Loading	1.1.4.1.1
Record Waste Loading	1.1.4.1.2
Verify Waste Description	1.1.4.2
Notify Purchaser/Producer of Improperly Described Waste	1.1.4.3
Accept Waste Title/Documentation	1.1.5
Resolve Improperly Described Waste	1.1.6
Support Fee Collection	1.1.7
Control and Account for Waste Inventory	1.1.8
Perform Material Control	1.1.8.1
Provide Material Accounting	1.1.8.2
Provide Material Tracking	1.1.8.3
MC&A General Management	1.1.8.4

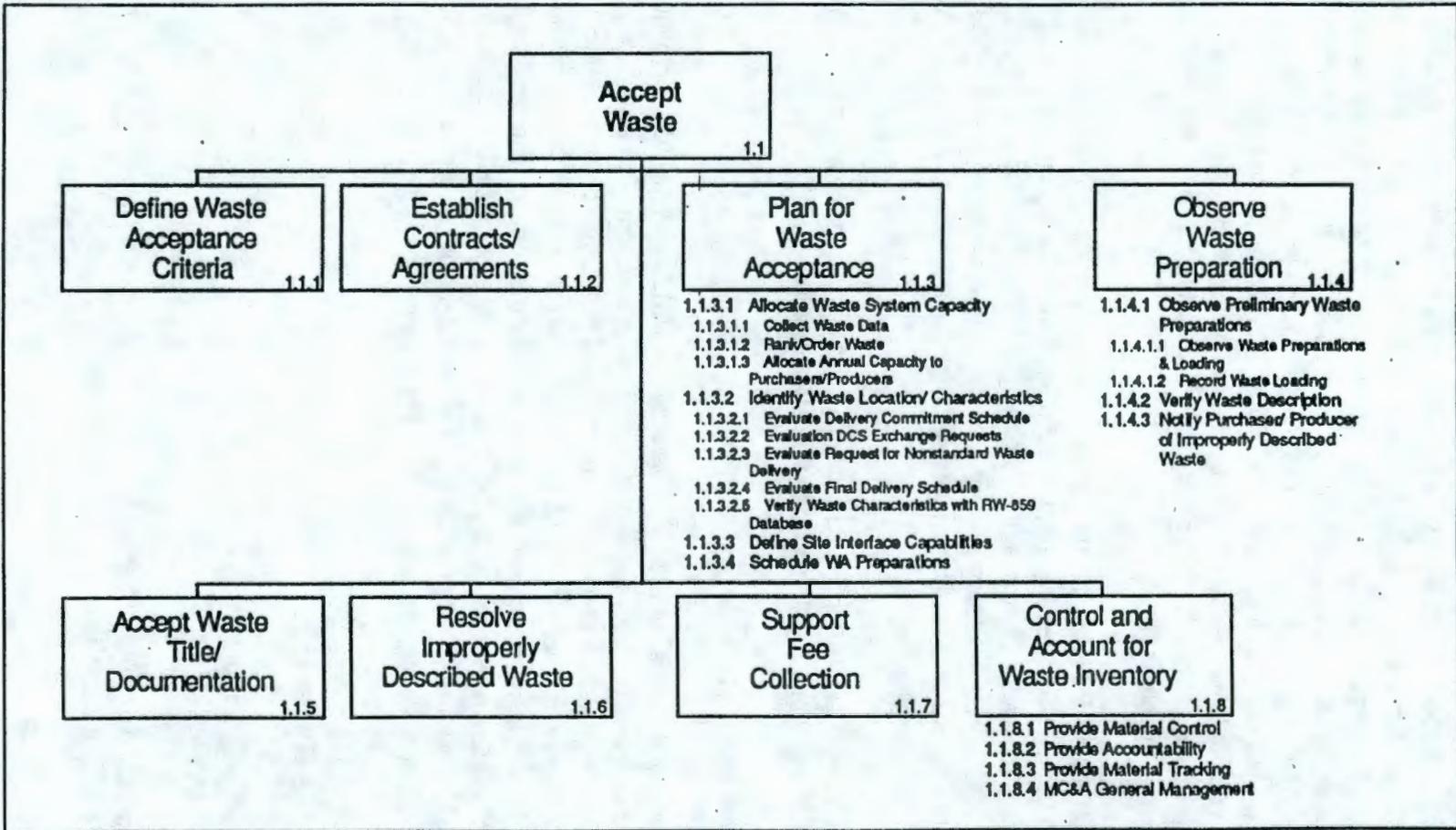


Figure 3-1. Accept Waste Functional Hierarchy

3.1.2 Waste Acceptance Functional Relationships

Functional identification is accomplished in this document by the use of function flow diagrams to depict functional relationships, and by the use of N-Square diagrams to identify inputs and outputs of a function. Throughout the iterative system engineering process, each design phase involves a more progressively detailed functional analysis. The functions identified in this document are the system-level functions that are required to meet the mission. Figure 3-2 shows the function flow diagram for the primary functions of the CRWMS. Figure 3-3 shows the function flow diagram for the third level indenture, which identifies the top-level Waste Acceptance functions. Figure 3-4 shows the N-Square diagram for the primary CRWMS functions. Additional function flow diagrams are contained in Appendix A.

The function flow diagrams identify the primary interactions between the functions in accepting SNF and HLW. On the N-Square diagram, the CRWMS functions appear in the bold outlined boxes on the diagonal. The double-lined boxes on the diagonal identify an interface with a function external to the CRWMS. Inputs to a function appear in the column above and below the function. Outputs from a function appear in the row to the left and right of a function. Figure 3-5 provides a pictorial explanation of N-Square diagrams.

The function flow diagrams are used in allocating functions to appropriate segments described in Section 3.1.3. Section 3.1.4 summarizes this allocation process.

3.1.3 System Description

Waste Acceptance is an integral part of the total CRWMS in which all system elements, segments, and subsystems and facilities are optimized as parts of a single system. WA will interface the CRWMS with the Purchasers and Producers by establishing contracts or agreements to accept waste, define the waste acceptance criteria, develop schedules for waste acceptance, observe preparatory operations during the waste acceptance process, and perform other functions if determined necessary or desirable by future federal mandates, studies, analyses, operational requirements, etc. Figure 3-6 shows the relationship of WA to the CRWMS. The top-level architecture is depicted in Figure 3-7. Waste Acceptance is composed of the following segments:

- A. WA Hardware
- B. WA Equipment
- C. WA Software
- D. WA Operations
- E. WA Facilities.

The segments are described in Section 3.7 of this document. These segments are integrated during operation to ensure compliance with all requirements.

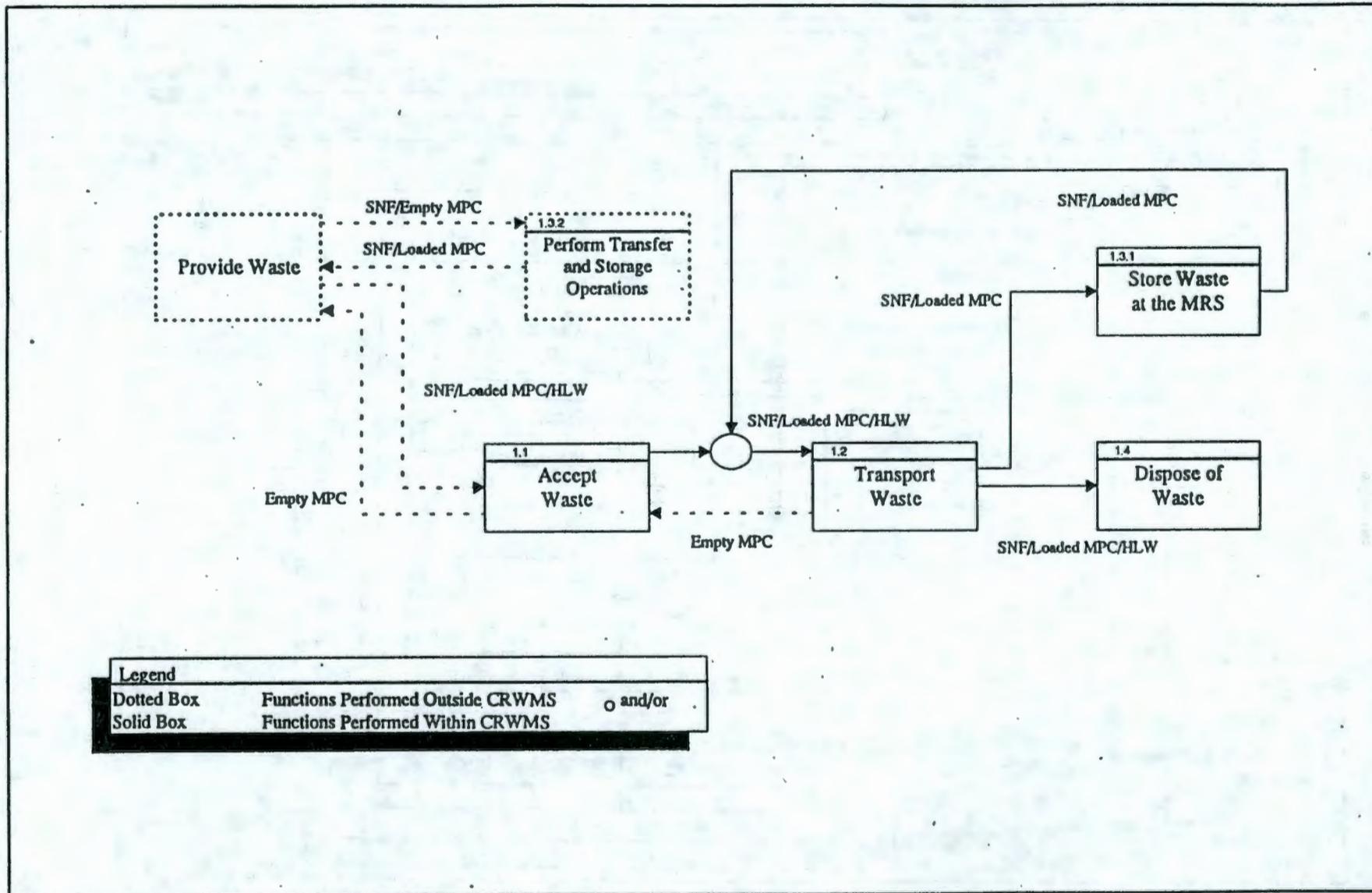


Figure 3-2. 1. Waste Disposal Function Flow Diagram

Provide Private Industry Support	OSTS		New or unloaded Transportation Cask Subsystems Equipment/Services New MPCs Empty MPCs	Utilities Equipment, Parts, and Supplies Vehicles Emergency response		Utilities Equipment, Parts, and Supplies Vehicles Emergency response	
	Provide Waste (Purchaser and Producer)	Contracts/Agreements SNF/HLW Loaded MPCs Fees Information Loaded or unloaded Transportation Cask Subsystems			SNF Empty MPCs Unloaded Transportation Cask Subsystems Verification Documentation		
	Unloaded Transportation Cask Subsystems Information Contracts/Agreements Regulations Empty MPCs	Accept Waste 1.1	Loaded or unloaded Transportation Cask Subsystems Shipping Documents Information SNF/HLW Loaded MPCs	Information		Information	Information
Procurement Contracts		Unloaded Transportation Cask Subsystems Information Empty MPCs	Transport Waste 1.2	Loaded or unloaded Transportation Cask Subsystems Shipping Documents Information SNF Loaded or Empty MPCs		Loaded or unloaded Transportation Cask Subsystem Shipping Documents Information SNF/HLW Loaded or Empty MPCs	Radiation Radionuclides Information Shipments Emissions
Solid Waste Salvage Parts and Equipment Packaged Low-level Radwaste	OSTS Design	Information	Loaded or unloaded Transportation Cask Subsystems Information Loaded MPCs	Store Waste at the MRS 1.3.1		Information	Radiation Radionuclides Emissions (Heat, Liquid Effluent) Information
	SNF Loaded MPCs Loaded Transportation Cask Subsystems	Verification Documentation			Perform Transfer and Storage Operations 1.3.2		
Solid Waste Salvage Parts and Equipment Packaged Low-level Radwaste		Information	Loaded or unloaded Transportation Cask Subsystems Information SNF/HLW Loaded MPCs	Information		Dispose of Waste 1.4	Radiation Radionuclides Emissions (Heat, Liquid Effluent) Information
		Laws Rules Orders Policies	Laws Rules Orders Policies License	Laws Rules Orders Policies License			Affect Environment (Physical, Legal, Public, etc.)

Legend: Dotted Line - Outside CRWMS Boundary Double Box - Functions Performed Outside CRWMS Solid Line - Within CRWMS Boundary Thick Box - Functions Performed Within CRWMS

Figure 3-4. N-Square Chart for 1. Manage Waste Disposal

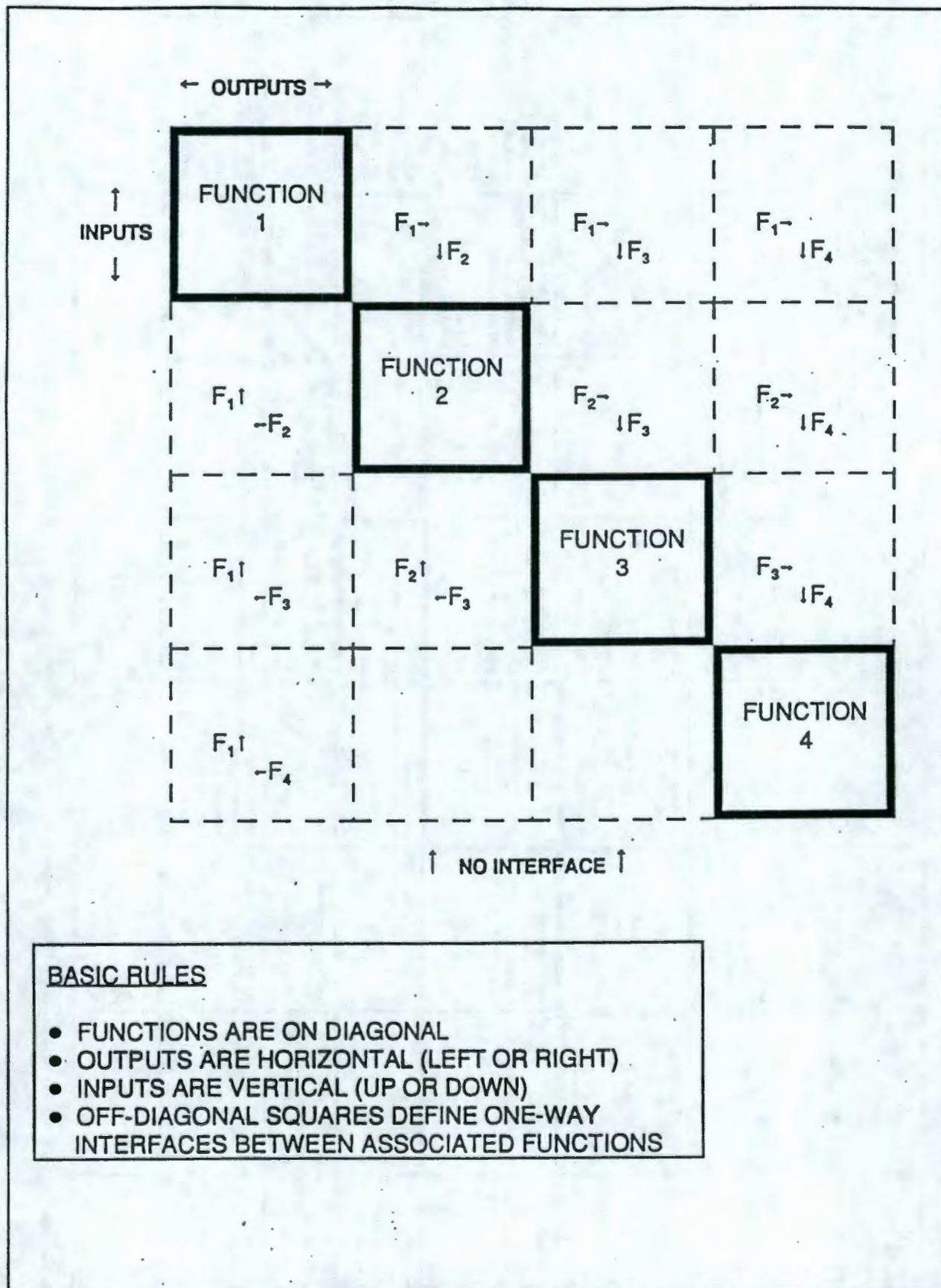


Figure 3-5. N-Square Chart Definition

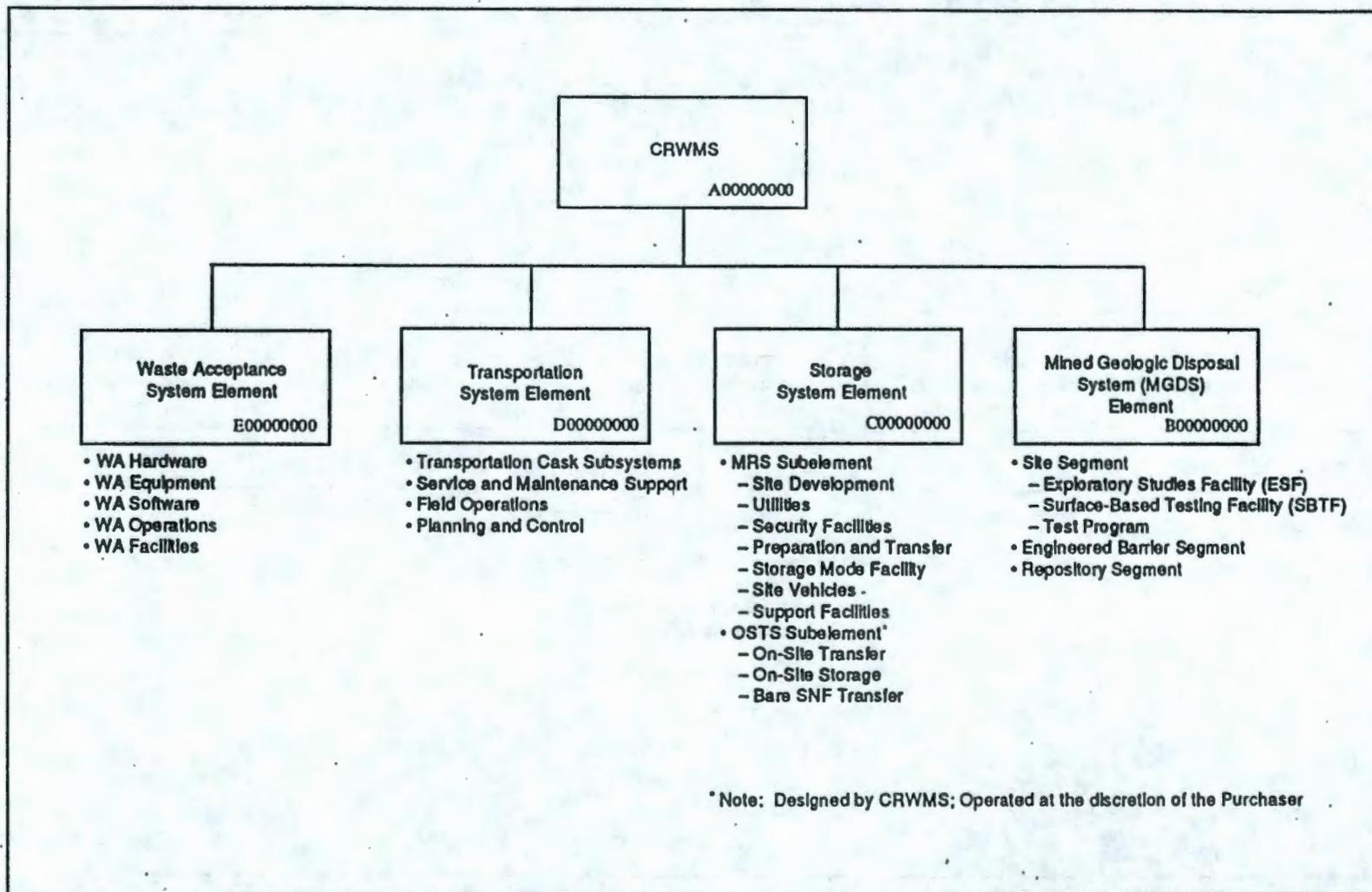


Figure 3-6. CRWMS Architecture

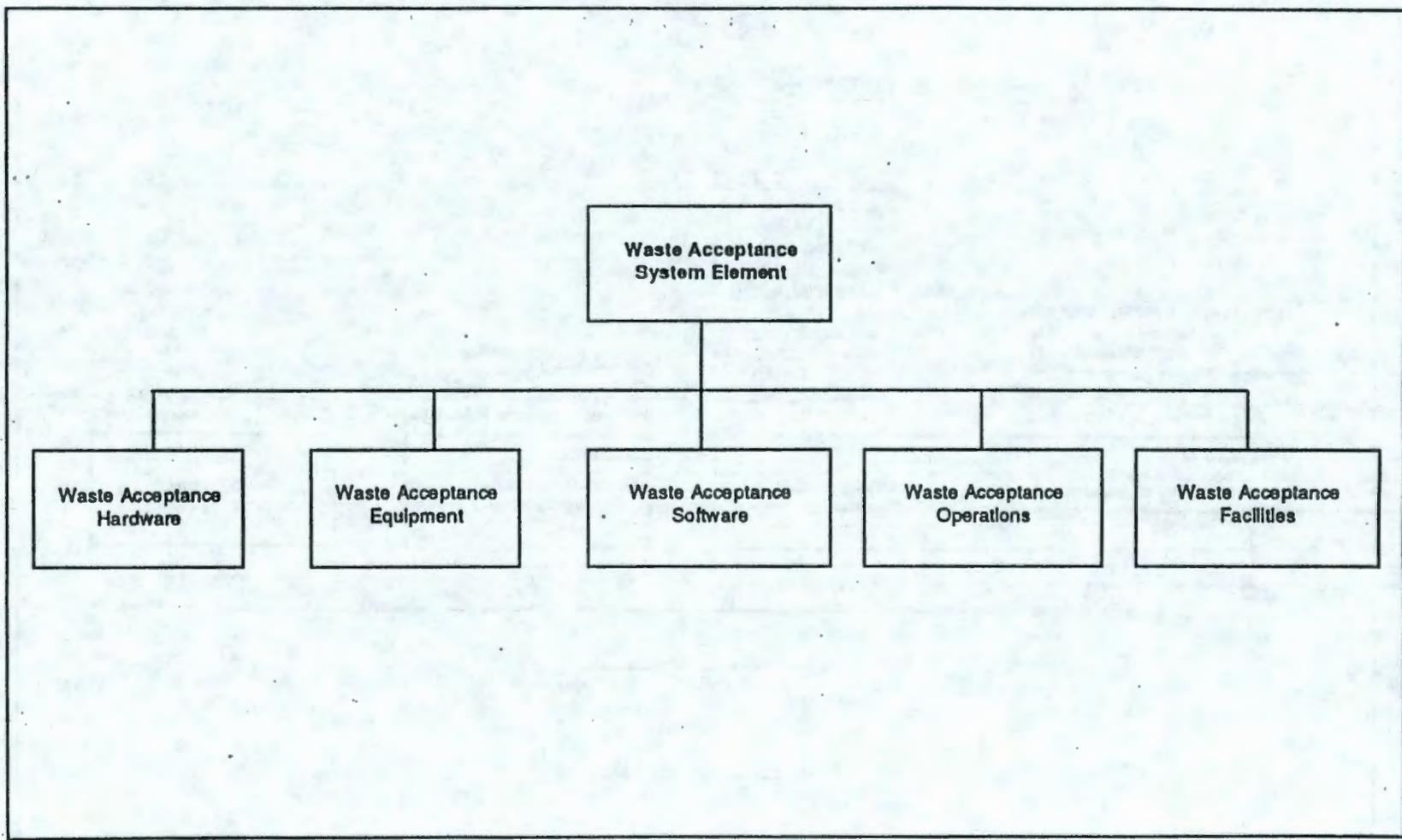


Figure 3-7. WA Architecture

3.1.4 Function and Requirement to Architecture Cross-References

The function flow diagrams are used in defining the segments identified in Section 3.1.3. The segments are items that can accomplish similar functions. The requirements for the functions are reviewed and the segments are defined to meet the requirements. Section 3.7 and Appendix B show the allocation of functions to the segments of Waste Acceptance that perform them. Appendix C shows the allocation of requirements to the segments of Waste Acceptance that must comply with them.

3.1.5 Major Considerations and Assumptions

Generally, the following assumptions are intended to provide guidance to proceed with waste acceptance activities, and are based on informed technical opinion, preliminary study results, and accumulated institutional experience.

- A. DOE, under the Nuclear Waste Policy Act, as amended, will not accept SNF or HLW absent of an operational repository or other facility constructed under the Act.
- B. The assumption used in developing the WA-SRD regarding the extent of any blending of SNF (or HLW) that may be required for thermal load modulation is limited to that blending that can be accomplished through management of the waste stream post-acceptance by the CRWMS. Limited blending of SNF can be accomplished at MRS and MGDS. If significant blending is required, this could have a major impact on MRS and MGDS design and operations, as well as use of MPCs in the system; or may require negotiations with Purchasers, should blending of wastes loaded into MPCs at Purchaser sites be recommended. These issues will be the subject of system studies. If these studies show that changes in system design requirements are necessary, this document will be revised.
- C. The CRWMS design is based on the OCRWM policy that an option to consolidate fuel rods will not be exercised at CRWMS facilities. Fuel consolidated at Purchaser sites will be accepted as 'non-standard' under the contract. SNF fuel assemblies will be accepted intact and loaded into MPCs that will not be reopened under normal conditions. SNF assemblies not shipped in MPCs will be accepted, transported, stored, and disposed of, in an intact configuration. Both bare SNF assemblies and MPCs will be placed in disposal overpacks prior to emplacement.
- D. The first repository is limited by the NWPA 42USC10134(d) to dispose of no more than 70,000 MTU¹ until a second repository is in operation. For planning purposes the first repository will dispose of 63,000 MTU SNF and 7,000 MTU HLW. The method of appointment described in 52FR31513 will be used to determine actual allocations between SNF and HLW. The first repository may not have the capability to dispose of all projected waste quantities.

¹ In this document MTU refers to metric tons of uranium, or heavy metal in spent fuel at the time it was loaded into a reactor, or a quantity of solidified high-level radioactive waste resulting from the reprocessing of such a quantity of spent fuel.

- E. The standard HLW form accepted into the CRWMS will be a vitrified borosilicate glass with a composition like that produced at Savannah River, Hanford, and West Valley.
- F. WA will accept SNF for storage at the MRS facility and SNF and HLW for disposal at the MGDS. Currently, the development of an MRS is not funded and all SNF and HLW is to be shipped directly to the repository. Requirements in this document that address interfaces to an MRS are only applicable if an MRS is built.
- G. Receipt of commercial SNF at the MGDS will commence in the year 2010.
- H. Usage of MPCs for on-site Purchaser storage will commence in the year 1998. The MPC serves as a canister for the SNF within a transportation cask, storage mode, or a waste package for such purposes as confining the waste and maintaining waste geometry.
- I. OCRWM is not obligated to begin waste acceptance starting in 1998 absent an operating facility as described in NWPA.
- J. The MPC will not be certified or licensed as a separate item, but will be addressed in the licensing or certification of other entities.
- K. The Program Approach is that MPCs will be developed in two sizes, so that approximately 90% of Purchaser sites will be accommodated by loading SNF into MPCs before transportation. The remaining 10% will utilize other types of transportation cask subsystems.
- L. The Waste Acceptance System Element will be responsible for the CRWMS system level functional interfaces with the Purchaser/Producer.
- M. Ownership of SNF stored at the Purchaser sites remains with the Purchaser.
- N. DOE (OCRWM) accepts title for SNF (f.o.b. carrier) at the time of physical possession.
- O. Transfer operations at the Purchaser facility are governed by each Purchaser facility license. (Utility licenses are governed by 10CFR50, which is not applicable to the CRWMS.) Some activities related to a cask and MPC that take place in the 10CFR50 licensed fuel building are required by the 10CFR71 (for transportation casks) and 10CFR72 (for storage casks) Certificates of Compliance or license. These activities include the closing and sealing of the cask or MPC. Nothing in this requirements document should be construed to countermand any provision of a Purchaser facility license.
- P. Once CRWMS facilities are complete the Secretary of State, or the Secretary's designee with the NRC, will place the facilities on the State Department's list of eligible facilities, subject to requirements of the US/IAEA agreement.
- Q. The design and certification of the On-Site Transfer and Storage (OSTS) subelement are presumed to be the responsibility of the CRWMS. The procurement and operation are presumed to be the responsibility of the Purchaser. Final determination of licensing,

procurement, and operational responsibilities will be addressed in agreements with the Purchasers that are yet to be established.

- R. The loaded MPC is expected to remain sealed through the normal life cycle. This does not preclude potential requirements for special inspections or addition of filler at the repository.
- S. The primary and normal means of shipping SNF will be in MPC transportation cask subsystems. In the event some Purchasers do not use MPCs, the CRWMS will maintain the capability to transport bare SNF to the MRS facility and the MGDS in (non-MPC) transportation cask subsystems.
- T. Table 3-2 lists the design basis SNF characteristics for the MPC. These characteristics are preliminary and are based on the MPC Conceptual Design Report (Ref. 2.5.N), and include consideration of 80% of the standard fuel available for pickup in the first ten years of CRWMS operation with acceptance rates specified in the Annual Capacity Report.

Table 3-2. SNF Characteristics for MPCs

Characteristics	PWR Assembly	BWR Assembly
Maximum length ¹ (inches)	180	180
Maximum cross-section ¹ (inches)	9 x 9	6 x 6
Reference burnup ² (MWd/MTU)	40,000	40,000
Reference initial enrichment ² (wt% U-235)	3.75	3.75
Minimum decay time (years)	5	5
Minimum decay time for full cask loading (years)	10	10

- ¹ This dimension includes integral nonfuel components.
- ² The combination of reference burnup, initial enrichment, and decay time provides the minimum thermal and radiological conditions to be met in the design.

- U. The waste form requirements are subject to change due to feedback from the NRC during the licensing process and from further site suitability investigations with the potential need for some performance allocation on the waste form in order to demonstrate overall compliance with regulatory requirements. For example, waste packages for permanent disposal must be designed to contribute to compliance with NRC regulations on engineered barrier system performance and releases to the accessible environment and must consider the unique features and properties associated with the form. The current CRWMS strategy for licensing for commercial SNF may take credit for cladding performance and on bounding release rates of radionuclides based on knowledge of the waste form. Until a specific licensing strategy for each waste form is developed, there may be a need to allocate performance to some particular waste form component.

3.2 CHARACTERISTICS

3.2.1 Performance Characteristics

The following are requirements on the general waste form characteristics and acceptance schedules. More specific requirements on the waste form characteristics are provided in Section 3.2.3.1.

3.2.1.1 SNF and HLW Acceptance

- A. WA shall accept all SNF and HLW defined in this document in order to protect the public health and safety and the environment. [NWPA 42USC10131(a)(4)]¹ [CRD 3.2.1.B]
- B. WA shall not accept in excess of 70,000 MTU or equivalent for disposal in the first repository prior to operation of a second repository. [NWPA 42USC10134(d):2s] [CRD 3.3.1.2]
- C. As a planning basis, WA shall not accept in excess of 63,000 MTU in the form of commercial SNF until such time as a second repository is in operation. [BCP-00-94-0005, pg 4] [CRD 3.3.1.2]
- D. For planning purposes WA shall accept up to 7000 MTU commercial and defense HLW. [BCP-00-94-0005, pg 4] [CRD 3.3.1.2]
- E. WA shall accept SNF or HLW in a manner consistent with 10CFR72.44(g). [10CFR72.44(g)] [CRD 3.3.1.2]
- F. Waste acceptance services:
 - 1. shall begin, in return for established fees, after commencement of facility (repository or MRS) operations. [NWPA 42USC10222(a)(5)] [10CFR961.11 Art II:3s] [CRD 3.2.1.1.E.1]
 - 2. shall continue until such time as all defense HLW, and SNF and/or HLW from the civilian nuclear power reactors specified in Appendix A of the standard contract have been disposed. [NWPA 42USC10222(a)(5)] [10CFR961.11 Art II:3s] [CRD 3.2.1.1.E.2]
- G. DOE/OCRWM shall only accept SNF or HLW that does not include components that are regulated as hazardous wastes under the Resources Conservation and Recovery Act for disposal in the first geologic repository. [6/22 memorandum from RW-1 to the Secretary] [CRD 3.2.1.1.G]

3.2.1.2 Reserved

3.2.1.3 Reserved

¹ Indicates the source document for the basis of the requirement.

3.2.1.4 Reserved

3.2.1.5 WA Verification and Acceptance Capabilities

- A. WA shall be capable of scheduling delivery of MPCs as necessary to support acceptance of SNF, and of the required operations to verify loading of MPCs at Purchaser sites, at the rate presented in Table 3-3¹. [10CFR961.11 Art II] [DOE/RW-0457] [BCP-00-94-0005, pg 12] [CRD 3.2.1.C] [CRD 3.2.1.1.E.1]

Table 3-3. Waste Acceptance MPC Verification Capability
(In Metric Tons of Initial Uranium or Equivalent)

Year	Delivery of MPCs
1998	400
1999	600
2000	900
2001	900
2002	900
2003	900
2004	900
2005	900
2006	900
2007	900
2008	900
2009	900
2010	1,400
2011	2,000
2012	2,600
2013	3,000
2014	3,000
2015	3,000
2016	3,000
2017	3,000
2018	3,000
2019	3,000
2020	3,000
2021	3,000
2022	3,000
2023	3,000

¹ Tables 3-3 and 3-4 are not additive. The Waste Acceptance System Element is not required to perform verification and acceptance activities in excess of 3000 MTU per year.

Table 3-3. Waste Acceptance Capability MPC Verification Capability
(In Metric Tons of Initial Uranium or Equivalent)
(continued)

Year	Delivery of MPCs
2024	3,000
2025	3,000
2026	3,000
2027	3,000
2028	3,000
2029	3,000
2030	3,000
2031	3,000
2032	3,000
2033	3,000
2034	3,000
2035	3,000
2036	1,042
2037	0

B. WA shall be capable of scheduling delivery of MPCs as necessary to support acceptance of SNF, and of the required operations to accept SNF and HLW from the Purchaser/Producer for disposal at the MGDS (first repository) at the rate presented in Table 3-4¹. [DOE/RW-0316P, App B, Pg 205-207] [ORNL/Sub/89-SD841/2, Section 4.2, Pg 4-15 and 4-16] [CRD 3.2.1.C]

¹ Tables 3-3 and 3-4 are not additive. The Waste Acceptance system element is not required to perform verification and acceptance activities in excess of 3000 MTU per year.

**Table 3-4. WA SNF and HLW Acceptance Capability
 (In Metric Tons of Initial Uranium or Equivalent)**

Year	SNF	HLW
2010	300	0
2011	600	0
2012	1,200	0
2013	2,000	0
2014	3,000	0
2015	3,000	400
2016	3,000	400
2017	3,000	400
2018	3,000	400
2019	3,000	400
2020	3,000	400
2021	3,000	400
2022	3,000	400
2023	3,000	400
2024	3,000	400
2025	3,000	400
2026	3,000	400
2027	3,000	400
2028	3,000	400
2029	3,000	400
2030	3,000	400
2031	3,000	400
2032	3,000	200
2033	1,900	0
2034	0	0
Total:	63,000	7,000

3.2.2 Radiological Protection

- A. WA shall manage occupational doses for their organization to ensure they are maintained as low as is reasonably achievable (ALARA). NRC Regulatory Guides 8.8 and provide guidance for the implementation of ALARA principles. [10CFR20.1101 [CRD 3.2.2.1.D]

B. Occupational dose limits:

1. WA shall manage the occupational dose to individual adults within their organization, to ensure they are maintained equal to or less than the following dose limits: (1) an annual limit, which is the more limiting of total effective dose equivalent of 5 rems (0.05 Sv), or sum of the deep-dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 50 rems (0.5 Sv); (2) the annual limits to the lens of the eye, to the skin, and to the extremities, which are (a) an eye dose equivalent of 15 rems (0.15 Sv), and (b) a shallow-dose equivalent of 50 rems (0.50 Sv) to the skin or to any extremity. [10CFR20.1201(a)] [CRD 3.2.2.2.A.1]
2. WA shall manage the dose to an embryo/fetus during the entire pregnancy, due to occupational exposure of a declared pregnant woman within their organization, to ensure they are maintained equal to or less than 0.5 rem (5 mSv), as discussed in 10CFR20.1208(a-d). [10CFR20.1208(a)] [CRD.3.2.2.2.A.3]

3.2.3 Interface Requirements

This section addresses interface requirements between the WA system element and organizations external to the CRWMS, including the Purchaser/Producer and with other CRWMS system elements, including Transportation, Storage, and MGDS.

3.2.3.1 Interface with External Organizations

3.2.3.1.1 WA - Producer Interface Requirements

This section contains interface requirements between WA and Producers. WA Operations is the only segment from Waste Acceptance that interfaces with Producers. An estimated 300 canisters of commercial HLW and an estimated 12,700 canisters of defense HLW will be accepted by WA for disposal in the first repository.

3.2.3.1.1.1 HLW Receipt

Until the HLW is accepted by WA, the Producer shall provide and pay the costs of interim storage for their respective sites. [NWPA 42USC10131(a)(5)] [CRD 3.3.1.2]

3.2.3.1.1.2 High-Level Waste Form Criteria

A. Any waste form accepted into the CRWMS for disposal at the MGDS:

1. shall be in solid form and placed in sealed containers. [10CFR60.135(c)(1)] [CRD 3.7.1.2.K.3]
2. shall be consolidated, if in particulate form, (for example, by incorporation into an encapsulating matrix) to limit the availability and generation of particulates. [10CFR60.135(c)(2)] [CRD 3.7.1.2.K.4]

3. shall be reduced to noncombustible form, if combustible, unless it can be demonstrated that a fire involving the waste packages containing combustibles will not adversely affect other waste packages, any structures, systems, and components important to safety, or the repository's ability for waste isolation. [10CFR60.135(c)(3)] [CRD 3.7.1.2.K.5]
- B. The Producer shall ensure that the waste form does not contribute to free liquids in the waste packages to an amount that could compromise the ability of the waste package to achieve the performance objectives related to containment of the waste form or result in spillage and spread of contamination in the event of waste package perforation during the period through permanent closure of the repository. [10CFR60.135(b)(2)] [CRD 3.7.1.2.K.2]
- C. The Producer shall ensure that the waste form does not contain explosive, pyrophoric, or chemically reactive materials in an amount that could compromise the repository's ability for waste isolation or the repository's ability to satisfy the performance objectives. [10CFR60.135(b)(1)] [CRD 3.7.1.2.K.1]

Waste forms that do not meet the criteria specified in parts A, B, and C, will not be accepted into the CRWMS.

3.2.3.1.1.3 HLW Standard Form

- A. The standard HLW form¹ shall be borosilicate glass sealed inside an austenitic stainless steel canister(s) with a concentric neck and lifting flange. [55FR22520 III.A.8.c(2)] [DOE/EA-0179] [CRD 3.7.1.2.K]
- B. The following criteria define the standard HLW form:
 1. Total length shall be 3.000 meters (+0.005, -0.020 m).² [DOE/RW-0184-R1/V1] [CRD 3.3.1.2]
 2. Diameter shall be 61.0 centimeters (+1.5, -1.0 cm).² [DOE/RW-0184-R1/V1] [CRD 3.3.1.2]
 3. Weight shall not exceed 2500 kilograms. [DOE/RW-0184-R1/V1] [CRD 3.3.1.2]
 4. Fill height shall be equivalent to at least 80% of the volume of the empty canister. [DOE/RW-0184-R1/V1] [CRD 3.3.1.2]
 5. Total heat generation rate shall not exceed 1500 watts per canister at the year of shipment. [DOE/RW-0184-R1/V1] [CRD 3.3.1.2]

¹ Other standard HLW forms will be described in subsequent revisions of the WA-SRD.

² The minimum dimension may be measured prior to filling.

6. Temperature shall not have exceeded 400°C during storage to ensure the glass transition temperature has not been exceeded. [10CFR60.135(a)] [CRD 3.3.1.2]
7. Inert cover gas leak rate of the outermost closure shall be less than 1×10^{-4} atm-cc/sec. [10CFR60.135(b)(3)] [10CFR60.135(c)(1)] [CRD 3.3.1.2]
8. Canister shall be labeled with a unique alphanumeric identifier as described in section 3.2.3.1.1.17. [10CFR60.135(b)(4)] [CRD 3.3.1.2]
9. The concentration of plutonium in each canister shall be less than 2500 grams/cubic meter. [DOE Memo from L. Desell (RW-44) to J. Carlson (RW-37), 8/22/95] [CRD 3.3.1.2]

3.2.3.1.1.4 HLW Nonconforming Form

The nonconforming canistered HLW form shall be any HLW that does not conform with the HLW characteristics in Sections 3.2.3.1.1.3 and 3.2.3.1.1.6 through 3.2.3.1.1.20. [] [CRD 3.3.1.2]

The requirements for acceptance of nonconforming canistered HLW are described in Sections 3.2.3.1.1.24.B and 3.2.3.1.1.34.

3.2.3.1.1.5 HLW Nonstandard Form

The nonstandard HLW form shall be any HLW with nonconforming conditions that have been reviewed and deemed acceptable into the CRWMS. Nonstandard HLW may be in a condition which requires special handling. [CRD 3.3.1.2]

The requirements for acceptance of nonstandard HLW are described in Sections 3.2.3.1.1.24.A.

3.2.3.1.1.6 Criticality Safety for HLW

- A. The Producer shall design a waste form to ensure that a nuclear criticality accident is not possible unless at least two unlikely, independent, and concurrent or sequential changes have occurred in the conditions essential to nuclear criticality safety. [10CFR60.131(b)(7)] [CRD 3.3.1.2]
- B. The waste form shall be designed for criticality safety under normal and accident conditions. [10CFR60.131(b)(7)] [10CFR71.55] [CRD 3.3.1.2]
- C. The calculated effective multiplication factor (k_{eff}) shall be sufficiently below unity to show at least a 5% margin, after allowance for the bias in the method of calculation and the uncertainty in the experiments used to validate the method of calculation. [10CFR60.131(b)(7)] [10CFR71.55] [CRD 3.3.1.2]

3.2.3.1.1.7 High-Level Waste Form - Material Compatibility

The contents of the canistered waste form shall not lead to internal corrosion of the canister such that there will be an adverse effect on normal handling, during storage, and on abnormal occurrence such

as a canister drop accident after exposure to temperatures up to the glass transition temperature. [10CFR60.135(a)(1)] [10CFR60.135(a)(2)] [CRD 3.3.1.2]

3.2.3.1.1.8 Chemical Composition of HLW

- A. The Producer shall report to DOE/OCRWM the chemical composition and crystalline phase projections for the waste form. [10CFR60.135(a)] [CRD 3.3.1.2]
- B. The Producer shall report to DOE/OCRWM the oxide composition of the waste form for the oxides of elements present in concentrations greater than 0.5% by weight and the estimate of the error of the composition. [10CFR60.135(a)(2)] [CRD 3.3.1.2]

3.2.3.1.1.9 Canister Material and Fabrication Reporting of HLW

The Producer shall report to DOE/OCRWM the ASTM alloy specification (ASTM or other nationally recognized specification) and composition of the fill canister material, secondary canister material, canister label material, and any filler material used for welding, and the method of fabrication of the fill canister and any secondary canister. [10CFR60.135(a)(1)] [CRD 3.3.1.2]

3.2.3.1.1.10 Radionuclide Inventory of HLW

The Producer shall report to DOE/OCRWM the estimated total and individual canister inventory of radionuclides (in Curies) that have half-lives longer than 10 years and that are or will be present in concentrations greater than 0.05% of the total radioactive inventory. The estimates shall be indexed to the years 2015 and 3115. The Producer shall also report the estimate of the uncertainty with the radionuclide inventories. [10CFR60.113] [CRD 3.3.1.2]

3.2.3.1.1.11 HLW Canister After Closure

- A. After closure, the canistered waste form shall not contain free gas other than air, residuals of air, inert cover, and radiogenic gases with an immediate internal gas pressure not to exceed 150 kPa (22 psia) at 25°C. [10CFR60.135(a)(2)] [CRD 3.2.1.1.H]
- B. After closure, the canistered waste form shall not contain detectable amounts of organic materials. [10CFR60.135(a)(2)] [CRD 3.2.1.1.H]

3.2.3.1.1.12 Removable Radioactive Contamination on HLW Canister

- A. The level of non-fixed (removable) radioactive contamination on external surfaces of each canistered waste form should be as low as reasonably achievable. The level of non-fixed radioactive contamination may be determined by wiping an area of 300 cm² of the surface concerned with an absorbent material, using moderate pressure, and measuring the activity on the wiping material. Sufficient measurements must be taken in the most appropriate locations to yield a representative assessment of the non-fixed contamination levels. Other methods of assessment of equal or greater efficiency may be used. At the time of shipment, the non-fixed radioactive contamination on the wiping material shall not exceed 2,200 dpm/100 cm² of canister surface wiped for alpha emitting radionuclides and 22,000

dpm/100 cm² of canister surface wiped for beta and gamma emitting radionuclides. [10CFR20.1101(b)] [CRD 3.2.2.1.D]

- B. The Producer shall inspect the canistered waste form and remove visible waste glass from the exterior surface of the canister prior to shipment. [10CFR71.93(a)] [CRD 3.3.1.2]
- C. The Producer shall report to DOE/OCRWM an estimate of the amount of canister material (particularly wall thickness) removed during decontamination of the canister surface. [10CFR60.135(a)] [CRD 3.2.1.1.H]

3.2.3.1.1.13 HLW Phase Stability and Integrity

- A. The Producer shall ensure the phase structure and composition of the canistered waste form are not degraded after initial cooldown by maintaining the waste form below 400°C to ensure the glass transition temperature is not exceeded. [10CFR60.135(a)] [CRD 3.2.1.1.H]
- B. The Producer shall provide the Time Temperature Transformation diagrams and data for the waste form. [10CFR60.135(a)] [CRD 3.2.1.1.H]

3.2.3.1.1.14 Hazardous Waste Determination for HLW

DOE/OCRWM will only accept HLW that does not include components that are regulated as hazardous wastes under the Resource Conservation and Recovery Act (RCRA) for disposal in the first geologic repository. The following requirements implement the decision documented in a memorandum from RW to Secretary O'Leary on 06/22/95.

- A. The Producer shall determine and report to DOE/OCRWM the presence or absence of any hazardous waste listed in 40CFR261.31 through 261.33, in the waste or in any feed stream proposed for storage or disposal. Any RCRA-listed component in a waste shall require the Producer to petition EPA and receive exemption to delist the waste. [40CFR261.20(b)] [40CFR262.11] [CRD 3.3.11.G]
- B. The Producer shall perform the appropriate tests and procedures as described in 40CFR261.20 through 261.24 using samples from production runs or prototypical specimens to determine if the waste that will be received by DOE/OCRWM for transportation and disposal has hazardous characteristics. Any waste that is shown to have hazardous characteristics shall be treated to remove such characteristics. [40CFR261.20(b)] [40CFR262] [CRD 3.3.11.G]
- C. The Producer shall certify in the Waste Form Qualification Report (WQR) that the waste is not hazardous, including the absence of any listed components. The methods to be used to conduct characteristic testing shall be described in the Waste Form Compliance Plan (WCP) and the results documented in the WQR. Any modification must have prior DOE/OCRWM approval. [40CFR261.20(b)] [40CFR262] [CRD 3.3.11.G]

3.2.3.1.1.15 HLW Consistency Test

- A. The Producer shall demonstrate control of waste form production by comparing production samples or process control information, separately or in combination to the Environmental Assessment (EA) benchmark glass using the Product Consistency Test (PCT) or equivalent. [10CFR60.135(a)] [ASTM C-1285-94] [CRD 3.2.6.1.B] <TBV>
- B. For acceptance, the concentrations of lithium, sodium, and boron in the leachate, after normalization for the concentrations in the glass, shall be less than those of the benchmark glass. [10CFR60.135(a)] [CRD 3.2.1.1.H]

3.2.3.1.1.16 HLW Canister Impact Characteristics

- A. The canistered HLW shall be capable of withstanding a drop of 7 meters onto a flat, essentially unyielding surface without breaching or dispersing radionuclides. [10CFR60.131(b)(2)] [10CFR60.135(b)(3)] [CRD 3.2.6.1.B]
- B. Drop test results shall include information on the measured canister leak rates and canister deformation after the test. [10CFR60.131(b)(2)] [10CFR60.135(b)(3)] [CRD 3.2.6.1.B]

3.2.3.1.1.17 HLW Canister Label Requirements

- A. The canistered waste form label shall be an integral part of the canister (e.g., embossed) and remain legible until the time it reaches the MGDS. This method will also assist in maintaining the label legible at least to the end of the period of retrievability at the MGDS. [10CFR60.135(b)(4)] [DOE 6430.1A 1300-12.4.11] [CRD 3.3.1.2]
- B. The canistered waste form label shall have a unique alphanumeric identifier and this identifier must appear on all documentation pertinent to that particular canister. [10CFR60.135(b)(4)] [DOE 6430.1A 1300-12.4.11] [CRD 3.3.1.2]
- C. The canistered waste form label shall not impair the integrity of the canister. [10CFR60.135(a)] [DOE 6430.1A 1300-12.4.11] [CRD 3.2.1.1.H]
- D. The canistered waste form label shall be a material compatible with the canistered material and the waste package material. [10CFR60.135(b)(4)] [DOE 6430.1A 1300-12.4.11] [CRD 3.3.1.2]
- E. The canistered waste form label shall be visible from the top and side of the canister. [10CFR60.135(b)(4)] [DOE 6430.1A 1300-12.4.11] [CRD 3.3.1.2]
- F. The canistered waste form label shall not cause the dimensional limits to be exceeded. [10CFR60.135(b)(4)] [DOE 6430.1A 1300-12.4.11] [CRD 3.3.1.2]

3.2.3.1.1.18 HLW Canister Handling Features

The following requirements pertain to the grapple used in the handling of the standard HLW canister that includes a concentric neck and lifting flange. (see Section 3.2.3.1.1.3.B for dimensions)

- A. The Producer shall provide a grapple design suitable for use in loading or unloading a transportation cask with a standard HLW canister. [10CFR60.135(a)(1)] [10CFR60.135(b)(3)] [CRD 3.3.1.2]
- B. The grapple, when attached to the hoist and engaged with the flange, shall be capable of moving the canistered waste form in the vertical direction. [10CFR60.135(a)(1)] [10CFR60.135(b)(3)] [CRD 3.3.1.2]
- C. The grapple shall be capable of being remotely engaged with and remotely disengaged from the HLW canister flange. [10CFR60.135(a)(1)] [10CFR60.135(b)(3)] [CRD 3.3.1.2]
- D. The grapple shall be capable of being engaged or disengaged while remaining within the projected diameter of the waste form canister. [10CFR60.135(a)(1)] [10CFR60.135(b)(3)] [CRD 3.3.1.2]
- E. The grapple shall include features that prevent inadvertent release of a suspended canistered waste form. [10CFR60.135(a)(1)] [10CFR60.135(b)(3)] [CRD 3.3.1.2]

3.2.3.1.19 HLW Form Dose Rate at Shipment

The canistered waste form shall not exceed a maximum surface gamma dose rate of 10^5 rem/hr and a maximum neutron dose rate of 10 rem/hr, at the time of shipment. The dose rate may either be measured or calculated from a radionuclide content. [10CFR60.21(c)(1)(ii)(F)(5)] [CRD 3.3.1.2]

3.2.3.1.120 HLW Form Condition at Delivery

At time of delivery, the HLW form shall stand upright without support on a flat horizontal surface and properly fit into a right-circular, cylindrical cavity (64 cm diameter and 3.01 m length). [10CFR60.21(c)(1)(ii)(F)(5)] [CRD 3.3.1.2]

3.2.3.1.121 Records for HLW

3.2.3.1.121.1 General Requirements

- A. The Producer shall submit documentation to DOE/OCRWM to demonstrate compliance of the HLW form with this WA-SRD in accordance with the requirements of OCRWM QARD section 17. As a minimum, this documentation includes a Waste Form Compliance Plan, a Waste Form Qualification Report, Production Records, and Storage and Shipping Records. [QARD (DOE/RW-0333P) App A] [CRD 3.3.1.2]
- B. DOE-EM, as the cognizant organization within DOE for HLW form production, shall produce waste form production specifications, which describe the form and content to demonstrate compliance with the WA-SRD. [QARD (DOE/RW-0333P) App A] [CRD 3.3.1.2]

3.2.3.1.1.21.2 Waste Form Compliance Plan

The WCP shall describe the Producer plan for demonstrating compliance with each requirement in the WA-SRD, including a description of tests, analyses, and process controls to be performed by the Producer. The WCP also identifies records that will be provided as evidence of compliance. [QARD (DOE/RW-0333P)] [CRD 3.3.1.2]

3.2.3.1.1.21.3 Waste Form Qualification Report

The WQR shall compile the results from waste form testing and analysis to demonstrate the ability of the Producer to comply with the WA-SRD. [QARD (DOE/RW-0333P)] [CRD 3.3.1.2]

3.2.3.1.1.21.4 Production Record for HLW

The Production Records shall describe the actual canistered waste form. [QARD (DOE/RW-0333P)] [CRD 3.3.1.2]

3.2.3.1.1.21.5 Storage and Shipping Record for HLW

The Storage and Shipping Record shall describe the physical attributes of each canistered waste form and identify any unexpected events, such as thermal excursions, which have occurred during storage. [QARD (DOE/RW-0333P)] [CRD 3.3.1.2]

3.2.3.1.1.22 HLW Annual Report

Producer shall provide annual reports of waste generation and projections of quantities of vitrified HLW requiring disposal. [CRD 3.3.1.2]

3.2.3.1.1.23 Agreements for HLW

In accordance with NWPA, the Secretary is authorized to enter into contracts with any person who generates or holds title to radioactive waste of domestic origin for the acceptance of title, subsequent transportation, and disposal of such waste.

Note: For the purposes of this section (3.2.3.1.1.23), NYSERDA is considered a "Purchaser" for contract/agreement requirements.

DOE-EM, as the cognizant organization within DOE for HLW form production, shall execute with DOE/RW a suitable interagency agreement. Fees paid by Federal agencies are to be equivalent to the fees that would be paid under 10CFR961 if such waste were generated by any other entity. [NWPA 42UCS10222 (b) 4] [NWPA 42UCS10222 (b) 2] [CRD 3.3.1.2]

3.2.3.1.1.24 Request for Nonstandard or Nonconforming HLW Delivery

- A. The Producer shall obtain delivery and procedure confirmation from DOE/RW prior to delivery of nonstandard HLW. DOE/RW will advise the Producer within 60 days after receipt of confirmation request as to the technical feasibility of accepting nonstandard

HLW on the currently agreed to schedule, and any schedule adjustment for such services.
[CRD 3.3.1.2]

- B. The Producer shall submit an action plan for correction or disposition of nonconforming waste for verification and documented approval. The action plan must adequately identify and describe the nonconformance and any action to change or correct the existing nonconformance. The action plan must be signed by authorized personnel/organization.
[QARD (DOE/RW-0333P)] [CRD 3.3.1.2]

3.2.3.1.1.25 Final Description of HLW

Except as otherwise agreed to by DOE/RW, the Producer shall describe in writing the material in each shipping lot 60 days prior to the scheduled transportation of that shipping lot. [NWPA 42USC10175] [CRD 3.3.1.2]

3.2.3.1.1.26 Shipping Records for HLW

The Producer shall provide written documentation and certification:

- A. Of cask conditions and contents prior to transfer to the receiving party. [10CFR71.5a] [NWPA 42USC10175(a)] [CRD 3.2.2.7]
- B. That the transportation cask subsystem has been packaged to meet DOE, DOT, and NRC requirements, and to transfer care, custody and control of the shipment. [NWPA 42USC1057(a)1] [CRD 3.2.2.7]
- C. Of the activity in terms of the appropriate SI units (the International System of units, e.g. Becquerel, Terabecquerel, etc.) contained in each shipping package and the name of each radionuclide in each shipping package in accordance with 49CFR172.203(d)(1) and (4). [49CFR172.203(d)(1)] [49CFR172.203(d)(4)] [CRD 3.3.1.2]
- D. That the standard HLW did not exceed 400°C to ensure the glass transition temperature was not exceeded. [10CFR60.135(a)] [CRD 3.3.1.2]
- E. Of the hazardous waste classification for land disposal. [40CFR262.20(a)] [40CFR262.41(a)] [CRD 3.3.11.G]

3.2.3.1.1.27 Routine Determinations for HLW

Prior to each shipment of licensed material, the Producer shall ensure the transportation cask with its contents satisfies the applicable requirements of 10CFR71.87. [10CFR71.87] [49CFR173.1(a)(2)] [CRD 3.2.2.7]

3.2.3.1.1.28 Title Transfer for HLW

- A. The Producer shall provide a designated facility adjacent to their HLW facility for HLW title transfer and acceptance. [MOA between DP and RW, 1986 (DHLW)] [Derived (CHLW)] [CRD 3.3.1.2]<TBV>

- B. The Producer shall provide the HLW loaded and prepared for shipment. [MOA between DP and RW, 1986] [CRD 3.3.1.2]
- C. The Producer shall have no claim against DOE/RW or the Government for such HLW to which DOE/RW has taken title. [NWSA 42USC10143] [CRD 3.3.1.2]

3.2.3.1.1.29 Observation by DOE for HLW

The Producer shall allow a representative(s) that DOE/OCRWM designates access to the site for observation of preparatory activities. [CRD 3.3.1.2]

3.2.3.1.1.30 Notification of Improperly Described HLW Prior to Acceptance into CRWMS

Producer shall not transfer title of improperly described HLW unless DOE/OCRWM agrees to accept title under other arrangements agreed to in writing by the parties. If HLW is determined by WA to be improperly described prior to acceptance by DOE/OCRWM at the Producer site, WA will promptly notify the Producer in writing. DOE/OCRWM reserves the right to refuse to accept improperly described waste. [NWSA 42USC 10143] [CRD 3.3.1.2]

3.2.3.1.1.31 Resolution of Improperly Described HLW After Acceptance into CRWMS

If subsequent to its acceptance, WA finds HLW is improperly described, WA will promptly notify the Producer in writing of such a finding. In this event, the Producer shall provide WA with a proper description within 30 days. In the event that the Producer fails to provide the proper description, DOE may hold in abeyance any and all further deliveries scheduled. [CRD 3.7.1.2.G]

3.2.3.1.1.32 Reserved

3.2.3.1.1.33 HLW Transaction Reporting

A Nuclear Material Transaction Report (DOE/NRC Form-741) shall be completed and distributed by the Producer, whenever HLW is transferred or received into CRWMS. [10CFR72.78] [10CFR75.31] [10CFR75.33(a)] [CRD 3.2.4.3.4.C]

3.2.3.1.1.34 Quality Assurance for HLW

- A. The Producer shall establish, maintain, and execute a quality assurance program satisfying each of the applicable criteria of the DOE OCRWM QARD, and satisfying any specific provisions which are applicable to WA activities as described in this section. [QARD (DOE/RW-0333P)Appendix A.2.1] [10CFR60.150, 60.151, 60.152] [10CFR72.140(b),(c)] [10CFR71.12] [10CFR71.101(b), (c)] [CRD 3.9.A]
- B. The Producer quality assurance program shall cover the activities from waste form development, through qualification, production, and acceptance. [QARD (DOE/RW-0333P)Appendix A.2.1] [10CFR60.150-152] [10CFR72.140(b), (c)] [10CFR71.12] [10CFR71.101(b), (c)] [CRD 3.9.A]

- C. EM/Producer shall prepare and maintain documentation sufficient to demonstrate canistered waste form compliance with the WA-SRD, WCP, and WQR as lifetime QA records. As a minimum, these documents include the WCP, WQR, Production Records, and Storage and Shipping Records. [QARD (DOE/RW-0333P)Appendix A.2.1] [CRD 3.9.A]
- D. Copies of the QA records shall be made available to the Federal Repository Operator at the time the repository is ready to begin accepting canistered waste forms from the Producer. [QARD (DOE/RW-0333P)Appendix A.2.1] [CRD 3.9.A]
- E. Other documentation generated during preparation and implementation of the WCP and WQR shall be collected and maintained as nonpermanent records. [QARD (DOE/RW-0333P)Appendix A.2.1] [10CFR2.1002(b)] [CRD 3.9.A]
- F. The Producer shall handle notification and disposition of nonstandard and nonconforming canisters of HLW in accordance with Section 3.2.3.1.1.24. [QARD (DOE/RW-0333P)Appendix A.2.1] [CRD 3.9.A]

3.2.3.1.1.35 IAEA Safeguards Reporting for HLW

The Producer shall report:

- A. The total and fissile uranium and plutonium content of each canister in grams. [10CFR75.21(a)] [CRD 3.3.1.2]
- B. The concentration of plutonium in grams per cubic meter for each canister. [10CFR75.21(a)] [CRD 3.3.1.2]
- C. The ratio by weight of the total element of the following isotopes: U-233, U-234, U-235, U-236, U-238, Pu-238, Pu-239, Pu-240, Pu-241, and Pu-242. [10CFR75.21(a)] [CRD 3.3.1.2]

3.2.3.1.2 WA - Purchaser Interface Requirements

This section contains interface requirements between WA and Purchasers. WA Operations is the only segment from Waste Acceptance that interfaces with Purchasers. As a planning basis, WA will accept 63,000 MTU of commercial SNF for disposal in the first repository.

3.2.3.1.2.1 Commercial SNF Receipt

Until the SNF is accepted by WA, the Purchaser shall provide and pay the costs of interim storage for their respective sites. [NWPA 42USC10131(a)(5)] [CRD 3.3.1.2]

3.2.3.1.2.2 Criteria for Commercial SNF

- A. Any waste form accepted into the CRWMS for disposal at the MGDS:
 - 1. shall be in solid form. [10CFR60.135(c)(1)] [CRD 3.7.1.2.K.3]

2. shall be consolidated, if in particulate form, (for example, by incorporation into an encapsulating matrix) to limit the availability and generation of particulates. [10CFR60.135(c)(2)] [CRD 3.7.1.2.K.4]
3. shall be reduced to noncombustible form, if combustible, unless it can be demonstrated that a fire involving the waste packages containing combustibles will not adversely affect other waste packages, any structures, systems, and components important to safety, or the repository's ability for waste isolation. [10CFR60.135(c)(3)] [CRD 3.7.1.2.K.5]

Consistent with established agreements, DOE may be responsible for ensuring that certain waste types meet this requirement.

- B. The Purchaser shall ensure that the waste form does not contribute to free liquids in the waste packages to an amount that could compromise the ability of the waste package to achieve the performance objectives related to containment of the waste form or result in spillage and spread of contamination in the event of waste package perforation during the period through permanent repository closure. [10CFR60.135(b)(2)] [CRD 3.7.1.2.K.2]
- C. The Purchaser shall ensure that the waste form does not contain explosive, pyrophoric, or chemically reactive materials in an amount that could compromise the repository's ability for waste isolation or the repository's ability to satisfy the performance objectives. [10CFR60.135(b)(1)] [CRD 3.7.1.2.K.1]

Waste forms that do not meet the criteria specified in parts A, B, and C, will not be accepted into the CRWMS.

3.2.3.1.2.3 Standard Commercial SNF

Standard SNF shall meet the criteria specified in 10CFR961.11 Appendix E.B.1 through E.B.5.¹ [10CFR961.11 App E.B.1 through E.B.5] [10CFR961.11 Art VI.A.1(a)] [CRD 3.3.1.2]

3.2.3.1.2.4 Commercial SNF Failed Form

Failed SNF shall meet the criteria specified in 10CFR961.11 Appendix E.B.6. [10CFR961.11 App E.B.6] [10CFR961.11 Art VI.A.1(a)] [CRD 3.3.1.2]

3.2.3.1.2.5 Commercial SNF Nonstandard Form

The nonstandard SNF shall be any SNF that does not fall within the standard or failed SNF description in Sections 3.2.3.1.2.3 and 3.2.3.1.2.4, respectively. [10CFR961.11 App E.A.1(b)] [10CFR961.11 Art VI.A.1(a)] [CRD 3.3.1.2]

The requirements for acceptance of nonstandard SNF are described in Sections 3.2.3.1.2.11.

¹ SNF will be defined in more detail in a subsequent revision of the WA-SRD.

3.2.3.1.2.6 Commercial SNF Data

A. Beginning October 1, 1983, the Purchasers shall provide to DOE, on an annual basis, one of the following:

1. Information on actual discharges, and projected discharges for the next 10 years in the form and content set forth in 10CFR961 Appendix B or
2. Information on the Nuclear Fuel Data Form RW-859 for the next 5 cycles.

The information to be provided should include estimates and projections and are not firm commitments with respect to discharges or deliveries. [10CFR961.11 Art IV.A.1(a)] [CRD 3.3.1.2]

B. Purchasers shall provide to DOE/RW a detailed description of the SNF to be delivered, as specified in 10CFR961.11 Appendix F and promptly advise DOE/RW of any changes in said SNF as soon as they become known. [10CFR961.11 Art VI.A.2(a)] [CRD 3.3.1.2]

3.2.3.1.2.7 Canisters Containing Commercial SNF

A. The Purchaser shall load the canister with SNF in a configuration that complies with written procedures and in compliance with the transportation cask and storage mode Certificates of Compliance. Standard, failed, and nonstandard SNF may be loaded in canisters; however, acceptance of failed and nonstandard SNF is subject to the procedure described in Section 3.2.3.1.2.11. [10CFR71.87(f)] [10CFR72.212(a)] [10CFR961.11 Art VI.A.1] [10CFR961.11 App E.B.1] [CRD 3.2.1.1.C]

B. The Purchaser shall ensure the canister and its contents are protected from damage or degradation that leads to gross SNF cladding ruptures during storage at the Purchaser site. [10CFR72.122(h)(1)] [10CFR72.212(b)(2)] [CRD 3.2.1.1.H]

C. At the time of transport off-site, the Purchaser shall ensure that the canister, for standard SNF, maintains the capability to fit into a right-circular, cylindrical cavity 70.26 inches in diameter and 197 inches in length, and that the canister for nonstandard SNF is capable of fitting into a right-circular cylindrical cavity 70.26 inches in diameter and 218 inches in length. [Derived] [CRD 3.2.1.1.H]

D. The Purchaser shall use an inert gas as the cover gas when filling the canister. [10CFR60.135(a)(2)] [CRD 3.3.1.2]

E. The Purchaser shall ensure that after closure, the canister does not contain or generate free gases other than air, inert cover, and radiogenic gases with an immediate internal gas pressure not to exceed 150 kPa (22 psia). [10CFR60.135(a)(2)] [CRD 3.3.1.2]

3.2.3.1.2.8 Contracts for Commercial SNF

- A. After June 30, 1983, the contract with DOE/OCRWM shall be signed by the date on which the Purchaser commences generation of, or takes title to, such SNF. [10CFR961.2] [CRD 3.3.1.2]
- B. The terms of the contract shall begin at the date of execution and continue until such time DOE has accepted title to all SNF. [10CFR961.11 Art III] [CRD 3.3.1.2]
- C. No SNF shall be disposed of in the CRWMS repository unless the Purchaser has entered into a contract with DOE/OCRWM as specified in the NWSA 42USC10222(b)(2). [NWSA 42USC10222(b)(2)] [CRD 3.3.1.2]

3.2.3.1.2.9 Delivery Commitment Schedules for Commercial SNF

Beginning January 1, 1992, the Purchasers shall submit to DOE the delivery commitment schedules (DCS) for all SNF the Purchasers wish to deliver to DOE beginning 63 months thereafter. The DCS should be in the format set forth in Appendix C of 10CFR961 as provided in OMB approved form number 1901-0260. [10CFR961.11 Art V.B.1] [CRD 3.3.1.2]

3.2.3.1.2.10 Exchange Requests for Commercial SNF

Not less than 6 months prior to the delivery date specified in the Purchaser approved DCS, the Purchaser shall be allowed to submit to DOE an exchange request as specified in 10CFR961.11 Article V.E. [10CFR961.11 Art V.E] [CRD 3.3.1.2]

3.2.3.1.2.11 Request for Nonstandard or Failed Commercial SNF Delivery

The Purchaser shall obtain delivery and procedure confirmation from DOE prior to delivery of failed SNF and nonstandard SNF. DOE will advise Purchaser within 60 days after receipt of confirmation request as to the technical feasibility of accepting of the nonstandard SNF on the currently agreed to schedule, and any schedule adjustment for such services. [10CFR961.11 Art VI.A.2(b)] [CRD 3.3.1.2]

3.2.3.1.2.12 Final Delivery Schedules for Commercial SNF

- A. The Purchaser shall submit to DOE/RW, not less than 12 months prior to delivery, final delivery schedule(s) (FDS) as specified in 10CFR961.11 Appendix D. [10CFR961.11 Art V.C] [CRD 3.3.1.2]
- B. DOE/RW will approve or disapprove an FDS within 45 days after receipt. In the event of disapproval, DOE will advise the Purchaser in writing of the reasons, and request a revised schedule. The Purchaser shall submit the revised schedule within 30 days after receipt of DOE's notice of disapproval. [10CFR961.11 Art V.C] [CRD 3.3.1.2]

3.2.3.1.2.13 Final Description for Commercial SNF

Except as otherwise agreed to by DOE, the Purchaser shall describe in writing the material in each shipping lot 60 days prior to the scheduled transportation of that shipping lot. [10CFR961.11 Art IV.A.2(b)] [CRD 3.3.1.2]

3.2.3.1.2.14 Waste Fund Management

A. Effective April 7, 1983, Purchaser shall be charged a fee in the amount of 1.0 mill per kilowatt hour (1 mill/kWh) electricity generated and sold. [10CFR961.11 Art VIII.A.1] [CRD 3.3.1.2]

B. Payment shall be made as specified in 10CFR961.11 Article VIII.B. [10CFR961.11 Art VIII.B] [CRD 3.3.1.2]

C. The Purchaser shall be charged a fee, as specified in 10CFR961 Article VII.B, for SNF produced from the generation of electricity in a civilian nuclear power reactor prior to April 7, 1983. [10CFR961.11 Art VII.B.2] [CRD 3.3.1.2]

3.2.3.1.2.15 Shipping Records for Commercial SNF

The Purchaser shall provide written documentation and certification:

A. Of cask conditions and contents (including but not limited to SNF matrixed to the unique MPC identifier) prior to transfer to the receiving party in accordance with 10CFR961.11 Article VI.B.2. [10CFR71.5a] [10CFR961.11 Art VI.B.2] [49CFR173.1(a)(2)] [CRD 3.2.2.7]

B. That the transportation cask subsystem (including the MPC, if applicable) has been packaged to meet DOE, DOT, and NRC requirements, and to transfer care, custody and control of the shipment. [10CFR40.13(c)(6)] [10CFR71.5a] [10CFR961.11 Art VI.B.2] [10CFR961.11 App E.B.6(c)] [49CFR172.204(a)] [49CFR173.1(a)(2)] [CRD 3.2.2.7]

C. Of the total activity (in SI units) contained in each shipping package and the name of the radionuclides in each shipping package in accordance with 49CFR172.203(d)(1) and (4). [49CFR172.203(d)(1)] [49CFR172.203(d)(4)] [CRD 3.3.1.2]

D. Of the sealing and inspection of the MPC welds. [10CFR60.135(a)] [CRD 3.3.1.2]

3.2.3.1.2.16 Routine Determinations for Commercial SNF

Prior to each shipment of licensed material, the Purchaser shall ensure the transportation cask with its contents satisfies the cask certificate of compliance. [10CFR71.87] [CRD 3.2.2.7]

3.2.3.1.2.17 Title Transfer for Commercial SNF

The Purchaser shall have no claim against DOE or the Government for SNF to which DOE has taken title. [10CFR961.11 Art VII] [CRD 3.3.1.2]

3.2.3.1.2.18 Observation by DOE for Commercial SNF

The Purchaser shall allow a representative(s) that DOE/OCRWM designates access to the site for observation and verification of preparatory activities, such as verification of SNF description, shipping records, and condition of transportation casks. [10CFR961.11 Art IV.A.2(a)] [CRD 3.3.1.2]

3.2.3.1.2.19 Notification of Improperly Described Commercial SNF Prior to Acceptance into CRWMS

The Purchaser shall not transfer title of improperly described SNF unless DOE/OCRWM agrees to accept title under other arrangements agreed to in writing by the parties. If SNF is determined by WA to be improperly described prior to acceptance by DOE/OCRWM at the Purchaser site, WA will promptly notify the Purchaser in writing. DOE/OCRWM reserves the right to refuse to accept improperly described waste. [10CFR961.11 Art VI.B.3(a)] [CRD 3.3.1.2]

3.2.3.1.2.20 Resolution of Improperly Described Commercial SNF After Acceptance into CRWMS

If subsequent to its acceptance, WA finds SNF is improperly described, WA will promptly notify the Purchaser in writing of such a finding. In this event, the Purchaser shall provide WA with a proper description within 30 days. In the event that the Purchaser fails to provide the proper description, DOE may hold in abeyance any and all further deliveries scheduled. [10CFR961.11 Art VI.B.3(b)] [CRD 3.7.1.2.G]

3.2.3.1.2.21 Initial Inventory Reporting for Commercial SNF

A Material Balance Report (DOE/NRC Form-742) shall be completed and distributed reporting initial inventory within 30 days after March 31 and September 30 of each year. [10CFR72.76] [10CFR75.31] [10CFR75.32] [CRD 3.2.4.3.4.C]

3.2.3.1.2.22 Transaction Reporting for Commercial SNF

A Nuclear Material Transaction Report (DOE/NRC Form-741) shall be completed and distributed whenever SNF is transferred or received into CRWMS. [10CFR72.78] [10CFR75.31] [10CFR75.33(a)] [CRD 3.2.4.3.4.C]

3.2.3.1.2.23 Quality Assurance for Commercial SNF

- A. The Purchaser shall handle notification and disposition of nonstandard or failed SNF in accordance with Section 3.2.3.1.2.11. [10CFR961.11 Art VI.A.2(b)] [QARD (DOE/RW-0333P) App A] [CRD 3.9.A]
- B. The Purchaser shall have a quality assurance program approved by the Nuclear Regulatory Commission that satisfies the criteria in 10CFR50 Appendix B or other appropriate regulation. [10CFR50 App B.I:1s-2s] [CRD 3.3.1.2]

3.2.3.2 Interfaces with Other CRWMS Elements

Interface requirements between WA and the other elements of the CRWMS, which include Storage (both the MRS subelement and the OSTS subelement), MGDS, and Transportation are included in this section.

3.2.3.2.1 WA-Storage Interface Requirements

This section contains interface requirements between WA and the Storage system elements. The Storage system element consists of the MRS and the OSTS subelements. The MRS requirements will be applicable only if an MRS is built.

3.2.3.2.1.1 WA-MRS Interface Requirements

The types of interfaces between these two elements reflect transfer of information and compatibility in communications. This information may include but is not limited to the waste description, Acceptance Priority Ranking (APR), Annual Capacity Report (ACR), Delivery Commitment Schedule (DCS), Final Delivery Schedule (FDS), Waste Acceptance Rate (WAR), DCS Exchange Requests, DOE/NRC forms 741&742, and 10CFR961 Appendix F.

Interfacing segments between Waste Acceptance and the MRS are identified with an 'X' in Table 3-5 below. The requirements associated with those interfaces appear in the sections following the table. All other segments have been reviewed and, at this time, determined not to be involved in the WA-MRS interface, as indicated by 'NONE' in the table.

Table 3-5. WA-MRS Interfaces

MRS Facility→ SEGMENTS WA↓	Site Development	MRS Utilities	Security Facilities	Preparation and Transfer	Storage Mode Facility	Site Vehicles	MRS Support Facilities
WA Hardware	NONE	X	NONE	NONE	NONE	NONE	NONE
WA Equipment	NONE	NONE	NONE	NONE	NONE	NONE	NONE
WA Software	NONE	X	NONE	NONE	NONE	NONE	NONE
WA Operations	NONE	NONE	NONE	X	X	NONE	NONE
WA Facilities	NONE	X	NONE	NONE	NONE	NONE	NONE

3.2.3.2.1.1.1 WA Hardware Segment Interface Requirements

3.2.3.2.1.1.1.1 WA Hardware - MRS Utilities Interface

The requirement below pertains to the interface between the WA Hardware segment and the MRS Utilities segment and ensures that the computer hardware used by both WA and the MRS is compatible and enables access to or transfer of information between system elements.

Waste Acceptance Hardware computer systems shall be compatible with MRS Utilities hardware

resources. The goal is to allow for the common use of databases and information between Waste Acceptance and the MRS. [DOE Order 4700.1 Ch III Pt B.2.c(2)(b)] [CRD 3.3.10.B]

3.2.3.2.1.1.2 WA Software Segment Interface Requirements

3.2.3.2.1.1.2.1 WA Software - MRS Utilities Interface

The requirement below pertains to the interface between the WA Software segment and the MRS Utilities segment and ensures that the computer software used by both WA and the MRS are compatible and enables access to or transfer of information between system elements.

Waste Acceptance Software computer resources shall be compatible with MRS Utilities computer software. The goal is to allow for the common use of databases and information between Waste Acceptance and the MRS. [DOE Order 4700.1 Ch III Pt B.2.c(2)(b)] [CRD 3.3.10.B]

3.2.3.2.1.1.3 WA Operations Segment Interface Requirements

3.2.3.2.1.1.3.1 WA Operations - MRS Preparation and Transfer Interface

The requirement below pertains to the interface between the WA Operations and the MRS Preparation and Transfer segment and ensures that WA accepts waste into the CRWMS that the MRS Preparation and Transfer facilities are capable of receiving and handling the waste.

WA Operations shall accept for delivery to the MRS Preparation and Transfer facilities only standard, failed, and nonstandard SNF described in 10CFR961.11, Appendix E and loaded MPCs. [NWP 42USC10131(a)(4)] [10CFR961.11 Art IV.B.1] [CRD 3.2.1.B]

3.2.3.2.1.1.3.2 WA Operations - MRS Storage Mode Facility Interface

The requirement below pertains to the interface between the WA Operations and the MRS Storage Mode Facility segment and ensures that WA accepts waste into the CRWMS that the MRS Storage Mode Facility is capable of receiving and handling the waste.

WA Operations shall accept for storage in the MRS Storage Mode Facility only loaded MPCs, standard, failed, and nonstandard SNF described in 10CFR961.11, Appendix E. [NWP 42USC10131(a)(4)] [10CFR961.11 Art IV.B.1] [CRD 3.2.1.B]

3.2.3.2.1.1.4 WA Facilities Segment Interface Requirements

3.2.3.2.1.1.4.1 WA Facilities - MRS Utilities Interface

The following requirement pertains to the interface between the WA Facilities and the MRS Utilities segments and ensures that communications equipment of both system elements is compatible and enables two-way communications between WA and the MRS.

Waste Acceptance Facilities communications systems shall be compatible with MRS Utilities resources. The goal is to allow for the common use of databases and information between Waste Acceptance and the MRS. [DOE Order 4700.1 Ch III Pt B.2.c(2)(b)] [CRD 3.2.3.2.B]

3.2.3.2.1.2 WA-OSTS Interface Requirements

No physical interface requirements on the OSTs - Waste Acceptance interface have been identified at this time. WA will provide the CRWMS with the necessary information for the design of the OSTs. Since this information is part of the design process and procedural in nature, it is not included as a requirement in the SRD.

3.2.3.2.2 WA-MGDS Interface Requirements

The types of interfaces between these two elements reflect transfer of and compatibility in communications information. This information may include, but is not limited to, the waste description, production records, Acceptance Priority Ranking (APR), Annual Capacity Report (ACR), Delivery Commitment Schedule (DCS), Final Delivery Schedule (FDS), Waste Acceptance Rate (WAR), DCS Exchange Requests, DOE/NRC forms 741&742, and 10CFR961 Appendix F.

Interfacing segments between Waste Acceptance and the MGDS are identified with an 'X' in Table 3-6 below. The requirements associated with those interfaces appear in the sections following the table. All other segments have been reviewed and, at this time, determined not to be involved in the WA-MGDS interface, as indicated by 'NONE' in the table.

Table 3-6. WA-MGDS Interfaces

MGDS→ SEGMENTS WA↓	Site	Repository	Engineered Barrier
WA Hardware	NONE	X	NONE
WA Equipment	NONE	NONE	NONE
WA Software	NONE	X	NONE
WA Operations	NONE	X	X
WA Facilities	NONE	X	NONE

3.2.3.2.2.1 WA Hardware Segment Interface Requirements

3.2.3.2.2.1.1 WA Hardware - Repository Interface

The requirement below pertains to the interface between the WA Hardware segment and the MGDS Repository segment and ensures that the computer hardware used by both WA and the MGDS is compatible and enables access to or transfer of information between system elements.

Waste Acceptance Hardware computer systems shall be compatible with MGDS Repository hardware resources. The goal is to allow for the common use of databases and information between Waste Acceptance and the MGDS. [DOE Order 4700.1 Ch III Pt B.2.c(2)(b)] [CRD 3.3.10.B]

3.2.3.2.2.2 WA Software Segment Interface Requirements

3.2.3.2.2.2.1 WA Software - MGDS Repository Interface

The requirement below pertains to the interface between the WA Software segment and the MGDS Repository segment and ensures that the computer software used by both WA and the MGDS is compatible and enables access to or transfer of information between system elements.

Waste Acceptance Software resources shall be compatible with MGDS Repository computer software resources. The goal is to allow for the common use of databases and information between Waste Acceptance and the MGDS. [DOE Order 4700.1 Ch III Pt B.2.c(2)(b)] [CRD 3.3.10.B]

3.2.3.2.2.3 WA Operations Segment Interface Requirements

3.2.3.2.2.3.1 WA Operations - MGDS Repository Interface

The requirements below pertain to the interface between the WA Operations and MGDS Repository segments and ensure that WA accepts waste into the CRWMS that is compatible with the MGDS and that the MGDS Repository is designed to be capable of receiving, handling, and disposing of waste that WA accepts.

- A. WA Operations shall accept for delivery to the MGDS Repository only SNF described in 10CFR961.11, Appendix E. [NWP 42USC10131(a)(4)] [10CFR961.11 Art VI.A.1] [CRD 3.7.1.2.E]
- B. WA Operations shall accept for delivery to the MGDS Repository standard and nonstandard canistered HLW as defined in the WA-SRD. [NWP 42USC10131(a)(4)] [10CFR961.11 Art IV.B.1] [CRD 3.2.1.B]

3.2.3.2.2.3.2 WA Operations - MGDS Engineered Barrier Segment Interface

The requirements below pertain to the interface between the WA Operations and MGDS Engineered Barrier segment and ensure that WA accepts waste into the CRWMS that is compatible with the Engineered Barrier.

- A. WA Operations shall accept for disposal only loaded MPCs and standard, failed, and nonstandard SNF described in 10CFR961.11, Appendix E. [NWP 42USC10131(a)(4)] [10CFR961.11 Art IV.B.1] [CRD 3.2.1.B]
- B. WA Operations shall accept for disposal standard and nonstandard canistered HLW as described in the WA-SRD. [NWP 42USC10131(a)(4)] [10CFR961.11 Art IV.B.1] [CRD 3.2.1.B]

3.2.3.2.2.4 WA Facilities Segment Interface Requirements

3.2.3.2.2.4.1 WA Facilities - MGDS Repository Interface

The following requirement pertains to the interface between the WA Facility and MGDS Repository segments and ensures that communications equipment of both system elements is compatible and does not preclude two-way communications between WA and the MGDS.

Waste Acceptance Facilities communications systems shall be compatible with MGDS Repository communications resources. The goal is to allow for the common use of databases and information between Waste Acceptance and the MGDS. [DOE Order 4700.1 Ch III Pt B.2.c(2)(b)] [CRD 3.2.3.2.B]

3.2.3.2.3 WA-Transportation Interface Requirements

The types of interfaces between these two elements reflect transfer of both loaded and unloaded transportation cask subsystems and the documentation, reports and communications regarding loaded and unloaded transportation cask subsystems.

Interfacing segments between Waste Acceptance and Transportation are identified with an 'X' in Table 3-7 below. The requirements associated with those interfaces appear in the sections following the table. All other segments have been reviewed and, at this time, determined not to be involved in the WA-Trans interface, as indicated by 'NONE' in the table.

Table 3-7. WA-Transportation Interfaces

Transportation→ SEGMENTS WA	Transportation Cask Subsystems	Service and Maintenance Support	Field Operations	Planning and Control
WA Hardware	NONE	NONE	NONE	X
WA Equipment	NONE	NONE	NONE	NONE
WA Software	NONE	NONE	NONE	X
WA Operations	NONE	NONE	NONE	X
WA Facilities	NONE	NONE	NONE	NONE

3.2.3.2.3.1 WA Hardware Segment Interface Requirements

3.2.3.2.3.1.1 WA Hardware - Trans Planning and Control Interface

The requirement below pertains to the interface between the WA Hardware segment and the Transportation Planning and Control segment and ensures that the computer hardware used by both WA and Transportation is compatible and enables access to or transfer of information between system elements.

Waste Acceptance Hardware computer systems shall be compatible with Transportation Planning and Control hardware resources. The goal is to allow for the common use of databases and information between Waste Acceptance and the Transportation. [DOE Order 4700.1 Ch III Pt B.2.c(2)(b)] [CRD 3.3.10.B]

3.2.3.2.3.2 WA Software Segment Interface Requirements

3.2.3.2.3.2.1 WA Software - Trans Planning and Control Interface

The requirement below pertains to the interface between the WA Software segment and the Transportation Planning and Control segment and ensures that the computer software used by both WA and Transportation are compatible and enables access to or transfer of information between system elements.

Waste Acceptance Software computer resources shall be compatible with Transportation Planning and Control computer software. The goal is to allow for the common use of databases and information between Waste Acceptance and the Transportation. [DOE Order 4700.1 Ch III Pt B.2.c(2)(b)] [CRD 3.3.10.B]

3.2.3.2.3.3 WA Operations Segment Interface Requirements

3.2.3.2.3.3.1 WA Operations - Trans Planning and Control Interface

The requirement below pertains to the WA Operations - Trans Planning and Control Interface and ensures that communications between the Purchasers/Producers and Transportation are accomplished in a manner consistent with the overall operation of the system. This interface facilitates the real-time scheduling of transportation cask subsystems for shipment to and from the Purchaser/Producer sites, negotiation of cleanliness requirements for casks sent to and received from the Purchaser/Producer sites, documentation of site interface capabilities for each Purchaser/Producer site, and the transfer of pertinent information on transportation cask subsystems to the Purchasers/Producers prior to each shipping campaign.

WA Operations shall act as the Purchaser/Producer liaison to the CRWMS, including Transportation, when information is transferred to or negotiation with the Purchaser/Producer is required. [10CFR961.11 Art. IV.B.2] [CRD 3.2.1.1.F.1] [CRD 3.2.1.1.F.2] [CRD 3.2.1.1.F.3]

3.2.3.2.4 Reserved

3.2.4 Physical Characteristics

3.2.4.1 Reserved

3.2.4.2 Reserved

3.2.4.3 Safeguards and Security

This section contains the system requirements related to safeguards. Within the context of 10CFR73, safeguards consists of two components: physical protection (including access control) and Material

Control and Accounting (MC&A).

3.2.4.3.1 Physical Protection

WA shall coordinate physical protection for facilities and equipment in compliance with 10CFR73. [10CFR72.182] [10CFR60.21(b)(3)(4)] [NUREG 1497] [CRD 3.2.4.3.1.B]

3.2.4.3.2 Reserved

3.2.4.3.3 Reserved

3.2.4.3.4 Material Control and Accounting

A. WA shall establish, maintain, and follow written material control and accounting procedures that enable the CRWMS to account for material in transit, storage, and disposal. [10CFR72.72(a)] [10CFR60.21(c)(10), 10CFR60.71(b)] [DOE Order 6430.1A, 1300-10.3.3] [NUREG 1497] [CRD 3.2.4.3.4.A]

B. WA shall retain copies of current inventory records and current material control and accounting procedures until the NRC terminates the last license held by the CRWMS. [10CFR72.72(a)&(c)] [10CFR60.21(c)(10), 10CFR60.71(b)] [DOE Order 6430.1A, 1300-10.3.3] [CRD 3.2.4.3.4.A]

C. Inventory accounting and control systems for acceptance of SNF and HLW shall comply with the requirements of 10CFR75, when a site is selected by the IAEA from the list of eligible facilities, in compliance with the US/IAEA agreement. SNF may be bare SNF or SNF loaded in MPCs. [10CFR75.21(a)] [CRD 3.2.4.3.4.C]

D. Hardware and software systems which are compatible with the other CRWMS elements shall be developed for maintaining inventory (e.g., including but not limited to receipt, location, transfer, storage, and disposal) of all spent fuel and high-level radioactive wastes for the CRWMS. [10CFR72.72(a)] [10CFR60.21(c)(10), 10CFR60.71(b)] [DOE Order 6430.1A, 1300-10.3.3] [CRD 3.2.4.3.4]

3.2.5 System Quality Factors

The quality factors for WA are described in this section. These factors include Reliability, Maintainability/Inspectability, Availability and Service Life.

3.2.5.1 Reliability

This section provides the minimum essential reliability requirements.

These requirements differ from those defined for "items important to safety" and "items important to waste isolation", both of which have very specific meanings for meeting NRC requirements. Further, these criteria do not supplant radiological standards contained in NRC or EPA requirements; e.g., the radiological standards of 10CFR20. They also do not address reliability of the engineered barrier system.

- A. All mission critical equipment shall have adequate reliability to allow WA to meet the verification and acceptance capability requirements identified in Section 3.2.1.5 and its mission. [DOE Order 4330.4A, 11.a(4)] [CRD 3.2.5.1.E]
- B. Designs shall be developed to ensure reliability that minimizes safety hazards and disruption of system operations to the extent possible. Under such design conditions, failures must not result in personal injury or occupational illness. If designs cannot be developed to these requirements, then the reliability of systems must be shown by analysis to be such as to minimize the probability of injury or illness to personnel. In demonstrating system reliability, probabilities of failures and their effects on personnel safety and system operations must be considered in the design, where applicable. [DOE Order 4330.4A, 11.a(4), (5), (6)] [CRD 3.2.5.1.F]

3.2.5.2 Maintainability/Inspectability

- A. All mission-critical equipment shall have adequate maintainability to allow WA to meet the verification and acceptance capability requirements identified in Section 3.2.1.5 and its mission. [DOE Order 4330.4A, 11.a(4)] [CRD 3.2.5.2.C]
- B. The design of WA SSCs shall conform to the maintainability requirements specified in applicable regulatory guidance and standards. [DOE Order 6430.1A, 1300-12.4.10] [CRD 3.2.5.2.D]
- C. The time required to perform work in the vicinity of radioactive components shall be at or below levels required to meet ALARA constraints. This is achieved, for example, by modifying procedures, providing sufficient space for ease of operation, and designing equipment for ease of repair and replacement. [10CFR72.126(a)(5)] [10CFR60.131(a)(2)] [CRD 3.2.5.2.E]

3.2.5.3 Availability

All mission critical equipment shall have adequate availability to allow WA to meet the verification and acceptance capability requirements identified in Section 3.2.1.5 and its mission [DOE Order 4700.1 Ch III Pt B.3.a] [CRD 3.2.5.3.A]

3.2.5.4 Service Life

Service life values will normally be determined by the logistic support analysis specified in Section 3.5.2 and other engineering and cost studies. Service life determination will give appropriate consideration to the terms of the license or certificate and applicability to pre-disposal or disposal phases.

Service life of WA SSCs shall be specified to ensure the capability of completing the WA mission. [DOE Order 6430.1A, 0140] [10CFR72.42(a)] [CRD 3.2.5.4]

3.2.5.5 Overall Utilization

WA SSCs will be designed to achieve the appropriate overall utilization to provide the capabilities specified in 3.2.1 above. The overall WA utilization factors shall be consistent with the WA concept of operations. [DOE Order 4700.1 Ch V Pt C.2.a(3), (4)] [CRD 3.2.5.5.B]

3.2.6 Reserved

3.2.7 Transportability/Modularity

The design of WA SSCs shall consider transportability/modularity as appropriate. [DOE Order 6430.1A, 0110-3] [CRD 3.2.7]

3.2.8 Reserved

3.2.9 Portability and Load Carrying

Equipment and components developed for WA that will be moved over short distances for maintenance or other purposes shall be designed to facilitate movement by taking into consideration such things as weight, hand grips, lifting aids, etc. [UCRL-15673, Section 3.3.1.2.a] [CRD 3.2.9]

3.3 DESIGN AND CONSTRUCTION

3.3.1 General Design Criteria

- A. Design and construction of all WA facilities and equipment shall be accomplished using the criteria specified in the appropriate section of DOE Order 6430.1A. [DOE Order 6430.1A, 0101-1] [CRD 3.3.1.1.A]
- B. Standards, or other DOE accepted documents, identified as sufficient or more appropriate for the support of design shall be used at the discretion of the designers, provided there are no conflicts with the identified requirements of WA. Examples of this documentation are NUREGs or Regulatory Guides and other similar type of guidance provided by the NRC. [DOE Order 4700.1 Ch V Pt A.2.i(3), (8)] [DOE Order 6430.1A, 0109] [QARD (DOE/RW-0333P) Section 3.2.1] [CRD 3.3.1.1.C]
- C. In addition to the requirements specified in this WA-SRD, the WA design shall comply with specifications and criteria (i.e., generated or identified in analysis of the system element mission and functions, such as system safety hazards analysis and other design studies) which are incorporated into baselined requirements documents. [10CFR60.130] [DOE Order 4700.1 Ch I Att I-3.1.a(3)] [CRD 3.3.1.1.E]
- D. WA shall have design objectives which include:
 1. Achieving minimum construction costs consistent with programmatic, environmental, security, and safety requirements;
 2. Achieving technical adequacy;
 3. Achieving optimum economy in operation and maintenance; and
 4. Assuring that appropriate consideration is given to the expected period of use; quality

construction practices; energy conservation, decontamination, decommissioning, and quality assurance requirements; and the appearance of completed facilities. [DOE Order 4700.1 Ch V Pt C.2.a] [CRD 3.3.1.1.F]

3.3.2 Electromagnetic Radiation

- A. Critical communications circuits shall be protected or shielded from electromagnetic interference from sources within WA, and from external sources to the extent specified by manufacturers of sensitive communications equipment used in the system. [DOE Order 6430.1A, 0200-99.8.1] [CRD 3.3.2.A]
- B. Lighting fixture types, locations, and illumination levels shall be coordinated with the equipment and functions of telecommunication, alarm, and ADP centers to provide the required illumination without creating electrical or electromagnetic interference detrimental to proper operation of equipment. [DOE Order 6430.1A, 1655-99.8] [CRD 3.3.2.B]
- C. Shielding shall be provided to protect magnetic recording equipment, magnetic tapes, and disk packs where an electromagnetic field of 10 microvolts or 50 Oersteds or greater can be expected. [DOE Order 6430.1A, 0110-99.8.4] [CRD 3.3.2.C]

3.3.3 Nameplate and Markings

- A. The identification markings and identification plates, tags, or labels, when used on equipment, systems, subsystems, assemblies, subassemblies, components and piece parts if necessary, shall be permanent for the life of the item including withstanding environmental conditions and cleaning requirements. [DOE Order 6430.1A, 1300-12.4.11] [CRD 3.3.3.A]
- B. Markings shall be accomplished using methods that do not adversely impact the life and use of the item. (See Section 3.3.7.8 for other Labeling and Marking requirements). [DOE Order 6430.1A, 1300-12.4.11] [CRD 3.3.3.B]

3.3.4 Workmanship

- A. Special processes, including welding, heat treating, and nondestructive testing, shall be controlled and accomplished by qualified personnel using qualified procedures in accordance with applicable codes, standards, specifications, criteria, and other special requirements. [10CFR72.158] [10CFR71.119] [QARD (DOE/RW-0333P) Section 9.1] [CRD 3.3.4.A]
- B. The workmanship criteria shall reflect the currently applicable codes, standards, and regulations, as well as architectural and engineering principles and practices specified in DOE Order 6430.1A (General Design Criteria) - 0109 Reference Standards and Guides, including:

AASHTO American Association of State Highway and Transportation Officials
ACI American Concrete Institute

AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANS	American Nuclear Society
ANSI	American National Standards Institute
AREA	American Railway Engineering Association
ARI	Air Conditioning and Refrigeration Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
AWS	American Welding Society
ASTM	American Society for Testing and Materials
IEEE	Institute of Electrical and Electronics Engineers
MBMA	Metal Building Manufacturers Association
NAAMM	National Association of Architectural Metal Manufacturers
NAPHCC	National Association of Plumbing-Heating-Cooling Contractors
NCMA	National Concrete Masonry Association
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NIST	National Institute of Standards and Technology (formerly National Bureau of Standards)
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute

[DOE Order 6430.1A, 0109] [CRD 3.3.4.B]

3.3.5 Interchangeability

To the extent practicable, components used for similar functions in various parts of the system shall be of identical manufacture and model. The objective is to simplify logistical support, such as repair parts supply, training and documentation. [DOE Order 6430.1A, 0110-9] [CRD 3.3.5]

3.3.6 Safety

3.3.6.1 General Requirements

- A. In compliance with occupational safety and health standards promulgated under 29USC651 et seq., WA work places shall be free from recognized hazards that are causing or likely to cause death or serious physical harm to employees. [29CFR1960.9] [29CFR1960.10(a)] [29CFR1910.1] [29CFR1926.1(a)] [CRD 3.3.6.1.A] [CRD 3.3.6.1.B]
- B. The WA design shall be based on a system safety program, and its supporting system safety analyses. This approach will ensure the WA design satisfies the system safety precedence. [DOE Order 5481.1B, 5.k] [CRD 3.3.6.1.C]

3.3.6.2 System Safety Precedence

In addition to satisfying the regulatory requirements specified in Sections 3.3.6.3 through 3.3.6.10, the following order of precedence for satisfying system safety requirements and resolving identified hazards shall be used in the same order of precedence as shown below.

- the first priority of design is to eliminate hazards. If an identified hazard cannot be eliminated, the associated risk will be reduced to an acceptable level through design selection;
- if identified hazards cannot be eliminated, or their associated risk adequately reduced through design selection, those risks will be reduced through the use of fixed, automatic, or other protective safety design features or devices. Provisions will be made for periodic functional checks of safety devices when applicable;
- when neither design nor safety devices can effectively eliminate identified hazards or adequately reduce associated risks, devices will be used to detect the condition and to produce an adequate warning signal to alert personnel of any hazards. Warning signals and their application will be designed to minimize the probability of incorrect personnel reaction to the signal and will be standardized within similar types of systems;
- where it is impractical to eliminate hazards through design selection or adequately reduce the associated risks with safety and warning devices, procedures and training may be used as the only protection.

[DOE Order 6430.1A, 0110-99.0.8] [DOE Order 6430.1A, 1300-3.6] [DOE Order 5481.1B, 5.K] [10CFR20.1702] [CRD 3.3.6.2]

3.3.6.3 Facilities, Equipment, and Materials Protective Measures

- A. WA facilities shall be constructed to meet the applicable requirements specified in 29CFR1910, subparts -
 - 1. D - Walking Surfaces
 - 2. E - Means of Egress
 - 3. G - Occupational Health and Environmental Control
 - 4. J - General Environmental Controls

[29CFR1910.5(a)] [CRD 3.3.6.3.A]
- B. WA Fire protection systems shall be designed in accordance with DOE Order 6430.1A. [DOE Order 6430.1A, 0110-6.1] [CRD 3.3.6.3.B]

3.3.6.4 Personnel Protective Equipment

- A. Protective equipment such as helmets, face shields, safety shoes, and respiratory protectors shall be selected in accordance with the applicable requirements of 29CFR1910, 29CFR1926, 30CFR57, and DOE Order 6430.1A. [29CFR1910.132(a)] [29CFR1926.302(e)(4)] [30CFR57.15001-57.15007, 57.15014, 57.15020] [DOE Order 6430.1A, 1300-12.4.5] [CRD 3.3.6.4.A]

- B. Hearing protection devices shall be provided as required by 29CFR1910.95. [29CFR1910.95(a), (b)] [CRD 3.3.6.4.B]
- C. Appropriate facilities that provide convenient storage and emergency issue shall be provided for personal protective equipment. [29CFR1910.132(a)] [CRD 3.3.6.4.C]

3.3.6.5 Reserved

3.3.6.6 Safety Labels and Placards

- A. Safety labels and placards shall be designed and displayed as required in 29CFR1910 Subpart J. [29CFR1910.145(a)] [CRD 3.3.6.6.A]
- B. Pipe, hose, and tube-line identification for liquids, gas, and steam shall be clearly and unambiguously labeled or coded as to contents, pressure, heat, cold, direction of flow, or other specific hazard information. [29CFR1926.59(e)(1)] [CRD 3.3.6.6.B]
- C. Alerting devices, emergency doors and exits, and equipment provided for use in hazard areas and the environment around surface work spaces shall be designed in accordance with the requirements of 29CFR1910. [29CFR1910.36(a)] [CRD 3.3.6.6.C]

3.3.6.7 Emergency Lighting

- A. Failure of the normal lighting systems shall not inhibit or degrade the operation of emergency lighting. [DOE Order 6430.1A, 1300-12.4.3] [CRD 3.3.6.7.A]
- B. Emergency lighting system:
 - 1. The emergency lighting system shall be designed to automatically actuate on failure of the normal lighting system. [DOE Order 6430.1A, 1300-12.4.3] [CRD 3.3.6.7.B.1]
 - 2. The emergency lighting system shall be powered by batteries that are continuously charged. [DOE Order 6430.1A, 1300-12.4.3] [CRD 3.3.6.7.B.2]
- C. Lighting levels shall comply with the requirements of applicable standards and practices. [29CFR1926.56] [DOE Order 6430.1A, 1300-12.4.3] [CRD 3.3.6.7.C]

3.3.6.8 Equipment Related Hazards

- A. Interlocks, alarms, access, hazard access, and edge-rounding shall be provided and designed in accordance with the applicable requirements of 29CFR1910. [29CFR1910.179(i)] [29CFR1910.212(a)(1)] [29CFR1910.242(a)] [CRD 3.3.6.8.A]
- B. To protect servicing and maintenance personnel, tag-out and lock-out fixtures shall be provided for all energy sources as required by 29CFR1910.147(c-f) for machines and equipment. [29CFR1910.147(a)(3)(i)] [CRD 3.3.6.8.B]

- C. Fixed machinery tools shall be selected, installed, and guarded as required by 29CFR1910, Subpart O. [29CFR1910.212(a)(1)] [CRD 3.3.6.8.C]
- D. Hand and portable power tools shall meet the applicable requirements specified by 29CFR1910, Subpart P. [29CFR1910.242(a)] [CRD 3.3.6.8.D]

3.3.6.9 Work Platforms

- A. Any powered platforms, man lifts, and vehicle-mounted work platforms shall be designed and constructed to comply with 29CFR1910, Subpart F. [29CFR1910.66(a)] [29CFR1910.67(b)] [CRD 3.3.6.9.A]
- B. Scaffolds, ladders, work platforms, stands, and bridges shall be provided with safety devices in accordance with the requirements of 29CFR1910 Subpart D and F. [29CFR1910.22] [29CFR1910.25] [29CFR1910.26] [29CFR1910.27] [29CFR1910.28] [29CFR1910.29] [29CFR1910.67(b)] [CRD 3.3.6.9.B]

3.3.6.10 Electrical Safety

- A. Electrical systems and components shall be selected, designed, and installed as required by 29CFR1910, Subpart S. [29CFR1910.301] [CRD 3.3.6.10.A]
- B. Electrical power systems shall be designed in accordance with DOE Order 6430.1A. [DOE Order 6430.1A, 1600] [CRD 3.3.6.10.B]
- C. Provisions shall be made to make reliable and timely emergency power available to SSCs, e.g., instruments, utility service systems, operating systems, central security system, and alarm systems important to safety in the event of a loss of primary power. (Backup power requirements for items not identified as important to safety are treated by analysis during the design development process. [10CFR72.122(k)(3)] [10CFR60.131(b)(5)(iii)] [CRD 3.3.6.10.C]
- D. Protection against electrical hazards shall also conform to national accepted standards and codes, (e.g., ANSI/NFPA 70 and ANSI C2). [DOE Order 6430.1A, 1605-1] [CRD 3.3.6.10.D]

3.3.7 Human Factors Engineering

3.3.7.1 Reserved

3.3.7.2 Voice Communications Equipment

Voice communications equipment includes telephones, intercoms, radios, and other voice communication equipment. Design and selection of voice communications equipment shall consider the human factors engineering requirements and guidelines identified in applicable regulatory guidelines and standards for:

- A. Conventional powered telephone systems
- B. Sound powered telephone systems

- | C. Hand portable radio transceivers
 - | D. Fixed base radio transceivers
 - | E. Announcing systems
 - | F. Point to point communication systems
 - | G. Emergency communications
 - | H. Operating controls for voice communications equipment.
- [DOE Order 6430.1A, 1300-12.4.9] [CRD 3.3.7.2]

| 3.3.7.3 Alarms and Warning Systems

| Auditory and visual alarm systems alert personnel to out of tolerance conditions that, if overlooked, may lead to unacceptable radiation exposure, personnel injury, equipment damage, or loss of system capability. Design of alarms and warning systems shall consider the guidelines identified in applicable regulatory guidelines and standards. [DOE Order 6430.1A, 1300-12.4.8] [10CFR72.126(b)] [CRD 3.3.7.3]

| 3.3.7.4 Controls

| Controls include operator activated switches, valves, and similar mechanisms or devices used to regulate or guide operations of a machine, apparatus, or system. Human factors engineering design of controls shall consider the guidelines identified in applicable regulatory guidelines and standards for selection of controls and design principles for controls. [DOE Order 6430.1A, 1300-12.4.7] [CRD 3.3.7.4]

| 3.3.7.5 Visual Displays

| Visual displays include meters, colored lights, graphic devices, and numerical readouts. Design or acquisition of visual displays shall consider the guidelines identified in applicable regulatory guidelines and standards. [DOE Order 6430.1A, 1300-12.4.6] [CRD 3.3.7.5]

| 3.3.7.6 Control Panel Layout

| The consideration of human engineering aspects of control contributes to operator proficiency, lessens operator fatigue, decreases training requirements, and contributes to safety. Design and integration of control panels and their associates displays shall consider the guidelines identified in applicable regulatory guidelines and standards. [DOE Order 6430.1A, 1300-12.4.4] [CRD 3.3.7.6]

| 3.3.7.7 Reserved

| 3.3.7.8 Labeling, Markings, and Signs

| Labeling and marking equipment and providing signs and location aids shall consider the guidelines provided in applicable regulatory guidelines and standards. [DOE Order 6430.1A, 1300-12.4.11] [CRD 3.3.7.8]

3.3.7.9 Visual Display Terminal (VDT) Workstation

Human factors engineering of computer terminals and VDT workstations contributes to operator proficiency and lessens operator fatigue. Design, selection, and integration of VDT workstations shall consider the guidelines specified in accepted standards. [DOE Order 6430.1A, 1300-12.4.2, 1300-12.4.6] [CRD 3.3.7.9]

3.3.7.10 Anthropometry and Ergonomics

Sizing and layout dimensions for equipment and facilities, and the selection of personnel equipment and clothing to provide compatibility with personnel shall consider the anthropometric and ergonomic guidelines identified in applicable standards. [DOE Order 6430.1A, 1300-12.4.2] [CRD 3.3.7.10]

3.3.7.11 Remote Handling and Operation

The design, selection, and integration of equipment, controls, and indicators for remotely operated systems, if used, shall consider the guidelines identified in applicable standards. [DOE Order 6430.1A, 1300-6.1 and 6.3] [CRD 3.3.7.11]

3.3.7.12 Vehicles and Material Handling

The human factors engineering, design, selection, and acquisition of operational vehicles, transportational vehicles, and material handling equipment shall consider the guidelines for human interface as specified in applicable standards. [DOE Order 6430.1A, 1300-12.1 and 12.2] [CRD 3.3.7.12]

3.3.7.13 Accessibility and Useability by the Physically Handicapped

As a minimum, the guidance and requirements specified in DOE Order 6430.1A Section 1300-13 and in the Americans with Disabilities Act (ADA) as implemented in applicable Federal regulations including 41CFR101-19.603 shall be considered for all facility and equipment designs for accessibility and usability by physically handicapped personnel, both visitors and employees. [41CFR101-19.603] [DOE Order 6430.1A, 1300-13] [CRD 3.3.7.13]

3.3.7.14 User-Computer Software Interface

Design of computer software and firmware that provides an interface between users and computers shall comply with or be comparable to the guidelines and requirements identified in Guidelines for Designing User Interface Software MTR 10090 for data entry and user inputs, data display, sequence control, user guidance and prompts, data transmission, and data protection. [DOE Order 6430.1A, 1300-12.2] [CRD 3.3.7.14]

3.3.7.15 Human Factors Program

The WA design shall be based on a human factors engineering program, and its supporting human factors engineering analyses. This approach will ensure the incorporation of the human factors engineering requirements into the WA design. [DOE Order 6430.1A, 1300-12.3.2] [CRD 3.3.7.15]

3.3.8 Methods and Controls

Material Management will be provided for materials, parts and components important to safety that are included as part of the Waste Acceptance architecture and its operation.

3.3.8.1 Material Management

A. Identification and control of materials:

1. WA shall implement material management systems (preferably automated) to provide identification and control of materials, parts, and components, including the use of heat numbers, part numbers, serial numbers, or other means, either on the item or on records traceable to the item as required, throughout fabrication, installation, and use of the item. [10CFR72.156] [QARD (DOE/RW-0333P) Section 8.2.2, 8.2.4.A] [10CFR71.117] [CRD 3.3.8.1.A.1]
2. The identification and control capability of the material management system shall be designed to prevent the use of incorrect or defective materials, parts, and components. [10CFR72.156] [QARD (DOE/RW-0333P) Section 8.2.2, 8.2.4.A, 15.2.2.A] [10CFR71.117] [CRD 3.3.8.1.A.2]

B. Material, parts, or components conformance:

1. Materials, parts, or components that do not conform to requirements shall not be used or installed. [10CFR72.170] [10CFR71.131] [QARD (DOE/RW-0333P) Section 8.2.2, 8.2.4.A, 15.2.2.A] [CRD 3.3.8.1.B.1]
2. The material management system shall enable identification, location, documentation, segregation, disposition, and notification to affected organizations of incorrect or defective materials, parts, and components. [10CFR71.117] [10CFR71.131] [10CFR72.156] [10CFR72.170] [QARD (DOE/RW-0333P) Section 8.2.2, 8.2.4.A, 15.2.2.A] [CRD 3.3.8.1.B.2]
3. Nonconforming items shall be reviewed and accepted, rejected, repaired, or reworked in accordance with documented procedures. [10CFR72.170] [10CFR71.131] [QARD (DOE/RW-0333P) Section 8.2.2, 8.2.4.A, 15.1, 15.2.2.A] [CRD 3.3.8.1.B.3]

C. Measures shall be established to ensure that purchased material, equipment, and services conform to procurement documents. [QARD (DOE/RW-0333P) Section 7.1] [CRD 3.3.8.1.C]

D. Standardization of WA SSCs and support systems design shall be used to the extent practicable, to ensure reliability and supportability. [DOE Order 6430.1A, 0110-9] [CRD 3.3.8.1.D]

3.3.8.2 Inventory Management

- WA shall implement an inventory management system for control of supplies and spare parts. [QARD (DOE/RW-0333P) Section 8.1] [10CFR72.156] [10CFR71.117] [CRD 3.3.8.2.B]

3.3.9 Government Furnished Property

- A. Surplus Government property that meets WA requirements shall be considered for incorporation into the design. [DOE Order 6430.1A, 0110-9] [CRD 3.3.9.B]
- B. Requirements pertaining to the receipt, maintenance, operation and disposal of Government furnished property shall be specified in WA Design Requirements Document, as appropriate. [DOE Order 6430.1A, 0110-9] [CRD 3.3.9.C]

3.3.10 Reserved

3.3.11 Environmental Protection Requirements

See Section 3.2.3.1.1.14 and 3.2.3.1.1.26.E for requirement on hazardous waste determination.

3.4 DOCUMENTATION

3.4.1 Requirements Documents and Specifications

- A. Applicable regulatory requirements, design requirements, and other requirements as specified herein shall be correctly translated into design requirements documents and specifications. [10CFR71.107] [10CFR72.146] [10CFR60.152] [CRD 3.4.1.A]
- B. WA facility construction specifications shall be prepared in accordance with the guidelines of Construction Specification Institute format, tailored to the application. [10CFR71.107] [10CFR72.150] [DOE Order 6430.1A, 0101-1] [DOE Order 6430.1A, 0101-3.1] [CRD 3.4.1.B]

3.4.2 Drawings

Applicable regulatory requirements, design requirements, and other requirements as specified herein shall be correctly translated into drawings in accordance with OCRWM DOE/RW-0461. [10CFR71.107(a)] [10CFR71.111] [10CFR72.146(a)] [10CFR72.150] [10CFR60.152] [DOE/RW-0461] [CRD 3.4.2.A]

3.4.3 Maintenance, Operator, and Technical Manuals

Applicable regulatory requirements, design requirements, and other requirements as specified herein shall be correctly translated into procedures and instructions, including training, operator, maintenance, and other technical manuals. [10CFR71.107] [10CFR72.146] [10CFR60.152] [CRD 3.4.3]

3.4.4 Test Plans and Procedures

Through test and evaluation, conformance of the system element's requirements shall be demonstrated as required in the verification matrix in Table 4-1. [DOE Order 4700.1 Ch III Pt B.3] [CRD 3.4.4]

3.4.5 Quality Assurance Documentation

WA design documentation that provides quality affecting information shall be prepared, maintained, controlled, and stored in accordance with the requirements specified in OCRWM QARD or equivalent OCRWM-approved QA program. [QARD (DOE/RW-0333P) Section 17.1] [QARD (DOE/RW-0333P) Section 6.1] [QARD (DOE/RW-0333P) Section 3.1] [CRD 3.4.5]

3.4.6 Construction Records

Construction records, including as-built documentation requirements, for WA shall be specified. [DOE Order 4700.1 Ch III Pt C.2.b(1)] [CRD 3.4.6.A]

3.4.7 Computer Documentation

Analytical models, databases, computational models, and software user documentation developed for WA (i.e., not commercial off-the-shelf documentation) that provides quality affecting information, shall be prepared in accordance with the OCRWM QARD. [QARD(DOE/RW-0333P) Supplement I.1] [CRD 3.4.7]

3.4.8 Records Management

- A. WA shall maintain sufficient records to furnish evidence of activities affecting quality. [QARD (DOE/RW-0333P) Section 17.2.1] [DOE/RW-0194P Sections 6.1, 6.3, and 6.4] [CRD 3.3.1.2]
- B. Records shall be identifiable, traceable to associated items and activities, and retrievable. [QARD (DOE/RW-0333P) Section 17.2.3] [CRD 3.3.1.2]
- C. WA shall implement records management to preserve adequate records that document program compliance with NWPA, and to meet operational needs. [DOE/RW-0194P, Section 6.1(2)] [CRD 3.4.8.B]

3.5 LOGISTICS

3.5.1 Maintenance

The purpose of the WA maintenance concept is to minimize the likelihood of, and mitigate the effects of, SSC failures using preventive maintenance and inspections. When failures do occur, the goal is to provide a capability to restore full operational capability as quickly as possible through a proactive corrective maintenance program. SSCs shall be designed to permit easy access, ease of maintenance, and periodic testing, inspection, and maintenance, as necessary, to ensure their continued functioning and readiness. [10CFR72.122(f)] [10CFR60.131(b)(6)] [CRD 3.5.1]

3.5.1.1 Equipment Maintenance

A. Built-In-Test Equipment (BITE) and Automatic-Test-Equipment (ATE):

1. Systems and equipment designed for WA shall incorporate BITE and ATE into the design, as appropriate. [DOE Order 4700.1 Ch III Att III-1 1.a, 1.c(6)(b)3] [CRD 3.5.1.1.B.1]
2. Off-the-shelf systems and equipment shall include BITE and ATE if it is cost-effective. [DOE Order 4700.1 Ch III Att III-1 1.a, 1.c(6)(b)3] [CRD 3.5.1.1.B.2]

B. Maintenance Facilities, Equipment and Tools: Maintenance facilities, equipment, and tools shall be provided based on the criteria specified by DOE Order 4330.4A, I, 3.5. [DOE Order 4330.4A, I, 3.5] [CRD 3.5.1.1.C]

C. The maintenance system shall be equipment intensive, rather than personnel intensive. [10CFR72.122(f)] [10CFR60.131(a)(2), (b)(8)] [CRD 3.5.1.1.A.1]

D. The maintenance system shall rely on technology to reduce maintenance requirements. [10CFR72.122(f)] [10CFR60.131(a)(2), (b)(8)] [CRD 3.5.1.1.A.2]

E. In developing the maintenance system, emphasis shall be placed on the detection of faults and failures through remote monitoring equipment. [10CFR72.122(f)] [10CFR60.131(a)(2), (b)(8)] [CRD 3.5.1.1.A.3]

3.5.1.2 Calibration Maintenance

Test equipment shall be calibrated in accordance with the manufacturer's standards/requirements and industry standards. [10CFR72.164] [DOE Order 4330.4A, I, 3.5] [10CFR20.1501(b)] [10CFR71.125] [CRD 3.5.1.2]

3.5.2 Supportability

As the maintenance concept influences the design it also affects the type of supportability that will be required to support the system.

A. Based on projected logistics support requirements for design considerations, an analysis shall be conducted to assess the capability of support available to WA. [DOE Order 4700.1 Ch III Att III-1 1.a, 1.c(6)(b)3] [CRD 3.5.2.A]

B. This analysis, A Logistic Support Analysis, shall be conducted on an iterative basis through all phases of the system or equipment life cycle to satisfy logistics supportability objectives. [DOE Order 4700.1 Ch III Att III-1 1.a, 1.c(6)(b)3] [CRD 3.5.2.B]

C. Facilities and systems for materials and equipment storage, maintenance, and supply shall be based on an iterative Logistics Support Analysis tailored to each system and responsive to program schedules and milestones. [DOE Order 4700.1 Ch III Att III-1 1.a, 1.c(6)(b)3] [CRD 3.5.2.C]

3.5.3 Facilities

- A. Facilities and equipment shall be provided to collect, store, and maintain QA records in accordance with the requirements of the QARD (DOE/RW-0333P). [10CFR71.135] [10CFR60.152] [QARD (DOE/RW-0333P) Section 17.1] [CRD 3.5.3.A]
- B. Warehouse space shall be provided for the storage of all spare parts, replacement equipment, and consumable material in an environment conducive to their safe keeping and protection. [10CFR72.166] [10CFR71.127] [DOE Order 6430.1A, 0110-9] [CRD 3.5.3.C]
- C. Facilities shall be provided to support training required by DOE Order 4330.4A. [DOE Order 4330.4A, I, 3.1.4] [CRD 3.5.3.D]
- D. Facilities and equipment shall be provided to implement support functions, such as administration (security, visitor center, etc.) and logistics (maintenance, utilities, etc.) not specified in 3.5.3 A-C above. [DOE Order 6430.1A, 0110-9] [DOE Order 4700.1 Ch III Att III-1 1.a, 1.c(6)(b)3] [CRD 3.5.3.E]

3.5.4 Support & Test Equipment

Requirements for support and test equipment shall be determined through the logistic support analysis process. Multiple requirements for the same or similar support and test equipment may be consolidated to the extent that performance of maintenance actions are not adversely impacted. Support and test equipment requirements are to be determined for each level of maintenance. [DOE Order 4700.1 Ch III Att III-1 1.a, 1.c(6)(b)3] [CRD 3.5.4]

3.6 PERSONNEL AND TRAINING

3.6.1 Personnel

- A. Operations of systems and components that have been identified as important to safety in a Safety Analysis Report and in a license or certificate shall be performed only by trained and certified personnel or by personnel under the direct visual supervision of an individual with training and certification in such operation. Supervisory personnel who direct operations that are important to safety must also be certified in such operations. [10CFR72.190] [10CFR60.160] [10CFR71.105(d)] [QARD (DOE/RW-0333P) Section 2.2.12] [CRD 3.6.1.A]
- B. The physical condition and general health of personnel certified in the operation of equipment and controls that are important to safety shall not be such as might cause operational errors that could endanger other in-plant personnel or the public health and safety. [10CFR72.194] [10CFR60.162] [CRD 3.6.1.C]

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- C. Any condition that might cause impaired judgement or motor coordination shall be considered in the selection of personnel for activities that are important to safety. These conditions need not categorically disqualify a person, if appropriate provisions are made to accommodate such defect. [10CFR72.194] [10CFR60.162] [10CFR707.3] [CRD 3.6.1.D]

3.6.2 Training

Training may be accomplished through a combination of formal structured programs and on-the-job training. Training requirements include both the training of personnel initially assigned to WA and the training of replacement personnel throughout the system life cycle as required. Training will address both operator and maintenance tasks. Training includes the usage of all equipment used by DOE or contractor staff during execution of the waste preparation and waste acceptance processes, and generic training of utility staff in the use of all equipment designed by DOE or provided by DOE, except for transportation-related equipment.

3.6.2.1 General Requirements

- A. WA shall develop facilities and equipment necessary to support or conduct training for the operation and maintenance of facilities, hardware, and software procured or developed for WA. The training programs will address at a minimum the following subjects: (1) equipment required for training purposes; (2) training devices to be developed, characteristics of the training devices, and training and skills to be developed through the use of training devices; and (3) other matters such as schedules, source materials, and training aids to ensure a comprehensive training program. [DOE Order 4700.1 Ch III Pt D.2.b] [QARD (DOE/RW-0333P) Section 2.2.12] [CRD 3.6.2.1.A]
- B. WA equipment maintenance training shall be provided based on the criteria specified by DOE Order 4330.4A. [DOE Order 4330.4A, I, 3.1.4] [QARD (DOE/RW-0333P) Section 2.2.12] [CRD 3.6.2.1.C]
- C. WA shall develop procedures to support and establish a program for training, proficiency testing, certification, and recertification of operating and supervisory personnel. [10CFR71.105(d)] [QARD (DOE/RW-0333P) Section 2.2.12] [CRD 3.6.2.1.E]

3.6.2.2 Health Physics Training

WA shall provide a program for training, proficiency testing, and certification of personnel in radiation protection (health physics) and ALARA principles. [10CFR20.1101(a), (b), (c)] [DOE/EH-0256T, Section 611] [CRD 3.6.2.2]

3.6.2.3 Occupational Safety and Health Training

WA shall provide appropriate job related safety and health training including training as required under section 19 of the occupational safety and health Act (OSHA) as implemented in DOE Order 3790.1B. [DOE Order 3790.1B, Ch V.2.b(3)] [CRD 3.6.2.3]

3.7 SEGMENT REQUIREMENTS

3.7.1 Reserved

3.7.2 Reserved

3.7.3 Reserved

3.7.4 Reserved

3.7.5 WA Hardware Segment

3.7.5.1 WA Hardware Segment Description

The WA Hardware (HW) Segment is responsible for defining and acquiring the HW capabilities necessary to support WA data validation, dissemination, and maintenance, supporting Safeguards and Security including MC&A, and database activities, supporting WA Management functions, and providing WA publications support.

3.7.5.1.1 WA Hardware Segment Functions

This segment shall be capable of performing all functions assigned to it in Table B-1 in Appendix B. These functions are:

- A. Accept Waste (1.1)
- B. Plan for Waste Acceptance (1.1.3)
- C. Allocate Waste System Capacity (1.1.3.1)
- D. Collect Waste Data (1.1.3.1.1)
- E. Rank/Order Waste (1.1.3.1.2)
- F. Identify Waste Location/Characteristics (1.1.3.2)
- G. Validate Description of Waste (1.1.3.2.5)
- H. Control and Account for Waste Inventory (1.1.8)
- I. Provide Material Control (1.1.8.1)
- J. Provide Material Accounting (1.1.8.2)
- K. Provide Material Tracking (1.1.8.3)
- L. MC&A General Management (1.1.8.4)

Descriptions for these functions are included in Appendix A. [DOE Order 4700.1 Ch III Att III-1, 1.c(2)(a)] [42USC10131(a)(5)] [CRD 3.7.1.1.1]

3.7.5.1.2 WA Hardware Segment Interfaces

The WA Hardware Segment will identify, describe, and specify interface requirements between WA Hardware and other WA segments, and between WA Hardware and entities external to the CRWMS in accordance with Section 3.2.3.1. [DOE Order 4700.1 Ch III Pt B.2.c(2)(b)] [CRD 3.2.3.1] [CRD 3.2.3.2.B]

3.7.5.2 WA Hardware Segment Requirements

WA Hardware systems shall be capable of supporting the use of operational software and performing the RW-859 & FICA data storage, management, retrieval, reporting, and communications functions related to operations including those necessary to implement the CRWMS wide Safeguards and Security program. [10CFR72.72(a)] [10CFR60.21(c)(10)] [10CFR60.71(b)] [10CFR75.21(a)] [CRD 3.2.4.3.4.A] [CRD 3.2.4.3.4.C]

3.7.6 WA Equipment Segment

3.7.6.1 WA Equipment Segment Description

The WA Equipment Segment is responsible for identifying and acquiring the equipment necessary to support WA personnel as they perform WA functions at the Purchaser/Producer and CRWMS sites. This may include video monitoring equipment for documentation of cask/MPC loadings, radionuclide monitoring equipment for use in verification of waste characteristics, fuel integrity inspection, equipment for supporting Safeguards and Security including MC&A operations such as inspecting and verifying the tamper indicating devices (TID), and installing the TID if needed.

3.7.6.1.1 WA Equipment Segment Functions

This segment shall be capable of performing all functions assigned to it in Table B-1 in Appendix B. These functions are:

- A. Accept Waste (1.1)
- B. Observe Waste Preparations (1.1.4)
- C. Observe Preliminary Waste Preparations (1.1.4.1)
- D. Record Waste Loading (1.1.4.1.2)
- E. Control and Account for Waste Inventory (1.1.8)
- F. Provide Material Control (1.1.8.1)

Descriptions for these functions are included in Appendix A. [DOE Order 4700.1 Ch III Att III-1, 1.c(2)(a)] [42USC10131(a)(5)] [CRD 3.7.1.1.1]

3.7.6.1.2 WA Equipment Segment Interfaces

The WA Equipment Segment will identify, describe, and specify interface requirements between WA Equipment and other WA segments, and between WA Equipment and entities external to the CRWMS in accordance with Section 3.2.3.1. [DOE Order 4700.1 Ch III Pt B.2.c(2)(b)] [CRD 3.2.3.1] [CRD 3.2.3.2.B]

3.7.6.2 WA Equipment Segment Requirements

- A. WA Equipment shall be capable of verifying the SNF and/or HLW descriptions during MPC and transportation cask loading and prior to acceptance, in accordance with 10CFR961.11 Appendices E and F. [10CFR961.11 Art VLB.2] [CRD 3.3.1.2]

B. WA Equipment shall have the capability to inspect, verify, and record the identification numbers, description, and characteristics of:

1. SNF prior to loading into an MPC or a transportation cask
2. HLW prior to loading into a transportation cask
3. Loaded MPC prior to loading into a transportation cask.
[10CFR961.11 Art VI.B.2] [CRD 3.2.1.1.A]

C. WA Equipment shall have the capability to inspect and verify that cask subsystems are provided with an appropriate feature, which is not readily breakable, and which, while intact, would be evidence that the cask has not been opened by unauthorized persons.
[10CFR71.43(b)] [CRD 3.3.1.2]

D. WA Equipment shall provide, for personal protection, appropriate dosimeters to determine the radiation dose in compliance with 10CFR20.1201. [10CFR20.1501(c)(1)] [10CFR20.1501(c)(2)] [CRD 3.2.2.4.C]

3.7.7 WA Software Segment

3.7.7.1 WA Software Segment Description

The WA Software (SW) Segment is responsible for defining and acquiring the SW tools necessary for conducting WA data validation, dissemination, and maintenance, supporting Safeguards and Security including MC&A, and database activities, supporting WA Management functions, and providing WA publications support.

3.7.7.1.1 WA Software Segment Functions

This segment shall be capable of performing all functions assigned to it in Table B-1 in Appendix B. These functions are:

- A. Accept Waste (1.1)
- B. Plan for Waste Acceptance (1.1.3)
- C. Allocate Waste System Capacity (1.1.3.1)
- D. Rank/Order Waste (1.1.3.1.2)
- E. Identify Waste Location/Characteristics (1.1.3.2)
- F. Validate Description of Waste (1.1.3.2.5)
- G. Control and Account for Waste Inventory (1.1.8)
- H. Provide Material Control (1.1.8.1)
- I. Provide Material Accounting (1.1.8.2)
- J. Provide Material Tracking (1.1.8.3)
- K. MC&A General Management (1.1.8.4)

Descriptions for these functions are included in Appendix A. [DOE Order 4700.1 Ch III Att III-1, 1.c(2)(a)] [42USC10131(a)(5)] [CRD 3.7.1.1.1]

3.7.7.1.2 WA Software Segment Interfaces

The WA Software Segment will identify, describe, and specify interface requirements between WA Software and other WA segments, and between WA Software and entities external to the CRWMS in accordance with Section 3.2.3.1. [DOE Order 4700.1 Ch III Pt B.2.c(2)(b)] [CRD 3.2.3.1] [CRD 3.2.3.2.B]

3.7.7.2 WA Software Segment Requirements

WA Software systems shall be capable of performing the RW-859 & FICA data storage, and the management, retrieval, reporting, and communications functions related to operations including those necessary to implement the CRWMS-wide Safeguards and Security program. [10CFR72.72(a)] [10CFR60.21(c)(10)] [10CFR60.71(b)] [10CFR75.21(a)] [CRD 3.2.4.3.4.A] [CRD 3.2.4.3.4.C]

3.7.8 WA Operations Segment

3.7.8.1 WA Operations Segment Description

The WA Operations Segment is responsible for identifying and acquiring the personnel and operational procedures that an operational CRWMS must have in place to accomplish WA management functions and objectives. For example, a procedure for acceptance of SNF and/or HLW into the CRWMS must be developed that completely defines the DOE and waste owner's responsibilities during the acceptance processes. In addition, WA management functions and objectives also include: Safeguards and Security including MC&A tracking and disseminating information about equipment or facility changes resulting from site interface discussions, establishment of waste acceptance criteria, verification of SNF during loading operations before it is shipped, verifying SNF and/or HLW characteristics, and ultimately accepting title to the SNF. Safeguards and Security including MC&A activities involve establishing and maintaining System-level MC&A procedures, and to support development of system element MC&A procedures. These procedures enable the CRWMS to account for material in transit, storage, and disposal, and includes controlling waste inventory, surveillance of waste inventory, periodic inventory reconciliation, tracking containers, seal monitoring/controlling, and records management.

3.7.8.1.1 WA Operations Segment Functions

This segment shall be capable of performing all functions assigned to it in Table B-1 in Appendix B. These functions are:

- A. Accept Waste (1.1)
- B. Define Waste Acceptance Criteria (1.1.1)
- C. Establish Contracts/Agreements (1.1.2)
- D. Plan for Waste Acceptance (1.1.3)
- E. Allocate Waste System Capacity (1.1.3.1)
- F. Allocate Annual Capacity to Purchasers/Producers (1.1.3.1.3)
- G. Identify Waste Location/Characteristics (1.1.3.2)
- H. Evaluate DCS (1.1.3.2.1)
- I. Evaluate Exchange Requests (1.1.3.2.2)
- J. Evaluate Request for Non-standard Waste Delivery (1.1.3.2.3)

- K. Evaluate FDS (1.1.3.2.4)
- L. Define Site Interface Capabilities (1.1.3.3)
- M. Schedule WA Preparations (1.1.3.4)
- N. Observe Waste Preparations (1.1.4)
- O. Observe Preliminary Waste Preparations (1.1.4.1)
- P. Observe Waste Loading (1.1.4.1.1)
- Q. Verify Waste Description (1.1.4.2)
- R. Notify Purchasers/Producers of Improperly Described Waste (1.1.4.3)
- S. Accept Waste Title/Documentation (1.1.5)
- T. Resolve Improperly Described Waste (1.1.6)
- U. Provide Fee Collection (1.1.7)
- V. Control and Account for Waste Inventory (1.1.8)
- W. Provide Material Control (1.1.8.1)
- X. Provide Material Accounting (1.1.8.2)
- Y. Provide Material Tracking (1.1.8.3)
- Z. MC&A General Management (1.1.8.4)

Descriptions for these functions are included in Appendix A. [DOE Order 4700.1 Ch III Att III-1, 1.c(2)(a)] [42USC10131(a)(5)] [CRD 3.7.1.1.1]

3.7.8.1.2 WA Operations Segment Interfaces

The WA Operations Segment will identify, describe, and specify interface requirements between WA Operations and other WA segments, and between WA Operations and entities external to the CRWMS in accordance with Section 3.2.3.1. [DOE Order 4700.1 Ch III Pt B.2.c(2)(b)] [CRD 3.2.3.1] [CRD 3.2.3.2.B]

3.7.8.2 WA Operations Segment Requirements

3.7.8.2.1 Notifications

- A. WA Operations shall provide information on the SNF to the MRS to ensure the facility has the capability of receiving, handling, and storing SNF and information on SNF and/or HLW to the MGDS to ensure that the facility has the capability of receiving, handling, and disposing of the waste prior to acceptance. [NWP 42USC10131(a)(4)] [10CFR961.11 Art IV.B.1] [CRD 3.7.1.2.D]
- B. On the shipment date, WA Operations shall notify the MRS and/or MGDS of the types of waste being shipped from the Purchaser and/or Producer. [NWP 42USC10222(a)(5)] [CRD 3.7.1.2.B]
- C. WA shall schedule with Transportation, the furnishing of a transportation cask subsystem(s), including MPCs where necessary to move the SNF and/or HLW from the Purchaser/Producer site to the CRWMS facility. [10CFR961.11 Art IV.B.2] [CRD 3.7.1.2.J]

3.7.8.2.2 Waste Acceptance Criteria

- A. WA Operations shall develop criteria, consistent with 10CFR60.21(c)5, for all radioactive waste (both SNF and HLW) accepted into the CRWMS for disposal at the MGDS and verify that the waste meets those criteria prior to acceptance. [10CFR60.21(c)5] [CRD 3.7.1.2.H]
- B. WA Operations shall not accept waste into the CRWMS if the waste form does not meet the criteria specified in Section 3.2.3.1. [10CFR60.135(b)] [10CFR60.135(c)] [CRD 3.7.1.2.K]

3.7.8.2.3 SNF Specifications

WA Operations shall accept standard, failed, and nonstandard SNF of domestic origin described in Sections 3.2.3.1.2.3, 3.2.3.1.2.4, and 3.2.3.1.2.5, respectively. [10CFR961.11 Art IV.B.1] [CRD 3.2.1.B] [CRD 3.7.1.2.D]

3.7.8.2.4 HLW Specifications

WA Operations shall accept standard nonconforming and nonstandard HLW described in Sections 3.2.3.1.1.3, 3.2.3.1.1.4 and 3.2.3.1.1.5, respectively. [10CFR961.11 App E.D] [CRD 3.3.1.2]

Detailed acceptance specifications are to be addressed in the WA Design Requirements Document.

3.7.8.2.5 Contract/Agreement

Note: For the purposes of this section (3.7.8.2.5), NYSERDA is considered a "Purchaser" for contract/agreement requirements.

- A. WA shall execute contracts/agreements established by DOE, with any person who generates or holds title to high-level radioactive waste, or spent nuclear fuel, of domestic origin for the acceptance of title of such waste or spent fuel. [NWSA 42USC10222(a)(1)] [CRD 3.7.1.2.A]
- B. DOE (WA Operations) shall accept title to all SNF and/or HLW, of domestic origin for which fees have been paid, generated by the civilian nuclear power reactor(s) specified in Appendix A of 10CFR961. [10CFR961.11 Art IV.B.1] [CRD 3.2.1.B] [CRD 3.7.1.2.D]
- C. Except as provided in the contracts/agreements, WA Operations shall accept only SNF and/or HLW that meets the General Specification and classifications requirements for waste as set forth in Appendix E of 10CFR961. [10CFR961.11 Art V.A] [10CFR961.11 Art VI.A.1] [CRD 3.7.1.2.E] [CRD 3.7.1.2.F]
- D. After June 30, 1983, the contract with DOE/OCRWM shall be signed by the date on which the Purchaser commences generation of, or takes title to, such SNF or HLW. [10CFR961.2] [CRD 3.3.1.2]

- E. DOE (WA Operations) shall execute a suitable interagency agreement, reflecting the terms and conditions specified in 10CFR961.11, with Federal agencies or departments requiring disposal service in the CRWMS. Fees to be paid by Federal agencies will be equivalent to the fees that would be paid under the 10CFR961 contract. [NWP A 42 UCS 10222(b)4] [CRD 3.3.1.2]
- F. The terms of the contract shall begin at the date of execution until such time DOE (WA Operations) has accepted title to all SNF and HLW. [10CFR961.11 Art III] [CRD 3.3.1.2]
- G. WA Operations shall not accept SNF for disposal in the CRWMS repository unless the Purchaser has entered into a contract with DOE/OCRWM as specified in the NWP A 42USC10222(b)(2). [NWP A 42USC10222(b)(2)] [CRD 3.3.1.2]
- H. DOE/RW (WA Operations) shall accept title to defense HLW. [Presidential Memo 1985] [CRD 3.2.1.1.D]

3.7.8.2.6 Acceptance Priority Ranking

DOE (WA Operations) shall issue the acceptance priority ranking for SNF and/or HLW as specified in 10CFR961.11 Articles IV.B.5 and VI.B.1. [10CFR961.11 Art IV.B.5] [10CFR961.11 Art VI.B.1] [CRD 3.3.1.2]

3.7.8.2.7 Annual Capacity Report

DOE (WA Operations) shall issue an annual capacity report for planning purposes for SNF as specified in 10CFR961.11 Article IV.B.5(b). [10CFR961.11 Art IV.B.5] [CRD 3.3.1.2]

3.7.8.2.8 Emergency Deliveries

Emergency deliveries of SNF and/or HLW may be accepted by DOE (WA Operations) before the date provided in the delivery commitment schedule upon prior written approval by DOE. [10CFR961.11 Art V.D] [CRD 3.3.1.2]

3.7.8.2.9 Delivery Commitment Schedules

- A. DOE (WA Operations) shall approve or disapprove of the Purchaser DCS within 3 months after receipt, and must notify the Purchaser in writing of the reasons for disapproval. DOE must request the Purchaser to submit a revised DCS within 30 days after receipt of DOE's disapproval. [10CFR961.11 Art V.B.1] [CRD 3.3.1.2]
- B. DOE (WA Operations) shall approve or disapprove the Purchaser revised DCS within 60 days after receipt. In the event of disapproval, DOE must advise the Purchaser in writing of the reasons and proposed schedules, and if the reasons and proposed schedules are not acceptable to the Purchaser, the parties must promptly try to negotiate mutually acceptable schedule(s). [10CFR961.11 Art V.B.2] [CRD 3.3.1.2]

- C. WA Operations shall allow the Purchaser to adjust the quantities of SNF and/or HLW plus or minus 20%, and the delivery schedule up to 2 months, until the submission of the final delivery schedule. [10CFR961.11 Art V.B.2] [CRD 3.3.1.2]

3.7.8.2.10 Exchange Requests

DOE (WA Operations) shall approve or disapprove the proposed exchange request within 30 days after receipt. In the event of disapproval, DOE must advise the Purchaser in writing of the reasons. [10CFR961.11 Art V.E] [CRD 3.3.1.2]

3.7.8.2.11 Request for Nonstandard Waste Form Delivery

The Purchaser/Producer will obtain delivery and procedure confirmation from DOE prior to delivery of nonstandard waste form (failed SNF and nonstandard SNF/HLW). DOE (WA Operations) shall advise Purchaser/Producer within 60 days after receipt of confirmation request as to the technical feasibility of accepting of the nonstandard waste form on the currently agreed to schedule, and any schedule adjustment for such services. [10CFR961.11 Art VI.A.2(b)] [CRD 3.3.1.2]

3.7.8.2.12 Final Delivery Schedules

- A. DOE (WA Operations) shall approve or disapprove an FDS within 45 days after receipt. [10CFR961.11 Art V.C] [CRD 3.3.1.2]
- B. In the event of disapproval of an FDS, DOE (WA Operations) shall advise the Purchaser in writing of the reasons, and request a revised schedule. The Purchaser will submit the revised schedule within 30 days after receipt of DOE's notice of disapproval. [10CFR961.11 Art V.C] [CRD 3.3.1.2]
- C. DOE (WA Operations) shall approve or disapprove the revised FDS submitted by the Purchaser within 60 days after receipt. [10CFR961.11 Art V.C] [CRD 3.3.1.2]
- D. If DOE (WA Operations) disapproves the revised schedule, the reasons for disapproval shall be provided in writing to the Purchaser, along with DOE's proposed schedule. If these are not acceptable to the Purchaser, the parties must promptly seek to negotiate mutually acceptable schedules. [10CFR961.11 Art V.C] [CRD 3.3.1.2]

3.7.8.2.13 Reserved

3.7.8.2.14 Waste Fund Management

- A. Procedures for the collection and payment of fees shall be established by the Secretary of Energy as specified in the NWPA 42USC10222. [NWPA 42USC10222(a)(4)] [CRD 3.3.1.2]
- B. The Secretary of Energy shall annually review the amount of the fees established to evaluate whether the amount will be sufficient to offset the costs. [NWPA 42USC10222(a)(4)] [CRD 3.3.1.2]

- C. DOE (WA Operations) shall annually review the adequacy of the fee and propose an adjustment, if necessary, in order to ensure full cost recovery by the Government. [NWPA 42USC10222(a)(4)] [10CFR961.11 Art VIII.A.4] [CRD 3.3.1.2]
- D. Any proposed adjustment to the said fee will be transmitted to Congress and shall be effective after a period of 90 days of continuous session has elapsed following receipt of such transmittal unless either House of Congress adopts a resolution disapproving the proposed adjustment. [NWPA 42USC10222(a)(4)] [10CFR961.11 Art VIII.A.4] [CRD 3.3.1.2]
- E. All receipts, proceeds, and revenues realized by DOE under the contract shall be deposited in the Nuclear Waste Fund, as established in the U.S. Treasury. [10CFR961.1:4s-5s] [CRD 3.3.1.2]

3.7.8.2.15 Fee Receipt Determination

WA Operations shall not accept HLW or SNF generated or owned by any Department of the United States for disposal in the CRWMS unless fees have been deposited in the Nuclear Waste Fund equivalent to the fees that would be paid if the waste were generated by civilian nuclear power reactors. [NWPA 42USC10222(b)(4)] [CRD 3.3.1.2]

3.7.8.2.16 Title Transfer

- A. Acceptance in writing by DOE (WA Operations) of any SNF and/or HLW shall constitute a transfer of title to DOE of the SNF and/or HLW. [NWPA 42USC10143] [10CFR961.11 Art I.10] [10CFR961.11 Art II] [CRD 3.3.1.2]
- B. DOE/OCRWM (WA Operations) shall accept HLW at a designated loading facility adjacent to the Producer HLW facility. [MOA between DP and RW, 1986 (DHLW)] [Derived (CHLW)] [CRD 3.3.1.2] <TBV>
- C. Title to SNF and/or HLW shall transfer to DOE (WA Operations) at the Purchaser/Producer site. [10CFR961.11 Art VII] [CRD 3.3.1.2]
- D. DOE (WA Operations) shall be solely responsible for control of all material upon transfer of title. DOE (WA Operations) has the right to dispose, as it sees fit, of any SNF and/or HLW to which it has taken title. [10CFR961.11 Art VII] [CRD 3.3.1.2]
- E. DOE (WA Operations) shall not be obligated to compensate the Purchaser/Producer for any SNF and/or HLW to which it has taken title. [10CFR961.11 Art VII] [CRD 3.3.1.2]

3.7.8.2.17 Observation by DOE

- A. WA Operations shall verify, using procedures developed by WA, the description of the SNF and/or HLW during MPC and transportation cask loading and prior to acceptance, in accordance with 10CFR961.11 Appendices E and F. [10CFR961.11 Art VI.B.2] [CRD 3.3.1.2]

B. WA Operations shall have the capability to inspect, verify, and record the identification numbers, description, and characteristics of:

1. SNF prior to loading into an MPC or a transportation cask
2. HLW prior to loading into a transportation cask
3. Loaded MPC prior to loading into a transportation cask.
[10CFR961.11 Art VI.B.2] [CRD 3.2.1.1.A]

3.7.8.2.18 Notification of Improperly Described Waste Prior to Acceptance into CRWMS

If SNF and/or HLW is determined by WA Operations to be improperly described prior to acceptance by DOE/OCRWM at the Purchaser/Producer site, WA Operations shall promptly notify the Purchaser/Producer in writing. DOE/OCRWM reserves the right to refuse to accept improperly described waste. The Purchaser/Producer will not transfer title of improperly described SNF and/or HLW unless DOE/OCRWM agrees to accept title under other arrangements agreed to in writing by the parties. [10CFR961.11 Art VI.B.3(a)] [CRD 3.3.1.2]

3.7.8.2.19 Resolution of Improperly Described Waste After Acceptance into CRWMS

- A. When notified by the MGDS and/or MRS of improperly described SNF or HLW, WA Operations shall resolve the waste description with the Purchaser/Producer. [10CFR961.11 Art VI.B.3(b)] [CRD 3.7.1.2.G]
- B. If subsequent to its acceptance, WA Operations finds SNF and/or HLW is improperly described, WA Operations shall promptly notify the Purchaser/Producer in writing of such a finding. In this event, the Purchaser/Producer will provide WA Operations with a proper description within 30 days. In the event that the Purchaser/Producer fails to provide the proper description, DOE may hold in abeyance any and all further deliveries scheduled. [10CFR961.11 Art VI.B.3(b)] [CRD 3.7.1.2.G]

3.7.8.2.20 Annual Report to Purchaser/Producer

DOE (WA Operations) shall annually provide to the Purchaser pertinent information on the waste disposal program including information on cost projections, project plans and progress reports, which will be available to the Producer upon request. [10CFR961.11 Art IV.B.4] [CRD 3.3.1.2]

3.7.8.2.21 Record Disposition

WA Operations shall disposition records in accordance with DOE Order 1324.2. All QA and NRC records related to licensing are to be dispositioned in accordance with QARD, 10CFR60, 10CFR71 and 10CFR73 (see Sections 3.9 and 3.4.8). [DOE Order 3790.1B Ch VII.5.b(2)(g)3] [DOE Order 1324.2A 11.b] [CRD 3.3.1.2]

3.7.9 WA Facilities Segment

3.7.9.1 WA Facilities Segment Description

The WA Facilities Segment provides industry standard facilities, equipment, and personnel necessary to support WA planning and operation. This includes administrative and support facilities that are capable of supporting equipment and computers for WA functions.

3.7.9.1.1 WA Facilities Segment Functions

This segment shall be capable of performing all functions assigned to it in Table B-1 in Appendix B. These functions are:

A. Accept Waste (1.1)

Descriptions for these functions are included in Appendix A. [DOE Order 4700.1 Ch III Att III-1, 1.c(2)(a)] [42USC10131(a)(5)] [CRD 3.7.1.1.1]

3.7.9.1.2 WA Facilities Segment Interfaces

The WA Facilities Segment will identify, describe, and specify interface requirements between WA Facilities and other WA segments, and between WA Facilities and entities external to the CRWMS in accordance with Section 3.2.3.1. [DOE Order 4700.1 Ch III Pt B.2.c(2)(b)] [CRD 3.2.3.1] [CRD 3.2.3.2.B]

3.7.9.2 WA Facilities Segment Requirements

3.7.9.2.1 Physical Characteristics

Selection of standards or guidelines to meet the requirements specified in this section shall be documented in accordance with project procedures. [QARD (DOE/RW-0333P) Section 3.2.2.C] [CRD 3.2.4]

3.7.9.2.1.1 Workplace Environment

A. WA Facilities shall be capable of maintaining, through the use of appropriate environmental controls, an environment that provides comfortable and appropriate workplace temperature and humidity. [DOE Order 6430.1A, 7a(4)] [DOE Order 6430.1A, 1300-12.4.3] [CRD 3.2.4.2.1.A]

B. WA Facilities shall provide personal storage, lavatory, and toilet facilities as required by 29CFR1910.141 and 29CFR1910.94. [29CFR1910.94 (d)(9)(x)] [29CFR1910.141 (c)(1)(i)] [29CFR1910.141(d)(2)(i)] [29CFR1910.141(e)] [CRD 3.2.4.2.1.B]

3.7.9.2.1.2 Heating, Ventilation, and Air Conditioning

WA Facilities shall provide HVAC equipment sized to conform to the environmental requirements of applicable standards. [DOE Order 6430.1A, 1300-12.4.3] [DOE Order 6430.1A, 1550-1.1] [CRD 3.2.4.2.2]

3.7.9.2.1.3 Illumination

WA Facilities shall provide lighting in working areas and other enclosures that conforms to the applicable standards and practices. [29CFR1926.56] [DOE Order 6430.1A, 1300-12.4.3] [DOE Order 6430.1A, 1650-1.1] [DOE Order 6430.1A, 1655-1] [CRD 3.2.4.2.3]

3.7.9.2.1.4 Acoustical Noise

WA Facility work spaces shall provide an acoustical environment that conforms to the requirements of 29CFR1910 and 19CFR1926. [DOE Order 6430.1A, 0950-1] [DOE Order 6430.1A, 1300-12.4.3] [29CFR1910.95(a)] [29CFR1926.52(a)] [CRD 3.2.4.2.4]

3.7.9.2.1.5 Vibration

WA Facility buildings, facilities, and personnel enclosures shall be designed, located, or modified for vibration control to be determined at the design level. [DOE Order 6430.1A, 1300-12.4.3] [CRD 3.2.4.2.5]

3.7.9.2.2 Records Storage

3.7.9.2.2.1 Waste Process Records

WA Facilities shall have storage area(s) to keep records showing the receipt and inventory (including location) of all SNF and HLW in the CRWMS. The records must include as a minimum the name of shipper of the material for each shipment, the estimated quantity of radioactive material per item, item identification, and storage location. [QARD(DOE/RW-0333P) Appendix A] [10CFR72.72(a)] [CRD 3.9.A]

3.7.9.2.2.2 Duplicate Records Storage

WA Facilities shall have storage facilities to keep duplicate records of waste. The duplicate set of records must be kept at a separate location sufficiently remote from the original records that a single event would not destroy both sets of records. [10CFR72.72(d)] [CRD 3.3.1.2]

3.7.9.2.3 Flexibility, Expansion, and Integration

WA Facilities shall be designed and constructed so as not to preclude the later addition, where appropriate, of facilities for offices and laboratories or expansion of their basic mission. [DOE Order 6430.1A, 0110-3] [CRD 3.2.8]

3.8 PRECEDENCE

- A. The order of precedence for external sources of requirements for the SRD is: Federal law (i.e., statutes and treaties; regulations and executive orders; and other documents, e.g., DOE orders); state and tribal laws; local ordinances; and national and international standards. After its review and approval, the SRD is the sole authority for the DRDs. The order of precedence for development of the technical baseline as reflected in the OCRWM Document Hierarchy is: CRD, SRDs, DRD, and Design Packages. Each design phase shall be developed in accordance with the applicable requirements documents appropriate to that phase, as outlined in the OCRWM Systems Engineering Management Plan (e.g., SRDs support Preliminary Design, DRDs support Detailed Design, Design Packages support construction, etc.). Thus, once approved, each requirements document or design package becomes the prime authority for work within its scope. Any conflicts identified are resolved in accordance with the OCRWM Baseline Management Plan. [DOE Order 4700.1 Ch I Pt C.7.b(2)] [DOE Order 6430.1A, 7.a(3)] [CRD 3.8.A]
- B. In resolving questions of precedence involving DOE Orders or CFRs that address nuclear safety requirements covered by the NRC issued CFRs, the NRC requirements shall take precedence in design of licensed facilities¹. [MOA NS/RW, 4/16/92] [CRD 3.8.B]

3.9 QUALITY ASSURANCE

- A. Waste Acceptance shall apply the QARD to all activities affecting the quality of Q-List items. [QARD(DOE/RW-0333P) Section 2.2.3.C] [10CFR60.150] [10CFR60.151] [10CFR60.152]
- B. Reserved
- C. Reserved
- D. Reserved
- E. Reserved

¹ However, DOE Orders, or CFRs, or other standards may be used for guidance in meeting NRC requirements.

4. CONFORMANCE VERIFICATION

Section 4 outlines the methods by which the M&O will verify the conformance of the CRWMS with its design requirements.

4.1 GENERAL

As specified in the OCRWM Test and Evaluation Master Plan, the CRWMS projects will establish test and evaluation programs to demonstrate their conformance of the design to the system requirements as required in the verification cross-reference table of Section 4.3.

The test and evaluation program and the conformance verification activities will be integrated activities associated with NRC-license application.

4.2 METHODS

The methods of verification to be used are:

- A. **Analysis.** Analysis is the process of accumulating results and conclusions intended to verify that a requirement has been satisfied. Analytical-verification of compliance may include compilation and interpretation of results of tests, demonstrations, and examinations of lower-level components of the system. Analysis may also include logical arguments, modeling, calculations, tradeoff studies, reports (design and/or tradeoff), and other relevant information to verify compliance with a requirement, when physical testing of a system is impracticable.

Example: Verifying compliance with the Groundwater Travel Time requirement, which requires integration of results of multiple studies involving models, test data, and other information.

- B. **Examination.** Examination is the process of conducting careful observation and inspection, without use of special laboratory appliances and procedures, to verify compliance with specified requirements. Examination is a relatively direct method, involving, at most, simple physical manipulation or measurement. It is generally non-destructive and does not necessarily involve operation of the system being evaluated.

Example: Visual inspection of a road to verify drainage ditches and culverts are present.

- C. **Test.** Test is the quantitative process whereby data is collected, under controlled conditions, to document the performance of a product with respect to a standard. Manipulation and analysis of data derived from testing is an integral part of the method. Special instrumentation and scientific procedures are commonly employed. A test may be conducted in a laboratory or in the field (in situ).

Example: Measurements to verify radiologic shielding effects.

D. **Demonstration.** Demonstration is the qualitative process of displaying or operating a system or item in or near its operational environment to verify compliance with requirements. It differs from testing in that it is generally a qualitative and direct determination of the performance of a function and is performed without special instrumentation or other special equipment.

Example: Deliberate turn-off of an electric power source to verify automatic operation of emergency lighting.

4.3 CROSS-REFERENCE

Table 4-1 correlates the requirements of Sections 3 and 5 with the verification methods to be used to verify conformance with the requirements¹. Verifying compliance with requirements is part of the test and evaluation process as documented in the OCRWM Test and Evaluation Master Plan. The process includes the development of test plans and procedures. These plans and procedures will be developed and performed on all procured, constructed, and developed equipment, structures, and software. Implementation of these plans and procedures will provide test reports that will be used as documentation of conformance verification.

In the following table, items marked "N/A" (not applicable) have no verification required. These items are titles or explanatory materials. The other columns "A" (analysis), "E" (examination), "T" (test), and "D" (demonstration) refer to the verification methods identified in Section 4.2.

The lower-level design documents may state methods of verification that differ from the direction provided in Table 4-1. When more than one method of compliance is marked in Table 4-1, compliance must be verified by one or more of the methods marked.

(Extensive changes have been made to the structure of the WA-SRD for revision 2. For this reason, Table 4-1 from WA-SRD Rev 1 has been deleted in its entirety and replaced with the following updated table.)

Table 4-1. Conformance Verification Matrix

SECTION 3 & 5 PARA.	TITLE	N/A	A	E	T	D
3.1	SYSTEM DEFINITION	X				
3.1.5	Major Considerations and Assumptions	X				
3.2	CHARACTERISTICS	X				
3.2.1	Performance Characteristics	X				
3.2.1.1	SNF and HLW Acceptance	X				
3.2.1.1.A			X	X		
3.2.1.1.B			X			X
3.2.1.1.C			X			

¹ For the purposes of the Purchaser/Producer and any requirements allocated by the WA-SRD to the Purchaser/Producer, this table is for guidance only. However, the Purchaser/Producer is still responsible for demonstrating compliance with those requirements allocated to them by the WA-SRD in a verifiable manner.

Table 4-1. Conformance Verification Matrix (continued)

SECTION 3 & 5 PARA.	TITLE	N/A	A	E	T	D
3.2.1.1.D				X		
3.2.1.1.E				X		
3.2.1.1.F	Waste Acceptance Services:	X				
3.2.1.1.F.1						X
3.2.1.1.F.2						X
3.2.1.1.G						X
3.2.1.2	Reserved	X				
3.2.1.3	Reserved	X				
3.2.1.4	Reserved	X				
3.2.1.5	WA Verification and Acceptance Capabilities	X				
3.2.1.5.A			X			X
3.2.1.5.B			X			X
3.2.2	Radiological Protection	X				
3.2.2.A			X	X	X	X
3.2.2.B	Occupational dose limits:	X				
3.2.2.B.1					X	X
3.2.2.B.2					X	X
3.2.3	Interface Requirements	X				
3.2.3.1	Interface with External Organizations	X				
3.2.3.1.1	WA - Producer Interface Requirements	X				
3.2.3.1.1.1	HLW Receipt			X		
3.2.3.1.1.2	High-Level Waste Form Criteria	X				
3.2.3.1.1.2.A		X				
3.2.3.1.1.2.A.1						X
3.2.3.1.1.2.A.2						X
3.2.3.1.1.2.A.3						X
3.2.3.1.1.2.B				X		X
3.2.3.1.1.2.C				X		X
3.2.3.1.1.3	HLW Standard Form	X				
3.2.3.1.1.3.A				X		
3.2.3.1.1.3.B		X				
3.2.3.1.1.3.B.1				X		X
3.2.3.1.1.3.B.2				X		X
3.2.3.1.1.3.B.3				X		
3.2.3.1.1.3.B.4				X		
3.2.3.1.1.3.B.5			X		X	
3.2.3.1.1.3.B.6			X	X		
3.2.3.1.1.3.B.7			X		X	X
3.2.3.1.1.3.B.8				X		

Table 4-1. Conformance Verification Matrix (continued)

SECTION 3 & 5 PARA.	TITLE	N/A	A	E	T	D
3.2.3.1.1.3.B.9			X	X		
3.2.3.1.1.4	HLW Nonconforming Form			X		
3.2.3.1.1.5	HLW Nonstandard Form			X		
3.2.3.1.1.6	Criticality Safety for HLW	X				
3.2.3.1.1.6.A			X			
3.2.3.1.1.6.B			X			
3.2.3.1.1.6.C			X			
3.2.3.1.1.7	High-Level Waste Form - Material Compatibility		X		X	X
3.2.3.1.1.8	Chemical Composition of HLW	X				
3.2.3.1.1.8.A						X
3.2.3.1.1.8.B						X
3.2.3.1.1.9	Canister Material and Fabrication Reporting of HLW					X
3.2.3.1.1.10	Radionuclide Inventory of HLW		X	X		
3.2.3.1.1.11	HLW Canister After Closure	X				
3.2.3.1.1.11.A				X		X
3.2.3.1.1.11.B				X		X
3.2.3.1.1.12	Removable Radioactive Contamination on HLW Canister	X				
3.2.3.1.1.12.A				X		
3.2.3.1.1.12.B				X		X
3.2.3.1.1.12.C						X
3.2.3.1.1.13	HLW Phase Stability and Integrity	X				
3.2.3.1.1.13.A			X	X		
3.2.3.1.1.13.B						X
3.2.3.1.1.14	Hazardous Waste Determination for HLW	X				
3.2.3.1.1.14.A			X	X		
3.2.3.1.1.14.B				X	X	
3.2.3.1.1.14.C				X		X
3.2.3.1.1.15	HLW Consistency Test	X				
3.2.3.1.1.15.A			X		X	
3.2.3.1.1.15.B			X		X	
3.2.3.1.1.16	HLW Canister Impact Characteristics	X				
3.2.3.1.1.16.A			X		X	
3.2.3.1.1.16.B			X		X	
3.2.3.1.1.17	HLW Canister Label Requirements	X				
3.2.3.1.1.17.A				X		X
3.2.3.1.1.17.B			X			

Table 4-1. Conformance Verification Matrix (continued)

SECTION 3 & 5 PARA.	TITLE	N/A	A	E	T	D
3.2.3.1.1.17.C				X		X
3.2.3.1.1.17.D				X		X
3.2.3.1.1.17.E				X		X
3.2.3.1.1.17.F				X		X
3.2.3.1.1.18	HLW Canister Handling Features	X				
3.2.3.1.1.18.A			X	X		
3.2.3.1.1.18.B			X	X	X	
3.2.3.1.1.18.C			X	X	X	
3.2.3.1.1.18.D			X	X	X	
3.2.3.1.1.18.E			X	X	X	
3.2.3.1.1.19	HLW Form Dose Rate at Shipment		X	X		
3.2.3.1.1.20	HLW Condition at Delivery			X		X
3.2.3.1.1.21	Records for HLW	X				
3.2.3.1.1.21.1	General Requirements	X				
3.2.3.1.1.21.1.A				X		
3.2.3.1.1.21.1.B				X		
3.2.3.1.1.21.2	Waste Form Compliance Plan (WCP)			X		
3.2.3.1.1.21.3	Waste Form Qualification Report (WQR)			X		
3.2.3.1.1.21.4	Production Record for HLW			X		
3.2.3.1.1.21.5	Storage and Shipping Record for HLW			X		
3.2.3.1.1.22	HLW Annual Report			X		
3.2.3.1.1.23	Agreements for HLW			X		
3.2.3.1.1.24	Request for Nonstandard or Nonconforming HLW Delivery	X				
3.2.3.1.1.24.A				X		
3.2.3.1.1.24.B				X		
3.2.3.1.1.25	Final Description of HLW			X		
3.2.3.1.1.26	Shipping Records for HLW	X				
3.2.3.1.1.26.A				X		
3.2.3.1.1.26.B				X		
3.2.3.1.1.26.C				X		
3.2.3.1.1.26.D				X		
3.2.3.1.1.26.E				X		
3.2.3.1.1.27	Routine Determinations for HLW			X		
3.2.3.1.1.28	Title Transfer for HLW	X				
3.2.3.1.1.28.A				X		
3.2.3.1.1.28.B				X		

Table 4-1. Conformance Verification Matrix (continued)

SECTION 3 & 5 PARA.	TITLE	N/A	A	E	T	D
3.2.3.1.1.28.C				X		
3.2.3.1.1.29	Observation by DOE for HLW			X		
3.2.3.1.1.30	Notification of Improperly Described HLW Prior to Acceptance into CRWMS			X		
3.2.3.1.1.31	Resolution of Improperly Described HLW After Acceptance into CRWMS			X		
3.2.3.1.1.32	Reserved	X				
3.2.3.1.1.33	HLW Transaction Reporting			X		
3.2.3.1.1.34	Quality Assurance for HLW	X				
3.2.3.1.1.34.A			X	X		
3.2.3.1.1.34.B			X	X		
3.2.3.1.1.34.C			X	X		
3.2.3.1.1.34.D				X		
3.2.3.1.1.34.E				X		
3.2.3.1.1.34.F				X		
3.2.3.1.1.35	IAEA Safeguards Reporting for HLW		X	X		
3.2.3.1.1.35.A			X	X		
3.2.3.1.1.35.B			X	X		
3.2.3.1.1.35.C			X	X		
3.2.3.1.2	WA - Purchaser Interface Requirements	X				
3.2.3.1.2.1	Commercial SNF Receipt			X		
3.2.3.1.2.2	Criteria for Commercial SNF	X				
3.2.3.1.2.2.A		X				
3.2.3.1.2.2.A.1			X			X
3.2.3.1.2.2.A.2						X
3.2.3.1.2.2.A.3						X
3.2.3.1.2.2.B			X			X
3.2.3.1.2.2.C			X			X
3.2.3.1.2.3	Standard Commercial SNF			X		
3.2.3.1.2.4	Commercial SNF Failed Form			X		
3.2.3.1.2.5	Commercial SNF Nonstandard Form			X		
3.2.3.1.2.6	Commercial SNF Data	X				
3.2.3.1.2.6.A				X		
3.2.3.1.2.6.B				X		
3.2.3.1.2.7	Canisters Containing Commercial SNF	X				
3.2.3.1.2.7.A				X		
3.2.3.1.2.7.B			X	X		

Table 4-1. Conformance Verification Matrix (continued)

SECTION 3 & 5 PARA.	TITLE	N/A	A	E	T	D
3.2.3.1.2.7.C				X		
3.2.3.1.2.7.D				X		
3.2.3.1.2.7.E				X		
3.2.3.1.2.8	Contracts for Commercial SNF	X				
3.2.3.1.2.8.A				X		
3.2.3.1.2.8.B				X		
3.2.3.1.2.8.C				X		
3.2.3.1.2.9	Delivery Commitment Schedules for Commercial SNF		X	X		
3.2.3.1.2.10	Exchange Requests for Commercial SNF			X		
3.2.3.1.2.11	Request for Nonstandard or Failed Commercial SNF Delivery			X		
3.2.3.1.2.12	Final Delivery Schedules for Commercial SNF	X				
3.2.3.1.2.12.A				X		
3.2.3.1.2.12.B			X	X		
3.2.3.1.2.13	Final Description for Commercial SNF			X		
3.2.3.1.2.14	Waste Fund Management	X				
3.2.3.1.2.14.A				X		
3.2.3.1.2.14.B				X		
3.2.3.1.2.14.C				X		
3.2.3.1.2.15	Shipping Records for Commercial SNF	X				
3.2.3.1.2.15.A				X		
3.2.3.1.2.15.B				X		
3.2.3.1.2.15.C				X		
3.2.3.1.2.15.D				X		
3.2.3.1.2.16	Routine Determinations for Commercial SNF			X		
3.2.3.1.2.17	Title Transfer for Commercial SNF			X		
3.2.3.1.2.18	Observation by DOE for Commercial SNF			X		
3.2.3.1.2.19	Notification of Improperly Described Commercial SNF Prior to Acceptance into CRWMS			X		
3.2.3.1.2.20	Resolution of Improperly Described Commercial SNF After Acceptance into CRWMS			X		
3.2.3.1.2.21	Initial Inventory Reporting for Commercial SNF			X		
3.2.3.1.2.22	Transaction Reporting for Commercial SNF			X		
3.2.3.1.2.23	Quality Assurance for Commercial SNF	X				
3.2.3.1.2.23.A				X		
3.2.3.1.2.23.B				X		
3.2.3.2	Interfaces with Other CRWMS Elements	X				
3.2.3.2.1	WA-Storage Interface Requirements	X				

Table 4-1. Conformance Verification Matrix (continued)

SECTION 3 & 5 PARA.	TITLE	N/A	A	E	T	D
3.2.3.2.1.1	WA-MRS Interface Requirements	X				
3.2.3.2.1.1.1	WA Hardware Segment Interface Requirements	X				
3.2.3.2.1.1.1.1	WA Hardware - MRS Utilities Interface			X		
3.2.3.2.1.1.2	WA Software Segment Interface Requirements	X				
3.2.3.2.1.1.2.1	WA Software - MRS Utilities Interface			X		
3.2.3.2.1.1.3	WA Operations Segment Interface Requirements	X				
3.2.3.2.1.1.3.1	WA Operations - MRS Preparation and Transfer Interface			X		
3.2.3.2.1.1.3.2	WA Operations - MRS Storage Mode Facility Interface			X		
3.2.3.2.1.1.4	WA Facilities Segment Interface Requirements	X				
3.2.3.2.1.1.4.1	WA Facilities - MRS Utilities Interface			X		
3.2.3.2.1.2	WA-OSTS Interface Requirements	X				
3.2.3.2.2	WA-MGDS Interface Requirements	X				
3.2.3.2.2.1	WA Hardware Segment Interface Requirements	X				
3.2.3.2.2.1.1	WA Hardware - Repository Interface			X		
3.2.3.2.2.2	WA Software Segment Interface Requirements	X				
3.2.3.2.2.2.1	WA Software - MGDS Repository Interface			X		
3.2.3.2.2.3	WA Operations Segment Interface Requirements	X				
3.2.3.2.2.3.1	WA Operations - MGDS Repository Interface	X				
3.2.3.2.2.3.1.A						X
3.2.3.2.2.3.1.B						X
3.2.3.2.2.3.2	WA Operations - MGDS Engineered Barrier Segment Interface	X				
3.2.3.2.2.3.2.A						X
3.2.3.2.2.3.2.B						X
3.2.3.2.2.4	WA Facilities Segment Interface Requirements	X				
3.2.3.2.2.4.1	WA Facilities - MGDS Repository Interface			X		
3.2.3.2.3	WA-Transportation Interface Requirements	X				
3.2.3.2.3.1	WA Hardware Segment Interface Requirements	X				
3.2.3.2.3.1.1	WA Hardware - Trans Planning and Control Interface			X		
3.2.3.2.3.2	WA Software Segment Interface Requirements	X				
3.2.3.2.3.2.1	WA Software - Trans Planning and Control Interface			X		
3.2.3.2.3.3	WA Operations Segment Interface Requirements	X				
3.2.3.2.3.3.1	WA Operations - Trans Planning and Control Interface		X	X		X
3.2.3.2.4	Reserved	X				
3.2.4	Physical Characteristics	X				
3.2.4.1	Reserved	X				
3.2.4.2	Reserved	X				

Table 4-1: Conformance Verification Matrix (continued)

SECTION 3 & 5 PARA.	TITLE	N/A	A	E	T	D
3.2.4.3	Safeguards and Security	X				
3.2.4.3.1	Physical Protection			X		
3.2.4.3.2	Reserved	X				
3.2.4.3.3	Reserved	X				
3.2.4.3.4	Material Control and Accounting	X				
3.2.4.3.4.A				X		
3.2.4.3.4.B				X		
3.2.4.3.4.C				X		
3.2.4.3.4.D				X		
3.2.5	System Quality Factors	X				
3.2.5.1	Reliability	X				
3.2.5.1.A			X			
3.2.5.1.B			X	X		
3.2.5.2	Maintainability/Inspectability	X				
3.2.5.2.A			X			
3.2.5.2.B				X		
3.2.5.2.C			X			X
3.2.5.3	Availability		X	X		
3.2.5.4	Service Life		X	X		
3.2.5.5	Overall Utilization		X			
3.2.6	Reserved	X				
3.2.7	Transportability/Modularity		X	X		
3.2.8	Reserved	X				
3.2.9	Portability and Load Carrying			X		
3.3	DESIGN AND CONSTRUCTION	X				
3.3.1	General Design Criteria	X				
3.3.1.A			X	X		
3.3.1.B			X	X		
3.3.1.C			X	X		
3.3.1.D				X		
3.3.2	Electromagnetic Radiation	X				
3.3.2.A			X	X		
3.3.2.B			X	X		
3.3.2.C			X	X		
3.3.3	Nameplate and Markings	X				
3.3.3.A				X		

Table 4-1. Conformance Verification Matrix (continued)

SECTION 3 & 5 PARA.	TITLE	N/A	A	E	T	D
3.3.3.B				X		
3.3.4	Workmanship	X				
3.3.4.A			X	X		
3.3.4.B				X		
3.3.5	Interchangeability			X		
3.3.6	Safety	X				
3.3.6.1	General Requirements	X				
3.3.6.1.A			X			
3.3.6.1.B			X			
3.3.6.2	System Safety Precedence		X			
3.3.6.3	Facilities, Equipment, and Materials Protective Measures	X				
3.3.6.3.A				X		
3.3.6.3.B				X		
3.3.6.4	Personnel Protective Equipment	X				
3.3.6.4.A				X		
3.3.6.4.B				X		
3.3.6.4.C				X		
3.3.6.5	Reserved	X				
3.3.6.6	Safety Labels and Placards	X				
3.3.6.6.A				X		
3.3.6.6.B				X		
3.3.6.6.C				X		
3.3.6.7	Emergency Lighting	X				
3.3.6.7.A				X	X	
3.3.6.7.B	Emergency Lighting system:	X				
3.3.6.7.B.1				X		
3.3.6.7.B.2				X		
3.3.6.7.C			X		X	
3.3.6.8	Equipment Related Hazards	X				
3.3.6.8.A				X		
3.3.6.8.B				X		
3.3.6.8.C				X		
3.3.6.8.D				X		
3.3.6.9	Work Platforms	X				
3.3.6.9.A				X		
3.3.6.9.B				X		

Table 4-1. Conformance Verification Matrix (continued)

SECTION 3 & 5 PARA.	TITLE	N/A	A	E	T	D
3.3.6.10	Electrical Safety	X				
3.3.6.10.A				X		
3.3.6.10.B				X		
3.3.6.10.C			X	X		
3.3.6.10.D				X		
3.3.7	Human Factors Engineering	X				
3.3.7.1	Reserved	X				
3.3.7.2	Voice Communications Equipment			X		
3.3.7.3	Alarms and Warning Systems			X		
3.3.7.4	Controls			X		
3.3.7.5	Visual Displays			X		
3.3.7.6	Control Panel Layout			X		
3.3.7.7	Reserved	X				
3.3.7.8	Labeling, Markings, and Signs			X		
3.3.7.9	Visual Display Terminal (VDT) Workstation			X		
3.3.7.10	Anthropometry and Ergonomics			X		
3.3.7.11	Remote Handling and Operation			X		
3.3.7.12	Vehicles and Material Handling			X		
3.3.7.13	Accessibility and Useability by the Physically Handicapped			X		
3.3.7.14	User-Computer Software Interface			X		
3.3.7.15	Human Factors Program			X		
3.3.8	Methods and Controls	X				
3.3.8.1	Material Management	X				
3.3.8.1.A	Identification and control of materials:	X				
3.3.8.1.A.1				X		
3.3.8.1.A.2				X		
3.3.8.1.B	Material, parts, or components conformance:	X				
3.3.8.1.B.1				X		
3.3.8.1.B.2				X		
3.3.8.1.B.3				X		
3.3.8.1.C				X		
3.3.8.1.D				X		
3.3.8.2	Inventory Management			X		
3.3.9	Government Furnished Property	X				
3.3.9.A				X		
3.3.9.B				X		

Table 4-1. Conformance Verification Matrix (continued)

SECTION 3 & 5 PARA.	TITLE	N/A	A	E	T	D
3.3.10	Reserved	X				
3.3.11	Environmental Protection Requirements	X				
3.4	DOCUMENTATION	X				
3.4.1	Requirements Documents and Specifications	X				
3.4.1.A				X		
3.4.1.B				X		
3.4.2	Drawings			X		
3.4.3	Maintenance, Operator, and Technical Manuals			X		
3.4.4	Test Plans and Procedures			X		
3.4.5	Quality Assurance Documentation			X		
3.4.6	Construction Records			X		
3.4.7	Computer Documentation			X		
3.4.8	Records Management	X				
3.4.8.A				X		
3.4.8.B				X		
3.4.8.C				X		
3.5	LOGISTICS	X				
3.5.1	Maintenance					X
3.5.1.1	Equipment Maintenance	X				
3.5.1.1.A	Built-In-Test Equipment (BITE) and Automatic-Test-Equipment (ATE):	X				
3.5.1.1.A.1			X	X		
3.5.1.1.A.2			X	X		
3.5.1.1.B				X		
3.5.1.1.C				X		
3.5.1.1.D				X		
3.5.1.1.E				X		
3.5.1.2	Calibration Maintenance			X	X	
3.5.2	Supportability	X				
3.5.2.A			X			
3.5.2.B						X
3.5.2.C				X		
3.5.3	Facilities	X				
3.5.3.A				X		
3.5.3.B			X	X		
3.5.3.C			X	X		
3.5.3.D			X	X		

Table 4-1. Conformance Verification Matrix (continued)

SECTION 3 & 5 PARA.	TITLE	N/A	A	E	T	D
3.5.4	Support & Test Equipment		X			
3.6	PERSONNEL AND TRAINING	X				
3.6.1	Personnel	X				
3.6.1.A				X		
3.6.1.B				X		
3.6.1.C				X		
3.6.2	Training	X				
3.6.2.1	General Requirements	X				
3.6.2.1.A			X	X		
3.6.2.1.B				X		
3.6.2.1.C			X			
3.6.2.2	Health Physics Training			X		
3.6.2.3	Occupational Safety and Health Training			X		
3.7	SEGMENT REQUIREMENTS	X				
3.7.1	Reserved	X				
3.7.2	Reserved	X				
3.7.3	Reserved	X				
3.7.4	Reserved	X				
3.7.5	WA Hardware Segment	X				
3.7.5.1	WA Hardware Segment Description	X				
3.7.5.1.1	WA Hardware Segment Functions		X	X		X
3.7.5.1.2	WA Hardware Segment Interfaces		X			
3.7.5.2	WA Hardware Segment Requirements				X	
3.7.6	WA Equipment Segment	X				
3.7.6.1	WA Equipment Segment Description	X				
3.7.6.1.1	WA Equipment Segment Functions		X	X		X
3.7.6.1.2	WA Equipment Segment Interfaces		X		X	
3.7.6.2	WA Equipment Segment Requirements	X				
3.7.6.2.A				X		
3.7.6.2.B				X		
3.7.6.2.C				X		X
3.7.6.2.D				X		X
3.7.7	WA Software Segment	X				
3.7.7.1	WA Software Segment Description	X				
3.7.7.1.1	WA Software Segment Functions		X	X		X
3.7.7.1.2	WA Software Segment Interfaces		X			

Table 4-1. Conformance Verification Matrix (continued)

SECTION 3 & 5 PARA.	TITLE	N/A	A	E	T	D
3.7.7.2	WA Software Segment Requirements				X	
3.7.8	WA Operations Segment	X				
3.7.8.1	WA Operations Segment Description	X				
3.7.8.1.1	WA Operations Segment Functions		X	X		X
3.7.8.1.2	WA Operations Segment Interfaces		X			
3.7.8.2	WA Operations Segment Requirements	X				
3.7.8.2.1	Notifications	X				
3.7.8.2.1.A			X	X		X
3.7.8.2.1.B			X			X
3.7.8.2.1.C			X	X		X
3.7.8.2.2	Waste Acceptance Criteria	X				
3.7.8.2.2.A			X			X
3.7.8.2.2.B			X			X
3.7.8.2.3	SNF Specifications			X	X	
3.7.8.2.4	HLW Specifications			X	X	
3.7.8.2.5	Contract/Agreement	X				
3.7.8.2.5.A				X		
3.7.8.2.5.B				X		
3.7.8.2.5.C				X		
3.7.8.2.5.D				X		
3.7.8.2.5.E				X		
3.7.8.2.5.F				X		
3.7.8.2.5.G				X		
3.7.8.2.5.H				X		
3.7.8.2.6	Acceptance Priority Ranking			X		
3.7.8.2.7	Annual Capacity Report			X		
3.7.8.2.8	Emergency Deliveries			X		
3.7.8.2.9	Delivery Commitment Schedules	X				
3.7.8.2.9.A			X	X		
3.7.8.2.9.B			X	X		
3.7.8.2.9.C				X		
3.7.8.2.10	Exchange Requests			X		
3.7.8.2.11	Request for Nonstandard Waste Form Delivery			X		
3.7.8.2.12	Final Delivery Schedules	X				
3.7.8.2.12.A			X	X		
3.7.8.2.12.B			X	X		

Table 4-1. Conformance Verification Matrix (continued)

SECTION 3 & 5 PARA.	TITLE	N/A	A	E	T	D
3.7.8.2.12.C			X	X		
3.7.8.2.12.D			X	X		
3.7.8.2.13	Reserved		X			
3.7.8.2.14	Waste Fund Management	X				
3.7.8.2.14.A			X	X		
3.7.8.2.14.B			X	X		
3.7.8.2.14.C				X		
3.7.8.2.14.D				X		
3.7.8.2.14.E			X	X		
3.7.8.2.15	Fee Receipt Determination		X	X		
3.7.8.2.16	Title Transfer	X				
3.7.8.2.16.A				X		
3.7.8.2.16.B				X		
3.7.8.2.16.C				X		
3.7.8.2.16.D				X		
3.7.8.2.16.E				X		
3.7.8.2.17	Observation by DOE	X				
3.7.8.2.17.A				X		
3.7.8.2.17.B			X		X	
3.7.8.2.18	Notification of Improperly Described Waste Prior to Acceptance into CRWMS			X		
3.7.8.2.19	Resolution of Improperly Described Waste After Acceptance into CRWMS	X				
3.7.8.2.19.A			X			X
3.7.8.2.19.B				X		
3.7.8.2.20	Annual Report to Purchaser/Producer			X		
3.7.8.2.21	Record Disposition			X		
3.7.9	WA Facilities Segment	X				
3.7.9.1	WA Facilities Segment Description	X				
3.7.9.1.1	WA Facilities Segment Functions		X	X		X
3.7.9.1.2	WA Facilities Segment Interfaces		X			
3.7.9.2	WA Facilities Segment Requirements	X				
3.7.9.2.1	Physical Characteristics	X				
3.7.9.2.1.1	Workplace Environment	X				
3.7.9.2.1.1.A					X	X
3.7.9.2.1.1.B					X	X
3.7.9.2.1.2	Heating, Ventilation, and Air Conditioning				X	X

Table 4-1. Conformance Verification Matrix (continued)

SECTION 3 & 5 PARA.	TITLE	N/A	A	E	T	D
3.7.9.2.1.3	Illumination				X	X
3.7.9.2.1.4	Acoustical Noise				X	X
3.7.9.2.1.5	Vibration		X		X	
3.7.9.2.2	Records Storage	X				
3.7.9.2.2.1	Waste Process Records		X	X		
3.7.9.2.2.2	Duplicate Records Storage		X	X		
3.7.9.2.3	Flexibility, Expansion, and Integration		X			
3.8	PRECEDENCE	X				
3.8.A						X
3.8.B						X
3.9	Quality Assurance	X				
3.9.A						X
3.9.B	Reserved	X				
3.9.C	Reserved	X				
3.9.D	Reserved	X				
3.9.E	Reserved	X				
5.	PREPARATION FOR OPERATIONS	X				
5.1	KEY DECISIONS	X				
5.1.A				X		
5.1.B				X		
5.2	REQUIREMENTS	X				
5.2.A				X		
5.2.B				X		
5.2.C				X		

5. PREPARATION FOR OPERATIONS

5.1 KEY DECISIONS

- A. Preparation for operations is governed by a series of Key Decision (KD) points. The Energy System Acquisition Advisory Board (ESAAB) supports the DOE Acquisition Executive by providing advice and assistance at those points. Key Decision 4 (KD-4), Approval to Commence Operation, is scheduled prior to transition from acquisition and construction to operation of the CRWMS elements. Preparation of applications for the licenses, certificates, and permits that must be issued prior to commencement of operations shall be undertaken in a timely manner to ensure their review, approval and issuance prior to KD-4. Transition to the operations phase is not formally made until demonstrated capability to meet technical performance goals specified in CRWMS requirements documents and specifications are achieved, and required licenses, certificates, and permits have been issued. These conditions are confirmed by the ESAAB. [DOE Order 4700.1 Ch I Pt D.2] [CRD 5.1.A]
- B. In accordance with DOE Order 4700.1, a presentation package shall be developed to support ESAAB determination of the readiness of each element of CRWMS to proceed with operations. At a minimum, the presentation packages to support the ESAAB at KD-4 will contain: a description of the project; background data; major technical and performance requirements; licenses, certificates and permits; readiness to proceed with operations; and problems, issues, or items of concern. [DOE Order 4700.1 Ch I Att I-2] [CRD 5.1.B]

5.2 REQUIREMENTS

- A. In addition to satisfying the requirements of the specifications, all elements of the CRWMS shall establish programs to ensure, at the commencement of operations, the availability of sufficient trained personnel to operate the elements and validated documentation to support the operations. [10CFR71.105(d)] [CRD 5.2.A]
- B. The elements shall additionally establish logistics support systems, to include ensuring the availability of sufficient spares to support the element maintenance concept and the design availability factors used in the design. [DOE Order 4700.1 Ch III Att III-1 1.a, 1.c(6)(b)3] [CRD 5.2.B]
- C. Specific plans and procedures for acceptance, operational, and integrated testing, as well as preparation of test documentation, will be governed by the test and evaluation plans. [DOE Order 4700.1 Ch II Att II-4.2.s] [CRD 5.2.C]

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6. NOTES

6.1 GLOSSARY

Acceptance, as used in this document, is the process by which the Department will take title to, and physical possession of, SNF and HLW for the Purchaser/Producer. Conceptually, acceptance is accomplished by execution of the primary WA functions. Specifically, acceptance is the planning, preparation, and completion of the documentation necessary to transfer title. Any actual handling of the SNF and HLW related to their transfer is accomplished by CRWMS elements other than WA, and/or by the Purchaser/Producer

Architecture is the physical system actually built, found, or selected to perform a function subject to its stated requirements.

As low as is reasonably achievable (ALARA) means making every reasonable effort to maintain exposures to radiation as far below the dose limits in 10CFR20 as is practical consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest. (As defined in 10CFR20.1003.)

Atomic Energy Defense Activity is any activity of the Secretary performed in whole or in part in carrying out any of the following functions:

- A. naval reactors development;
- B. weapons activities including defense inertial confinement fusion;
- C. verification and control technology;
- D. defense nuclear materials production;
- E. defense nuclear waste and materials by-products management;
- F. defense nuclear materials security and safeguards and security investigations; and
- G. defense research and development.

Availability is the probability that an equipment, system, or process is able to perform a specified function under specified conditions at a randomly selected point in time. Availability can also be defined as the fraction of time during an operating period that the system or equipment is functioning properly.

Blending is (1) selecting SNF assemblies of different characteristics for inclusion in an MPC, transportation cask, storage mode, or waste package, or (2) selecting HLW of different characteristics for inclusion in a transportation cask or waste package to meet design goals.

Borosilicate waste glass is glass typically containing approximately 20 to 40 wt.% waste oxides, 40 to 65 wt.% silica, 5 to 10 wt.% boron oxide, and 10 to 20 wt.% alkali oxides, plus other oxide constituents.

Canister is the structure surrounding the waste form (e.g., HLW immobilized in borosilicate glass) that facilitates handling, storage, transportation, and/or disposal. A canister is a metal receptacle with

the following purpose: (1) for solidified HLW, its purpose is a pour mold and (2) for SNF, it may provide structural support for intact SNF, loose rods, nonfuel components, or confinement of radionuclides. (See definition of multi-purpose canister.)

Cask is a container for shipping or storing spent nuclear fuel and/or canistered high-level waste that meets all applicable regulatory requirements.

Cask Subsystem is defined under transportation cask subsystem.

Civilian Radioactive Waste Management System (CRWMS) is the composite of sites, facilities, systems, equipment, materials, information, activities, and personnel required to perform those activities necessary to manage spent nuclear fuel and high-level radioactive waste disposal.

Commercial high-level radioactive waste (CHLW) is the high-level radioactive waste, as defined by NWPA 42USC10101(12), resulting from reprocessing spent nuclear fuel in a commercial facility.

Consolidation is the operation performed on spent fuel assemblies during which the upper and lower fuel-assembly tie plates are removed, the assembly spacer grids and any other assembly structural members are removed, and the fuel rods are collected and formed into a closely packed array in a canister or container. The nonfuel structural members of the fuel assemblies are reduced in volume and placed in canisters or containers for shipment and disposal. [DOE/RW-0199, Vol. VIII, Part B, page G-18]

Contract is the agreement set forth in 10CFR961.11 and any duly executed amendment or modification thereto.

Defense high-level radioactive waste (DHLW) is the high-level radioactive waste, as defined by NWPA 42USC10101(12), resulting from reprocessing spent nuclear fuel in a defense facility.

Disposal is the isolation of radioactive wastes from the accessible environment. (As defined in 10CFR60.2.) Disposal means the emplacement in a repository of high-level radioactive waste, spent nuclear fuel, or other highly radioactive material with no foreseeable intent of recovery, whether or not such emplacement permits the recovery of such waste. (As defined in 10CFR961.11 and NWPA 42USC10101(9).)

DOE/NRC Form-741 is a Nuclear Material Transaction Report and is completed whenever SNF or HLW is transferred or received. [10CFR75.31, .33, .35]

DOE/NRC Form-742 is a Material Balance Report and when completed documents the quantities of SNF and/or HLW contained at an installation as of the initial inventory reporting date. [10CFR75.31, .32, .33, .35]

Function is a primary statement of purpose; it defines what a system or subsystem must accomplish to meet the system mission.

Function flow diagram is a diagram that graphically illustrates the relationships among functions.

Functional interface is the interaction between functions, as in the flow of material or information between a sequence of activities.

Glass transition temperature is the temperature at which, upon heating, the glass transforms from a rigid solid to a viscous liquid. This temperature corresponds to glass viscosity of approximately 10^{13} poise, and is less than 500°C , for most, if not all, borosilicate waste glass.

High-level radioactive waste (HLW) means (1) the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and (2) other highly radioactive material that the Nuclear Regulatory Commission, consistent with existing law, determines by rule requires permanent isolation. The CRWMS will only accept solidified HLW. For the purposes of this document, HLW is vitrified borosilicate glass cast in a stainless steel canister. (As defined in NWPA 42USC10101(12), 10CFR72.3, 10CFR960.2, 10CFR961.11, (Note that the 10CFR60 definition of HLW includes SNF. See definitions of commercial HLW and defense HLW.)

Important to safety means necessary: (1)(Storage) to maintain the conditions required to store spent fuel safely; (2)(Storage) to prevent damage to the spent fuel container during handling and storage; or (3)(Storage) to provide reasonable assurance that spent fuel can be received, handled, packaged, stored, and retrieved without undue risk to the health and safety of the public; (4)(MGDS) to those engineered structures, systems, and components essential to the prevention or mitigation of an accident that could result in a radiation dose to the whole body, or any organ, of 0.5 rem or greater at or beyond the nearest boundary of the unrestricted area anytime until the completion of permanent closure of the repository.

Interface requirement means a requirement that applies to the inputs to, or outputs from, the function; or the physical connection or dependence between architectural items.

Maintainability is the measure of the ability to perform maintenance on an item, on which maintenance is performed by personnel having specified skill levels, using prescribed procedures and resources, at each prescribed level of maintenance and repair; that is, the ability of an item to be maintained.

Mission critical refers to those systems, structures, and components (and related activities) whose importance to the successful accomplishment of the CRWMS mission is determined by management to warrant the selected application of QA Program controls.

Multi-purpose canister (MPC) refers to a sealed, metallic container maintaining multiple SNF assemblies in a dry, inert environment and overpacked separately and uniquely for the various system elements of storage, transportation, and disposal. (See definition of waste form.)

Nonconforming waste form is an individual HLW form that has been produced, handled, or stored such that its compliance with the WA-SRD requirements on waste forms cannot be demonstrated.

Nonstandard waste form is a nonconforming waste form and its nonconforming condition has been reviewed and deemed acceptable into the CRWMS. Nonstandard HLW may also be in a condition which requires special handling. This general definition is specifically applied to HLW and SNF in this requirements document.

N-square diagram is a type of function flow diagram. The N-square diagram has been used extensively to develop data interfaces. The system functions are placed on the diagonal of an N-by-N matrix. The remainder of the squares of the matrix represent interface inputs and outputs. Inputs to a function appear in the column above and below the function, and outputs from a function appear in the row to the left and right of a function. Where blank square exists there is no interface between the respective functions. N-square diagrams are used to develop and document system and system element interfaces. The N-square diagram may also be used to document hardware-to-hardware interfaces where hardware items are placed on the diagonal and their interfaces shown in the remaining squares of the matrix.

On-Site Transfer and Storage (OSTS) is the equipment for transfer and storage, at Purchaser sites, of SNF contained in MPCs. The development and design of the OSTs are presumed to be performed by the CRWMS. The procurement and operation of the OSTs are presumed to be at the discretion of the Purchasers.

Overall Utilization is the product of scheduled utilization, availability, and worker productivity, where scheduled utilization is the ratio of scheduled operating hours per year to total hours per year. Availability is the WA availability as required in Section 3.2.5.3. Worker productivity is the average fraction of a work period that workers perform required work; time waiting for resources, break time, dress out time, and other non-productive time is not included.

Overpack is a structural component used to hold and protect the MPC so that the combination meets the NRC requirements for its application. There are several types of overpacks: one for transportation, 10CFR71; one for transfer, 10CFR72; one for storage, 10CFR72; and one for disposal, 10CFR60. An overpack is designed for its particular use in conjunction with the MPC.

Prime mover is the vehicle providing motive power to the transporter.

Producer is any generator of high-level radioactive waste resulting from atomic energy defense activities or any producer of vitrified commercial HLW.

Product Consistency Test is a test developed to determine the composition and homogeneity of complex and varied radioactive waste glasses. [Ref. ASTM C-1285-94]

Production Record is the documentation, provided by the Producer, that describes the actual canistered waste form.

Purchaser is any person, other than a Federal agency, who is licensed by the Nuclear Regulatory Commission to use a utilization or production facility under the authority of Sections 103 or 104 of the Atomic Energy Act of 1954 (42USC2133, 2134), or who has title to SNF or HLW and who has executed a contract or other contractual agreement with DOE. Purchaser SNF includes Government-owned SNF from commercial industry and civilian development programs. For purposes of this document, West Valley Demonstration Project (WVDP), which has commercial HLW, is considered

a "Purchaser" only for contract/agreement purposes; otherwise WVDP is considered a "Producer."

Radioactive mixed waste is waste containing both radioactive and hazardous components regulated by AEA and RCRA, respectively. The term "radioactive component" refers only to the actual radionuclides dispersed or suspended in the waste substance.

Reliability is (a) the duration of, or probability of, failure-free performance under stated conditions; or (b), the probability that an item can perform its intended function for a specified interval under stated conditions. For non-redundant items, (b) is the equivalent of (a). For redundant items, (b) is the equivalent of mission reliability.

RW-859 data is data from Nuclear Fuel Data Form RW-859, submitted either annually or 90 days after startup of a new cycle by Purchaser which lists the site-specific total SNF inventory and projected discharges.

Segment is a distinct, top-level component of the overall architecture of each system element to which functions and requirements are allocated.

Special nuclear material means (1) plutonium, uranium 233, uranium enriched in the isotope 233 or in the isotope 235, and any other material that the NRC, pursuant to the provisions of Section 51 of the Atomic Energy Act of 1954 as amended, determines to be special nuclear material, but does not include source material; or (2) any material artificially enriched by any of the foregoing but does not include source material. (As defined in 10CFR70.4.)

Specialty engineering encompasses those disciplines that support the design process by applying knowledge from a specific area to ensure system operability in its operational environment. They include reliability, availability, maintainability, human factors engineering, safeguards and security, integrated logistics support, transportability, system safety, electromagnetic compatibility, parts/materials/processes and other specialist areas generally involved in development of systems. These specialties are integrated into the development effort through the system engineering process.

Spent nuclear fuel (SNF) is fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing. (As defined in NWPA 42USC10101(23) and 10CFR961.11.) (Specifically in this document, SNF includes (1) intact, non-defective fuel assemblies; (2) failed fuel assemblies in canisters; (3) fuel assemblies in canisters; (4) consolidated fuel rods in canisters; (5) nonfuel components inserted in PWR fuel assemblies, including, but not limited to, control rod assemblies, burnable poison assemblies, thimble plug assemblies, neutron source assemblies, and instrumentation assemblies; (6) fuel channels attached to BWR fuel assemblies; and (7) nonfuel components and structural parts of assemblies in canisters.)

Standard waste form is a waste form that meets the physical characteristics specified in the WA-SRD as standard. Other standard HLW forms will be defined in subsequent revisions of the WA-SRD. This general definition is specifically applied to HLW and SNF in this requirements document.

Storage and Shipping Records are the documents that describe the physical attributes of the canistered waste forms. The records also identify any unexpected events, such as thermal excursions, which have occurred during storage.

| **System element** is one of the elements of the CRWMS (Waste Acceptance, Transportation, Storage or MGDS). This differs from the "project" that may be initiated by DOE to manage and control development of one or more system elements (e.g., the Yucca Mountain Project or the WAST Project).

| **System engineering process** is an iterative process encompassing changes at any point in the process. Possible impacts of change to the system should be analyzed during the conduct of the project. These impacts should be examined for validity, consistency, desirability, and attainability with respect to current technology, physical resources, human performance capabilities, life-cycle costs, and other constraints. The output of this analysis should either verify the existing requirements or lead to the development of new requirements that are more appropriate for the mission.

| **System, Structure, Component, or SSC**, is a general term that means the standard English definition of those individual words. In this document, if and when an SSC is used in a way that requires any qualification, such as important to safety or important to waste isolation, that qualifier will also be provided.

| **Technical Baseline** is a configuration identification document, or set of such documents, that is formally designated and approved at a specific time. Within the CRWMS, technical baseline is composed of, and evolves through, the functional and technical requirements baseline that is presented in the CRD and SRDs, the design requirements baseline, the final design baseline, and the as-built baseline. See CRD Section 1.2.1 for additional details.

| **To Be Determined (TBD)** is used as a placeholder to identify information that is not yet defined.

| **To Be Verified (TBV)** is used to identify information that is unqualified, preliminary, or that needs to be reevaluated.

| **Time-temperature-transformation diagrams** identify the duration of exposure at any temperature that causes significant changes in either the phase structure, the phase compositions, or the PCT response of the borosilicate glass waste type.

| **Transportation cask subsystem**, as a minimum, shall include the complete cask, an MPC (when required), truck trailer or rail car (defined as the transporter), a tie down system, an intermodal transfer device (when required), special tools and ancillary equipment.

| **Transporter** is a cargo-carrying vehicle used for transportation of cargo. It includes semi-trailers, rail cars, intermodal transportation skids and equipment such as tie-down components, personnel barriers, etc. needed to make the loaded cargo-carrying vehicle transport-ready.

| **Waste Acceptance** is the system element or organization that manages the Accept Waste function which includes acceptance of SNF and HLW into the CRWMS from the Purchaser/ Producer of such waste.

| **Waste form** is the radioactive waste material and any encapsulating or stabilizing matrix. A loaded MPC is a canistered waste form as defined in 10CFR60.2.

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Waste Form Compliance Plan (WCP) is a document prepared by a waste producer describing planned analyses, tests, and engineering development work to be undertaken and information to be included in individual waste form production records to demonstrate compliance of a proposed waste form with Waste Acceptance Specifications.

Waste Form Qualification Report (WQR) is documentation prepared by a waste producer which describes results of analyses, tests, and engineering development work actually performed to demonstrate waste form compliance with waste acceptance specifications.

Waste package is the waste form and any containers, shielding, packing, and other absorbent materials immediately surrounding an individual waste container. (As defined in 10CFR60.2.)

6.2 ACRONYMS AND ABBREVIATIONS

ACR	Annual Capacity Report
ADP	Automated Data Processing
ANSI	American National Standards Institute
APR	Acceptance Priority Ranking
ASME	American Society of Mechanical Engineers
BDAT	Best Demonstrated Available Technology
BWR	Boiling Water Reactor
CFR	Code of Federal Regulations
CHLW	Commercial High-Level radioactive Waste
CRD	CRWMS Requirements Document
CRWMS	Civilian Radioactive Waste Management System
DCS	Delivery Commitment Schedule
DHLW	Defense High-Level radioactive Waste
DOE	Department Of Energy
DOT	Department Of Transportation
DP	Office of Defense Programs (DOE)
EA	Environmental Assessment
EM	Office of Environmental Management (DOE)
EPA	Environmental Protection Agency
ESAAB	Energy System Acquisition Advisory Board
FDS	Final Delivery Schedule
FICA	Facility Interface Capability Assessment
HLW	High-Level radioactive Waste
IAEA	International Atomic Energy Agency
KD	Key Decision
M&O	Management and Operating contractor
MC&A	Material Control and Accounting
MGDS	Mined Geologic Disposal System
MOA	Memorandum Of Agreement
MPC	Multi-Purpose Canister
MRS	Monitored Retrievable Storage
MTU	Metric Ton(s) of initial Uranium
NRC	Nuclear Regulatory Commission
NS	Nuclear Safety
NWF	Nuclear Waste Fund
NWPA	Nuclear Waste Policy Act of 1982
NWPAA	Nuclear Waste Policy Amendments Act of 1987
NYSERDA	New York State Energy Research and Development Administration
OCRWM	Office of Civilian Radioactive Waste Management (DOE)
OMB	Office of Management and Budget (DOE)
OSTS	On-Site Transfer and Storage
PCT	Product Consistency Test
PWR	Pressurized Water Reactor
QA	Quality Assurance
QARD	Quality Assurance Requirements and Description
RCRA	Resource Conservation and Recovery Act

6.2 ACRONYMS AND ABBREVIATIONS (continued)

RW	Office of Civilian Radioactive Waste Management (DOE)
SNF	Spent Nuclear Fuel
SRD	System Requirements Document
TBD	To Be Determined
TBV	To Be Verified
TCS	Transportation Cask Subsystem
TDPP	Technical Document Preparation Plan
USC	United States Code
WA	Waste Acceptance System Element
WCP	Waste form Compliance Plan
WQR	Waste form Qualification Report
WVDP	West Valley Demonstration Project

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APPENDIX A WA Function Descriptions

1.1 Accept Waste

The Accept Waste function establishes the criteria for acceptable waste, establishes and maintains contracts/agreements with Purchasers/Producers, collects fees, develops the plan for waste pickup, observes waste preparations, transfers the custody of the waste, resolves discrepancies in the waste description, and maintains material control and accounting of waste accepted into the CRWMS.

The transfer of custody (including title), f.o.b. carrier, of spent nuclear fuel (SNF) or high-level radioactive waste (HLW)¹ from all Purchasers/Producers (who have executed a contract or an agreement with OCRWM) to OCRWM occurs at the Purchaser/Producer civilian nuclear power reactor or other domestic sites as may be designated by the Purchaser/Producer and approved by OCRWM. [10CFR961.11 Article I, Definitions - Expanded]

Inputs:	From:
• Plans, Data, Contract/Agreement	Purchaser/Producer
• SNF Documentation	Purchaser
• HLW Documentation	Producer
• Loaded Transportation Cask Subsystems	Purchaser/Producer
• Unloaded Transportation Cask Subsystems	1.2
• Shipping Documents	1.2
• Ancillary Equipment	1.2

Outputs:	To:
• Loaded Transportation Cask Subsystems	1.2
• SNF Documentation	1.2, 1.3, 1.4
• HLW Documentation	1.2, 1.3, 1.4
• Documentation	1.2
• Information	1.2
• Unloaded Transportation Cask Subsystems	Purchaser/Producer
• Reports	Purchaser/Producer
• Contracts/Agreements	Purchaser/Producer

1.1.1 Define Waste Acceptance Criteria

Determine the conditions necessary to be met by the SNF/HLW, in order for DOE to be able to accept it for disposal including defining standard and nonstandard waste forms.

¹ Note that the 10CFR60 definition of HLW includes SNF.

Inputs:

- Waste Characteristics
- RW-859 Data
- 10CFR961
- Waste Form Compliance Plan
- Waste Form Qualification Report

From:

- 1.1.2
- 1.1.3
- 1.1.2
- 1.1.3
- 1.1.3

Outputs:

- Waste Acceptance Criteria

To:

- 1.1.2

1.1.2 Establish Contracts/Agreements

Develop, execute, and maintain written agreements between DOE and Purchasers/Producers that include terms, conditions, and criteria for waste acceptance and related services, and responsibilities of each party.

Inputs:

- Waste Characteristics
- Waste Acceptance Criteria

From:

- Purchaser/Producer
- 1.1.1

Outputs:

- Waste Characteristics
- Contract/Agreement
- 10CFR961

To:

- 1.1.1
- 1.1.3
- Purchaser/Producer/DOE/OCRWM
- 1.1.1 / 1.1.3

1.1.3 Plan for Waste Acceptance

Establish and provide the data on spent nuclear fuel and high-level waste characteristics and the Purchaser/Producer site capabilities and requirements, as well as the CRWMS capabilities and requirements. Sub-functions include: Allocate Waste System Capacity; Identify Waste Locations/Characteristics; and Define Site Interface Capabilities.

Inputs:

- RW-859 Data
- Waste Form Compliance Plan
- Waste Form Qualification Report
- Production Records
- 10CFR961 Appendix A, B, C, D, E, F, G
- Schedules, Plans
- DCS
- FDS
- DCS Exchange Requests

From:

- Purchaser
- Producer
- Producer
- Producer
- Purchaser
- 1.2
- Purchaser
- Purchaser
- Purchaser/Producer

- Requests for Nonstandard Waste Delivery Purchaser/Producer
- Services Planning Documents Purchaser/Producer / 1.2
- Site-Specific Servicing Plans Purchaser/Producer / 1.2
- FICA 1.2

Outputs:

To:

- Approved DCS Purchaser / 1.1.4 / 1.2 / 1.3 / 1.4
- Approved FDS 1.1.4 / 1.2 / 1.3 / 1.4
- RW-859 Data 1.1.1 / 1.1.8
- Production Records 1.1.4 / 1.2 / 1.4
- Waste Form Compliance Plan 1.1.1
- Waste Form Qualification Report 1.1.1
- Services Planning Documents Purchaser/Producer / 1.2
- Site-Specific Servicing Plans Purchaser/Producer / 1.2
- 10CFR961 Appendix F 1.1.8
- Information 1.1.8

1.1.3.1 Allocate Waste System Capacity

Using the priority ranking of Purchasers/Producers, distribute projected throughput capability (based on total CRWMS capacity) among each Purchaser/Producer for ten years of operation.

Inputs:

From:

- RW-859 Data Purchaser
- Waste Form Compliance Plan Producer
- Waste Form Qualification Report Producer
- Waste Acceptance Rate 1.2 / 1.3 / 1.4
- APR 1.2 / 1.3 / 1.4
- 10CFR961 Appendix B, C, D, F, G 1.1.3.2

Outputs:

To:

- RW-859 Data 1.1.1 / 1.1.8
- ACR 1.1.3.2
- Waste Form Compliance Plan 1.1.3.2
- Waste Form Qualification Report 1.1.3.2

1.1.3.1.1 Collect Waste Data

Establish and provide the information on the Purchaser/Producer SNF/HLW that is necessary for CRWMS planning and design. This information may be gathered on site at the Purchaser/Producer are by other means.

Inputs:

From:

- RW-859 Data Purchaser

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- Waste Form Compliance Plan Producer
- Waste Form Qualification Report Producer
- Other SNF Data Purchaser
- 10CFR961 Appendix B, C, D, F, G 1.1.3.2

Outputs: **To:**

- Waste Data 1.1.3.1.2
- RW-859 Data 1.1.1 / 1.1.3.1.2

1.1.3.1.2 Rank/Order Waste

Establish and maintain a priority ranking for acceptance of waste into the CRWMS. The priority ranking is based on the date the SNF was permanently discharged, with the Purchasers with the oldest SNF, on an industry-wide basis, given the highest priority. The acceptance priority accrues to the Purchaser. Producer priority ranking will be established by a method yet to be determined.

Inputs: **From:**

- Waste Data 1.1.3.1.1
- RW-859 Data 1.1.3.1.1

Outputs: **To:**

- APR 1.1.3.1.3

1.1.3.1.3 Allocate Annual Capacity to Purchasers/Producers

Allocate acceptance capacity among Purchasers/Producers according to CRWMS annual waste acceptance rate and APR.

Inputs: **From:**

- APR 1.1.3.1.2
- Waste Acceptance Rate 1.2 / 1.3 / 1.4

Outputs: **To:**

- ACR Purchaser / 1.1.3.2

1.1.3.2 Identify Waste Locations/Characteristics

Evaluate Purchaser/Producer proposed waste locations and characteristics.

Inputs: **From:**

- ACR 1.1.3.1
- Waste Form Compliance Plan 1.1.3.1

- Waste Form Qualification Report 1.1.3.1
- Submitted DCS Purchaser
- Submitted FDS Purchaser
- 10CFR961 Appendix A, B, C, D, E, F, G Purchaser
- Submitted DCS Exchange Requests Purchaser
- Request for Nonstandard Waste Delivery Purchaser/Producer
- Production Records Producer

Outputs:

To:

- Approved DCS 1.1.3.3 / Purchaser / 1.2 / 1.3 / 1.4
- Approved FDS Purchaser / 1.1.4 / 1.2 / 1.3 / 1.4
- Production Records 1.1.4 / 1.2 / 1.4
- 10CFR961 Appendix B 1.1.3.1 / 1.1.4
- 10CFR961 Appendix C, D, F, G 1.1.3.1
- Information 1.1.8

1.1.3.2.1 Evaluate Delivery Commitment Schedule

Determine the feasibility of waste acceptance as proposed by the Purchaser/Producer on the submitted forms as it corresponds to their allocation, site capabilities, and minimum acceptance requirements.

Inputs:

From:

- Submitted DCS Purchaser
- Evaluation Support 1.2

Outputs:

To:

- Approved DCS Purchaser / 1.2 / 1.3 / 1.4 / 1.1.3.2.2
- Disapproved DCS Purchaser
- Evaluation Request 1.2

1.1.3.2.2 Evaluate DCS Exchange Requests

Determine the feasibility of exchanging approved DCSs.

Inputs:

From:

- Submitted DCS Exchange Request Purchaser
- Evaluation Support 1.2

Outputs:

To:

- Approved DCS Exchange Request Purchaser/ 1.2 / 1.3 / 1.4
- Disapproved DCS Exchange Request Purchaser
- Evaluation Request 1.2

1.1.3.2.3 Evaluate Request for Nonstandard Waste Delivery

Determine the feasibility of accommodating suggested acceptance procedures for SNF/HLW that is other than standard waste.

Inputs:

From:

- Request for Nonstandard Waste Delivery Purchaser/Producer
- Evaluation Support 1.2

Outputs:

To:

- Approved Request for Nonstandard Waste Delivery Purchaser/Producer
1.2 / 1.3 / 1.4
- Disapproved Request for Nonstandard Waste Delivery Purchaser/Producer
- Evaluation Request 1.2

1.1.3.2.4 Evaluate Final Delivery Schedule

Determine the feasibility of accepting described waste on the proposed schedule.

Inputs:

From:

- Submitted FDS Purchaser
- Evaluation Support 1.2

Outputs:

To:

- Approved FDS Purchaser / 1.2 / 1.3 / 1.4
- Disapproved FDS Purchaser
- Evaluation Request 1.2

1.1.3.2.5 Validate Description of Waste

Perform RW-859 database queries to verify waste characteristics and provide notification of and information to support resolution of improperly described waste.

Inputs:

From:

- Production Records Producer

- Waste Form Qualification Report 1.1.3.1 |
- Submitted DCS Purchaser |
- Submitted FDS Purchaser |
- 10CFR961 Appendix A, B, C, D, E, F, G Purchaser |
- RW-859 Data 1.1.8.3 |
- Waste Data 1.1.8.3 |

Outputs:

To:

- Notification of improperly described waste Purchaser/Producer/1.2/1.3/1.4/1.1.6 |
- Information Purchaser/Producer/1.2/1.3/1.4/1.1.6 |

1.1.3.3 Define Site Interface Capabilities

Determine the interface capabilities at each Purchaser/Producer site to ensure that they can be accommodated by the CRWMS equipment and facilities.

Inputs:

From:

- FICA 1.2
- Approved DCS 1.1.3.2
- Draft Services Planning Documents 1.2
- Services Planning Documents Purchaser/Producer
- Approval/Comments
- Draft Site-Specific Servicing Plans 1.2
- Site-Specific Servicing Plans Purchaser/Producer
- Approval/Comments

Outputs:

To:

- Draft Services Planning Documents for Review/Approval Purchaser/Producer
- Services Planning Documents Approval/Comments 1.2
- Draft Site-Specific Servicing Plans for Review/Approval Purchaser/Producer
- Site-Specific Servicing Plans Approval/Comments 1.2

1.1.3.4 Schedule WA Preparations

Determine the schedule for WA participation in Purchaser/Producers loading operations and develop contingency plans for WA operations. This includes scheduling personnel assignments, equipment needs and interfacing with Transportation personnel.

Inputs:

From:

- | • DCS Purchaser
- | • FDS Purchaser
- | • DCS Exchange Requests Purchaser/Producer
- | • Requests for Nonstandard Waste Delivery Purchaser/Producer
- | • Services Planning Documents Purchaser/Producer/1.2
- | • Site-Specific Servicing Plans Purchaser/Producer/1.2
- | • FICA 1.2

Outputs: To:

- | • Schedules, Plans Purchaser/Producer/1.1.4/1.1.8

1.1.4 Observe Waste Preparations

Verify the identified waste to be delivered is in agreement with its corresponding documentation. Verification may be accomplished by certification by the Purchaser/Producer and/or by independent direct methods including observation by DOE representatives.

Inputs: From:

- | • Schedules, Plans 1.1.3.4
- | • SNF Purchaser
- | • HLW Producer
- | • FDS 1.1.3
- | • 10CFR961 Appendix F 1.1.3
- | • Production Records 1.1.3
- | • Unloaded Transportation Cask Subsystems 1.2
- | • Empty MPC 1.2

Outputs: To:

- | • Documentation, Findings 1.1.5
- | • Notification of Discrepancy Purchaser/Producer
- | • Proposed Resolution Purchaser/Producer
- | • SNF/HLW Documentation 1.1.5
- | • Loaded Transportation Cask Subsystems 1.1.5
- | • Loaded MPC 1.1.5

1.1.4.1 Observe Preliminary Waste Preparations

| Observe and record preparation activities prior to acceptance and including SNF/HLW loading into MPC/TCS.

Inputs: From:

- | • Information Purchaser/Producer

Outputs:

- Verified Documentation, Findings

To:

1.1.4.2

1.1.4.1.1 Observe Waste Preparations & Loading

Observe the activities of getting the SNF/HLW ready for acceptance (including review of techniques used to classify the waste) to ensure that it is appropriate to the transportation cask subsystem (including MPC), storage facility and repository provided by the CRWMS.

Inputs:

- Information

From:

Purchaser/Producer

Outputs:

- Verified Documentation, Findings

To:

1.1.4.2

1.1.4.1.2 Record Waste Loading

Record observations during waste preparations prior to acceptance and during loading of SNF/HLW into MPC/TCS. Store records at Waste Acceptance for possible review for process improvement studies.

Inputs:

- Information

From:

Purchaser/Producer

Outputs:

- NONE

To:

1.1.4.2 Verify Waste Description

Verify that the contents being placed into the MPC (if required) and the transportation cask correspond to those described in the submitted documentation.

Inputs:

- FDS
- Verified Documentation, Findings
- Information

From:

1.1.3

1.1.4.1.1

Purchaser/Producer

Outputs:

- Verified Documentation, Findings

To:

1.1.4.3 / 1.1.5

1.1.4.3 Notify Purchaser/Producer of Improperly Described Waste

Prior to DOE/OCRWM taking title to the waste, resolve any identified discrepancy between the description of the waste provided in documentation and the actual contents of the transportation cask with the Purchaser/Producer.

Inputs:	From:
<ul style="list-style-type: none"> • Verified Documentation, Findings 	1.1.4.2
Outputs:	To:
<ul style="list-style-type: none"> • Notification of Discrepancy • Proposed Resolution 	Purchaser/Producer Purchaser/Producer

1.1.5 Accept Waste Title/Documentation

Transfer documents between DOE and the Purchaser/Producer at the time of acceptance. Documents include certification of cask transportation readiness. Confirm completeness and compliance, accept title to waste, and turn over to Transportation for off-site removal.

Inputs:	From:
<ul style="list-style-type: none"> • Documentation, Findings • Title • Documentation • SNF/HLW Documentation • Loaded Transportation Cask Subsystems • Loaded MPC • DOE/NRC Forms-741 & 742 • Resolved Waste Description 	1.1.4 Purchaser/Producer Purchaser/Producer 1.1.4 1.1.4 1.1.4 Purchaser 1.1.6
Outputs:	To:
<ul style="list-style-type: none"> • Title • Documentation • SNF Documentation • HLW Documentation • Loaded Transportation Cask Subsystems • Loaded MPC • DOE/NRC Forms-741 & 742 	DOE/OCRWM DOE/OCRWM / 1.1.6 / 1.2 1.3 / 1.4 1.4 1.2 1.2 1.1.8

1.1.6 Resolve Improperly Described Waste

When a discrepancy is found with the waste after DOE/OCRWM has taken title to it, make arrangements with the Purchaser/Producer to correct the waste description.

Inputs:

- Waste Description
- Resolved Waste Description
- DOE/NRC Forms-741 & 742

From:

1.3 / 1.4
 Purchaser/Producer
 Purchaser

Outputs:

- Notification of Proposed Resolution
- Resolved Waste Description
- DOE/NRC Forms-741 & 742

To:

Purchaser/Producer
 1.1.5 / 1.3 / 1.4
 1.1.8

1.1.7 Support Fee Collection

Collect, verify, and assess the adequacy of fees paid into the Nuclear Waste Fund (NWF) and recommend adjustment of the fee, if necessary, in order to ensure full cost recovery. Fees for waste disposal services will be paid by the Purchasers/Producers. DOE will regularly review and verify the accuracy of all fees paid into the NWF.

Inputs:

- Fees
- OCRWM Program Cost Estimates

From:

Purchaser/Producer
 DOE

Outputs:

- Fees
- Fee Adequacy Assessment
- Payment Received Notification

To:

Nuclear Waste Fund
 DOE Secretary
 1.1.3

1.1.8 Control and Account for Waste Inventory

Control, account for, and track the SNF and HLW inventory after it is accepted into the CRWMS and feed all systems that similarly track material control and accountability (MC&A) data records. Additionally, the SNF and HLW will be tracked prior to acceptance into the CRWMS.

Inputs:

- Schedules, Plans
- 10CFR961 Appendix F
- RW-859 Data
- FDS
- SNF Specifications
- Production Records
- DOE/NRC Forms-741 & 742
- Information

From:

1.1.3.4
 1.1.3
 1.1.3
 1.1.3
 1.1.3
 1.1.3
 1.1.5 / 1.1.6 / 1.2 / 1.3 / 1.4
 1.1.3

Outputs:

To:

- Information Purchaser / Producer / NRC / IAEA
1.2 / 1.3 / 1.4

1.1.8.1 Perform Material Control

Control inventory of SNF and HLW within the CRWMS.

Inputs:

From:

- 10CFR961 Appendix F 1.1.3
- FDS 1.1.3
- SNF Specifications 1.1.3
- Production Records 1.1.3
- DOE/NRC Forms-741 & 742 1.1.5 / 1.1.6 / 1.2 / 1.3 / 1.4

Outputs:

To:

- Information Purchaser / Producer / NRC / IAEA
1.2 / 1.3 / 1.4

1.1.8.2 Provide Material Accounting

Account for the location of SNF and HLW within the CRWMS. The accounting function will include conducting periodic physical verification of materials, validating and reconciling accounting ledger data of materials in inventory prior to disposal, and supporting the maintenance of MC&A records after final disposal.

Inputs:

From:

- 10CFR961 Appendix F 1.1.3
- FDS 1.1.3
- SNF Specifications 1.1.3
- Production Records 1.1.3
- DOE/NRC Forms-741 & 742 1.1.5 / 1.1.6 / 1.2 / 1.3 / 1.4

Outputs:

To:

- Information Purchaser / Producer / NRC / IAEA
1.2 / 1.3 / 1.4

1.1.8.3 Provide Material Tracking

Track the location of SNF and HLW prior to and after acceptance into the CRWMS.

Inputs:

From:

- 10CFR961 Appendix F 1.1.3
- RW-859 Data 1.1.3
- FDS 1.1.3
- SNF Specifications 1.1.3
- Production Records 1.1.3
- DOE/NRC Forms-741 & 742 1.1.5 / 1.1.6 / 1.2 / 1.3 / 1.4
- Information 1.1.3

Outputs:

To:

- Information Purchaser / Producer / NRC / IAEA
1.2 / 1.3 / 1.4

1.1.8.4 MC&A General Management

This function provides the general management over the MC&A functions. It serves to organize and provide guidance to MC&A operations within the CRWMS. This includes developing high level management procedures for MC&A, training of personnel, archival and retrieval of records and general management.

Inputs:

From:

- Information 1.1.3

Outputs:

To:

- Information Purchaser / Producer / NRC / IAEA
1.2 / 1.3 / 1.4

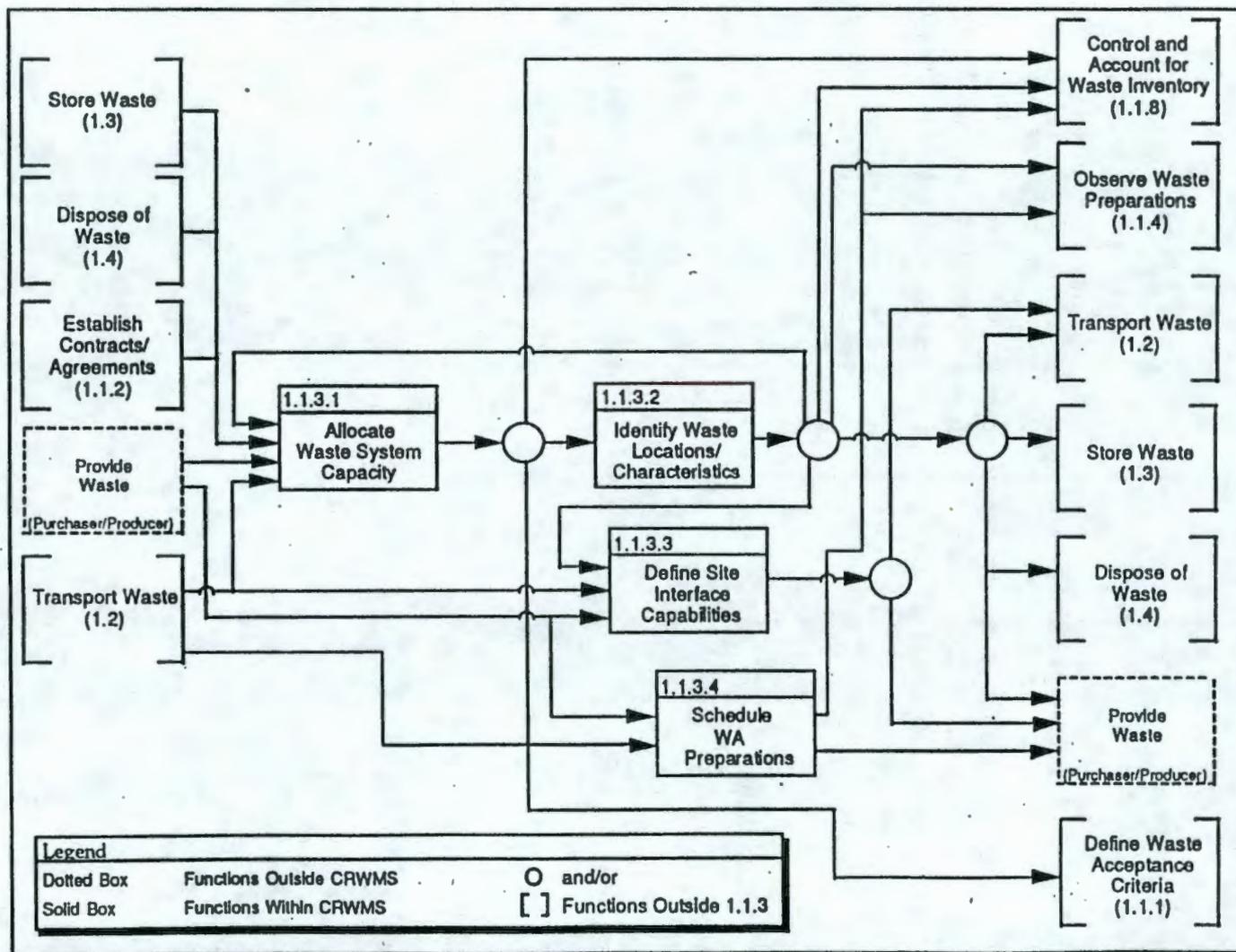


Figure A-1. 1.1.3 Plan for Waste Acceptance Functional Flow Diagram

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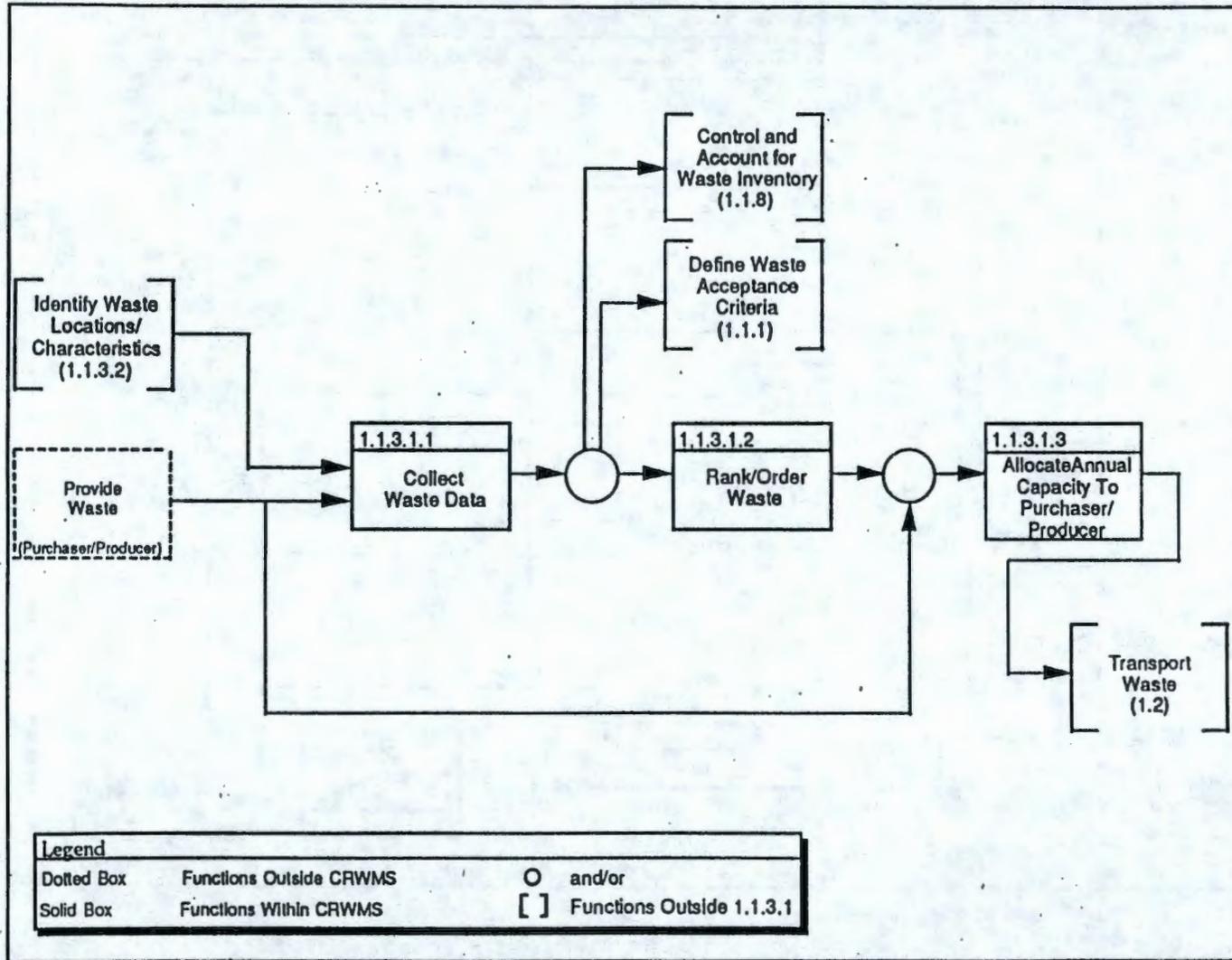


Figure A-2. 1.1.3.1 Allocate Waste System Capacity Functional Flow Diagram

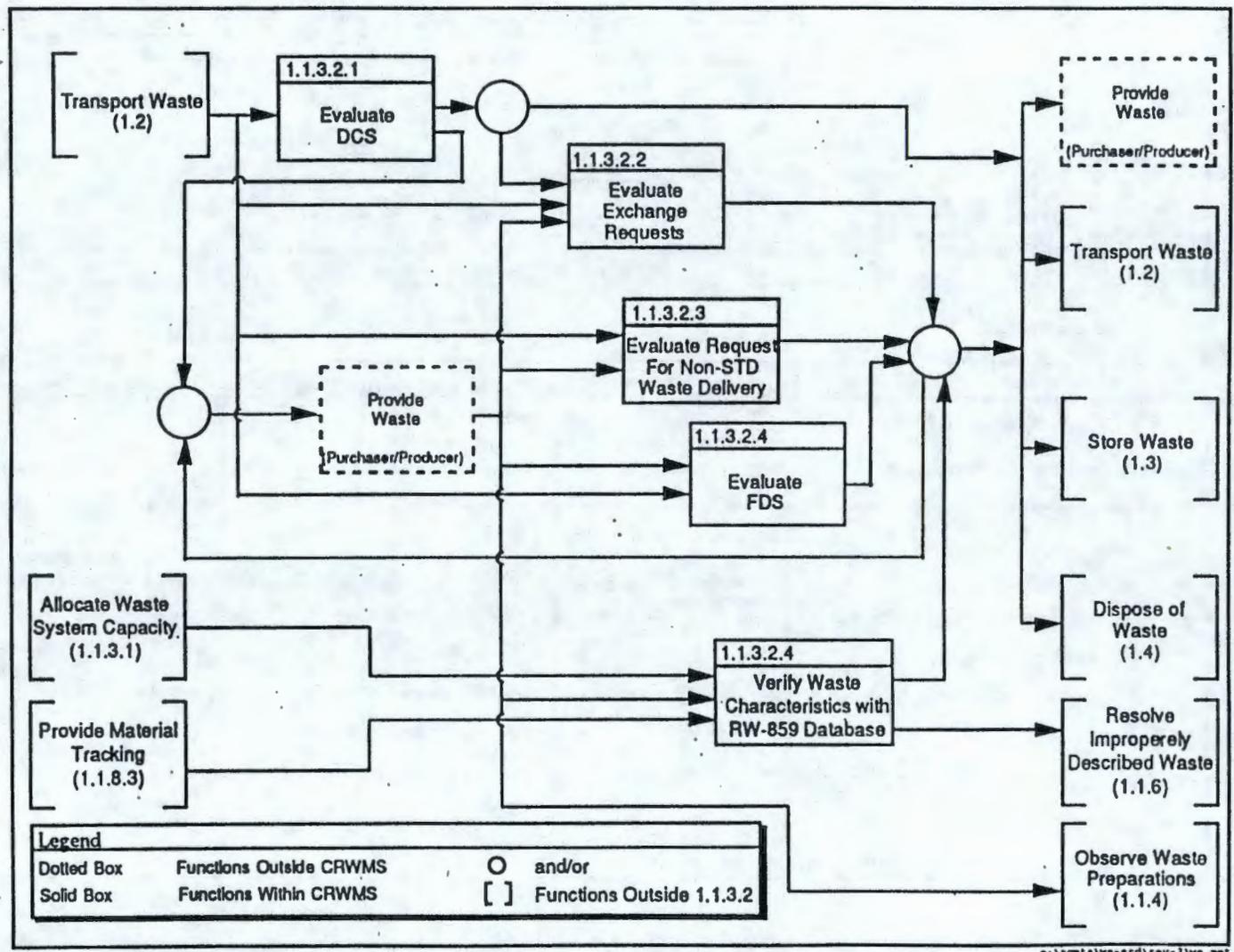


Figure A-3. 1.1.3.2 Identify Waste Locations/Characteristics Functional Flow Diagram

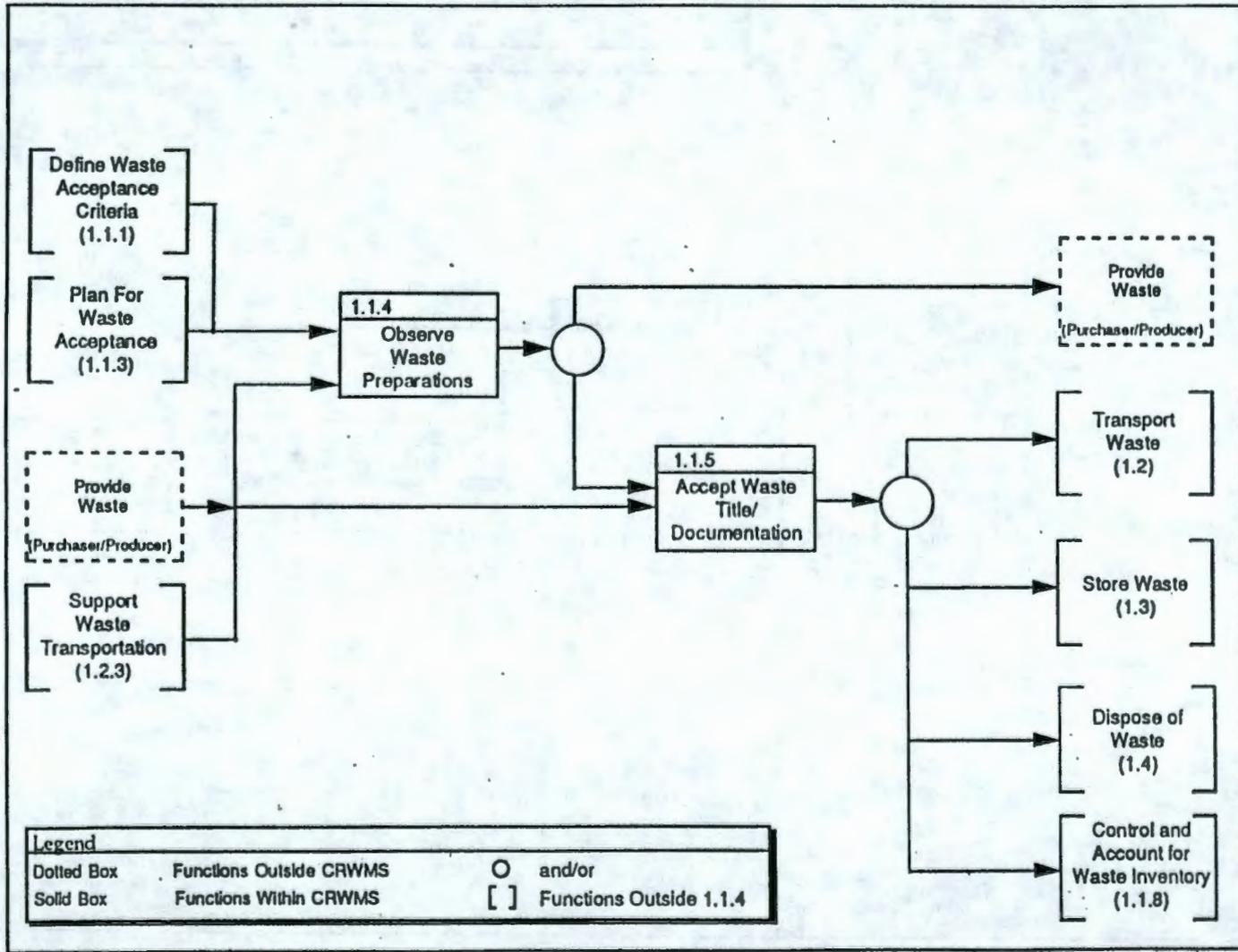


Figure A-4. Accept Waste Custody Functional Flow Diagram

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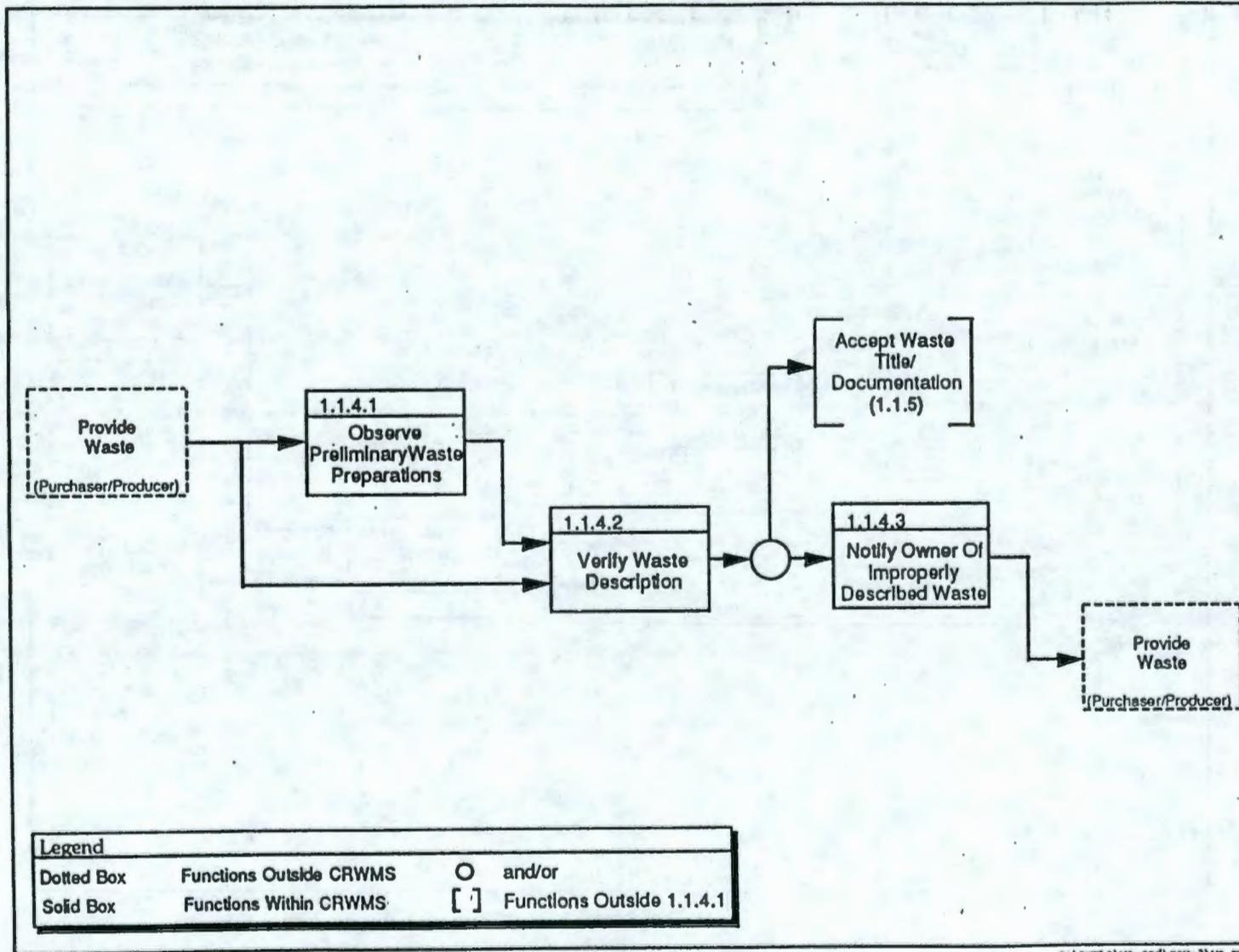


Figure A-5. 1.1.4 Observe Waste Preparations Functional Flow Diagram

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APPENDIX B WA Function Allocation Table

Table B-1. Allocation of Functions to Architecture

Function Title	Waste Acceptance Segments				
	HW	E	SW	Op	F
Accept Waste 1.1	X	X	X	X	X
Define Waste Acceptance Criteria 1.1.1				X	
Establish Contracts/Agreements 1.1.2				X	
Plan for Waste Acceptance 1.1.3	X		X	X	
Allocate Waste System Capacity 1.1.3.1	X		X	X	
Collect Waste Data 1.1.3.1.1	X	X	X	X	
Rank/Order Waste 1.1.3.1.2	X		X		
Allocate Annual Capacity to Purchasers/Producers 1.1.3.1.3				X	
Identify Waste Location/Characteristics 1.1.3.2	X		X	X	
Evaluate DCS 1.1.3.2.1				X	
Evaluate DCS Exchange Requests 1.1.3.2.2				X	
Evaluate Request for Nonstandard Waste Delivery 1.1.3.2.3				X	
Evaluate FDS 1.1.3.2.4				X	
Validate Description of Waste 1.1.3.2.5	X		X		
Define Site Interface Capabilities 1.1.3.3				X	
Schedule WA Preparations 1.1.3.4				X	
Observe Waste Preparations 1.1.4		X		X	
Observe Preliminary Waste Preparations 1.1.4.1		X		X	
Observe Waste Preparations & Loading 1.1.4.1.1				X	
Record Waste Loading 1.1.4.1.2		X			
Verify Waste Description 1.1.4.2				X	
Notify Purchasers/Producers of Improperly Described Waste 1.1.4.3				X	
Accept Waste Title/Documentation 1.1.5				X	
Resolve Improperly Described Waste 1.1.6				X	
Support Fee Collection 1.1.7				X	
Control and Account for Waste Inventory 1.1.8	X	X	X	X	
Provide Material Control 1.1.8.1	X	X	X	X	
Provide Material Accounting 1.1.8.2	X		X	X	
Provide Material Tracking 1.1.8.3	X		X	X	
MC&A General Management 1.1.8.4	X		X	X	

Legend:

HW - Waste Acceptance Hardware
 SW - Waste Acceptance Software
 F - Waste Acceptance Facilities

E - Waste Acceptance Equipment
 Op - Waste Acceptance Operations

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APPENDIX C WA Allocation of Requirements to Segments

The following table identifies WA requirement to segment allocations. This table identifies the WA paragraph, its title (if available) and its segment allocation. The allocation is shown as an "X" in the appropriate column. Paragraphs without requirements are signified by an "X" in the N/A column.

Table C-1. WA Allocation of Requirements to Segments

WA-SRD Requirement Numbers	TITLE	WA Segments					
		N A	H W	E Q	S W	O P	F A
3.1	SYSTEM DEFINITION	X					
3.1.5	Major Considerations and Assumptions	X					
3.2	CHARACTERISTICS	X					
3.2.1	Performance Characteristics	X					
3.2.1.1	SNF and HLW Acceptance	X					
3.2.1.1.A						X	
3.2.1.1.B						X	
3.2.1.1.C						X	
3.2.1.1.D						X	
3.2.1.1.E						X	
3.2.1.1.F	Waste Acceptance Services:	X					
3.2.1.1.F.1						X	
3.2.1.1.F.2						X	
3.2.1.1.G						X	
3.2.1.2	Reserved	X					
3.2.1.3	Reserved	X					
3.2.1.4	Reserved	X					
3.2.1.5	WA Verification and Acceptance Capabilities	X					
3.2.1.5.A						X	
3.2.1.5.B						X	
3.2.2	Radiological Protection	X					
3.2.2.A						X	
3.2.2.B	Occupational dose limits:	X					
3.2.2.B.1						X	
3.2.2.B.2						X	
3.2.3	Interface Requirements	X					
3.2.3.1	Interface with External Organizations	X					
3.2.3.1.1	WA - Producer Interface Requirements	X					

Legend:

NA - Not Applicable
 EQ - WA Equipment Segment
 Op - WA Operations Segment

HW - WA Hardware Segment
 SW - WA Software Segment
 FA - WA Facilities Segment

Table C-1. WA Allocation of Requirements to Segments (Continued)

WA-SRD Requirement Numbers	TITLE	WA Segments					
		N A	H W	E Q	S W	O P	F A
3.2.3.1.1.1	HLW Receipt					X	
3.2.3.1.1.2	High-Level Waste Form Criteria	X					
3.2.3.1.1.2.A		X					
3.2.3.1.1.2.A.1						X	
3.2.3.1.1.2.A.2						X	
3.2.3.1.1.2.A.3						X	
3.2.3.1.1.2.B						X	
3.2.3.1.1.2.C						X	
3.2.3.1.1.3	HLW Standard Form	X					
3.2.3.1.1.3.A						X	
3.2.3.1.1.3.B		X					
3.2.3.1.1.3.B.1						X	
3.2.3.1.1.3.B.2						X	
3.2.3.1.1.3.B.3						X	
3.2.3.1.1.3.B.4						X	
3.2.3.1.1.3.B.5						X	
3.2.3.1.1.3.B.6						X	
3.2.3.1.1.3.B.7						X	
3.2.3.1.1.3.B.8						X	
3.2.3.1.1.3.B.9						X	
3.2.3.1.1.4	HLW Nonconforming Form					X	
3.2.3.1.1.5	HLW Nonstandard Form					X	
3.2.3.1.1.6	Criticality Safety for HLW	X					
3.2.3.1.1.6.A						X	
3.2.3.1.1.6.B						X	
3.2.3.1.1.6.C						X	
3.2.3.1.1.7	High-Level Waste Form - Material Compatibility					X	
3.2.3.1.1.8	Chemical Composition of HLW	X					
3.2.3.1.1.8.A						X	
3.2.3.1.1.8.B						X	
3.2.3.1.1.9	Canister Material and Fabrication Reporting of HLW					X	
3.2.3.1.1.10	Radionuclide Inventory of HLW					X	
3.2.3.1.1.11	HLW Canister After Closure	X					
3.2.3.1.1.11.A						X	

Legend:

NA - Not Applicable

EQ - WA Equipment Segment

Op - WA Operations Segment

HW - WA Hardware Segment

SW - WA Software Segment

FA - WA Facilities Segment

Table C-1. WA Allocation of Requirements to Segments (Continued)

WA-SRD Requirement Numbers	TITLE	WA Segments					
		N A	H W	E Q	S W	O P	F A
3.2.3.1.1.11.B						X	
3.2.3.1.1.12	Removable Radioactive Contamination on HLW Canister	X					
3.2.3.1.1.12.A						X	
3.2.3.1.1.12.B						X	
3.2.3.1.1.12.C						X	
3.2.3.1.1.13	HLW Phase Stability and Integrity	X					
3.2.3.1.1.13.A						X	
3.2.3.1.1.13.B						X	
3.2.3.1.1.14	Hazardous Waste Determination for HLW	X					
3.2.3.1.1.14.A						X	
3.2.3.1.1.14.B						X	
3.2.3.1.1.14.C						X	
3.2.3.1.1.15	HLW Consistency Test	X					
3.2.3.1.1.15.A						X	
3.2.3.1.1.15.B						X	
3.2.3.1.1.16	HLW Canister Impact Characteristics	X					
3.2.3.1.1.16.A						X	
3.2.3.1.1.16.B						X	
3.2.3.1.1.17	HLW Canister Label Requirements	X					
3.2.3.1.1.17.A						X	
3.2.3.1.1.17.B						X	
3.2.3.1.1.17.C						X	
3.2.3.1.1.17.D						X	
3.2.3.1.1.17.E						X	
3.2.3.1.1.17.F						X	
3.2.3.1.1.18	HLW Canister Handling Features	X					
3.2.3.1.1.18.A						X	
3.2.3.1.1.18.B						X	
3.2.3.1.1.18.C						X	
3.2.3.1.1.18.D						X	
3.2.3.1.1.18.E						X	
3.2.3.1.1.19	HLW Form Dose Rate at Shipment			X		X	

Legend:

NA - Not Applicable
 EQ - WA Equipment Segment
 Op - WA Operations Segment

HW - WA Hardware Segment
 SW - WA Software Segment
 FA - WA Facilities Segment

Table C-1. WA Allocation of Requirements to Segments (Continued)

WA-SRD Requirement Numbers	TITLE	WA Segments					
		N A	H W	E Q	S W	O P	F A
3.2.3.1.1.20	HLW Condition at Delivery					X	
3.2.3.1.1.21	Records for HLW	X					
3.2.3.1.1.21.1	General Requirements	X					
3.2.3.1.1.21.1.A						X	
3.2.3.1.1.21.1.B						X	
3.2.3.1.1.21.2	Waste Form Compliance Plan (WCP)					X	
3.2.3.1.1.21.3	Waste Form Qualification Report (WQR)					X	
3.2.3.1.1.21.4	Production Record for HLW					X	
3.2.3.1.1.21.5	Storage and Shipping Record for HLW					X	
3.2.3.1.1.22	HLW Annual Report					X	
3.2.3.1.1.23	Agreements for HLW					X	
3.2.3.1.1.24	Request for Nonstandard or Nonconforming HLW Delivery	X					
3.2.3.1.1.24.A						X	
3.2.3.1.1.24.B						X	
3.2.3.1.1.25	Final Description of HLW					X	
3.2.3.1.1.26	Shipping Records for HLW	X					
3.2.3.1.1.26.A						X	
3.2.3.1.1.26.B						X	
3.2.3.1.1.26.C						X	
3.2.3.1.1.26.D						X	
3.2.3.1.1.26.E						X	
3.2.3.1.1.27	Routine Determinations for HLW					X	
3.2.3.1.1.28	Title Transfer for HLW	X					
3.2.3.1.1.28.A						X	
3.2.3.1.1.28.B						X	
3.2.3.1.1.28.C						X	
3.2.3.1.1.29	Observation by DOE for HLW					X	
3.2.3.1.1.30	Notification of Improperly Described HLW Prior to Acceptance into CRWMS					X	
3.2.3.1.1.31	Resolution of Improperly Described HLW After Acceptance into CRWMS					X	
3.2.3.1.1.32	Reserved	X					
3.2.3.1.1.33	HLW Transaction Reporting					X	
3.2.3.1.1.34	Quality Assurance for HLW	X					

Legend:

NA - Not Applicable
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 Op - WA Operations Segment

HW - WA Hardware Segment
 SW - WA Software Segment
 FA - WA Facilities Segment

Table C-1. WA Allocation of Requirements to Segments (Continued)

WA-SRD Requirement Numbers	TITLE	WA Segments					
		N A	H W	E Q	S W	O P	F A
3.2.3.1.1.34.A						X	
3.2.3.1.1.34.B						X	
3.2.3.1.1.34.C						X	
3.2.3.1.1.34.D						X	
3.2.3.1.1.34.E						X	
3.2.3.1.1.34.F						X	
3.2.3.1.1.35	IAEA Safeguards Reporting for HLW	X					
3.2.3.1.1.35.A						X	
3.2.3.1.1.35.B						X	
3.2.3.1.1.35.C						X	
3.2.3.1.2	WA - Purchaser Interface Requirements	X					
3.2.3.1.2.1	Commercial SNF Receipt					X	
3.2.3.1.2.2	Criteria for Commercial SNF	X					
3.2.3.1.2.2.A		X					
3.2.3.1.2.2.A.1						X	
3.2.3.1.2.2.A.2						X	
3.2.3.1.2.2.A.3						X	
3.2.3.1.2.2.B						X	
3.2.3.1.2.2.C						X	
3.2.3.1.2.3	Standard Commercial SNF					X	
3.2.3.1.2.4	Commercial SNF Failed Form					X	
3.2.3.1.2.5	Commercial SNF Nonstandard Form					X	
3.2.3.1.2.6	Commercial SNF Data	X					
3.2.3.1.2.6.A		X					
3.2.3.1.2.6.A.1						X	
3.2.3.1.2.6.A.2						X	
3.2.3.1.2.6.B						X	
3.2.3.1.2.7	Canisters Containing Commercial SNF	X					
3.2.3.1.2.7.A						X	
3.2.3.1.2.7.B						X	
3.2.3.1.2.7.C						X	
3.2.3.1.2.7.D						X	
3.2.3.1.2.7.E						X	
3.2.3.1.2.8	Contracts for Commercial SNF	X					
3.2.3.1.2.8.A		X					

Legend:

NA - Not Applicable
 EQ - WA Equipment Segment
 Op - WA Operations Segment

HW - WA Hardware Segment
 SW - WA Software Segment
 FA - WA Facilities Segment

Table C-1. WA Allocation of Requirements to Segments (Continued)

WA-SRD Requirement Numbers	TITLE	WA Segments					
		N A	H W	E Q	S W	O P	F A
3.2.3.1.2.8.B						X	
3.2.3.1.2.8.C						X	
3.2.3.1.2.9	Delivery Commitment Schedules for Commercial SNF					X	
3.2.3.1.2.10	Exchange Requests for Commercial SNF					X	
3.2.3.1.2.11	Request for Nonstandard or Failed Commercial SNF Delivery					X	
3.2.3.1.2.12	Final Delivery Schedules for Commercial SNF	X					
3.2.3.1.2.12.A						X	
3.2.3.1.2.12.B						X	
3.2.3.1.2.13	Final Description for Commercial SNF					X	
3.2.3.1.2.14	Waste Fund Management	X					
3.2.3.1.2.14.A						X	
3.2.3.1.2.14.B						X	
3.2.3.1.2.14.C						X	
3.2.3.1.2.15	Shipping Records for Commercial SNF	X					
3.2.3.1.2.15.A						X	
3.2.3.1.2.15.B						X	
3.2.3.1.2.15.C						X	
3.2.3.1.2.15.D						X	
3.2.3.1.2.16	Routine Determinations for Commercial SNF					X	
3.2.3.1.2.17	Title Transfer for Commercial SNF					X	
3.2.3.1.2.18	Observation by DOE for Commercial SNF					X	
3.2.3.1.2.19	Notification of Improperly Described Commercial SNF Prior to Acceptance into CRWMS					X	
3.2.3.1.2.20	Resolution of Improperly Described Commercial SNF After Acceptance into CRWMS					X	
3.2.3.1.2.21	Initial Inventory Reporting for Commercial SNF					X	
3.2.3.1.2.22	Transaction Reporting for Commercial SNF					X	
3.2.3.1.2.23	Quality Assurance for Commercial SNF	X					
3.2.3.1.2.23.A						X	
3.2.3.1.2.23.B						X	
3.2.3.2	Interfaces with Other CRWMS Elements	X					
3.2.3.2.1	WA-Storage Interface Requirements	X					
3.2.3.2.1.1	WA-MRS Interface Requirements	X					
3.2.3.2.1.1.1	WA Hardware Segment Interface Requirements	X					
3.2.3.2.1.1.1.1	WA Hardware - MRS Utilities Interface		X				

Legend:

NA - Not Applicable
 EQ - WA Equipment Segment
 Op - WA Operations Segment

HW - WA Hardware Segment
 SW - WA Software Segment
 FA - WA Facilities Segment

Table C-1. WA Allocation of Requirements to Segments (Continued)

WA-SRD Requirement Numbers	TITLE	WA Segments					
		N A	H W	E Q	S W	O P	F A
3.2.3.2.1.1.2	WA Software Segment Interface Requirements	X					
3.2.3.2.1.1.2.1	WA Software - MRS Utilities Interface				X		
3.2.3.2.1.1.3	WA Operations Segment Interface Requirements	X					
3.2.3.2.1.1.3.1	WA Operations - MRS Preparation and Transfer Interface					X	
3.2.3.2.1.1.3.2	WA Operations - MRS Storage Mode Facility Interface					X	
3.2.3.2.1.1.4	WA Facilities Segment Interface Requirements	X					
3.2.3.2.1.1.4.1	WA Facilities - MRS Utilities Interface						X
3.2.3.2.1.2	WA-OSTS Interface Requirements	X					
3.2.3.2.2	WA-MGDS Interface Requirements	X					
3.2.3.2.2.1	WA Hardware Segment Interface Requirements	X					
3.2.3.2.2.1.1	WA Hardware - Repository Interface		X				
3.2.3.2.2.2	WA Software Segment Interface Requirements	X					
3.2.3.2.2.2.1	WA Software - MGDS Repository Interface				X		
3.2.3.2.2.3	WA Operations Segment Interface Requirements	X					
3.2.3.2.2.3.1	WA Operations - MGDS Repository Interface	X					
3.2.3.2.2.3.1.A						X	
3.2.3.2.2.3.1.B						X	
3.2.3.2.2.3.2	WA Operations - MGDS Engineered Barrier Segment Interface	X					
3.2.3.2.2.3.2.A						X	
3.2.3.2.2.3.2.B						X	
3.2.3.2.2.4	WA Facilities Segment Interface Requirements	X					
3.2.3.2.2.4.1	WA Facilities - MGDS Repository Interface						X
3.2.3.2.3	WA-Transportation Interface Requirements	X					
3.2.3.2.3.1	WA Hardware Segment Interface Requirements	X					
3.2.3.2.3.1.1	WA Hardware - Trans Planning and Control Interface		X				
3.2.3.2.3.2	WA Software Segment Interface Requirements	X					
3.2.3.2.3.2.1	WA Software - Trans Planning and Control Interface				X		
3.2.3.2.3.3	WA Operations Segment Interface Requirements	X					
3.2.3.2.3.3.1	WA Operations - Trans Planning and Control Interface					X	
3.2.4	Physical Characteristics	X					
3.2.4.1	Reserved	X					
3.2.4.2	Reserved	X					
3.2.4.3	Safeguards and Security	X					
3.2.4.3.1	Physical Protection and Industrial Security			X			X
3.2.4.3.2	Reserved	X					

Legend:

NA - Not Applicable
EQ - WA Equipment Segment
Op - WA Operations Segment

HW - WA Hardware Segment
SW - WA Software Segment
FA - WA Facilities Segment

Table C-1. WA Allocation of Requirements to Segments (Continued)

WA-SRD Requirement Numbers	TITLE	WA Segments					
		N A	H W	E Q	S W	O P	F A
3.2.4.3.3	Reserved	X					
3.2.4.3.4	Material Control and Accounting	X					
3.2.4.3.4.A						X	
3.2.4.3.4.B						X	
3.2.4.3.4.C			X		X		
3.2.4.3.4.D			X		X		
3.2.5	System Quality Factors	X					
3.2.5.1	Reliability	X					
3.2.5.1.A			X	X			X
3.2.5.1.B			X	X			X
3.2.5.2	Maintainability/Inspectability	X					
3.2.5.2.A			X	X			
3.2.5.2.B			X	X			X
3.2.5.2.C						X	
3.2.5.3	Availability		X	X			X
3.2.5.4	Service Life		X	X			X
3.2.5.5	Overall Utilization	X					
3.2.6	Reserved	X					
3.2.7	Transportability/Modularity		X	X			X
3.2.8	Reserved	X					
3.2.9	Portability and Load Carrying		X	X			X
3.3	DESIGN AND CONSTRUCTION	X					
3.3.1	General Design Criteria	X					
3.3.1.A			X	X			X
3.3.1.B			X	X			X
3.3.1.C			X	X			X
3.3.1.D			X	X			X
3.3.2	Electromagnetic Radiation	X					
3.3.2.A			X	X			X
3.3.2.B							X
3.3.2.C			X	X			X
3.3.3	Nameplate and Markings	X					
3.3.3.A			X	X			X
3.3.3.B			X	X			X
3.3.4	Workmanship	X					

Legend:

NA - Not Applicable
 EQ - WA Equipment Segment
 Op - WA Operations Segment

HW - WA Hardware Segment
 SW - WA Software Segment
 FA - WA Facilities Segment

Table C-1. WA Allocation of Requirements to Segments (Continued)

WA-SRD Requirement Numbers	TITLE	WA Segments					
		N A	H W	E Q	S W	O P	F A
3.3.4.A						X	X
3.3.4.B						X	X
3.3.5	Interchangeability		X	X			X
3.3.6	Safety	X					
3.3.6.1	General Requirements	X					
3.3.6.1.A							X
3.3.6.1.B			X	X			X
3.3.6.2	System Safety Precedence		X	X		X	X
3.3.6.3	Facilities, Equipment, and Materials Protective Measures	X					
3.3.6.3.A							X
3.3.6.3.B							X
3.3.6.4	Personnel Protective Equipment	X					
3.3.6.4.A				X			
3.3.6.4.B				X			
3.3.6.4.C							X
3.3.6.5	Reserved	X					
3.3.6.6	Safety Labels and Placards	X					
3.3.6.6.A				X			X
3.3.6.6.B							X
3.3.6.6.C				X			X
3.3.6.7	Emergency Lighting	X					
3.3.6.7.A							X
3.3.6.7.B	Emergency Lighting system:	X					
3.3.6.7.B.1							X
3.3.6.7.B.2							X
3.3.6.7.C							X
3.3.6.8	Equipment Related Hazards	X					
3.3.6.8.A							X
3.3.6.8.B				X			X
3.3.6.8.C				X			X
3.3.6.8.D				X			
3.3.6.9	Work Platforms	X					
3.3.6.9.A				X			X
3.3.6.9.B				X			X
3.3.6.10	Electrical Safety	X					

Legend:

NA - Not Applicable
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Table C-1. WA Allocation of Requirements to Segments (Continued)

WA-SRD Requirement Numbers	TITLE	WA Segments					
		N A	H W	E Q	S W	O P	F A
3.3.6.10.A			X	X			X
3.3.6.10.B			X	X			X
3.3.6.10.C			X	X			X
3.3.6.10.D			X	X		X	X
3.3.7	Human Factors Engineering	X					
3.3.7.1	Reserved	X					
3.3.7.2	Voice Communications Equipment		X	X			X
3.3.7.3	Alarms and Warning Systems			X			X
3.3.7.4	Controls			X			X
3.3.7.5	Visual Displays		X	X			X
3.3.7.6	Control Panel Layout			X			X
3.3.7.7	Reserved	X					
3.3.7.8	Labeling, Markings, and Signs			X		X	X
3.3.7.9	Visual Display Terminal (VDT) Workstation		X				X
3.3.7.10	Anthropometry and Ergonomics			X			X
3.3.7.11	Remote Handling and Operation			X			X
3.3.7.12	Vehicles and Material Handling			X			X
3.3.7.13	Accessibility and Useability by the Physically Handicapped			X			X
3.3.7.14	User-Computer Software Interface		X		X		
3.3.7.15	Human Factors Program		X	X	X	X	X
3.3.8	Methods and Controls	X					
3.3.8.1	Material Management	X					
3.3.8.1.A	Identification and control of materials:	X					
3.3.8.1.A.1			X		X	X	X
3.3.8.1.A.2			X		X	X	X
3.3.8.1.B	Material, parts, or components conformance:	X					
3.3.8.1.B.1						X	
3.3.8.1.B.2			X		X	X	X
3.3.8.1.B.3						X	
3.3.8.1.C						X	
3.3.8.1.D			X	X		X	X
3.3.8.2	Inventory Management		X		X	X	
3.3.9	Government Furnished Property	X					
3.3.9.A						X	X
3.3.9.B						X	

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Table C-1. WA Allocation of Requirements to Segments (Continued)

WA-SRD Requirement Numbers	TITLE	WA Segments					
		N A	H W	E Q	S W	O P	F A
3.3.10	Reserved	X					
3.3.11	Environmental Protection Requirements	X					
3.4	DOCUMENTATION	X					
3.4.1	Requirements Documents and Specifications	X					
3.4.1.A						X	
3.4.1.B						X	
3.4.2	Drawings					X	
3.4.3	Maintenance, Operator, and Technical Manuals					X	
3.4.4	Test Plans and Procedures					X	
3.4.5	Quality Assurance Documentation					X	
3.4.6	Construction Records					X	
3.4.7	Computer Documentation				X	X	
3.4.8	Records Management	X					
3.4.8.A			X		X	X	X
3.4.8.B			X		X	X	X
3.4.8.C			X		X	X	
3.5	LOGISTICS	X					
3.5.1	Maintenance		X	X			X
3.5.1.1	Equipment Maintenance	X					
3.5.1.1.A	Built-in-Test Equip. (BITE) and Automatic-Test-Equip. (ATE) :	X					
3.5.1.1.A.1			X	X			X
3.5.1.1.A.2			X	X			X
3.5.1.1.B				X			X
3.5.1.1.C							X
3.5.1.1.D							X
3.5.1.1.E						X	X
3.5.1.2	Calibration Maintenance			X			X
3.5.2	Supportability	X					
3.5.2.A						X	
3.5.2.B						X	
3.5.2.C							X
3.5.3	Facilities	X					
3.5.3.A				X			X
3.5.3.B							X
3.5.3.C							X

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Table C-1. WA Allocation of Requirements to Segments (Continued)

WA-SRD Requirement Numbers	TITLE	WA Segments					
		N A	H W	E Q	S W	O P	F A
3.5.3.D				X			X
3.5.4	Support & Test Equipment			X			X
3.6	PERSONNEL AND TRAINING	X					
3.6.1	Personnel	X					
3.6.1.A						X	
3.6.1.B						X	
3.6.1.C						X	
3.6.2	Training	X					
3.6.2.1	General Requirements	X					
3.6.2.1.A				X			X
3.6.2.1.B						X	
3.6.2.1.C						X	
3.6.2.2	Health Physics Training					X	
3.6.2.3	Occupational Safety and Health Training					X	
3.7	SEGMENT REQUIREMENTS	X					
3.7.1	Reserved	X					
3.7.2	Reserved	X					
3.7.3	Reserved	X					
3.7.4	Reserved	X					
3.7.5	WA Hardware Segment	X					
3.7.5.1	WA Hardware Segment Description	X					
3.7.5.1.1	WA Hardware Segment Functions		X				
3.7.5.1.2	WA Hardware Segment Interfaces		X				
3.7.5.2	WA Hardware Segment Requirements		X				
3.7.6	WA Equipment Segment	X					
3.7.6.1	WA Equipment Segment Description	X					
3.7.6.1.1	WA Equipment Segment Functions			X			
3.7.6.1.2	WA Equipment Segment Interfaces			X			
3.7.6.2	WA Equipment Segment Requirements	X					
3.7.6.2.A				X			
3.7.6.2.B				X			
3.7.6.2.C				X			
3.7.6.2.D				X			
3.7.7	WA Software Segment	X					
3.7.7.1	WA Software Segment Description	X					

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Table C-1. WA Allocation of Requirements to Segments (Continued)

WA-SRD Requirement Numbers	TITLE	WA Segments					
		N A	H W	E Q	S W	O P	F A
3.7.7.1.1	WA Software Segment Functions				X		
3.7.7.1.2	WA Software Segment Interfaces				X		
3.7.7.2	WA Software Segment Requirements				X		
3.7.8	WA Operations Segment	X					
3.7.8.1	WA Operations Segment Description	X					
3.7.8.1.1	WA Operations Segment Functions					X	
3.7.8.1.2	WA Operations Segment Interfaces					X	
3.7.8.2	WA Operations Segment Requirements	X					
3.7.8.2.1	Notifications	X					
3.7.8.2.1.A						X	
3.7.8.2.1.B						X	
3.7.8.2.1.C						X	
3.7.8.2.2	Waste Acceptance Criteria	X					
3.7.8.2.2.A						X	
3.7.8.2.2.B						X	
3.7.8.2.3	SNF Specifications					X	
3.7.8.2.4	HLW Specifications					X	
3.7.8.2.5	Contract/Agreement	X					
3.7.8.2.5.A						X	
3.7.8.2.5.B						X	
3.7.8.2.5.C						X	
3.7.8.2.5.D						X	
3.7.8.2.5.E						X	
3.7.8.2.5.F						X	
3.7.8.2.5.G						X	
3.7.8.2.5.H						X	
3.7.8.2.6	Acceptance Priority Ranking					X	
3.7.8.2.7	Annual Capacity Report					X	
3.7.8.2.8	Emergency Deliveries					X	
3.7.8.2.9	Delivery Commitment Schedules	X					
3.7.8.2.9.A						X	
3.7.8.2.9.B						X	
3.7.8.2.9.C						X	
3.7.8.2.10	Exchange Requests					X	
3.7.8.2.11	Request for Nonstandard Waste Form Delivery					X	

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Table C-1. WA Allocation of Requirements to Segments (Continued)

WA-SRD Requirement Numbers	TITLE	WA Segments					
		N A	H W	E Q	S W	O P	F A
3.7.8.2.12	Final Delivery Schedules	X					
3.7.8.2.12.A						X	
3.7.8.2.12.B						X	
3.7.8.2.12.C						X	
3.7.8.2.12.D						X	
3.7.8.2.13	Reserved					X	
3.7.8.2.14	Waste Fund Management	X					
3.7.8.2.14.A						X	
3.7.8.2.14.B						X	
3.7.8.2.14.C						X	
3.7.8.2.14.D						X	
3.7.8.2.14.E						X	
3.7.8.2.15	Fee Receipt Determination					X	
3.7.8.2.16	Title Transfer	X					
3.7.8.2.16.A						X	
3.7.8.2.16.B						X	
3.7.8.2.16.C						X	
3.7.8.2.16.D						X	
3.7.8.2.16.E						X	
3.7.8.2.17	Observation by DOE	X					
3.7.8.2.17.A						X	
3.7.8.2.17.B						X	
3.7.8.2.18	Notification of Improperly Described Waste Prior to Acceptance into CRWMS					X	
3.7.8.2.19	Resolution of Improperly Described Waste After Acceptance into CRWMS	X					
3.7.8.2.19.A						X	
3.7.8.2.19.B						X	
3.7.8.2.20	Annual Report to Purchaser/Producer					X	
3.7.8.2.21	Record Disposition					X	
3.7.9	WA Facilities Segment	X					
3.7.9.1	WA Facilities Segment Description	X					
3.7.9.1.1	WA Facilities Segment Functions						X
3.7.9.1.2	WA Facilities Segment Interfaces						X
3.7.9.2	WA Facilities Segment Requirements	X					

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WA-SRD Requirement Numbers	TITLE	WA Segments					
		N A	H W	E Q	S W	O P	F A
3.7.9.2.1	Physical Characteristics						X
3.7.9.2.1.1	Workplace Environment	X					
3.7.9.2.1.1.A							X
3.7.9.2.1.1.B							X
3.7.9.2.1.2	Heating, Ventilation, and Air Conditioning						X
3.7.9.2.1.3	Illumination						X
3.7.9.2.1.4	Acoustical Noise						X
3.7.9.2.1.5	Vibration						X
3.7.9.2.2	Records Storage	X					
3.7.9.2.2.1	Waste Process Records						X
3.7.9.2.2.2	Duplicate Records Storage						X
3.7.9.2.3	Flexibility, Expansion, and Integration						X
3.8	PRECEDENCE	X					
3.8.A						X	
3.8.B						X	
3.9	QUALITY ASSURANCE	X					
3.9.A						X	
3.9.B	Reserved					X	
3.9.C	Reserved					X	
3.9.D	Reserved					X	
3.9.E	Reserved					X	
5.	PREPARATION FOR OPERATIONS	X					
5.1	KEY DECISIONS	X					
5.1.A						X	
5.1.B						X	
5.2	REQUIREMENTS	X					
5.2.A						X	
5.2.B						X	
5.2.C						X	

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