DOE/RW-0369

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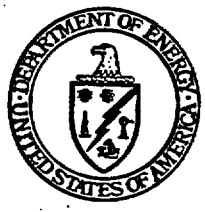
Office of Civilian Radioactive Waste Management



Physical System Requirements — Accept Waste

August 1992

U.S. Department of Energy
Office of Civilian Radioactive Waste Management

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DOE/RW-0369

Office of Civilian Radioactive Waste Management

Physical System Requirements — Accept Waste

August 1992

U.S. Department of Energy
Office of Civilian Radioactive Waste Management
Washington, D.C. 20585

DOE/RW-0223

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
PROGRAM CHANGE CONTROL BOARD
DIRECTIVE

(1) DCP NUMBER: 60 (2) DCP TITLE: Initial Issuance of Physical System Requirements-Accept Waste PAGE 1 OF 1

(3) DOCUMENT NUMBER: N/A
REVISION: N/A
DOCUMENT TITLE: Physical System Requirements-Accept Waste

(4) COGNIZANT ORGANIZATION: RW-30

(5) DCP DISPOSITION:

- [x] APPROVE
- [ ] APPROVE WITH CONDITIONS
- [ ] DISAPPROVE
- [ ] ACTION DEFERRED
- [ ] CANCELLED/WITHDRAWN

(6) CONDITIONS/RATIONALE:

Per implementation direction of DCP-56 (Interim Approach to the Technical Baseline), the Physical System Requirements-Accept Waste document replaces the applicable portions of both the WMSR, Volume I and the WMSD documents as the technical baseline requirements for the Waste Acceptance System.

(7) IMPLEMENTATION DIRECTION:

This document is hereby approved and shall be effective immediately.

(8) CONCURRENCE: _____ (IF REQUIRED) DIRECTOR, OQA

DATE: _____

(9) SIGNATURE: Daniel A. Peters PCCB CHAIRMAN

DATE: 8/31/92

(10) SIGNATURE: _____ PCCB EXECUTIVE SECRETARY

DATE: _____

Revision 4
(Previous editions are obsolete)

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1.0 INTRODUCTION

1.1 Background

The Nuclear Waste Policy Act (NWPA) assigned to the Department of Energy (DOE) the responsibility for managing the disposal of spent nuclear fuel and high-level radioactive waste and established the Office of Civilian Radioactive Waste Management (OCRWM) for that purpose. The Secretary of Energy, in his November 1989 report to Congress (DOE/RW-0247), announced new initiatives for the conduct of the Civilian Radioactive Waste Management (CRWM) program. One of these initiatives was to establish improved management structure and procedures. In response, OCRWM performed a management study and the OCRWM Director subsequently issued the Management Systems Improvement Strategy (MSIS) on August 10, 1990, calling for a rigorous implementation of systems engineering principles with a special emphasis on functional analysis.

The functional analysis approach establishes a framework for integrating the program management efforts with the technical requirements analysis into a single, unified, and consistent program. This approach recognizes that just as the facilities and equipment comprising the physical waste management system must perform certain functions, so must certain programmatic and management functions be performed within the program in order to successfully bring the physical system into being.

Thus, a comprehensive functional analysis effort has been undertaken which is intended to:

- Identify the functions that must be performed to fulfill the waste disposal mission;
- Identify the corresponding requirements imposed on each of the functions; and
- Identify the conceptual architecture that will be used to satisfy the requirements.

The principal purpose of this requirements document is to present the results that were obtained from the conduct of a functional analysis effort for the Accept Waste mission. The starting point for this functional analysis was the further decomposition of the Accept Waste function from the "Physical System Requirements - Overall System" document. The Physical System Requirements/Functional Analysis Management Plan defines the criteria and activities for the preparation, review, and approval of this document.

1.2 Objective

The objective of this document is to establish the essential functions, requirements, interfaces, and system architecture for the Accept Waste mission. This document will serve as the baseline and the technical requirements contained herein will be the basis for future stages of development of the Waste Acceptance System.

1.3 Approach

A comprehensive functional analysis begins with a statement of the mission, from which all essential functions that the system must perform are derived. The functional analysis process is sequential. Thus, there are several distinct steps, each containing progressively more detail, and each leading to three important pieces of information:

- Functions,
- Requirements, and
- Architecture.

Functions are simple statements of purpose, defining what the system must do; requirements indicate how well the function must be accomplished; and architecture represents a piece of the actual physical system that satisfies a corresponding requirement. This triad of functions (F), requirements (R), and architecture (A) is needed to completely describe and understand the system at each level and to set the stage for the next lower level.

Figure 1 illustrates the sequential F-R-A approach that was implemented by a team of technical experts from across the OCRWM program, in accordance with the Physical System Requirements/Functional Analysis Management Plan. These experts were supported by a regulatory review team who extracted all potentially relevant requirements from the source documents identified in Table 1.

Beginning with the mission statement, the technical experts assigned a set of applicable requirements from those provided by the regulatory review team, and provided an architectural concept. At this point, the mission statement became the parent function which the technical experts decomposed into a set of functions that are both necessary and sufficient to satisfy the parent. Requirements were assigned and architectural concepts provided for each function, establishing the basis for further decomposition. Eventually, a level of detail is reached within the function hierarchy that cannot be supported with either specific requirements or specific architecture. This can lead to some differences in the level of detail for functions, requirements, and architecture contained within this document.

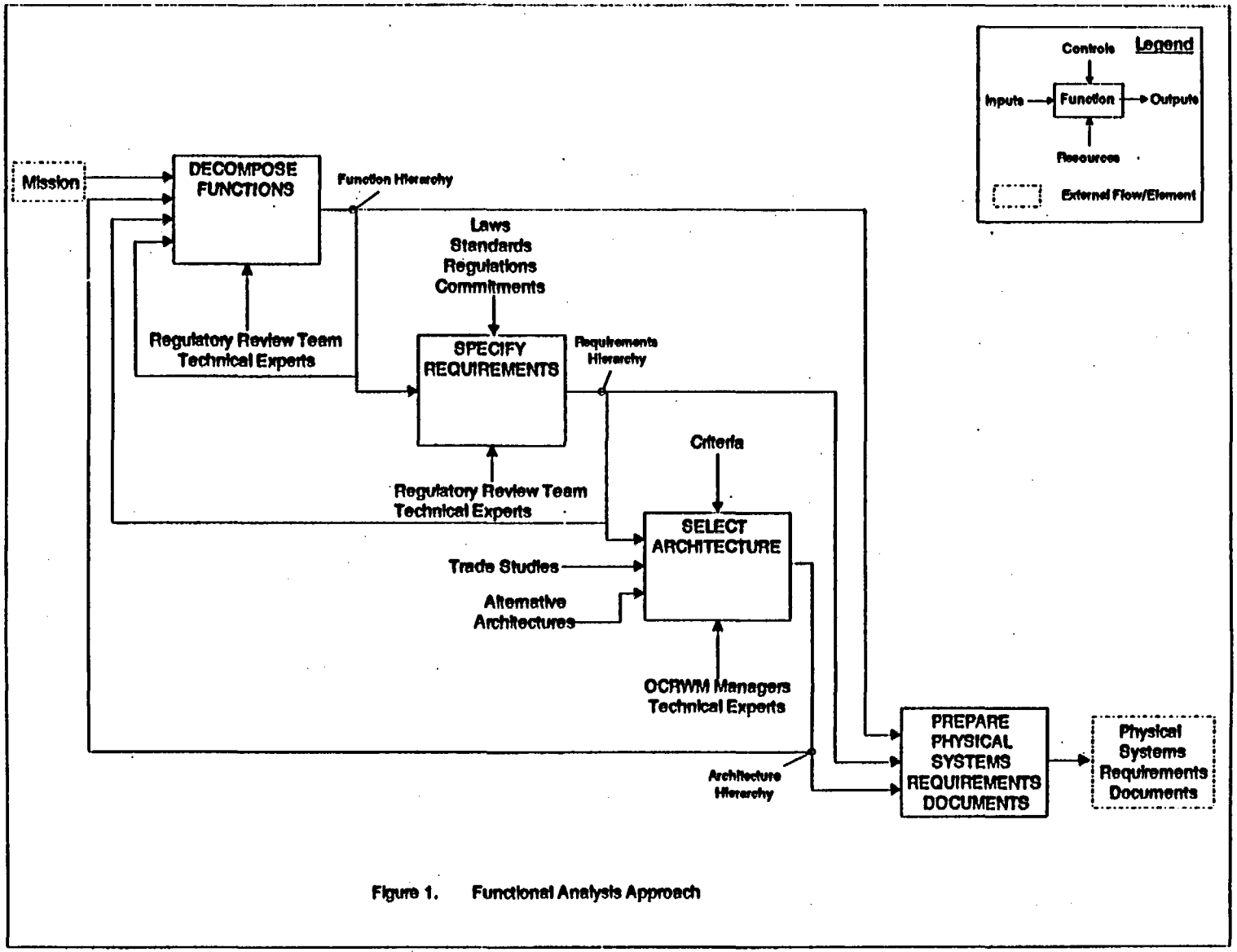

Figure 1. Functional Analysis Approach

Table 1. Source Documents Containing Requirements in this Accept Waste Document

Document Identifier	Document Description
29 USC 651 et seq.	Occupational Safety and Health Act
NWPA-42 USC 10101 et seq.	Nuclear Waste Policy Act of 1982
10 CFR 60	Disposal of High-Level Radioactive Wastes in Geologic Repositories
10 CFR 71	Packaging and Transportation of Radioactive Material
10 CFR 72	Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-level Radioactive Waste
10 CFR 961	Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste
DOE/RW-0247	Report to Congress on Reassessment of the Civilian Radioactive Waste Management Program
DOE/RW-0214	OCRWM Quality Assurance Requirements Document
DOE ORDER 5000.3A	Occurrence Reporting and Processing of Operations Information
MOA RW/DP	Memorandum of 7/14/86 on Policy for Shipping Defense High-Level Waste (DHLW) to a Civilian Radioactive Waste Repository
Presidential Memo	Memorandum of 4/30/85 on Disposal of Defense Waste in a Commercial Repository
Bartlett Letter to Sanda	Letter dated 2/14/92 on DOE's obligation to accept SNF pursuant to the NWPA and the standard contract

1.4 Mission

Based upon the Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste (10 CFR 961), the mission of the Waste Acceptance System is the transfer of custody, f.o.b. carrier, of spent nuclear fuel or high-level radioactive waste from all purchasers/producers (who have executed a contract with DOE or an agreement with OCRWM) to OCRWM at the purchaser's/producer's civilian nuclear power reactor or such other domestic site as may be designated by the purchaser/producer.

1.5 Scope

1.5.1 Scope of Functional Analysis

The functional analysis process must consider all phases of a system's life cycle. For the Accept Waste mission, the time period covered by this functional analysis is from the initial issuance of the NWPA of 1982 through the receipt and verification of the last shipment of waste for disposal.

Figure 2 illustrates the boundaries between the Manage Waste Disposal function, the purchasers/producers, the Nuclear Waste Fund, and its environment. The environment identified on Figure 2 is defined as anything and everything outside the direct control of the CRWM program. The boundaries for the Accept Waste function are shown in Figure 3.

1.5.2 Organization of Document

Section 2.0 of this document contains an explicit description for each of the Accept Waste functions plus the higher level - Manage Waste Disposal function; an identification of the key interfaces (inputs/outputs) between these functions; and a specification of the corresponding requirements (constraints, performance, and interface). All of this information is presented in the form of a single table for each function. The Manage Waste Disposal function (Table F1) is included to provide continuity from the Overall System document and for complete traceability of functions from top to bottom.

Section 3.0 contains individual architectural description tables for each physical system element of a Waste Acceptance System plus the higher level - Nuclear Waste Management System. These tables present the rationale justifying the need for, or the selection of, a particular architecture and a brief description of the concept.

Section 4.0 contains a more illustrative description of the important interfaces that have been identified within the Accept Waste mission. This includes interfaces between the lower level functions and between a function and the external environment. The interfaces at the Manage Waste Disposal level are also included for continuity with the Overall System document. Two types of diagrams are used to illustrate these functional interfaces: N-square charts and functional flow diagrams.

A number of appendices are included in this document. Appendix A is a Glossary of terms that are used throughout the functional analysis effort; Appendix B, a Bibliography of reference documents used in this effort; Appendix C, Decision Documentation, indicates the basis for any DOE/OCRWM decisions that have been made in support of this effort; Appendix D, a list of the Acronyms that are used throughout this document; Appendix E, Accept Waste Interfaces, contains a list of the important inputs and outputs from the Accept Waste function; Appendix F, a reserved section for the Waste Acceptance Schedule, including the transportation modal split and SNF/high-level waste characteristics; and Appendix G, an indentured list of Accept Waste functions. In addition, Supplemental Appendices, which are not intended to be approved and controlled, are included as separate attachments for completeness.

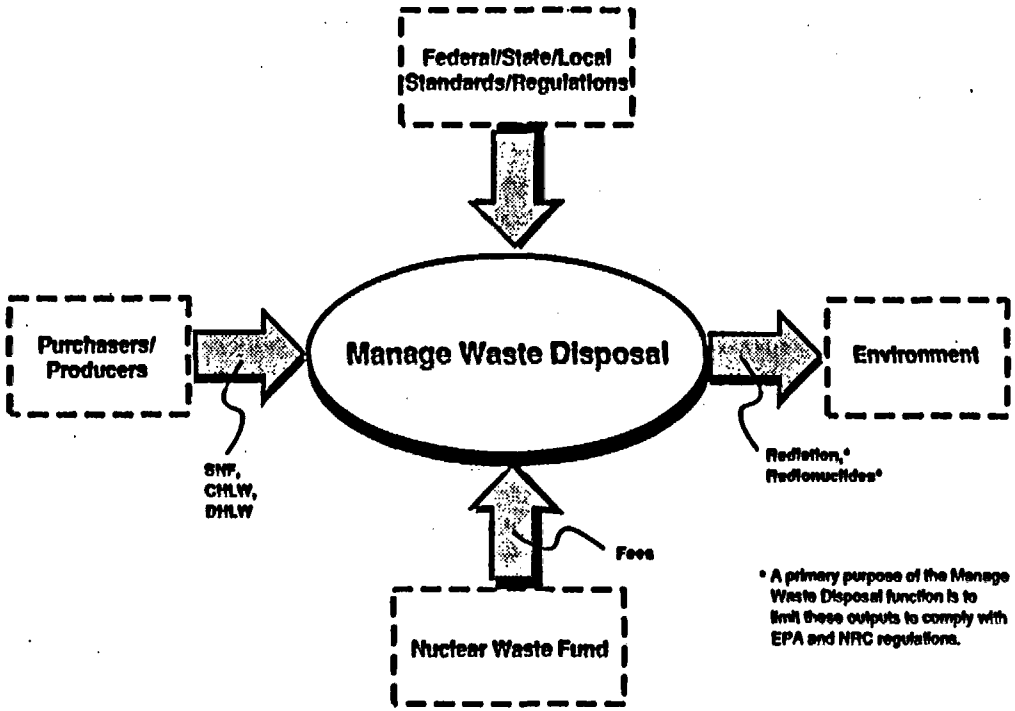

Figure 2. Manage Waste Disposal Boundaries

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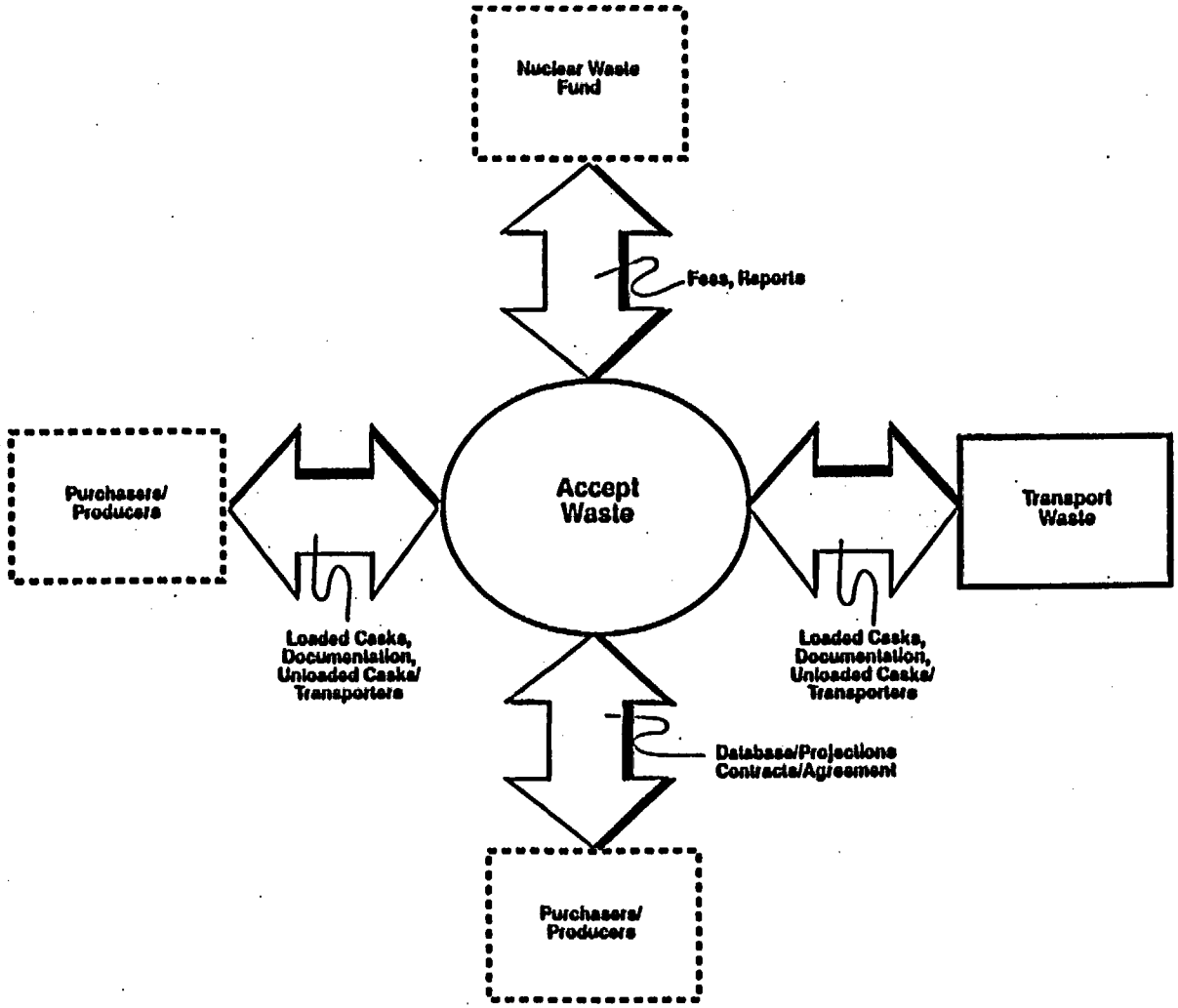

Figure 3. Accept Waste Boundaries

2.0 FUNCTIONS AND REQUIREMENTS

Figure 4 displays the functions deemed necessary to fulfill the Accept Waste mission. As indicated, the numbering scheme which uniquely identifies function titles is based on using a 1. at the first level, a 1.1 at the second level, a 1.1.X at the third level, etc. This scheme, which permits traceability between functions and subfunctions, is used throughout the results of the physical system functional analysis.

Table 1 contains a list of source documents from which the requirements contained in this document were extracted. Although additional source documents have been and will continue to be reviewed, it was determined that the scope and detail contained in the documents referenced in Table 1 are sufficient to specify an initial set of requirements in the Accept Waste requirements document. Other supplementary documents have been identified as potential source documents, which will be reviewed to identify requirements. Any applicable results of these reviews will be incorporated into subsequent revisions to this functional analysis document.

Tables F1. through F1.1.5 contain descriptions for each of the functions, including an identification of inputs to, and outputs from, each of the functions. A compilation of all inputs and outputs is provided in Appendix E, and an indentured list of all Accept Waste functions is provided in Appendix G. Tables F1. through F1.1.5 also include a compilation of the corresponding requirements that are determined to be appropriate for each function. In general, if a requirement is applicable to all functions at a given level in the hierarchy, it is assigned to their parent function in order to avoid unnecessary repetition.

Requirements can be one of three types: constraints, which are requirements imposed on the function by sources external to OCRWM (e.g., Congress, Environmental Protection Agency, Nuclear Regulatory Commission, other DOE offices); performance requirements which are imposed on the function by OCRWM (n.b., requirements extracted from 10 CFR Part 961 are considered to be performance requirements); and interface requirements which apply to the inputs to, or outputs from, the functions and may be imposed either by external sources or by OCRWM. The sum of the requirements assigned to the input and the corresponding output is the interface requirements for any given interface. The numbering convention used for the identification of requirements in these tables is as follows: for example, 1.1C1: the first constraint (C) assigned to function 1.1; 1.1P1: the first performance requirement (P) assigned to function 1.1; 1.1I1a: the first interface requirement assigned to input (I) 1 to function 1.1; and 1.1O1a: the first interface requirement assigned to output (O) 1 from function 1.1. Each requirement that has been extracted from a source document has the appropriate reference noted. Others that have not yet been firmly decided are noted as "None specified at this time". Note that any reference to any term, an appendix, a different section number or

paragraph number within a particular requirement statement refers to the term's definition, the appendix, section, or paragraph in the source document itself. However, this document uses the definitions for SNF and HLW from the NWPA, unless otherwise noted.

OCRWM recognizes that this initial version of the Accept Waste requirements document contains a limited number of performance and interface requirements, pending future decisions to be made by OCRWM management on the basis of the results of both prior and future systems studies. Subsequent revisions to this document will include additional specific requirements as they are identified and resolved. To be included, performance and interface requirements tied to quality affecting activities must be (or have been) developed under a Quality Assurance (QA) program which meets the requirements of OCRWM's Quality Assurance Requirements Document, 10 CFR 50 Appendix B and NQA-1, and documented under an acceptable decision record format.

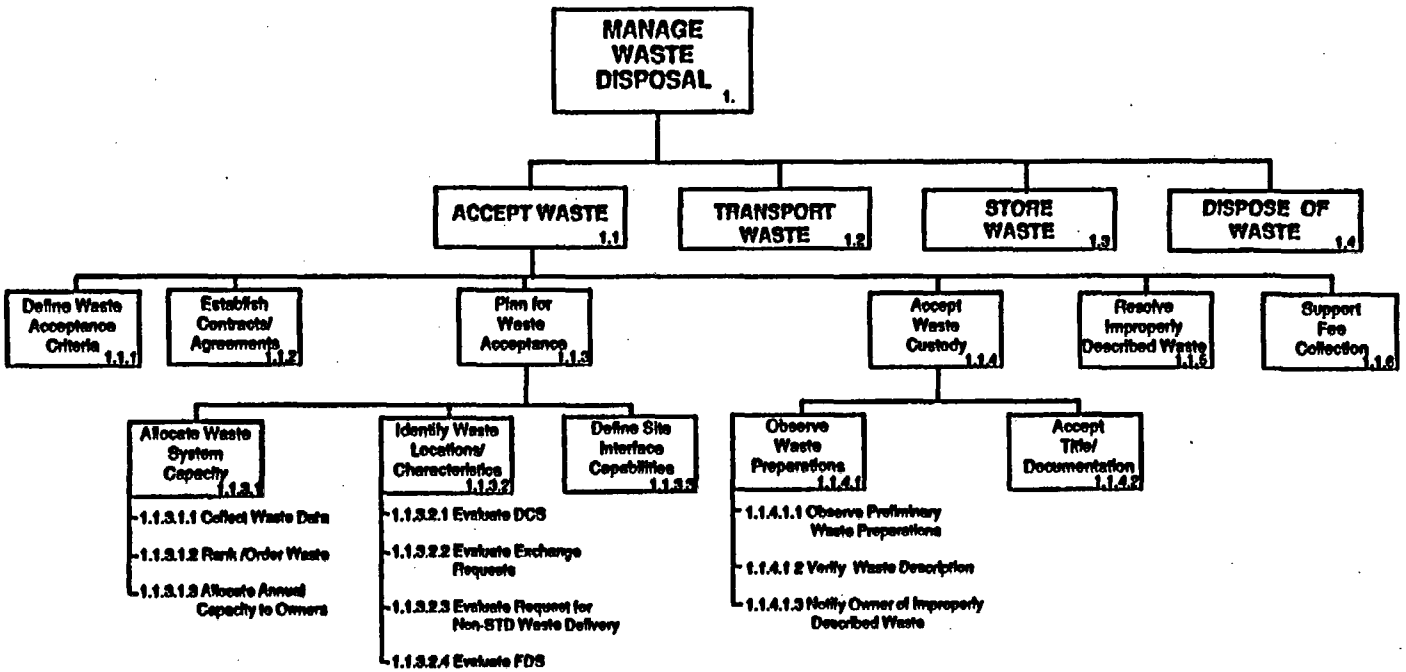

Figure 4. Accept Waste Function Hierarchy

Table F1. Function Description: Manage Waste Disposal

I. Function ID Number: 1.

II. Function Title: Manage Waste Disposal

III. Function Definition:

Manage waste disposal means to conduct any physical activity, operation, or process to accept, transport, store, or dispose of spent nuclear fuel or high-level waste.

The mission of the Nuclear Waste Management System (NWMS) is to manage and dispose of the nation's spent nuclear fuel and high-level radioactive waste in a geologic repository in a manner that protects the health and safety of the public and of the workers and the quality of the environment.

The NWPA defines spent nuclear fuel as the fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing. High-level radioactive waste is defined as (A) 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 (B) other highly radioactive material that the Commission, consistent with existing law, determines by rule requires permanent isolation.

[NWPA Sec. 2 (23) and (12)]

IV. Interfaces:

A. Inputs:

1.I1	SNF	From: Purchaser
1.I2	CHLW	From: Producer
1.I3	DHLW	From: Producer

B. Outputs:

1.O1	Federally-Limited Radiation Exposure	To: Accessible Environment
1.O2	Federally-Limited Release of Radionuclides	To: Accessible Environment

V. Function Requirements:

A. Constraints:

1.C1 This requirement intentionally left blank.

1.C2 ... the Secretary is authorized to enter into contracts 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, subsequent transportation, and disposal of such waste or spent fuel.

[NWPA Sec. 302 (a)(1)]

1.C3 This requirement intentionally left blank.

1.C4 This requirement intentionally left blank.

1.C5 (a) Each employer -

(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or likely to cause death or serious physical harm to his employees;

(2) shall comply with occupational safety and health standards promulgated under this chapter.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this chapter which are applicable to his own actions and conduct.

[29 USC 651 et seq., Sect. 654]

1.C6 IMPLEMENTATION REQUIREMENTS.

d. Procedures.

Program Senior Officials (PSOs) shall take action to have procedures established for implementation of the requirements of this Order for facilities under their cognizance. These procedures shall be approved by the PSO and shall include:

(1) Responsibilities of the contractor, field organization, Headquarters program office, and the HQ Emergency Operations Center (EOC).

(2) Categorization, notification, and reporting requirements for each facility.

e. Training.

PSOs shall take action to have training programs established for both DOE and contractor personnel in the requirements of this Order for facilities under their cognizance. These training programs shall include:

(1) Indoctrination in the philosophy of occurrence reporting as outlined in Paragraph 6 of this Order.

(2) Identification of Reportable Occurrences; their categorization, notification, and associated reporting requirements; analysis, determination of root causes and generic implications; and implementation, tracking and close-out of correction actions.

(3) Utilization of the DOE Operational Data Base, including the input of occurrence reports and obtaining information from the data base.

[DOE Order 5000.3A, 8]

1.C7 RESPONSIBILITIES AND AUTHORITIES

d. Program Senior Officials (PSO), in addition to other responsibilities prescribed in this Order, shall carry out responsibilities which include but are not limited to:

(1) Providing clear and explicit delegations of responsibility and authority for implementing this Order;

(2) Establishing agreements with Heads of Field Organizations to ensure support to the DOE Facility Representative and DOE Program Manager(s) in accordance with this Order;

(3) May appoint Headquarters investigation boards as required under DOE 5484.1.

[DOE Order 5000.3A, 9]

1.C8 (b) In order to carry out the policy set forth in this Act, it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may-

(1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;

(2) assure for all Americans safe, healthful, productive and aesthetically and culturally pleasing surroundings;

(3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;

(4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, and environment which supports diversity and variety of individual choice;

(5) achieve a balance between population and resources use which will permit high standards of living and a wide sharing of life's amenities; and

(6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

[42 USC 4321 et seq., Section 101]

1.C9 This requirement intentionally left blank.

B. Performance:

1.P1 DOE shall accept title to all SNF and/or HLW, of domestic origin, generated by the civilian nuclear power reactor(s) specified in Appendix A, provide subsequent transportation for such material to the DOE facility, and dispose of such material in accordance with the terms of this contract.

[10 CFR 961.11, Article IV, B, 1]

1.P2 This document defines the quality assurance requirements governing activities affecting quality of all affected organizations unless specifically stated otherwise herein. These quality assurance requirements are applicable to the Mined Geologic Disposal System (MGDS), Waste Acceptance Process Activities of High-Level Waste Form Production, Transport of Spent Fuel and High-Level Nuclear Waste, and Monitored Retrievable Storage.

[DOE/RW-0214, p. iii]

C. Interface:

1.I1 Contracts entered into under this section shall provide that-

(A) Following commencement of operation of a repository, the Secretary shall take title to the ... spent nuclear fuel involved as expeditiously as practicable upon the request of the generator or owner of such ... spent fuel; and

(B) in return for the payment of fees established by this section, the Secretary, beginning not later than January 31, 1998, will dispose of the ... spent nuclear fuel involved as provided in this subtitle.

[NWPA Sec. 302 (a)(5)]

1.I2 Contracts entered into under this section shall provide that-

(A) Following commencement of operation of a repository, the Secretary shall take title to the high-level radioactive waste... involved as expeditiously as practicable upon the request of the generator or owner of such waste ... ; and

(B) in return for the payment of fees established by this section, the Secretary, beginning not later than January 31, 1998, will dispose of the high-level radioactive waste ... involved as provided in this subtitle.

[NWPA Sec. 302 (a)(5)]

1.I3 ... the Department of Energy ... plans ... to dispose of defense waste in a commercial repository.

[Presidential Memo, 1985]

1.O1 ... the Federal Government has the responsibility to provide for the permanent disposal of high-level radioactive waste and such spent nuclear fuel as may be disposed of in order to protect the public health and safety and the environment. ...
[NWPA Sec. 111(a)(4)]

1.O2 Same as 1.O1 above.

Table F1.1 Function Description: Accept Waste

I. **Function ID Number:** 1.1

II. **Function Title:** Accept Waste

III. **Function Definition:**

The Accept Waste function establishes the criteria for acceptable waste, establishes contracts/agreements with purchasers/producers, collects fees, develops the plan for waste pickup, transfers the custody of the waste and resolves discrepancies in the waste description.

The transfer of custody, f.o.b. carrier, of spent nuclear fuel or high-level radioactive waste from all purchasers/producers (who have executed a contract with DOE or an agreement with OCRWM) to OCRWM at the purchaser's/producer's civilian nuclear power reactor or other domestic sites as may be designated by the purchaser/producer and approved by OCRWM. [10 CFR 961.11, Article I, Definitions - Expanded]

IV. Interfaces:

A. Inputs:

1.1I1	SNF	From:	Purchaser
1.1I2	CHLW	From:	Producer
1.1I3	DHLW	From:	Producer
1.1I4	Unloaded Casks/Transporters	From:	Function 1.2
1.1I5	Shipping Documents	From:	Function 1.2
1.1I6	Ancillary Equipment	From:	Function 1.2

B. Outputs:

1.1O1	Loaded SNF Casks/Transporters	To:	Function 1.2
1.1O2	Loaded CHLW Casks/Transporters	To:	Function 1.2
1.1O3	Loaded DHLW Casks/Transporters	To:	Function 1.2
1.1O4	Documentation	To:	Function 1.2
1.1O5	Information	To:	Function 1.2

V. Function Requirements:

A. Constraints:

1.1C1 This requirement intentionally left blank.

1.1C2 ... the Secretary shall establish procedures for the collection and payment of fees ....
[NWPA, Section 302 (a)(4)]

1.1C3 This requirement intentionally left blank.

1.1C4 The Secretary shall annually review the amount of the fees established ... to evaluate whether collection of the fee will provide sufficient revenues to offset the costs ....
[NWPA, Section 302 (a)(4)]

1.1C5 (A) Contracts entered into under this section shall provide that - (A) following commencement of operation of a repository, the Secretary shall take title to the high-level radioactive waste or spent nuclear fuel involved as expeditiously as practicable upon the request of the generator or owner of such waste or spent fuel ...

(B) in return for the payment of fees established by this section, the Secretary, beginning not later than January 31, 1998, will dispose of the high-level radioactive waste or spent nuclear fuel involved as provided in this subtitle.
[NWPA Sec. 302(a)(5)]

1.1C6 No high-level radioactive waste or spent nuclear fuel generated or owned by any Department of the United States ... may be disposed of by the Secretary ... unless such Department transfers to the Secretary, for deposit in the Nuclear Waste Fund, amounts equivalent to the fees that would be paid ... if such waste were generated by any other person.
[NWPA, Section 302 (b)(4)]

1.1C7 The Secretary of the Treasury shall hold the Waste Fund and, after consultation with the Secretary, annually report to the Congress on the financial condition and operations of the Waste Fund ....
[NWPA, Section 302 (e)]

1.1C8 This requirement intentionally left blank.

B. Performance:

1.1P1 This contract applies to the delivery by Purchaser to DOE of SNF and/or HLW of domestic origin from civilian nuclear power reactors, acceptance of title by DOE to such SNF and/or HLW, ... The services to be provided by DOE under this contract shall begin, after commencement of facility operations, not later than January 31, 1998 and shall continue until such time as all SNF and/or HLW from the civilian nuclear power reactors specified in Appendix A, annexed hereto and made a part hereof, has been disposed of.
[10 CFR 961.11, Article II]

1.1P2 ... the Secretary is announcing ... an initiative for establishing integrated monitored retrievable storage (MRS) with a target for spent-fuel acceptance in 1998.
[DOE/RW-0247, page vii]

1.1P3 DOE shall accept title to all SNF and/or HLW, of domestic origin, generated by the civilian nuclear power reactor(s) specified in Appendix A, ...
[10 CFR 961.11, Article IV, B, 1]

1.1P4 (a) Except as otherwise provided in this contract, DOE shall accept hereunder only such SNF and/or HLW which meets the General Specifications for such fuel and waste as set forth in Appendix E, annexed hereto and made a part hereof.
[10 CFR 961.11, Article VI, A, 1]

1.1P5 Neither the NWPA nor the Standard Contract imposes an unconditional obligation on the Department to accept SNF by January 31, 1998. The NWPA and the Standard Contract condition waste acceptance by the Department upon the commencement of operation of a repository or an MRS facility. In this connection, Section 302(a)(5)(B) of the NWPA directs that contracts entered into in accordance with Section 302(a) of the NWPA are to provide that the Department will take title to SNF following commencement of operation of a repository.

In response to this statutory requirement, the Standard Contract provides in Article II that "[t]he services to be provided by DOE under this contract shall begin, after commencement of facility operations, not later than January 31, 1998." Of further importance is Section 142 of the NWPA that authorizes the Department to accept SNF for temporary storage at an MRS facility prior to disposal in a repository. By these provisions, the triggering event for the Department's waste acceptance obligation is the commencement of either repository or MRS operation on or after January 31, 1998.

The Department intends to initiate the waste acceptance process, consistent with its obligation under both the NWPA and the Standard Contract, as soon as a facility commences operation. The Department fully expects this process to begin at an MRS by January 31, 1998. Until the SNF is accepted by the Department, Section 111(a)(5) of the NWPA assigns the waste owners the primary responsibility to provide for, and pay the costs of, interim storage.

[Bartlett Letter to Sanda, dated 2/14/92]

C. Interface:

1.1I1a This requirement intentionally left blank.

1.1I1b The Purchaser shall deliver to DOE and DOE shall, as provided in this contract, accept the SNF ... which is described in accordance with Article VI.A of this contract, for disposal thereof.

[10 CFR 961.11, Article V, A]

1.1I1c (a) Except as otherwise provided in this contract, DOE shall accept hereunder only such SNF ... which meets the General Specifications for such fuel ... as set forth in Appendix E, annexed hereto and made a part hereof ...

(b) Purchaser shall accurately classify SNF ... prior to delivery in accordance with paragraphs B. ... of Appendix E.

[10 CFR 961.11, Article VI, A, 1]

1.1I1d (c) Spent fuel assemblies shall be packaged and placed in casks so that all applicable regulatory requirements are met.

[10 CFR 961.11, Appendix E, B, 6]

1.1I1e The SNF acceptance rate will be in accordance with Appendix F of this document.

[TBD, pending DOE/OCRWM decision]

1.1I1f (2) Except as provided in paragraph (1), no spent nuclear fuel ... generated or owned by any person (other than a department of the United States referred to in section 101 or 102 of title 5, United States Code [5 U.S.C. 101, 102]) may be disposed of by the Secretary in any repository constructed under this Act [42 U.S.C. 10101 et. seq.] unless the generator or owner of such spent fuel or waste has entered into a contract with the Secretary under this section by not later than-

(A) June 30, 1983; or

(B) the date on which such generator or owner commences generation of, or takes title to, such spent fuel or waste; whichever occurs later.

[NWPA Sec. 302(b)(2)]

1.1I2a This requirement intentionally left blank.

1.1I2b The Purchaser shall deliver to DOE and DOE shall, as provided in this contract, accept the ... HLW which is described in accordance with Article VI.A of this contract, for disposal thereof.

[10 CFR 961.11, Article V, A]

1.1I2e (a) Except as otherwise provided in this contract, DOE shall accept hereunder only such ... HLW which meets the General Specifications for such ... waste as set forth in Appendix E, annexed hereto and made a part hereof...

(b) Purchaser shall accurately classify ... HLW prior to delivery in accordance with ....
[10 CFR 961.11, Article VI, A, 1]

1.1I2d The CHLW acceptance rate will be in accordance with Appendix F of this document.
[TBD, pending DOE/OCRWM decision]

1.1I2e The acceptance agreement for HLW from WVDP is TBD.
[TBD, pending DOE/OCRWM decision]

1.1I2f (2) Except as provided in paragraph (1), no ... high-level radioactive waste generated or owned by any person (other than a department of the United States referred to in section 101 or 102 of title 5, United States Code [5 U.S.C. 101, 102] may be disposed of by the Secretary in any repository constructed under this Act [42 U.S.C. 10101 et. seq.] unless the generator or owner of such spent fuel or waste has entered into a contract with the Secretary under this section by not later than-

(A) June 30, 1983; or

(B) the date on which such generator or owner commences generation of, or takes title to, such spent fuel or waste; whichever occurs later.
[NWPA Sec. 302(b)(2)]

1.1I3a The DHLW acceptance rate will be in accordance with Appendix F of this document.
[TBD, pending DOE/OCRWM decision]

1.1I3b (4) No high-level radioactive waste or spent nuclear fuel generated or owned by any department of the United States referred to in section 101 or 102 of title 5, United States Code [5 U.S.C. 101, 102], may be disposed of by the Secretary in any repository constructed under this Act [42 U.S.C. 10101 et. seq.] unless such department transfers to the Secretary, for deposit in the Nuclear Waste Fund, amounts equivalent to the fees that would be paid to the Secretary under the contracts referred to in this section if such waste or spent fuel were generated by any other person.
[NWPA Sec. 302(b)]

1.1I3c The acceptance agreement for the DOE's SNF and HLW is TBD.
[TBD, pending DOE/OCRWM decision]

1.1I4 DOE shall arrange for, and provide, a cask(s) and all necessary transportation of the SNF and/or HLW from the Purchaser's site to the DOE facility. Such cask(s) shall be furnished sufficiently in advance to accommodate scheduled deliveries. Such cask(s) shall be suitable for use at the Purchaser's site, meet applicable regulatory requirements, and be accompanied by pertinent information including, but not limited to, the following:

(a) Written procedures for cask handling and loading, including specifications on Purchaser-furnished canisters for containment of failed fuel;

(b) Training for Purchaser's personnel in cask handling and loading, as may be necessary;

(c) Technical information, special tools, equipment, lifting trunnions, spare parts and consumables needed to use and perform incidental maintenance on the cask(s); and

(d) Sufficient documentation on the equipment supplied by DOE.
[10 CFR 961.11, Article IV, B, 2]

1.1I5 None specified at this time

1.1I6 None specified at this time

1.1O1a This requirement intentionally left blank.

1.1O1b ... To the extent the SNF ... is consistent with the description submitted and approved, in accordance with Appendices E and F, DOE agrees to accept such SNF ... for disposal when DOE has verified the SNF ... description, determined the material is properly loaded, packaged, marked, labeled and ready for transportation, and has taken custody, as evidenced in writing of the material at the Purchaser's site, f.o.b. carrier.
[10 CFR 961.11, Article VI, B, 2]

1.1O2a This requirement intentionally left blank.

1.1O2b ... To the extent ... the HLW is consistent with the description submitted and approved, in accordance with Appendices E and F, DOE agrees to accept such SNF ... for disposal when DOE has verified ... the HLW description, determined the material is properly loaded, packaged, marked, labeled and ready for transportation, and has taken custody, as evidenced in writing of the material at the Purchaser's site, f.o.b. carrier.
[10 CFR 961.11, Article VI, B, 2]

1.1O3 This requirement intentionally left blank.

1.1O4 ... A properly executed off-site radioactive shipment record describing cask contents must be prepared by the Purchaser along with a signed certification which states: "This is to certify that the above-named materials are properly described, classified, packaged, marked and labeled and are in proper condition for transfer according to the applicable regulations of the U.S. Department of Transportation."
[10 CFR 961.11, Article VI, B, 2]

1.1O5 None specified at this time

Table F1.1.1 Function Description: Define Waste Acceptance Criteria

I. Function ID Number: 1.1.1

II. Function Title: Define Waste Acceptance Criteria

III. Function Definition:

Determine the conditions necessary to be met by the SNF/HLW, in order for DOE to be able to accept it for disposal. *(Note that the 10 CFR 60 definition for HLW includes SNF.)*

IV. Interfaces:

A. Inputs:

1.1.1I1	Waste Characteristics	From: Purchaser/Producer
1.1.1I2	RW-859 Data	From: Purchaser
1.1.1I3	10 CFR 961	From: Function 1.1.2

B. Outputs:

1.1.1O1 Waste Acceptance Criteria To: Function 1.1.2

V. Function Requirements:

A. Constraints:

1.1.1C1 (a) High-level-waste package design in general.

(1) Packages for HLW shall be designed so that the in situ chemical, physical, and nuclear properties of the waste package and its interactions with the emplacement environment do not compromise the function of the waste packages or the performance of the underground facility or the geologic setting.

(2) The design shall include but not be limited to consideration of the following factors: solubility, oxidation/reduction reactions, corrosion, hydriding, gas generation, thermal effects, mechanical strength, mechanical stress, radiolysis, radiation damage, radionuclide retardation, leaching, fire and explosion hazards, thermal loads, and synergistic interactions.

(b) Specific criteria for HLW package design --

(1) Explosive, pyrophoric, and chemically reactive materials. The waste package shall not contain explosive or pyrophoric materials or chemically reactive materials in an amount that could compromise the ability of the underground facility to contribute to waste isolation or the ability of the geologic repository to satisfy the performance objectives.

(2) Free liquids. The waste package shall not contain free liquids in an amount that could compromise the ability of the waste packages to achieve the performance objectives relating to containment of HLW (because of chemical interactions or formation of pressurized vapor) or result in spillage and spread of contamination in the event of waste package perforation during the period through permanent closure ....

(4) Unique identification. A label or other means of identification shall be provided for each waste package. The identification shall not impair the integrity of the waste package and shall be applied in such a way that the information shall be legible at least to the end of the period of retrievability. Each waste package identification shall be consistent with the waste package's permanent written records.

[10 CFR 60.135]

1.1.1C2 (c) Waste form criteria for HLW. High-level radioactive waste that is emplaced in the underground facility shall be designed to meet the following criteria:

(1) Solidification. All such radioactive wastes shall be in solid form and placed in sealed containers.

(2) Consolidation. Particulate waste forms shall be consolidated (for example, by incorporation into an encapsulating matrix) to limit the availability and generation of particulates.

(3) Combustibles. All combustible radioactive wastes shall be reduced to a noncombustible form unless it can be demonstrated that a fire involving the waste packages containing combustibles will not compromise the integrity of other waste packages, adversely affect any structures, systems, or components important to safety, or compromise the ability of the underground facility to contribute to waste isolation.

[10 CFR 60.135]

1.1.1C3 (d) Design criteria for other radioactive wastes. Design criteria for waste types other than HLW will be addressed on an individual basis if and when they are proposed for disposal in a geologic repository.

[10 CFR 60.135]

1.1.1C4 This requirement intentionally left blank.

1.1.1C5 This requirement intentionally left blank.

1.1.1C6 (c) The Safety Analysis Report shall include: ...

(5) A description of the kind, amount, and specifications of the radioactive material proposed to be received and possessed at the geologic repository operations area.

[10 CFR 60.21]

1.1.1C7 (b) License conditions shall include items in the following categories:

(1) Restrictions as to the physical and chemical form and radioisotopic content of radioactive waste.

(2) Restrictions as to size, shape, and materials and methods of construction of radioactive waste packaging.

(3) Restrictions as to the amount of waste permitted per unit volume of storage space considering the physical characteristics of both the waste and the host rock.

(4) Requirements relating to test, calibration, or inspection to assure that the foregoing restrictions are observed.

[10 CFR 60.43]

1.1.1C8 (b) Structures, systems, and components important to safety --

(7) Criticality control. All systems for processing, transporting, handling, storage, retrieval, emplacement, and isolation of radioactive waste shall be designed 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. Each system shall be designed for criticality safety under normal and accident conditions. The calculated effective multiplication factor (k_{eff}) must 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.

[10 CFR 60.131]

1.1.1C9 This requirement intentionally left blank.

1.1.1C10 This requirement intentionally left blank.

1.1.1C11 Criteria for nuclear criticality safety.

(a) Design for criticality safety. Spent fuel handling, packaging, transfer, and storage systems must be designed to be maintained subcritical and to ensure that, before a nuclear criticality accident is possible, at least two unlikely, independent, and concurrent or sequential changes have occurred in the conditions essential to nuclear criticality safety. The design of handling, packaging, transfer, and storage systems must include margins of safety for the nuclear criticality parameters that are commensurate with the uncertainties in the data and methods used in calculations and demonstrate safety for the handling, packaging, transfer and storage conditions and in the nature of the immediate environment under accident conditions.

[10 CFR 72.124]

B. Performance:

1.1.1P1 The DOE shall accept high-level radioactive waste. Detailed acceptance criteria and general specifications for such waste will be issued by the DOE no later than the date on which DOE submits its license application to the Nuclear Regulatory Commission for the first disposal facility.

[10 CFR 961.11, Appendix E, D]

C. Interface:

1.1.1I1a Routine determinations.

Prior to each shipment of licensed material, the licensee shall ensure that the package with its contents satisfies the applicable requirements of this part and of the license. The licensee shall determine that:

(a) The package is proper for the contents to be shipped;

(b) The package is in unimpaired physical condition except for superficial defects such as marks or dents;

(c) Each closure device of the packaging, including any required gasket, is properly installed and secured and free of defects;

(d) Any system for containing liquid is adequately sealed and has adequate space or other specified provision for expansion of the liquid;

(e) Any pressure relief device is operable and set in accordance with written procedures;

(f) The package has been loaded and closed in accordance with written procedures;

(g) For fissile material, any moderator or neutron absorber, if required, is present and in proper condition;

(h) Any structural part of the package which could be used to lift or tie down the package during transport is rendered inoperable for that purpose unless it satisfies the design requirements of Sec. 71.45;

(i)(1) The level of non-fixed (removable) radioactive contamination on the external surfaces of each package offered for shipment is as low as reasonably achievable. The level of non-fixed radioactive contamination may be determined by wiping an area of 300 square centimeters 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. Except as provided under paragraph (i)(2) of this section, the amount of radioactivity measured on any single wiping material when averaged over the surface wiped, must not exceed the limits given in Table V of this part at any time during transport. Other methods of assessment of equal or greater efficiency may be used. When other methods are used, the detection efficiency of the method used must be taken into account and in no case may the non-fixed contamination on the external surfaces of the package exceed ten times the limits listed in Table V.

Table V--Removable External Radioactive Contamination Wipe Limits

Contaminant	Maximum permissible limits $\mu Ci/cm^2$	Maximum permissible limits dpm/cm^2
Beta-gamma emitting radionuclides; all radionuclides with half-lives less than ten days; natural uranium; natural thorium; uranium-235; uranium-238; thorium-232; thorium-228 and thorium-230 when contained in ores or physical concentrates	10^{-5}	22
All other alpha emitting radionuclides	10^{-6}	2.2

(2) In the case of packages transported as exclusive use shipments by rail or highway only, the non-fixed radioactive contamination at any time during transport must not exceed ten times the levels prescribed in paragraph (i)(1) of this section. The levels at the beginning of transport must not exceed the levels prescribed in paragraph (i)(1) of this section;

(j) External radiation levels around the package and around the vehicle, if applicable, will not exceed the limits specified in Sec. 71.47 at any time during transportation; and

(k) Accessible package surface temperatures will not exceed the limits specified in Sec. 71.43(g) at any time during transportation.

[10 CFR 71.87]

1.1.1I1b General considerations.

(b) The MRS must be designed to store either spent fuel or solid high-level radioactive wastes. Liquid high-level radioactive wastes may not be received or stored in an MRS. If the MRS is a water-pool type facility, the solidified waste form shall be a durable solid with demonstrable leach resistance.

[10 CFR 72.120]

Table F1.1.2 Function Description: Establish Contracts/Agreements

I. **Function ID Number:** 1.1.2

II. **Function Title:** Establish Contracts/Agreements

III. **Function Definition:**

Develop written agreements which include terms, conditions, and criteria for waste acceptance and related services, and responsibilities of each party.

IV. **Interfaces:**

A. Inputs:

1.1.2I1	Waste Acceptance Criteria	From:	Function 1.1.1

B. Outputs:

1.1.2O1	Contract/Agreement	To:	Function 1.1.3 (Control) / Purchaser/Producer / DOE/ OCRWM
1.1.2O2	10 CFR 961	To:	Function 1.1.3 (Control)

V. **Function Requirements:**

A. Constraints: None specified at this time

B. Performance:

1.1.2P1 The contract must be signed by June 30, 1983, or by the date on which such owner or generator commences generation of, or takes title to, such spent fuel or waste, whichever occurs later.

[10 CFR 961.2]

1.1.2P2 Federal agencies or departments requiring DOE's disposal services for SNF and/or HLW will be accommodated by a suitable interagency agreement reflecting, as appropriate, the terms and conditions set forth in the contract in 961.11; Provided,

however, that the fees to be paid by Federal agencies will be equivalent to the fees that would be paid under the contract.

[10 CFR 961.5]

1.1.2P3 The term of this contract shall be from the date of execution until such time as DOE has accepted, ... all SNF and/or HLW of domestic origin from the civilian nuclear power reactor(s).

[10 CFR 961.11, Article III]

C. Interface: None specified at this time

Table F1.1.3 Function Description: Plan for Waste Acceptance

I. Function ID Number: 1.1.3

II. Function Title: Plan for Waste Acceptance

III. Function Definition:

Establish and provide the data on the purchaser's site capabilities and requirements, as well as the NWMS's capabilities and requirements.

IV. Interfaces:

A. Inputs:

1.1.3I1	RW 859 Data	From:	Purchaser
1.1.3I2	Waste Form Compliance Plan	From:	Producer
1.1.3I3	Waste Form Qualification Report	From:	Producer
1.1.3I4	10 CFR 961, Appendix F	From:	Purchaser
1.1.3I5	Schedules, Plans	From:	Function 1.2
1.1.3I6	10 CFR 961/Appendix B	From:	Purchaser
1.1.3I7	DCS	From:	Purchaser
1.1.3I8	FDS	From:	Purchaser

B. Outputs:

1.1.3O1	Approved DCS	To:	Purchaser / Function 1.1.4 (Control) / 1.2 / 1.3 / 1.4
1.1.3O2	Approved FDS	To:	Function 1.1.4 (Control) / 1.2 / 1.3 / 1.4
1.1.3O3	Production Records	To:	Function 1.1.4 (Control) / 1.2 / 1.4

V. Function Requirements:

A. Constraints: None specified at this time

B. Performance: None specified at this time

C. Interface:

1.1.3I1a (a) On an annual basis, commencing October 1, 1983, the Purchaser shall provide DOE with information on actual discharges to date and projected discharges for the next ten (10) years in the form and content set forth in Appendix B, annexed hereto and made a part hereof. The information to be provided will include estimates and

projections and will not be Purchaser's firm commitment with respect to discharges or deliveries.[1]

[10 CFR 961.11, Article IV, A, 1]

1.1.3I1b 17.1 Product Certification

The WCP and/or WQR are to identify the types of records that will be developed during the waste form production process. The WQR is to identify the quality records required to be a permanent part of the overall canistered waste form product certification package. These documents shall be delivered in accordance with the requirements of QARD Section 17.

17.2 Determination of QA Records

Documentation sufficient to demonstrate canistered waste form compliance with the WAS, WCP, and WQR shall be prepared and maintained as lifetime QA Records. Copies of these 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 waste form producer. Other documentation generated during preparation and implementation of the WCP, WAS, and WQR shall be collected and maintained as nonpermanent records.

[DOE/RW-0214, p. B-6]

1.1.3I2 Same as 1.1.3I1b above.

1.1.3I3 None specified at this time

1.1.3I4 2. Procedures.

(a) Purchaser shall provide to DOE a detailed description of the SNF and/or HLW to be delivered hereunder in the form and content as set forth in Appendix F, annexed hereto and made a part hereof. Purchaser shall promptly advise DOE of any changes in said SNF and/or HLW as soon as they become known to the purchaser.

[10 CFR 961.11, Article VI, A]

1.1.3I5 None specified at this time

1.1.3I6 None specified at this time

1.1.3I7 None specified at this time

1.1.3I8 None specified at this time

1.1.3O1 None specified at this time

1.1.3O2 None specified at this time

[1] The Contracting Officer has allowed Purchasers to submit Nuclear Fuel Data Form RW-859 in place of Appendix B.

1.1.303 17.3 Production Documentation

Production documentation shall be traceable to the canister and shall become lifetime quality assurance records that are transferred to the Federal Repository Operator with the canistered waste forms to which they relate.

[DOE/RW-0214, p. B-6]

Table F1.1.3.1 Function Description: Allocate Waste System Capacity

I. Function ID Number: 1.1.3.1

II. Function Title: Allocate Waste System Capacity

III. Function Definition:

Using the priority ranking of purchasers, distribute projected throughput capability (based on total NWMS capacity) among each purchaser for ten years of operation.

IV. Interfaces:

A. Inputs:

1.1.3.1I1	RW 859 Data	From:	Purchaser
1.1.3.1I2	Waste Form Compliance Plan	From:	Producer
1.1.3.1I3	Waste Form Qualification Report	From:	Producer
1.1.3.1I4	Waste Acceptance Rate	From:	Function 1.2 / 1.3 / 1.4
1.1.3.1I5	APR	From:	Function 1.2 / 1.3 / 1.4

B. Outputs:

1.1.3.1O1	ACR	To:	Function 1.1.3.2

V. Function Requirements:

A. Constraints: None specified at this time

B. Performance:

1.1.3.1P1 (b) Beginning not later than July 1, 1987, DOE shall issue an annual capacity report for planning purposes. This report shall set forth the projected annual receiving capacity for the DOE facility(ies) and the annual acceptance ranking relating to DOE contracts for the disposal of SNF and/or HLW including, to the extent available, capacity information for ten (10) years following the projected commencement of operation of the initial DOE facility.

[10 CFR 961.11, Article IV, B, 5]

C. Interface: None specified at this time

Table F1.1.3.1.1 Function Description: Collect Waste Data

I. Function ID Number: 1.1.3.1.1

II. Function Title: Collect Waste Data

III. Function Definition:

Establish and provide the information on the purchaser's/producer's SNF/HLW that is necessary for NWMS's planning and design.

IV. Interfaces:

A. Inputs:

1.1.3.1.1I1	RW 859 Data	From:	Purchaser
1.1.3.1.1I2	Waste Form Compliance Plan	From:	Producer
1.1.3.1.1I3	Waste Form Qualification Report	From:	Producer
1.1.3.1.1I4	Other SNF Data	From:	Purchaser
1.1.3.1.1I5	10 CFR 961/Appendix B	From:	Purchaser
1.1.3.1.1I6	10 CFR 961/Appendix C	From:	Purchaser
1.1.3.1.1I7	10 CFR 961/Appendix D	From:	Purchaser
1.1.3.1.1I8	10 CFR 961/Appendix F	From:	Purchaser
1.1.3.1.1I9	10 CFR 961/Appendix G	From:	Purchaser

B. Outputs:

1.1.3.1.1O1	Waste Data	To:	Function 1.1.3.1.2

V. Function Requirements:

A. Constraints: None specified at this time

B. Performance:

1.1.3.1.1P1 (c) In the event that the Purchaser fails to provide the annual forecast in the form and content required by DOE, DOE may, in its sole discretion, require a rescheduling of any delivery commitment schedules then in effect.

[10 CFR 961.11, Article IV, A, 1]

C. Interface:

1.1.3.1.1I1 (a) On an annual basis, commencing October 1, 1983, the Purchaser shall provide DOE with information on actual discharges to date and projected discharges for the next ten (10) years in the form and content set forth in Appendix B, annexed hereto and made a part hereof. The information to be provided will include estimates and projections and will not be Purchaser's firm commitment with respect to discharges or deliveries.[2]

(b) No later than October 1, 1983, the Purchaser shall provide DOE with specific information on:

(1) Total spent nuclear fuel inventory as of April 7, 1983;

(2) Total number of fuel assemblies removed from the particular reactor core prior to 12:00 am April 7, 1983 for which there are plans for reinsertion in the core. Estimates of the burned and unburned portion of each individual assembly are to be provided.

[10 CFR 961.11, Article IV, A, 1]

1.1.3.1I1 None specified at this time

[2] The Contracting Officer has allowed Purchasers to submit Nuclear Fuel Data Form RW-859 in place of Appendix B.

1.1.3.1I2 None specified at this time

1.1.3.1I3 None specified at this time

1.1.3.1I4 None specified at this time

1.1.3.1I5 None specified at this time

1.1.3.1I6 None specified at this time

1.1.3.1I7 None specified at this time

1.1.3.1I8 None specified at this time

1.1.3.1I9 None specified at this time

1.1.3.1O1 None specified at this time

Table F1.1.3.1.2 Function Description: Rank/Order Waste

I. Function ID Number: 1.1.3.1.2

II. Function Title: Rank/Order Waste

III. Function Definition:

The priority ranking is based on the date the SNF was permanently discharged, with the purchasers with the oldest SNF, on a industry-wide basis, given the highest priority. The acceptance priority accrues to the purchaser.

IV. Interfaces:

A. Inputs:

1.1.3.1.2I1	Waste Data	From:	Function 1.1.3.1.1

B. Outputs:

1.1.3.1.2O1	APR	To:	Function 1.1.3.1.3

V. Function Requirements:

A. Constraints: None specified at this time

B. Performance:

1.1.3.1.2P1 (a) Beginning on April 1, 1991, DOE shall issue an annual acceptance priority ranking for receipt of SNF and/or HLW at the DOE repository. This priority ranking shall be based on the age of SNF and/or HLW as calculated from the date of discharge of such material from the civilian nuclear power reactor. The oldest fuel or waste will have

the highest priority for acceptance, except as provided in paragraphs B and D of Article V and paragraph B.3 of Article VI hereof.[3]

(b) Beginning not later than July 1, 1987, DOE shall issue an annual capacity report for planning purposes. This report shall set forth the projected annual receiving capacity for the DOE facility(ies) and the annual acceptance ranking relating to DOE contracts for the disposal of SNF and/or HLW including, to the extent available, capacity information for ten (10) years following the projected commencement of operation of the initial DOE facility.

[10 CFR 961.11, Article IV, B, 5]

1.1.3.1.2P2 1. Acceptance Priority Ranking

Delivery commitment schedules for SNF and/or HLW may require the disposal of more material than the annual capacity of the DOE disposal facility (or facilities) can accommodate. The following acceptance priority ranking will be utilized:

(a) Except as may be provided for in subparagraph (b) below and Article V.D. of this contract, acceptance priority shall be based upon the age of the SNF and/or HLW as calculated from the date of discharge of such material from the civilian nuclear power reactor. DOE will first accept from Purchaser the oldest SNF and/or HLW for disposal in the DOE facility, except as otherwise provided for in paragraphs B and D of Article V.[3]

(b) Notwithstanding the age of the SNF and/or HLW, priority may be accorded any SNF and/or HLW removed from a civilian nuclear power reactor that has reached the end of its useful life or has been shut down permanently for whatever reason.

[10 CFR 961.11, Article VI, B, 1]

1.1.3.1.2P3 Emergency deliveries of SNF and/or HLW may be accepted by DOE before the date provided in the delivery commitment schedule upon prior written approval by DOE.

[10 CFR 961.11, Article V, D]

C. Interface: None specified at this time

Table F1.1.3.1.3 Function Description: Allocate Annual Capacity to Owners

I. Function ID Number: 1.1.3.1.3

II. Function Title: Allocate Annual Capacity to Owners

III. Function Definition:

Allocate acceptance capacity among purchasers according to NWMS's annual waste acceptance rate and APR.

IV. Interfaces:

A. Inputs:

1.1.3.1.3I1	APR	From: Function 1.1.3.1.2
1.1.3.1.3I2	Waste Acceptance Rate	From: Function 1.2 / 1.3 / 1.4

[3] Based on the Contracting Officer letter of May 27, 1983, Paragraph E of Article V is also required.

B. Outputs:

1.1.3.1.3O1	ACR	To:	Purchaser / Function 1.1.3.2

V. Function Requirements:

A. Constraints: None specified at this time

B. Performance:

1.1.3.1.3P1 DOE shall annually provide to the Purchaser pertinent information on the waste disposal program including information on cost projections, project plans and progress reports.

[10 CFR 961.11, Article IV, B, 4]

1.1.3.1.3P2 The annual waste acceptance rate will be in accordance with Appendix F of this document.

[TBD, pending DOE/OCRWM decision]

C. Interface: None specified at this time

Table F1.1.3.2 Function Description: Identify Waste Locations/Characteristics

I. Function ID Number: 1.1.3.2

II. Function Title: Identify Waste Locations/Characteristics

III. Function Definition:

Evaluate purchaser's/producer's proposed waste locations and characteristics.

IV. Interfaces:

A. Inputs:

1.1.3.2I1	ACR	From:	Function 1.1.3.1
1.1.3.2I2	Waste Form Compliance Plan	From:	Producer
1.1.3.2I3	Waste Form Qualification Report	From:	Producer
1.1.3.2I4	Submitted DCS	From:	Purchaser
1.1.3.2I5	Submitted FDS	From:	Purchaser
1.1.3.2I6	10 CFR 961/Appendix F	From:	Purchaser

B. Outputs:

1.1.3.2O1	Approved DCS	To:	Purchaser / Function 1.2 / 1.3 / 1.4
1.1.3.2O2	Approved FDS	To:	Purchaser / Function 1.1.4 (Control) / 1.2 / 1.3 / 1.4
1.1.3.2O3	Production Records	To:	Function 1.1.4 (Control) / 1.2 / 1.4

V. Function Requirements:

A. Constraints: None specified at this time

B. Performance:

1.1.3.2P1 (b) Except as otherwise agreed to by DOE, the Purchaser shall advise DOE in writing ... as to the description of the material in each shipping lot sixty (60) days prior to scheduled DOE transportation of that shipping lot.

[10 CFR 961.11, Article IV, A, 2]

1.1.3.2P2 ... beginning January 1, 1992 the Purchaser shall submit to DOE the delivery commitment schedule(s) which shall identify all SNF and/or HLW the Purchaser wishes to deliver to DOE beginning sixty-three (63) months thereafter.

[10 CFR 961.11, Article V, B, 1]

C. Interface: None specified at this time

Table F1.1.3.2.1 Function Description: Evaluate Delivery Commitment Schedule

I. Function ID Number: 1.1.3.2.1

II. Function Title: Evaluate Delivery Commitment Schedule

III. Function Definition:

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

IV. Interfaces:

A. Inputs:

1.1.3.2.1I1	Submitted DCS	From:	Purchaser
1.1.3.2.1I2	Evaluation Support	From:	Function 1.2

B. Outputs:

1.1.3.2.1O1	Approved DCS	To:	Purchaser / Function 1.2 / 1.3 / 1.4; 1.1.3.2.2 (Control)
1.1.3.2.1O2	Disapproved DCS	To:	Purchaser (Control)
1.1.3.2.1O3	Evaluation Request	To:	Function 1.2

V. Function Requirements:

A. Constraints: None specified at this time

B. Performance:

1.1.3.2.1P1 ... DOE shall approve or disapprove such schedule within three (3) months after receipt. In the event of disapproval, DOE shall advise the Purchaser in writing of the reasons for such disapproval and request a revised schedule from the Purchaser, to be submitted to DOE within thirty (30) days after receipt of DOE's notice of disapproval.
[10 CFR 961.11, Article V, B, 1]

1.1.3.2.1P2 DOE shall approve or disapprove such revised schedule(s) within sixty (60) days after receipt. In the event of disapproval, DOE shall advise the Purchaser in writing of the reasons for such disapproval and shall submit its proposed schedule(s). If these are not acceptable to the Purchaser, the parties shall promptly seek to negotiate mutually acceptable schedule(s) ....
[10 CFR 961.11, Article V, B, 2]

C. Interface:

1.1.3.2.1I1a Delivery commitment schedule(s), in the form set forth in Appendix C annexed hereto and made a part hereof, for delivery of SNF and/or HLW shall be furnished to DOE by Purchaser. After DOE has issued its proposed acceptance priority ranking, as described in paragraph B.5 of Article IV hereof, beginning January 1, 1992 the Purchaser shall submit to DOE the delivery commitment schedule(s) which shall identify all SNF and/or HLW the Purchaser wishes to deliver to DOE beginning sixty-three (63) months thereafter.
[10 CFR 961.11, Article V, B, 1]

1.1.3.2.1I1b ... a revised schedule from the Purchaser, to be submitted to DOE within thirty (30) days after receipt of DOE's notice of disapproval.
[10 CFR 961.11, Article V, B, 1]

1.1.3.2.1I1c ... Purchaser shall have the right to adjust the quantities of SNF and/or HLW plus or minus (+/-) twenty percent (20%), and the delivery schedule up to two (2) months, until the submission of the final delivery schedule.
[10 CFR 961.11, Article V, B, 2]

1.1.3.2.1I2 None specified at this time

1.1.3.2.1O1 None specified at this time

1.1.3.2.1O2 None specified at this time

1.1.3.2.1O3 None specified at this time

Table F1.1.3.2.2 Function Description: Evaluate Exchange Requests

I. **Function ID Number:** 1.1.3.2.2

II. **Function Title:** Evaluate Exchange Requests

III. **Function Definition:**

Determine the feasibility of exchanging approved DCSs.

IV. **Interfaces:**

A. Inputs:

1.1.3.2.2I1	Submitted Exchange Request	From:	Purchaser
1.1.3.2.2I2	Evaluation Support	From:	Function 1.2

B. Outputs:

1.1.3.2.2O1	Approved Exchange Request	To:	Purchaser/Producer / Function 1.2 / 1.3 / 1.4
1.1.3.2.2O2	Disapproved Exchange Request	To:	Purchaser (Control)
1.1.3.2.2O3	Evaluation Request	To:	Function 1.2

V. **Function Requirements:**

A. Constraints: None specified at this time

B. Performance:

1.1.3.2.2P1 ... DOE shall approve or disapprove the proposed exchange within thirty (30) days after receipt. In the event of disapproval, DOE shall advise the Purchaser in writing of the reasons for such disapproval.

[10 CFR 961.11, Article V, E]

C. Interface:

1.1.3.2.2I1 Not less than six (6) months prior to the delivery date specified in the Purchaser's approved delivery commitment schedule, the Purchaser shall submit to DOE an exchange request, which states the priority rankings of both the Purchaser hereunder and any other Purchaser with whom the exchange or approved delivery commitment schedules is proposed.

[10 CFR 961.11, Article V, E]

1.1.3.2.2I2 None specified at this time

1.1.3.2.2O1 None specified at this time

1.1.3.2.2O2 None specified at this time

1.1.3.2.2O3 None specified at this time

Table F1.1.3.2.3 Function Description: Evaluate Request for Non-Standard Waste Delivery

I. **Function ID Number:** 1.1.3.2.3

II. **Function Title:** Evaluate Request for Non-Standard Waste Delivery

III. **Function Definition:**

Determine the feasibility of accommodating suggested acceptance procedures for SNF/HLW which is other than standard fuel as described by Appendix E of 10 CFR 961.

IV. **Interfaces:**

A. **Inputs:**

1.1.3.2.3I1	Request for Non-Standard Waste Delivery	From:	Purchaser/Producer
1.1.3.2.3I2	Evaluation Support	From:	Function 1.2

B. **Outputs:**

1.1.3.2.3O1	Approved Request for Non-Standard Waste Delivery	To:	Purchaser/Producer / Function 1.2 / 1.3 / 1.4
1.1.3.2.3O2	Disapproved Request for Non-Standard Waste Delivery	To:	Purchaser/Producer (Control)
1.1.3.2.3O3	Evaluation Request	To:	Function 1.2

V. **Function Requirements:**

A. **Constraints:** None specified at this time

B. **Performance:**

1.1.3.2.3P1 (b) DOE's obligation for disposing of SNF under this contact also extends to other than standard fuel; however, for any SNF which has been designated by the Purchaser as other than standard fuel, as that term is defined in Appendix E, the Purchaser shall obtain delivery and procedure confirmation from DOE prior to delivery. DOE shall advise Purchaser within sixty (60) days after receipt of such confirmation request as to the technical feasibility of disposing of such fuel on the currently agreed to schedule and any schedule adjustment for such services.

[10 CFR 961.11, Article VI, A, 2]

1.1.3.2.3P2 Control of Nonconforming Items

15.0 General

The provisions of NQA-1 Basic Requirement 15 and Supplement 15S-1 shall apply with the following amplification.

15.1 Closure

The action taken to correct the nonconforming item shall be verified and the verification documented.

15.2 Nonconformance Disposition

The person or organization assigned the responsibility of dispositioning the nonconformance shall ensure the following:

- Nonconformance documentation adequately identifies and describes the nonconformance.
- If a change to reflect the as-built condition is appropriate, then the disposition addresses action to change the existing design documents, test plans or procedures, reports, etc. Any document change shall reference the NCR and also be cross-referenced on the nonconformance report.

The signature of personnel or organizations authorized to approve the disposition is documented.

[DOE/RW-0214, p. 15-1]

C. Interface:

1.1.3.2.3I1 (b) ... for any SNF which has been designated by the Purchaser as other than standard fuel, as that term is defined in Appendix E, the Purchaser shall obtain delivery and procedure confirmation from DOE prior to delivery.

[10 CFR 961.11, Article VI, A, 2]

1.1.3.2.3I2 None specified at this time

1.1.3.2.3O1 None specified at this time

1.1.3.2.3O2 None specified at this time

1.1.3.2.3O3 None specified at this time

Table F1.1.3.2.4 Function Description: Evaluate Final Delivery Schedule

I. Function ID Number: 1.1.3.2.4

II. Function Title: Evaluate Final Delivery Schedule

III. Function Definition:

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

IV. Interfaces:

A. Inputs:

1.1.3.2.4I1	Submitted FDS	From:	Purchaser
1.1.3.2.4I2	Evaluation Support	From:	Function 1.2

B. Outputs:

1.1.3.2.4O1	Approved FDS	To:	Purchaser / Function 1.2 / 1.3 / 1.4
1.1.3.2.4O2	Disapproved FDS	To:	Purchaser (Control)
1.1.3.2.4O3	Evaluation Request	To:	Function 1.2

V. Function Requirements:

A. Constraints: None specified at this time

B. Performance:

1.1.3.2.4P1 ... DOE shall approve or disapprove a final delivery schedule within forty-five (45) days after receipt. In the event of disapproval, DOE shall advise the Purchaser in writing of the reasons for such disapproval and shall request a revised schedule from the Purchaser, to be submitted to DOE within thirty (30) days after receipt of DOE's notice of disapproval ....

[10 CFR 961.11, Article V, C]

1.1.3.2.4P2 ... DOE shall approve or disapprove such revised schedule(s) within sixty (60) days after receipt. In the event of disapproval, DOE shall advise the Purchaser in writing of the reasons for such disapproval and shall submit its proposed schedule(s). If these are not acceptable to the Purchaser, the parties shall promptly seek to negotiate mutually acceptable schedule(s).

[10 CFR 961.11, Article V, C]

C. Interface:

1.1.3.2.4I1a Final delivery schedule(s), in the form set forth in Appendix D, annexed hereto and made a part hereof, for delivery of SNF and/or HLW covered by an approved delivery commitment schedule(s) shall be furnished to DOE by Purchaser. The Purchaser shall submit to DOE final delivery schedules not less than twelve (12) months prior to the delivery date specified therein ....

[10 CFR 961.11, Article V, C]

1.1.3.2.4I1b ... a revised schedule from the Purchaser, to be submitted to DOE within thirty (30) days after receipt of DOE's notice of disapproval ....

[10 CFR 961.11, Article V, C]

1.1.3.2.4I2 None specified at this time

1.1.3.2.4O1 None specified at this time

1.1.3.2.4O2 None specified at this time

1.1.3.2.4O3 None specified at this time

Table F1.1.3.3 Function Description: Define Site Interface Capabilities

I. Function ID Number: 1.1.3.3

II. Function Title: Define Site Interface Capabilities

III. Function Definition:

The interface capabilities at each Purchaser's/Producer's site must be determined to ensure that they can be accommodated by the NWMS equipment and facilities.

IV. Interfaces:

A. Inputs:

1.1.3.3I1	Draft Servicing Planning Documents	From: Function 1.2
1.1.3.3I2	Servicing Planning Documents Approval/Comments	From: Purchaser/Producer
1.1.3.3I3	Draft Site-Specific Servicing Plans	From: Function 1.2
1.1.3.3I4	Site-Specific Servicing Plans Approval/Comments	From: Purchaser/Producer

B. Outputs:

1.1.3.3O1	Draft Servicing Planning Documents for Review/Approval	To:	Purchaser/Producer
1.1.3.3O2	Servicing Planning Documents Approval/Comments	To:	Function 1.2
1.1.3.3O3	Draft Site-Specific Servicing Plans for Review/Approval	To:	Purchaser/Producer
1.1.3.3O4	Site-Specific Servicing Plans Approval/Comments	To:	Function 1.2

V. Function Requirements:

A. Constraints: None specified at this time

B. Performance: None specified at this time

C. Interface: None specified at this time

Table F1.1.4 Function Description: Accept Waste Custody

I. Function ID Number: 1.1.4

II. Function Title: Accept Waste Custody

III. Function Definition:

Observe the purchaser/producer preparatory operations for waste delivery and transfer title, f.o.b. carrier, from the purchaser/producer to DOE.

IV. Interfaces:

A. Inputs:

1.1.4I1	SNF	From:	Purchaser
1.1.4I2	CHLW	From:	Producer
1.1.4I3	DHLW	From:	Producer
1.1.4I4	Title/Documentation	From:	Purchaser/ Producer
1.1.4I5	Unloaded Casks/Transporters	From:	Function 1.2

B. Outputs:

1.1.4O1	Loaded SNF Casks/Transporters	To:	Function 1.2
1.1.4O2	Loaded CHLW Casks/Transporters	To:	Function 1.2
1.1.4O3	Loaded DHLW Casks/Transporters	To:	Function 1.2
1.1.4O4	Title	To:	DOE/OCRWM
1.1.4O5	Documentation	To:	Function 1.2 / DOE/OCRWM
1.1.4O6	Information	To:	Function 1.2

V. Function Requirements:

A. Constraints:

1.1.4C1 Delivery, and acceptance by the Secretary, of any high-level radioactive waste or spent nuclear fuel for a repository constructed under this subtitle shall constitute a transfer to the Secretary of title to such waste or spent fuel.

[NWPA Section 123]

1.1.4C2 This requirement intentionally left blank.

1.1.4C3 The Office of Civilian Radioactive Waste Management (RW) will accept the defense waste at a designated loading facility adjacent to the Defense Programs (DP) high-level facility.

[MOA between DP and RW, 1986]

B. Performance:

1.1.4P1 This requirement intentionally left blank.

1.1.4P2 Title to all SNF and/or HLW accepted by DOE for disposal shall pass to DOE at the Purchaser's site as provided for in Article VI hereof. DOE shall be solely responsible for control of all material upon passage of title. DOE shall have the right to dispose as it sees fit of any SNF and/or HLW to which it has taken title. The Purchaser shall have no claim against DOE or this Government with respect to such SNF or HLW nor shall DOE or the Government be obligated to compensate the Purchaser for such material.

[10 CFR 961.11, Article VII]

C. Interface:

1.1.4I1 None specified at this time

1.1.4I2 None specified at this time

1.1.4I3 None specified at this time

1.1.4I4 None specified at this time

1.1.4I5 None specified at this time

1.1.4O1 (b) The outside of a package must incorporate a feature, such as a seal, which is not readily breakable, and which, while intact, would be evidence that the package has not been opened by unauthorized persons.

[10 CFR 71.43]

1.1.4O2 Same as 1.1.4O1 above.

1.1.4O3 Same as 1.1.4O1 above.

1.1.4O4 None specified at this time

1.1.4O5 None specified at this time

1.1.4O6 None specified at this time

Table F1.1.4.1 Function Description: Observe Waste Preparations

I. Function ID Number: 1.1.4.1

II. Function Title: Observe Waste Preparations

III. Function Definition:

Verify the identified waste to be delivered is in agreement with its corresponding documentation. Verification may be accomplished by certification by the purchaser/ producer.

IV. Interfaces:

A. Inputs:

1.1.4.1I1	FDS	From:	Purchaser
1.1.4.1I2	10 CFR 961/Appendix F	From:	Purchaser

B. Outputs:

1.1.4.1O1	Documentation, Findings	To:	Function 1.1.4.2 / 1.1.5
1.1.4.1O2	Notification of Discrepancy	To:	Purchaser
1.1.4.1O3	Proposed Resolution	To:	Purchaser

V. Function Requirements:

A. Constraints: None specified at this time

B. Performance:

1.1.4.1P1 (a) ... DOE may designate a representative to observe the preparatory activities conducted by the Purchaser at the Purchaser's site, and the Purchaser shall afford access to such representative.

[10 CFR 961.11, Article IV, A, 2]

C. Interface: None specified at this time

Table F1.1.4.1.1 Function Description: Observe Preliminary Waste Preparations

I. Function ID Number: 1.1.4.1.1

II. Function Title: Observe Preliminary Waste Preparations

III. Function Definition:

Observe the activities of getting the SNF/HLW ready for acceptance to ensure that it is appropriate to the cask system, storage facility and/or repository provided by the NWMS.

IV. Interfaces:

A. Inputs:

1.1.4.1.1I1	Information	From:	Purchaser

B. Outputs:

1.1.4.1O1	Verified Documentation, Findings	To:	Function 1.1.4.1.2

V. Function Requirements:

A. Constraints: None specified at this time

B. Performance:

1.1.4.1.1P1 ... (a) DOE may designate a representative to observe the preparatory activities conducted by the Purchaser at the Purchaser's site, and the Purchaser shall afford access to such representative.

[10 CFR 961.11, Article IV, A, 2]

C. Interface: None specified at this time

Table F1.1.4.1.2 Function Description: Verify Waste Description

I. Function ID Number: 1.1.4.1.2

II. Function Title: Verify Waste Description

III. Function Definition:

Verify that the contents being placed into the shipping container correspond to those described in the submitted documentation.

IV. Interfaces:

A. Inputs:

1.1.4.1.2I1	Documentation, Findings	From:	Function 1.1.4.1.1
1.1.4.1.2I2	Information	From:	Purchaser

B. Outputs:

1.1.4.1.2O1	Verified Documentation, Findings	To:	Function 1.1.4.1.3 / 1.1.4.2

V. Function Requirements:

A. Constraints: None specified at this time

B. Performance:

1.1.4.1.2P1 During cask loading and prior to acceptance by DOE for transportation to the DOE facility, the SNF and/or HLW description of the shipping lot shall be subject to verification by DOE. To the extent the SNF and/or HLW is consistent with the description submitted and approved, in accordance with Appendices E and F, DOE agrees to accept such SNF and/or HLW for disposal when DOE has verified the SNF and/or HLW description, determined the material is properly loaded, packaged, marked, labeled and ready for transportation, and has taken custody, as evidenced in writing, of the material at the Purchaser's site, f.o.b. carrier ....

[10 CFR 961.11, Article VI, B, 2]

C. Interface: None specified at this time

Table F1.1.4.1.3 Function Description: Notify Owner of Improperly Described Waste

I. Function ID Number: 1.1.4.1.3

II. Function Title: Notify Owner of Improperly Described Waste

III. Function Definition:

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

IV. Interfaces:

A. Inputs:

1.1.4.1.3I1	Verified Documentation, Findings	From:	Function 1.1.4.1.2

B. Outputs:

1.1.4.1.3O1	Notification of Discrepancy	To:	Purchaser/Producer
1.1.4.1.3O2	Proposed Resolution	To:	Purchaser/Producer

V. Function Requirements:

A. Constraints: None specified at this time

B. Performance:

1.1.4.1.3P1 Improperly Described SNF and/or HLW.

(a) Prior to Acceptance -- If SNF and/or HLW is determined by DOE to be improperly described prior to acceptance by DOE at the Purchaser's site, DOE shall promptly notify the Purchaser in writing of such determination. DOE reserves the right, in its sole discretion, to refuse to accept such SNF and/or HLW until the SNF and/or HLW has been properly described. The Purchaser shall not transfer such SNF and/or HLW to DOE unless DOE agrees to accept such SNF and/or HLW under such other arrangements as may be agreed to, in writing, by the parties.

[10 CFR 961.11, Article VI, B, 3]

C. Interface: None specified at this time

Table F1.1.4.2 Function Description: Accept Title/Documentation

I. Function ID Number: 1.1.4.2

II. Function Title: Accept Title/Documentation

III. Function Definition:

Transfer the documents authorizing DOE-acceptance of the waste from the purchaser/producer to the DOE at the time of such acceptance.

IV. Interfaces:

A. Inputs:

1.1.4.2I1	Findings	From:	Function 1.1.4.1 / 1.1.4.1.2
1.1.4.2I2	Title	From:	Purchaser/Producer
1.1.4.2I3	Documentation	From:	Purchaser/Producer

B. Outputs:

1.1.4.2O1	Title	To:	DOE/OCRWM
1.1.4.2O2	Documentation	To:	DOE/OCRWM / Function 1.2

V. Function Requirements:

A. Constraints:

1.1.4.2C1 License required; types of licenses.

(b) A general license is hereby issued to receive title to and own spent fuel or high-level radioactive waste without regard to quantity. Notwithstanding any other provision of this chapter, a general licensee under this paragraph is not authorized to acquire, deliver, receive, possess, use, or transfer spent fuel or high-level radioactive waste except as authorized in a specific license.

[10 CFR 72.6]

B. Performance:

1.1.4.2P1 Title to all SNF and/or HLW accepted by DOE for disposal shall pass to DOE at the Purchaser's site as provided for in Article VI hereof. DOE shall be solely responsible for control of all material upon passage of title. DOE shall have the right to dispose as it sees fit of any SNF and/or HLW to which it has taken title. The Purchaser shall have no claim against DOE or the Government with respect to such SNF or HLW nor shall DOE or the Government be obligated to compensate the Purchaser for such material.

[10 CFR 961.11, Article VII]

C. Interface: None specified at this time

Table F1.1.5 Function Description: Resolve Improperly Described Waste

I. Function ID Number: 1.1.5

II. Function Title: Resolve Improperly Described Waste

III. Function Definition:

When a discrepancy is found with the waste after the DOE/OCRWM has taken title to it, the proper description of the waste needs to be provided promptly, in writing, by the originating purchaser/producer.

IV. Interfaces:

A. Inputs:

1.1.5I1	Waste Description	From:	Function 1.3 / 1.4
1.1.5I2	Resolved Waste Description	From:	Purchaser/Producer

B. Outputs:

1.1.5O1	Notification of Proposed Resolution	To:	Purchaser/Producer

V. Function Requirements:

A. Constraints: None specified at this time

B. Performance:

1.1.5P1 (b) After Acceptance - If subsequent to its acceptance DOE finds that such SNF and/or HLW is improperly described, DOE shall promptly notify the Purchaser, in writing, of such finding. In the event of such notification, Purchaser shall provide DOE with a proper designation within thirty (30) days. In the event of a failure by the Purchaser to provide such proper designation, DOE may hold in abeyance any and all deliveries scheduled hereunder.

[10 CFR 961.11, Article VI, B, 3]

C. Interface: None specified at this time

Table F1.1.6 Function Description: Support Fee Collection

I. Function ID Number: 1.1.6

II. Function Title: Support Fee Collection

III. Function Definition:

Fees shall be paid quarterly by the Purchaser and must be received by DOE not later than the close of business on the last business day of the month following the end of each assigned 3-month period. DOE will annually review the adequacy of the fee and recommend adjustments, if necessary, in order to assure full cost recovery by the Government.

IV. Interfaces:

A. Inputs:

1.1.6I1	Fees	From:	Purchaser/Producer
1.1.6I2	OCRWM Program Cost Estimates	From:	DOE

B. Outputs:

1.1.6O1	Fees	To:	Nuclear Waste Fund
1.1.6O2	Fee Adequacy Report	To:	DOE Secretary
1.1.6O3	Payment Received Notification	To:	Function 1.1.3 (Control)

V. Function Requirements:

A. Constraints: None specified at this time

B. Performance:

1.1.6P1 A. Fees

4. DOE will annually review the adequacy of the fees and adjust the 1M/KWH fee, if necessary, in order to assure full cost recovery by the Government. Any proposed adjustment to the said fee will be transmitted to Congress and shall be effective after a period of ninety (90) days of continuous session has elapsed following receipt of such transmittal unless either House of Congress adopts a resolution disapproving the proposed adjustment. Any adjustment to the 1M/KWH fee under paragraph A.1. of this Article VIII shall be prospective.

[10 CFR 961.11, Article VIII]

C. Interface:

1.1.6I1a 1. Effective April 7, 1983, Purchaser shall be charged a fee in the amount of 1.0 mill per net kilowatt hour generated (1M/kWh) electricity generated and sold.

[10 CFR 961.11, Article VIII, A, 4]

1.1.6I1b B. Payment

1. For electricity generated and sold by the Purchaser's civilian nuclear power reactor(s) on or after April 7, 1983, fees shall be paid quarterly by the Purchaser and must be received by DOE not later than the close of the last business day of the month following the end of each assigned 3-month period. The first payment shall be due on July 31, 1983, for the period April 7, 1983, to June 30, 1983. [add as applicable: A one-time adjustment period payment shall be due on ___, for the period ___ to ___]. The assigned 3-month period, for purposes of payment and reporting of electricity generated and sold shall begin ___.

2. For SNF discharged prior to April 7, 1983, and for in-core burned fuel as of 12:00 A.M. April 7, 1983, the Purchaser shall, within two (2) years of contract execution, select one of the following fee payment options:

(a) Option 1--The Purchaser's financial obligation for said fuel shall be prorated evenly over forty (40) quarters and will consist of the fee plus interest on the outstanding fee balance. The interest from April 7, 1983, to date of the first payment is to be calculated based upon the 13-week Treasury bill rate, as reported on the first such issuance following April 7, 1983, and compounded quarterly thereafter by the 13-week Treasury bill rates as reported on the first such issuance of each succeeding assigned three-month period. Beginning with the first payment, interest is to be calculated on Purchaser's financial obligation plus accrued interest, at the ten-year Treasury note rate in effect on the date of the first payment. In no event shall the end of the forty (40) quarters extend beyond the first scheduled delivery date as reflected in the DOE-approved delivery commitment schedule. All payments shall be made concurrently with the assigned three month period payments. At any time prior to the end of the forty (40) quarters, Purchaser may, without penalty, make a full or partial lump sum payment at any of the assigned three month period payment dates. Subsequent quarterly payments will be appropriately reduced to reflect the reduction in the remaining balance in the fee due and payable. The remaining financial obligation, if any, will be subject to interest at the same ten-year Treasury note rate over the remainder of the ten year period.

(b) Option 2--The Purchaser's financial obligation shall be paid in the form of a single payment anytime prior to the first delivery, as reflected in the DOE approved delivery commitment schedule, and shall consist of the fee plus interest on the outstanding fee balance. Interest is to be calculated from April 7, 1983, to the date of the payment based upon the 13-week Treasury bill rate, as reported on the first such issuance following April 7, 1983, and compounded quarterly thereafter by the 13-week Treasury bill rates as reported on the first such issuance of each succeeding assigned three-month period until payment.

(c) Option 3--The Purchaser's financial obligation shall be paid prior to June 30, 1985, or prior to two (2) years after contract execution, whichever comes later, in the form of a single payment and shall consist of all outstanding fees for SNF and

in-core fuel burned prior to April 7, 1983. Under this option, no interest shall be due to DOE from April 7, 1983, to the date of full payment on the outstanding fee balance.

3. Method of Payment:

(a) Payments shall be made by wire transfer, in accordance with instructions specified by DOE in Appendix G, annexed hereto and made a part hereof, and must be received within the time periods specified in paragraph B.1. of this Article VIII.

(b) The Purchaser will complete a Standard Remittance Advice, as set forth in Appendix G, for each assigned three month period payment, and mail it postmarked no later than the last business day of the month following each assigned three month period to Department of Energy, Office of Controller, Cash Management Division, Box 500, Room D-208, Germantown, Maryland 20874.

4. Any fees not paid on a timely basis or underpaid because of miscalculation will be subject to interest as specified in paragraph C of this Article VIII.

[10 CFR 961.11, Article VIII, B]

1.1.6I2 None specified at this time

1.1.6O1 All receipts, proceeds, and revenues realized by DOE under the contract will be deposited in the Nuclear Waste Fund, an account established by the Act in the U.S. Treasury.

[10 CFR 961.1]

1.1.6O2 Same as 1.1.6P1 above.

1.1.6O3 None specified at this time

3.0 ARCHITECTURE DESCRIPTION

Architecture is defined herein to be that part of the system actually built, found, or selected to perform a function subject to its stated requirements. Figure 5 portrays the architectural concepts that comprise a Waste Acceptance System based on how DOE/OCRWM plans to satisfy its mission.

Tables A1 - A1.1.3.5 identify the specific requirements to be satisfied by each architectural concept, a rationale justifying the need for the architecture, and a description of the concept.

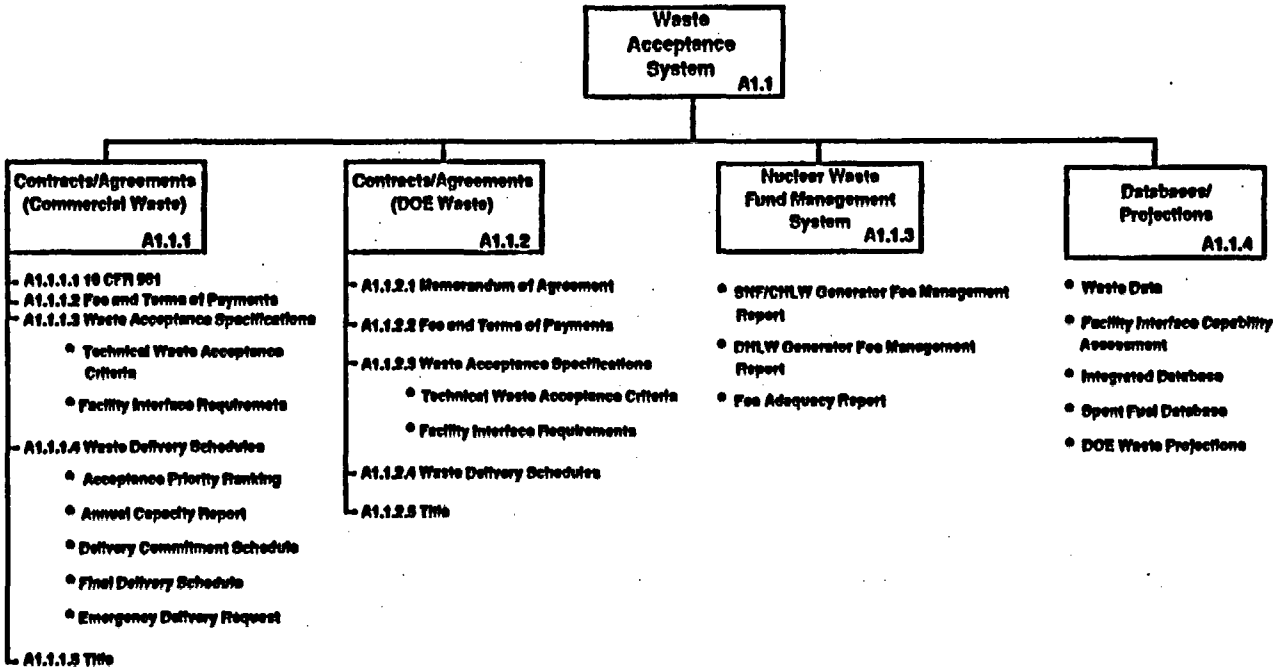

Figure 5. Accept Waste Conceptual Architecture Hierarchy

Table A.1 Nuclear Waste Management System

ARCHITECTURE Nuclear Waste Management System

REQUIREMENTS SATISFIED

1.C2, 1.C5 - 1.C8; 1.P1, 1.P2; 1.I1 - 1.I3; 1.O1, 1.O2

RATIONALE

- ... to develop a technically sound integrated waste-management system .... *[DOE/RW-0247, Sec. 5]*

DESCRIPTION

- The Nuclear Waste Management System consists of the composite of the sites, and all facilities, systems, equipment, materials, information, activities, and the personnel required to perform those activities necessary to manage waste disposal.

Table A1.1 Waste Acceptance System

ARCHITECTURE Waste Acceptance System

REQUIREMENTS SATISFIED

1.1C2, 1.1C4 - 1.1C7; 1.1P1 - 1.1P5; 1.1I1b - f; 1.1I2b - f; 1.1I3a - c; 1.1I4; 1.1O1b; 1.1O2b; 1.1O4; 1.1.3.1.3P2; 1.1.4C1, 1.1.4C3; 1.1.4P1; 1.1.4O1 - 1.1.4O3

RATIONALE

- ... the Secretary is authorized to enter into contracts 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, subsequent transportation, and disposal of such waste or spent fuel. *[NWPA Section 302 (a)(1)]*

DESCRIPTION

- Waste acceptance system will take legal and physical possession of the spent fuel and high level waste from its purchasers/producers. The waste acceptance system establishes the baseline system interface requirements and determines the quantity, schedule and characteristics of waste to be accepted. The results define the inputs to the Transport Waste, Store Waste, and Dispose of Waste functions. It is the interface between the NWMS and the waste purchasers/producers that allows nuclear waste to enter the system.

Table A1.1.1 Contracts/Agreements (Commercial Waste)

ARCHITECTURE Contracts/Agreements (Commercial Waste)

REQUIREMENTS SATISFIED

1.1C5; 1.1I1f; 1.1I2f; 1.1.2P1; 1.1.4C1, 1.1.4C3; 1.1.4P1; 1.1.4O1 - 1.1.4O3

RATIONALE

- ... the Secretary is authorized to enter into contracts 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, subsequent transportation, and disposal of such waste or spent fuel.

[NWPA, Section 302 (a)(1)]

DESCRIPTION

- The standard contract for the Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste was published in the Federal Register (10 CFR 961) and served as the basis for the contracts entered into between DOE and purchasers/producers.

Table A1.1.1.1 10 CFR 961

ARCHITECTURE 10 CFR 961

REQUIREMENTS SATISFIED

1.1P1; 1.1.2P3

RATIONALE

- ... the Secretary is authorized to enter into contracts 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, subsequent transportation, and disposal of such waste or spent fuel.

[NWPA, Section 302 (a)]

DESCRIPTION

- 10 CFR 961 served as the basis for the development of individual contracts with the various purchasers/producers of spent nuclear fuel.

- ... the contractual terms and conditions under which the Department of Energy (DOE) will make available nuclear waste disposal services to the purchasers/producers of spent nuclear fuel (SNF) and high-level radioactive waste (HLW) as provided in section 302 of the Nuclear Waste Policy Act of 1982 (Pub. L. 97-425).

[10 CFR 961.1]

Table A1.1.1.2 Fee and Terms of Payments

ARCHITECTURE Fee and Terms of Payments

REQUIREMENTS SATISFIED

1.1C5; 1.1.6P1; 1.1.6I1a; 1.1.6I1b; 1.1.6O1; 1.1.6O2

RATIONALE

• A. Fees

1. Effective April 7, 1983, Purchaser shall be charged a fee in the amount of 1.0 mill per kilowatt hour (1M/kWh) electricity generated and sold.

B. Payment

1. For electricity generated and sold by the Purchaser's civilian nuclear power reactor(s) on or after April 7, 1983, fees shall be paid quarterly by the Purchaser and must be received by DOE not later than the close of business on the last business day of the month following the end of each assigned 3-month period. The first payment shall be due on July 31, 1983, for the period April 7, 1983, to June 30, 1983. [add as applicable: A one-time adjustment period payment shall be due on ___, for the period ___ to ___]. The assigned 3-month period, for purposes of payment and reporting of electricity generated and sold of net kilowatt hours generated shall begin ___ ---.

3. Method of Payment:

(a) Payments shall be made by wire transfer, in accordance with instructions specified by DOE in Appendix G, annexed hereto and made a part hereof, and must be received within the time periods specified in paragraph B.1. of this Article VIII. (b) The Purchaser will complete a Standard Remittance Advice, as set forth in Appendix G, for each assigned three month period payment, and mail it postmarked no later than the last business day of the month following each assigned three month period to Department of Energy, Office of Controller, Cash Management Division, Box 500, Room D-208, Germantown, Maryland 20874.

[10 CFR 961.11, Article VIII]

• 2. For SNF, or solidified high-level radioactive waste derived from SNF, which fuel was used to generate electricity in a civilian nuclear power reactor prior to April 7, 1983, a one-time fee will be assessed by applying industry-wide average dollar per kilogram charges to four (4) distinct ranges of fuel burnup so that the integrated cost across all discharged (i.e. spent) fuel is equivalent to an industry-wide average charge of 1.0 mill per kilowatt-hour. For purposes of this contract, discharged nuclear fuel is that fuel removed from the reactor core with no plans for reinsertion. In the event that any such fuel withdrawn with plans for reinsertion is not reinserted, then the applicable fee for such fuel shall be calculated as set forth in this paragraph 2. The categories of spent nuclear fuel burnup and the fee schedule are listed below:

[In 1982 dollars]

Nuclear spent fuel burnup range	Dollars per kilogram
0 to 5,000 MWDT/MTU	$80.00
5,000 to 10,000 MWDT/MTU	142.00
10,000 to 20,000 MWDT/MTU	162.00
Over 20,000 MWDT/MTU	184.00

This fee shall not be subject to adjustment, and the payment thereof by the Purchaser shall be made to DOE as specified in paragraph B of this Article VIII.
3. For in-core fuel as of April 7, 1983, that portion of the fuel burned through April 6, 1983 shall be subject to the one-time fee as calculated in accordance with the following methodology: [a] determine the total weight in kilograms of uranium loaded initially in the particular core; [b] determine the total megawatt-days (thermal) which have been

generated by all of the fuel assemblies in the said core as of 12:00 A.M. April 7, 1983; [c] divide the megawatt-days (thermal) generated in the said core by the total metric tons of initially loaded uranium in that core and multiply the quotient by the conversion factor 0.0078 to obtain a value in dollars per kilogram; and [d] multiply the dollars per kilogram value by the kilograms determined in [a] above to derive the dollar charge for the one-time fee to be paid for the specified in-core fuel as of 12:00 A.M. April 7, 1983. For purposes of this contract, in-core fuel is that fuel in the reactor core as of the date specified, plus any fuel removed from the reactor with plans for reinsertion. That portion of such fuel unburned as of 12:00 A.M. April 7, 1983 shall be subject to the 1.0 mill per kilowatt-hour charge.

[10 CFR 961.11, Article VIII]

DESCRIPTION

• This article of the Standard Contract established a fee in the amount of 1.0 mill per kilowatt-hour electricity generated and sold after April 7, 1983, and established a schedule for determination of the fee for spent fuel generated prior to this date. Purchasers were given three options for the payment of fees due for waste generated prior to April 7, 1983.

Table A1.1.1.3 Waste Acceptance Specifications

ARCHITECTURE Waste Acceptance Specifications

REQUIREMENTS SATISFIED

1.1P4; 1.1I1c, d; 1.1I2c; 1.1.1C1 - 1.1.1C3, 1.1.1C6 - 1.1.1C8, 1.1.1C11; 1.1.1P1; 1.1.1I1a, 1.1.1I1b; 1.1.4.1P1; 1.1.4.1.1P1; 1.1.4.1.2P1

RATIONALE

• 1. Criteria.

(a) Except as otherwise provided in this contract, DOE shall accept hereunder only such SNF and/or HLW which meets the General Specifications for such fuel and waste as set forth in Appendix E, annexed hereto and made a part hereof.

(b) Purchaser shall accurately classify SNF and/or HLW prior to delivery in accordance with paragraphs B and D of Appendix E.

[10 CFR 961.11, Article VI, A]

• Criteria for the waste package and its components.

(a) High-level-waste package design in general.

(1) Packages for HLW shall be designed so that the in situ chemical, physical, and nuclear properties of the waste package and its interactions with the emplacement environment do not compromise the function of the waste packages or the performance of the underground facility or the geologic setting.

(2) The design shall include but not be limited to consideration of the following factors: solubility, oxidation/reduction reactions, corrosion, hydriding, gas generation, thermal effects, mechanical strength, mechanical stress, radiolysis, radiation damage, radionuclide retardation, leaching, fire and explosion hazards, thermal loads, and synergistic interactions.

(b) Specific criteria for HLW package design –

(1) Explosive, pyrophoric, and chemically reactive materials. The waste package shall not contain explosive or pyrophoric materials or chemically reactive materials in an amount that could compromise the ability of the underground facility to contribute to waste isolation or the ability of the geologic repository to satisfy the performance objectives.

(2) Free liquids. The waste package shall not contain free liquids in an amount that could compromise the ability of the waste packages to achieve the performance objectives relating to containment of HLW (because of chemical interactions or formation of pressurized vapor) or result in spillage and spread of contamination in the event of waste package perforation during the period through permanent closure.

(3) Handling. Waste packages shall be designed to maintain waste containment during transportation, emplacement, and retrieval.

(4) Unique identification. A label or other means of identification shall be provided for each waste package. The identification shall not impair the integrity of the waste package and shall be applied in such a way that the information shall be legible at least to the end of the period of retrievability. Each waste package identification shall be consistent with the waste package's permanent written records.

(c) Waste form criteria for HLW. High-level radioactive waste that is emplaced in the underground facility shall be designed to meet the following criteria:

(1) Solidification. All such radioactive wastes shall be in solid form and placed in sealed containers.

(2) Consolidation. Particulate waste forms shall be consolidated (for example, by incorporation into an encapsulating matrix) to limit the availability and generation of particulates.

(3) Combustibles. All combustible radioactive wastes shall be reduced to a noncombustible form unless it can be demonstrated that a fire involving the waste packages containing combustibles will not compromise the integrity of other waste packages, adversely affect any structures, systems, or components important to safety, or compromise the ability of the underground facility to contribute to waste isolation.

(d) Design criteria for other radioactive wastes. Design criteria for waste types other than HLW will be addressed on an individual basis if and when they are proposed for disposal in a geologic repository.

[10 CFR 60.135]

DESCRIPTION

- Appendix E of 10 CFR 961 established the general specifications for the waste covered under the contract. Waste which met the specifications for "standard fuel" was awarded higher priority for acceptance than waste which was classified as "nonstandard fuel".

Table A1.1.1.4 Waste Delivery Schedules

ARCHITECTURE Waste Delivery Schedules

REQUIREMENTS SATISFIED

1.1.3I1a, b; 1.1.3I2, 1.1.3I4; 1.1.3O3; 1.1.3.1P1; 1.1.3.1.1P1; 1.1.3.1.1I1; 1.1.3.1.2P1 - 1.1.3.1.2P3; 1.1.3.2P1, 1.1.3.2P2; 1.1.3.1.3P1, 1.1.3.1.3P2; 1.1.3.2.1P1, 1.1.3.2.1P2, 1.1.3.2.1I1a - c; 1.1.3.2.2P1, 1.1.3.2.2I1; 1.1.3.2.3P1, 1.1.3.2.3P2; 1.1.3.2.3I1; 1.1.3.2.4P1, 1.1.3.2.4P2; 1.1.3.2.4I1a, b; 1.1.4C1, 1.1.4C3; 1.1.4P1; 1.1.4O1 - 1.1.4O3; 1.1.4.1.3P1; 1.1.5P1

RATIONALE

- 5. (a) Beginning on April 1, 1991, DOE shall issue an annual acceptance priority ranking for receipt of SNF and/or HLW at the DOE repository ....

(b) Beginning not later than July 1, 1987, DOE shall issue an annual capacity report for planning purposes.

[10 CFR 961.11, Article IV, B]

- B. Delivery Commitment Schedule

1. Delivery commitment schedule(s), in the form set forth in Appendix C annexed hereto and made a part hereof, for delivery of SNF and/or HLW shall be furnished to DOE by Purchaser ....

C. Final Delivery Schedule

Final delivery schedule(s), in the form set forth in Appendix D, annexed hereto and made a part hereof, for delivery of SNF and/or HLW covered by an approved delivery commitment schedule(s) shall be furnished to DOE by Purchaser ....

[10 CFR 961.11, Article V, B and C]

- D. Emergency Deliveries

Emergency deliveries of SNF and/or HLW may be accepted by DOE before the date provided in the delivery commitment schedule upon prior written approval by DOE.

[10 CFR 961.11, Article V, D]

DESCRIPTION

- The above cited provisions specified:

- an annual acceptance priority ranking based on the age of the SNF.
- an annual capacity report projecting annual receiving capacities.
- Delivery Commitment Schedules wherein the purchasers/producers identify the SNF and/or HLW they wish to deliver beginning 63 months thereafter.
- Final Delivery Schedules, covered by approved DCSs, to be submitted no later than 12 months prior to delivery.
- Appendix F of 10 CFR 961 submitted 60 days prior to delivery.

Table A1.1.1.5 Title

ARCHITECTURE Title

REQUIREMENTS SATISFIED

1.1.4C1, 1.1.4P2; 1.1.4.2C1; 1.1.4.2P1

RATIONALE

- Delivery, and acceptance by the Secretary, of any high-level radioactive waste or spent nuclear fuel for a repository constructed under this subtitle shall constitute a transfer to the Secretary of title to such waste or spent fuel.

[NWPA, Section 123]

DESCRIPTION

- The coincidence of all elements that constitute the fullest legal right to control and dispose of property.

[American Heritage Dictionary]

Table A1.1.2 Contracts/Agreements (DOE Waste)

ARCHITECTURE Contracts/Agreements (DOE Waste)

REQUIREMENTS SATISFIED

1.1C5; 1.1.2P1 - 1.1.2P3; 1.1.4P1

RATIONALE

- TBD pending agreement with EM.

DESCRIPTION

- TBD, but analogous to A1.1.1

Table A1.1.2.1 Memorandum of Agreement

ARCHITECTURE Memorandum of Agreement

REQUIREMENTS SATISFIED

1.1I2e; 1.1I3c

RATIONALE

- ... the Secretary is authorized to enter into contracts 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, subsequent transportation, and disposal of such waste or spent fuel.

[NWPA, Section 302 (a)(1)]

- Federal agencies.

Federal agencies or departments requiring DOE's disposal services for SNF and/or HLW will be accommodated by a suitable interagency agreement reflecting, as appropriate, the terms and conditions set forth in the contract in Sec. 961.11; Provided, however, that the fees to be paid by Federal agencies will be equivalent to the fees that would be paid under the contract.

[10 CFR 961.5]

DESCRIPTION

- TBD, but analogous to A1.1.1.1

Table A1.1.2.2 Fee and Terms of Payments

ARCHITECTURE Fee and Terms of Payments

REQUIREMENTS SATISFIED

1.1C5, 1.1C6; 1.1I3b

RATIONALE

- No high-level radioactive waste or spent nuclear fuel generated or owned by any Department of the United States ... may be disposed of by the Secretary ... unless such Department transfers to the Secretary, for deposit in the Nuclear Waste Fund, amounts equivalent to the fees that would be paid ... if such waste were generated by any other person.

[NWPA, Section 302 (b)(4)]

DESCRIPTION

- TBD, but analogous to A1.1.1.2

Table A1.1.2.3 Waste Acceptance Specifications

ARCHITECTURE Waste Acceptance Specifications

REQUIREMENTS SATISFIED

1.1.1C1 - 1.1.1C3, 1.1.1C6 - 1.1.1C8, 1.1.1C11; 1.1.1P1; 1.1.1I1a, 1.1.1I1b

RATIONALE

- (c) Waste form criteria for HLW. High-level radioactive waste that is emplaced in the underground facility shall be designed to meet the following criteria:

  (1) Solidification. All such radioactive wastes shall be in solid form and placed in sealed containers.

  (2) Consolidation. Particulate waste forms shall be consolidated (for example, by incorporation into an encapsulating matrix) to limit the availability and generation of particulates.

  (3) Combustibles. All combustible radioactive wastes shall be reduced to a noncombustible form unless it can be demonstrated that a fire involving the waste packages containing combustibles will not compromise the integrity of other waste packages, adversely affect any structures, systems, or components important to safety, or compromise the ability of the underground facility to contribute to waste isolation.

  [10 CFR 60.135]

DESCRIPTION

- TBD, but analogous to A1.1.1.3

Table A1.1.2.4 Waste Delivery Schedules

ARCHITECTURE Waste Delivery Schedules

REQUIREMENTS SATISFIED

1.1.4.1.3P1; 1.1.5P1

RATIONALE

- The DHLW acceptance rate will be in accordance with Appendix F of this document.
  [TBD, pending DOE/OCRWM decision]

DESCRIPTION

- TBD, but analogous to A1.1.1.4

Table A1.1.2.5 Title

ARCHITECTURE Title

REQUIREMENTS SATISFIED

1.1.4C3, 1.1.4P2; 1.1.4.2P1

RATIONALE

- Delivery, and acceptance by the Secretary, of any high-level radioactive waste or spent nuclear fuel for a repository constructed under this subtitle shall constitute a transfer to the Secretary of title to such waste or spent fuel.

[NWPA, Section 123]

DESCRIPTION

- The coincidence of all elements that constitute the fullest legal right to control and dispose of property.

[American Heritage Dictionary]

Table A1.1.3 Nuclear Waste Fund Management System

ARCHITECTURE Nuclear Waste Fund Management System

REQUIREMENTS SATISFIED

1.1C2, 1.1C4, 1.1C8; 1.1.6P1; 1.1.6I1a; 1.1.6O1, 1.1.6O2

RATIONALE

- ... the Secretary shall establish procedures for the collection and payment of the fees .... The Secretary shall annually review the amount of the fees established ... to evaluate whether collection of the fee will provide sufficient revenues to offset the costs ....

[NWPA, Section 302 (a)(4)]

DESCRIPTION

- The Secretary is authorized to enter into contracts, collect fees and invest the funds as prescribed by the Act to recover the full costs of the CRWM program.

Table A1.1.4 Databases/Projections

ARCHITECTURE Databases/Projections

REQUIREMENTS SATISFIED

1.1.3.1.1P1; 1.1.3.1.1I1; 1.1.3.1.3P1

RATIONALE

- 1. Discharge Information.

(a) On an annual basis, commencing October 1, 1983, the Purchaser shall provide DOE with information on actual discharges to date and projected discharges for the next ten (10) years in the form and content set forth in Appendix B, annexed hereto and made a part hereof. The information to be provided will include estimates and projections and will not be Purchaser's firm commitment with respect to discharges or deliveries ....[1]

[10 CFR 961.11, Article IV, A]

DESCRIPTION

- Purchasers are required to submit data to DOE and DOE is required to collect and review data submitted in order to develop a system adequate to meet purchaser's needs.

[1] The Contracting Office has allowed Purchasers to submit Nuclear Fuel Data Form RW-859 in place of Appendix B.

4.0 INTERFACES

Interfaces can indicate either a flow between functions as in a sequence of activities, or a necessary fit between architectures. They are also either internal interfaces which are contained entirely within the function structure or external interfaces which interact with functions outside of the function structure. Prior to the preparation of detailed designs, only interfaces that indicate a flow between functions can be explicitly described.

Figures 6 - 11 show the interfaces, both internal and external, at the various levels within the function hierarchy. As depicted in these N-Square charts, functions are located on the diagonal, and interfaces are represented as either inputs to a particular function (those items located vertically above or below a function), or outputs from a particular function (those items located horizontally to the right or left of a function). The requirements for each of these interfaces are contained in Tables F1. - F1.1.5.

A more visual display of the interfaces is illustrated in the functional flow diagrams (Figures 12 - 18). Interfaces enter or exit a box containing a function as either inputs or outputs (see legend on illustration). A compilation of key inputs and outputs of the Accept Waste function are provided in Appendix E. Inputs and outputs from functions below the third level are not shown in Appendix E, however, these can be seen in both the N-Square charts and functional flow diagrams. Each interface is automatically tracked through lower level functional flow diagrams, thus assuring both traceability and consistency in logic and material flows. However, to maintain legibility on these diagrams, only key inputs/outputs, addressing the most important concepts at a particular function level, are explicitly shown on each diagram. Therefore, inputs and outputs not shown on lower level diagrams are bracketed (i.e. tunnelled) on the higher level functions and vice versa. Also, only the important controls and resources are shown at each level.

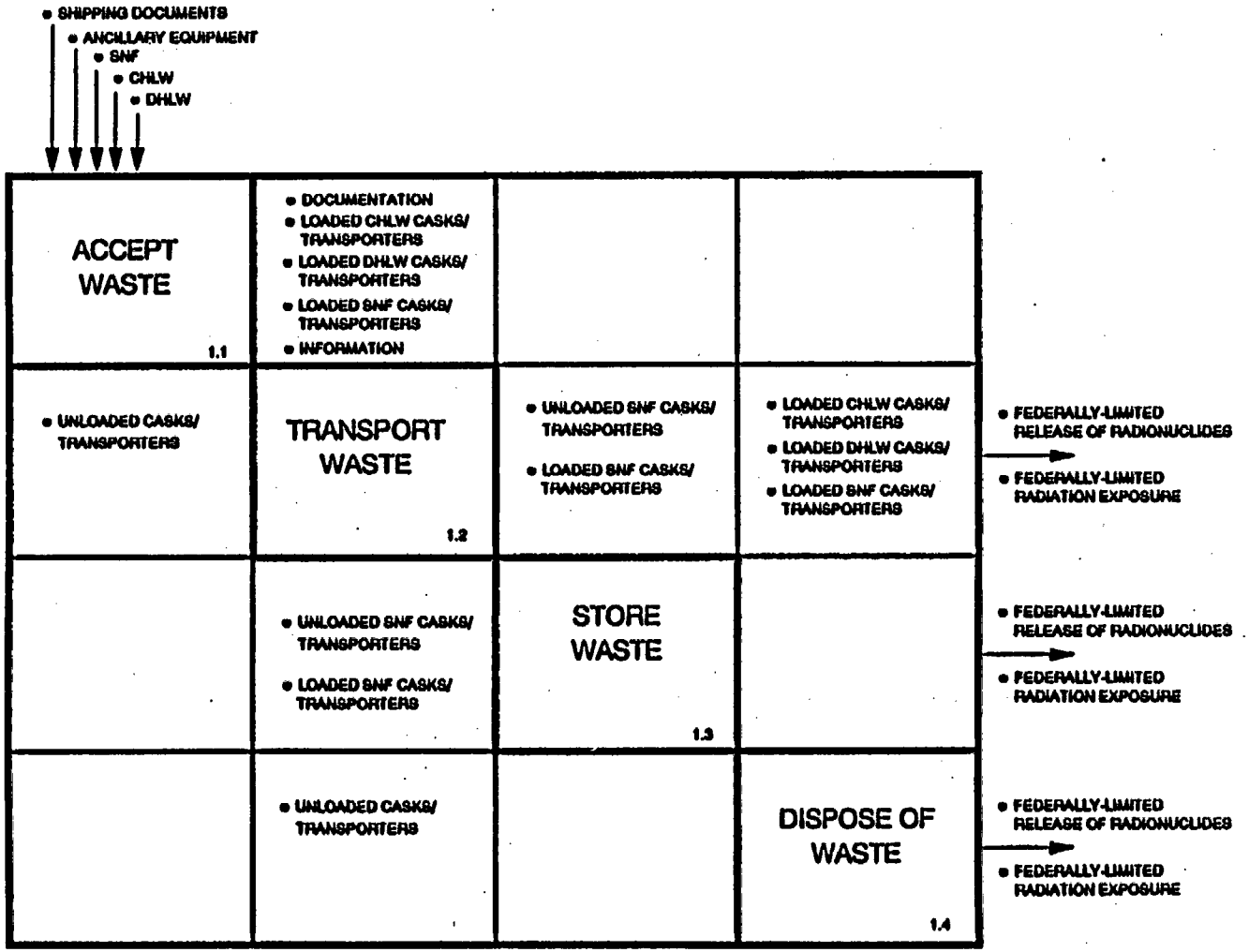

Figure 6. N-Square Chart for 1. - Manage Waste Disposal

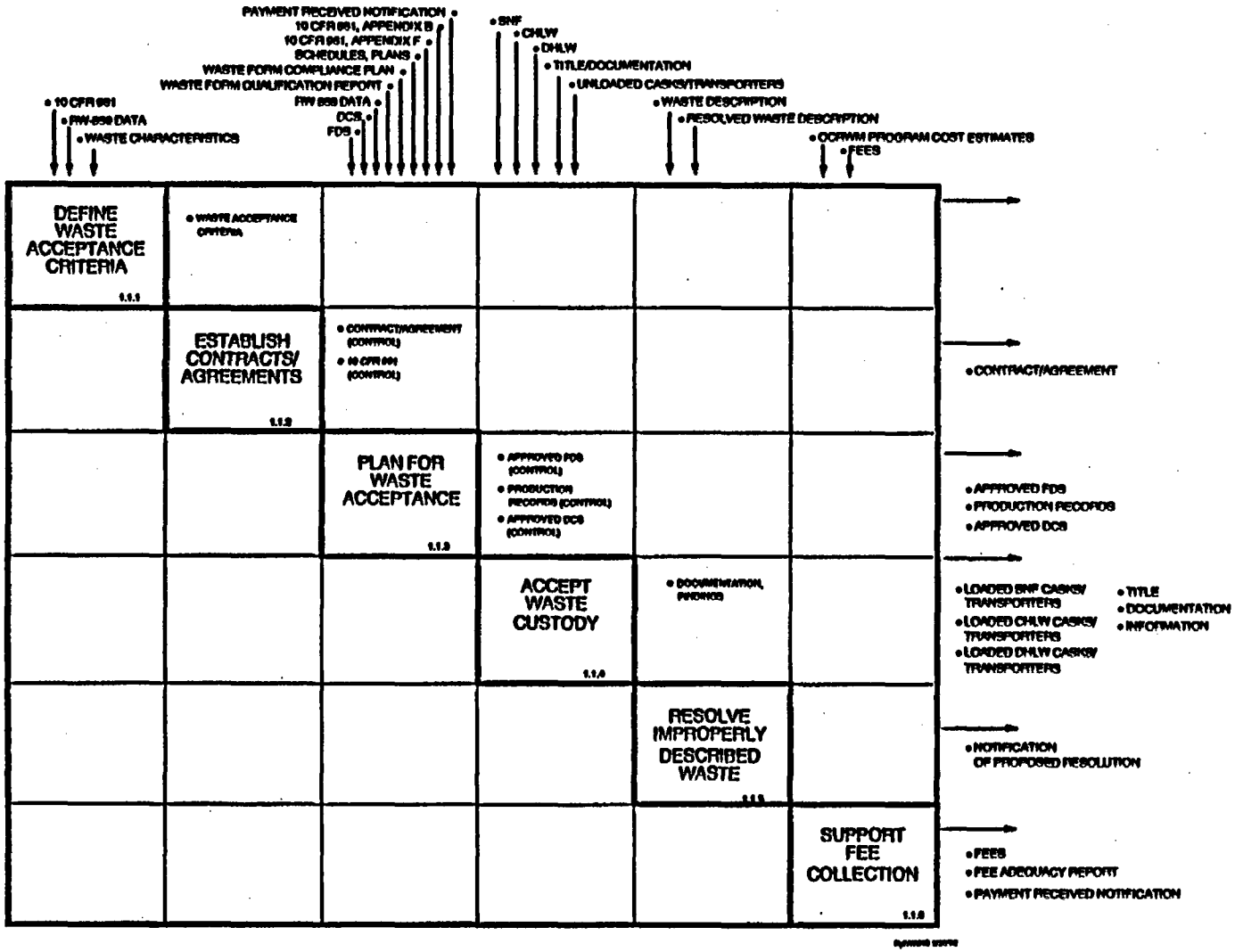

Figure 7. N-Square Chart for 1.1 - Accept Waste

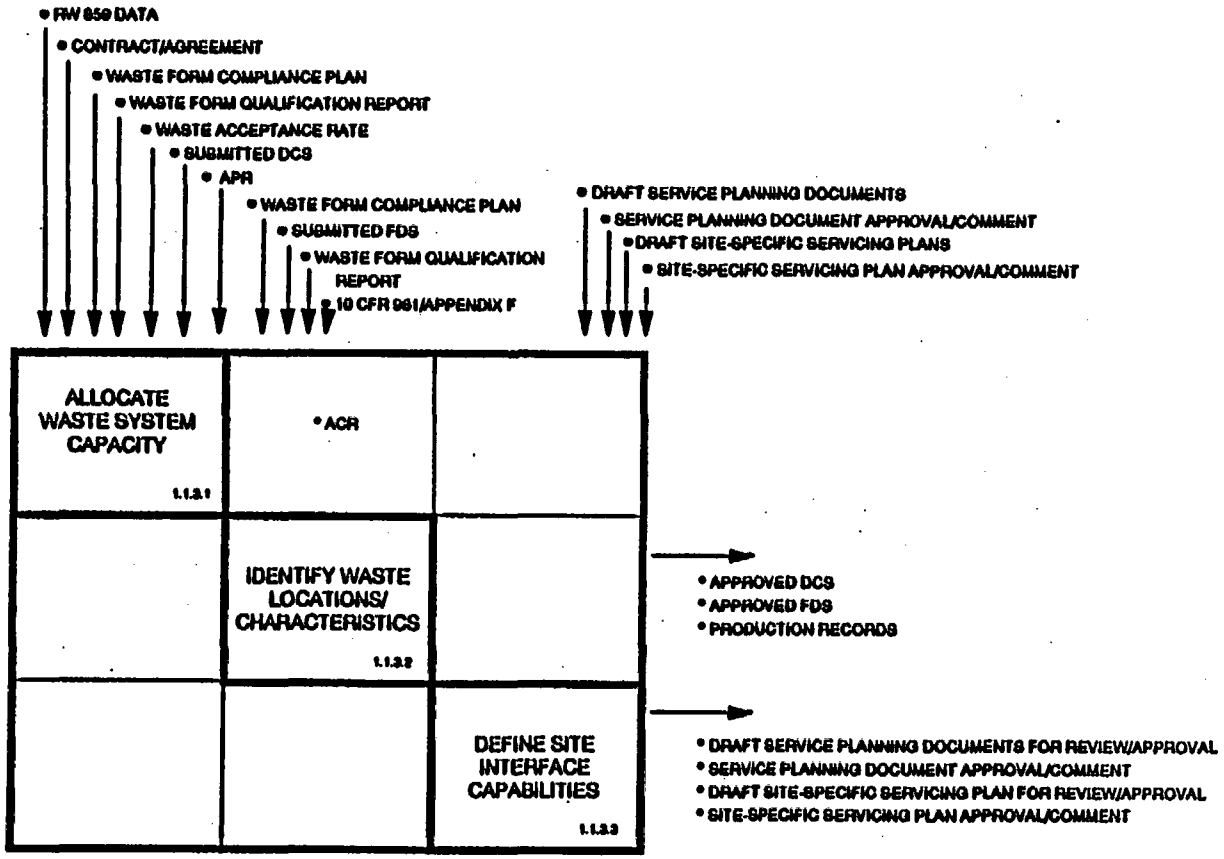

Figure 8. N-Square Chart for 1.1.3 - Plan for Waste Acceptance

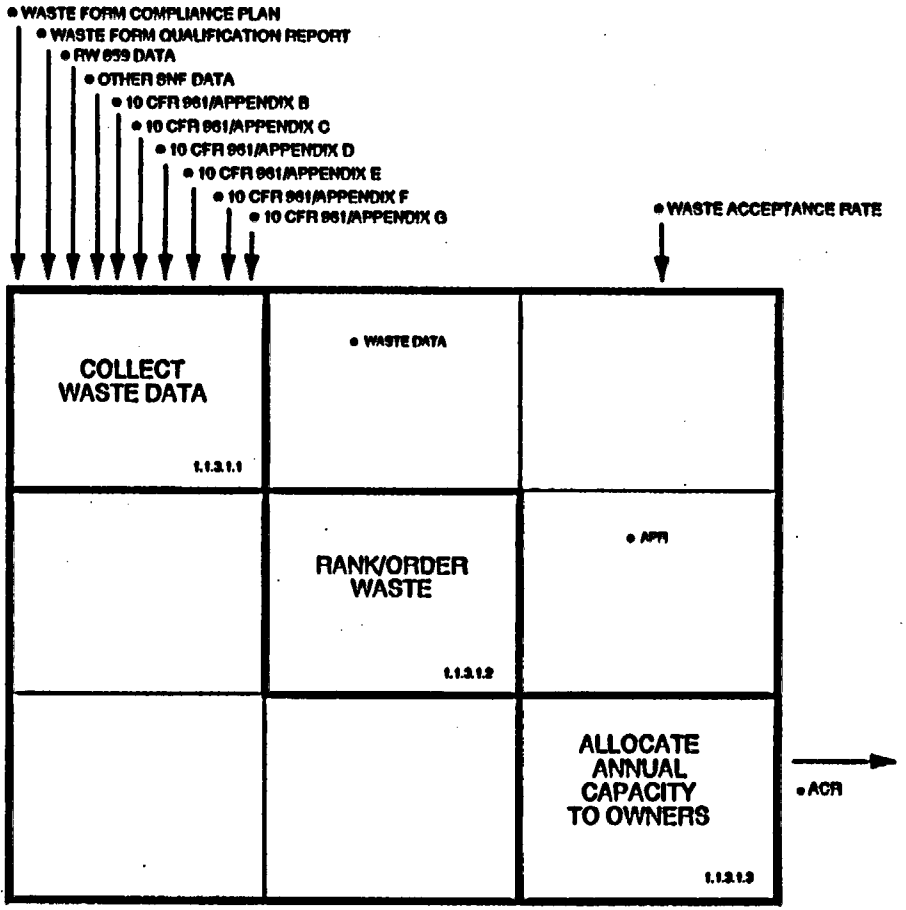

Figure 9. N-Square Chart for 1.1.3.1 - Allocate Waste System Capacity

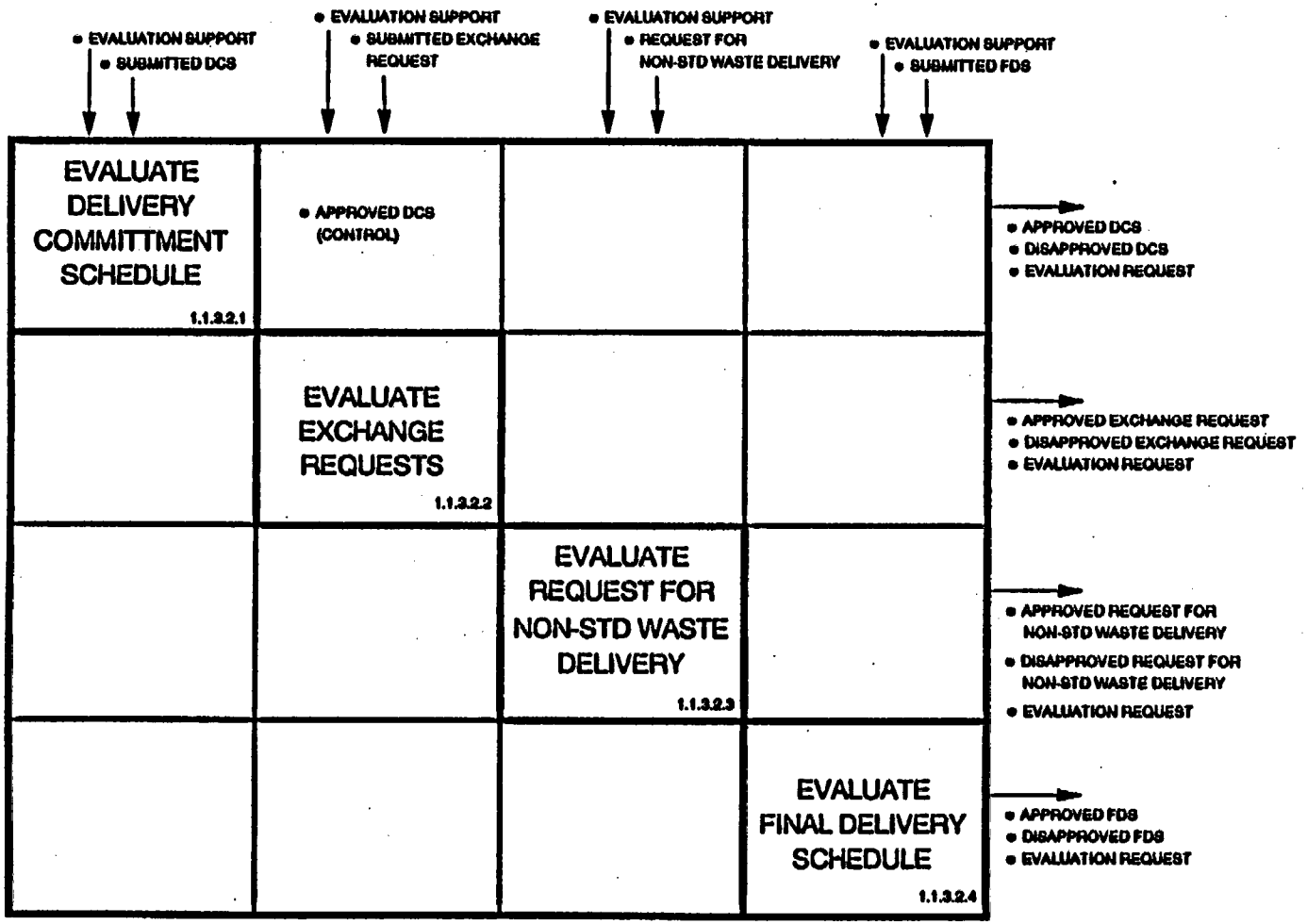

Figure 10. N-Square Chart for 1.1.3.2 - Identify Waste Locations/Characteristics

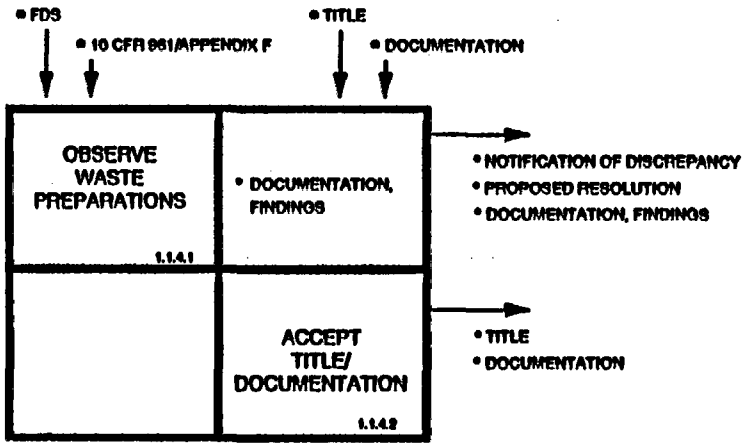

Figure 11. N-Square Chart for 1.1.4 - Transfer Waste Custody

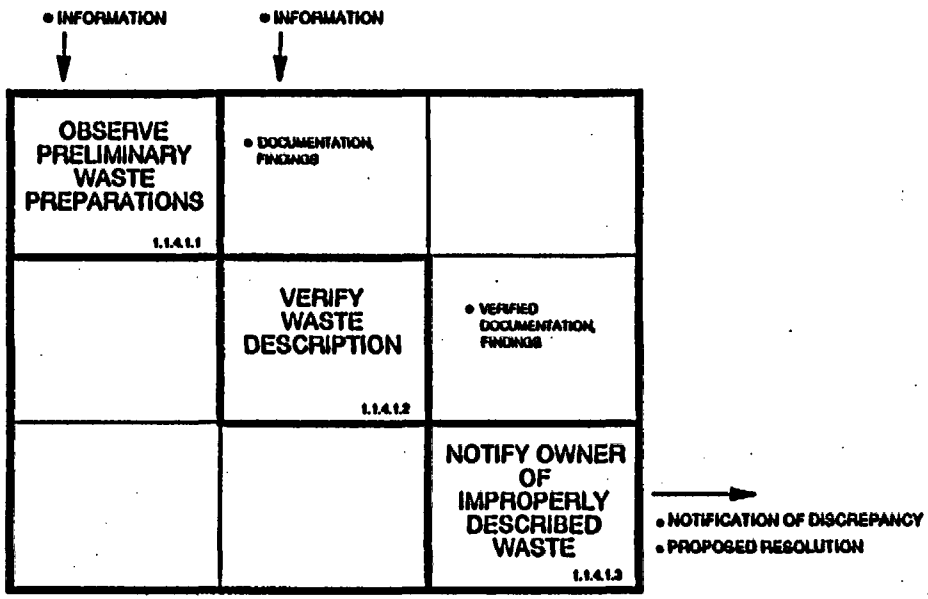

Figure 12. N-Square Chart for 1.1.4.1 - Observe Waste Preparations

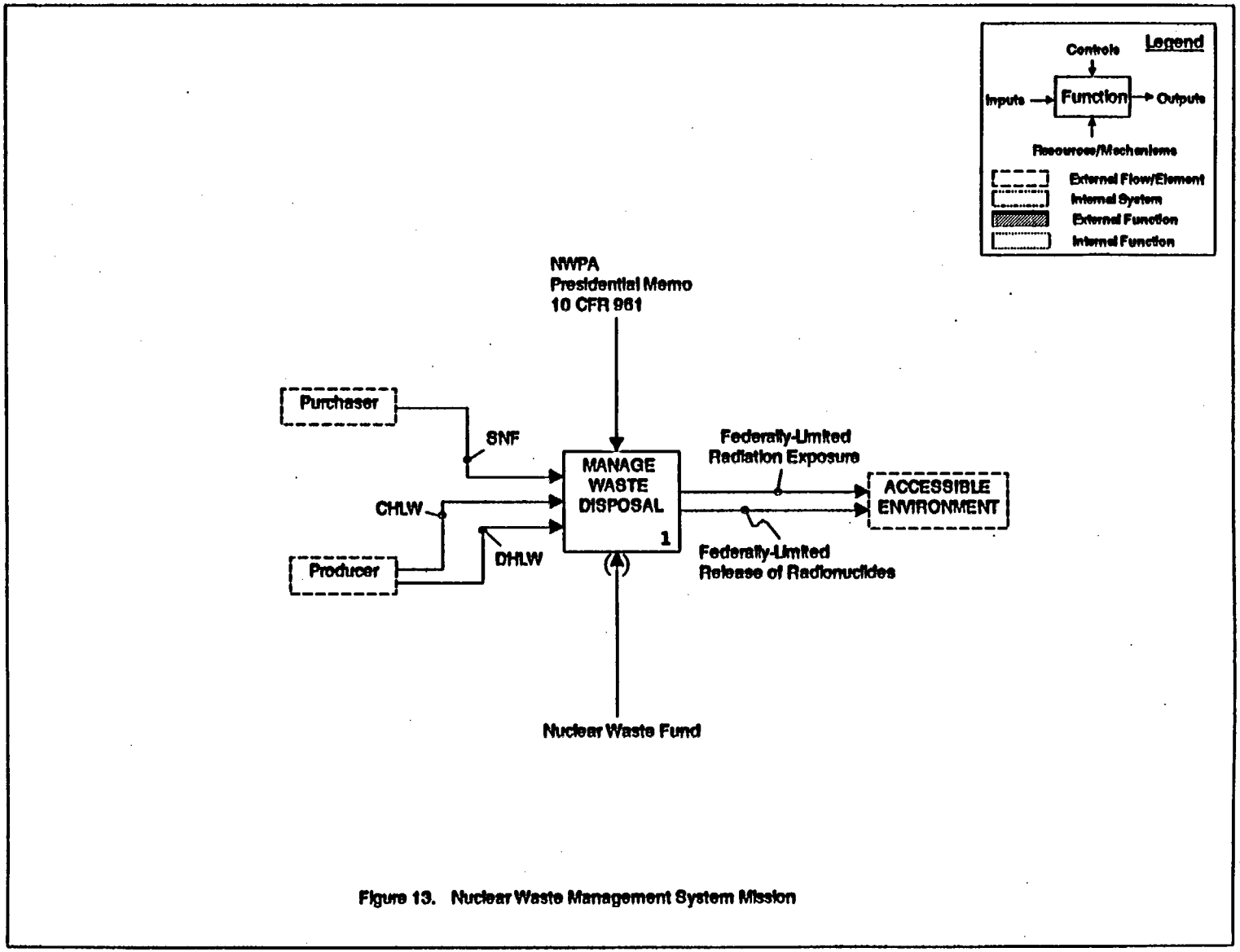

Figure 13. Nuclear Waste Management System Mission

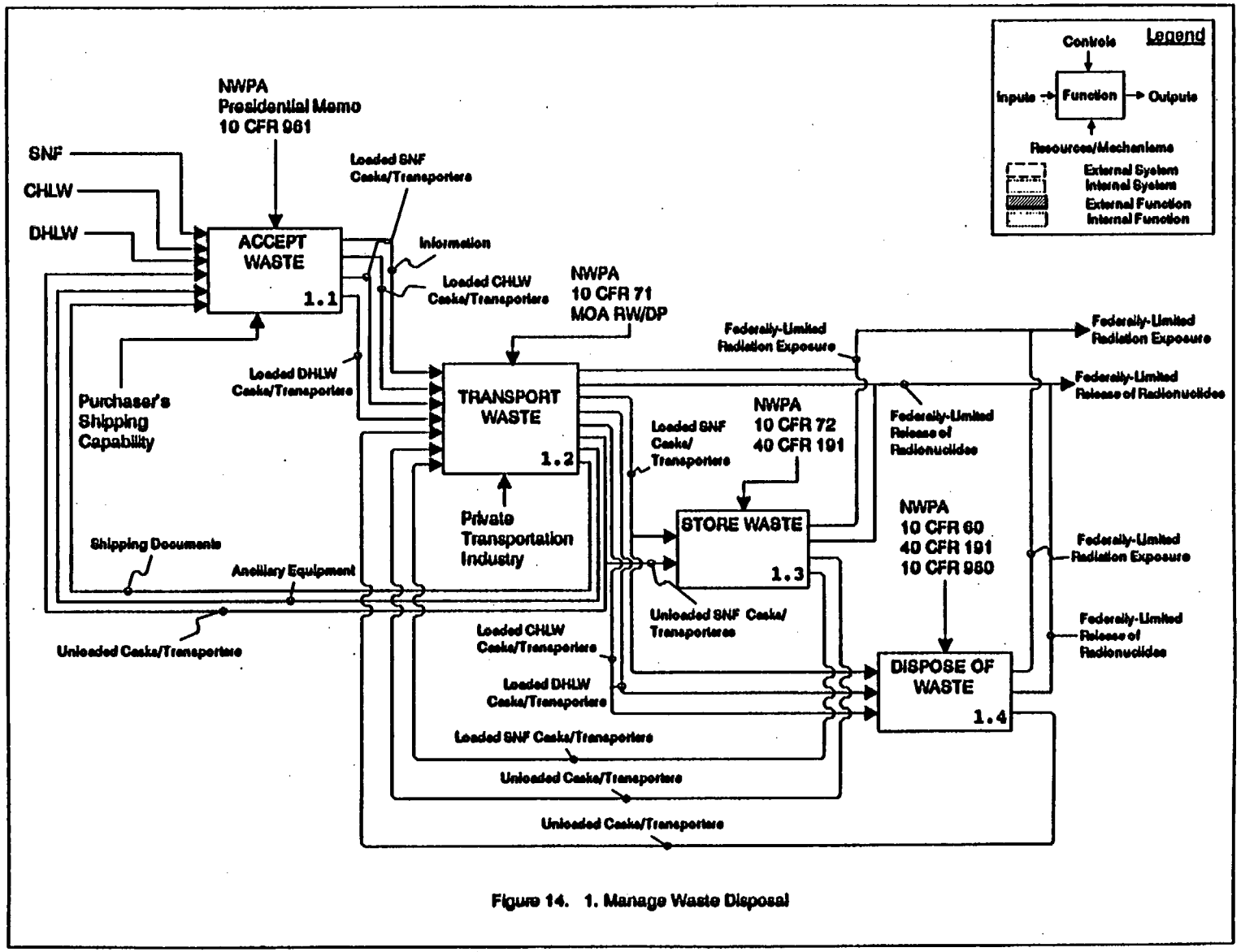

Figure 14. 1. Manage Waste Disposal

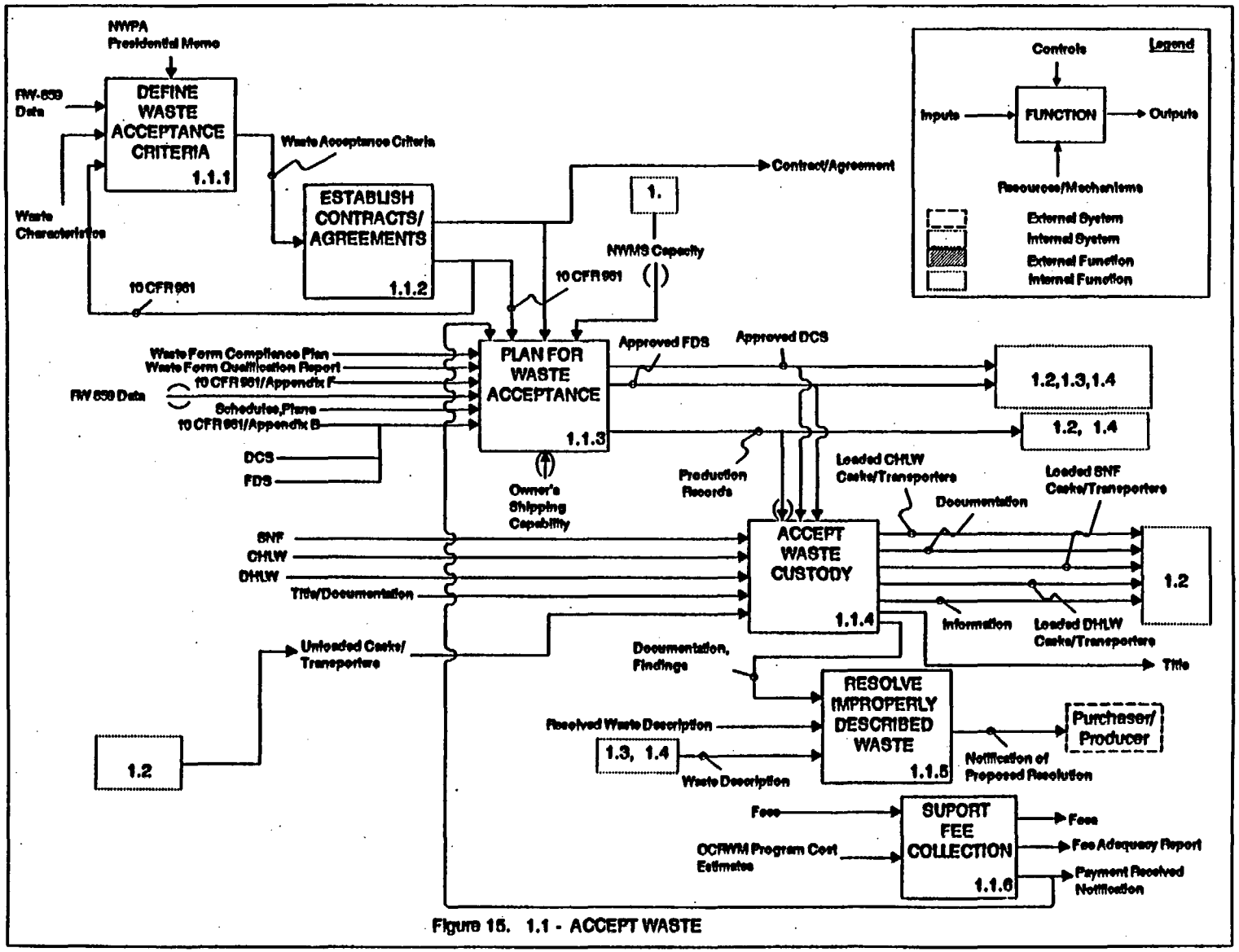

Figure 15. 1.1 - ACCEPT WASTE

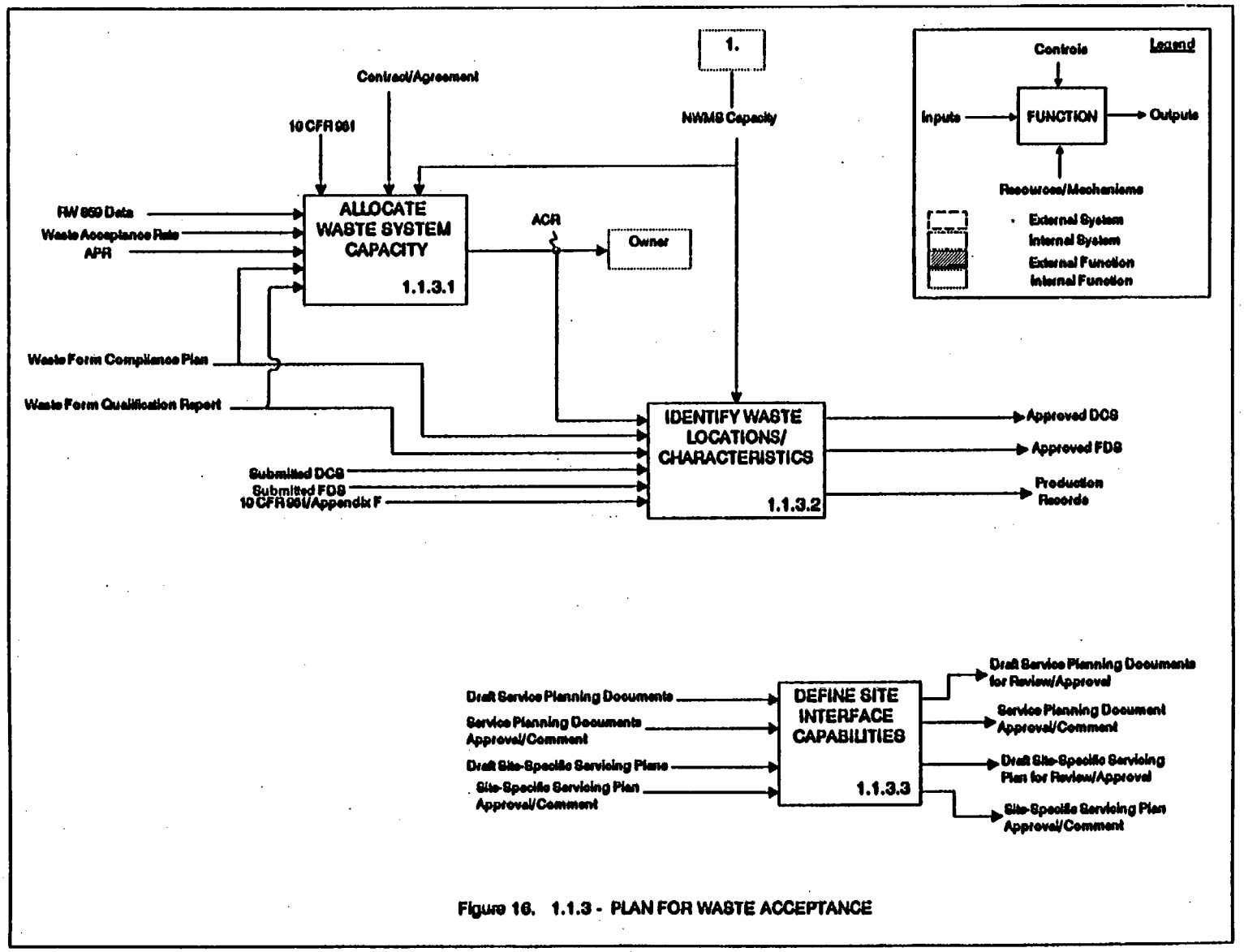

Figure 16. 1.1.3 - PLAN FOR WASTE ACCEPTANCE

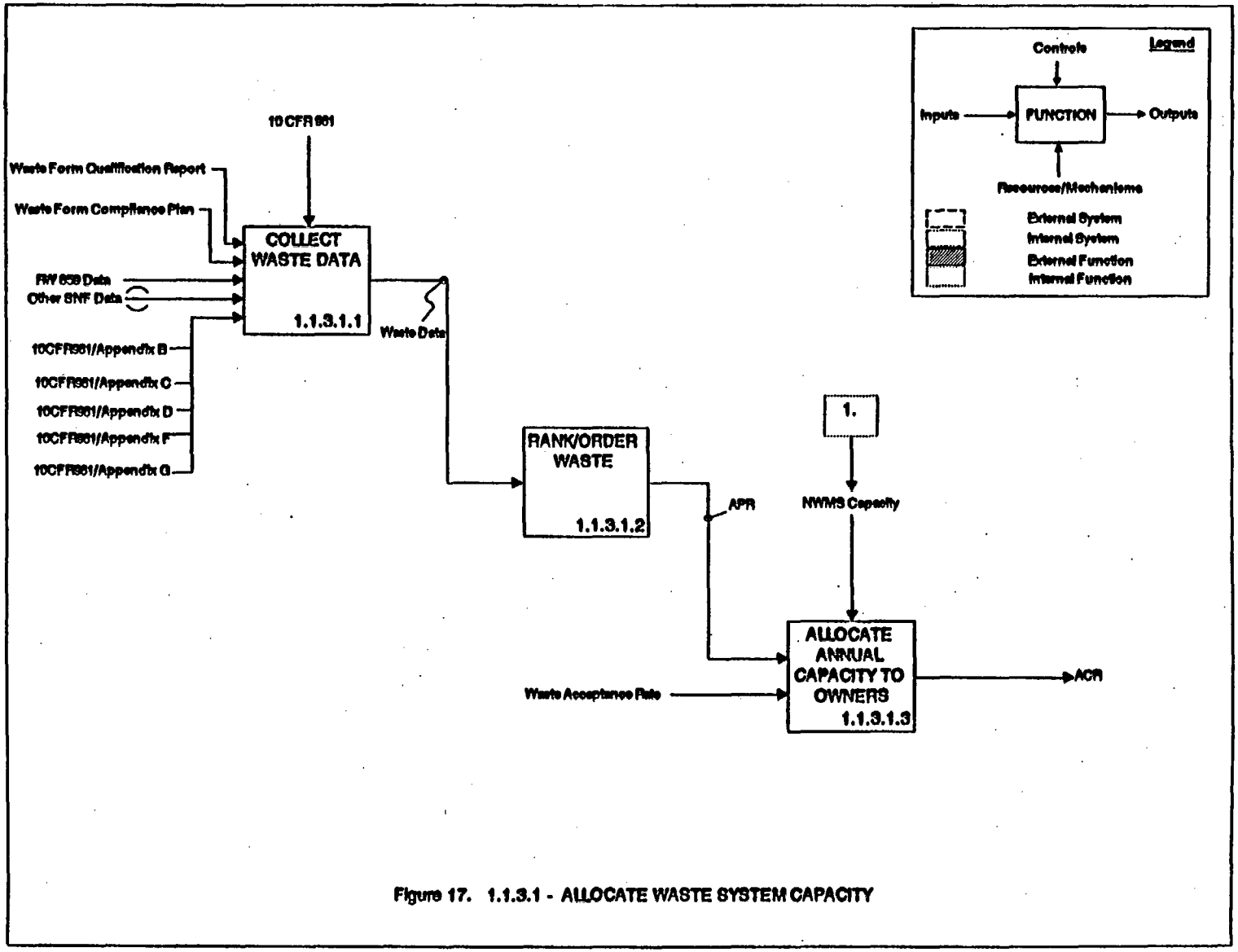

Figure 17. 1.1.3.1 - ALLOCATE WASTE SYSTEM CAPACITY

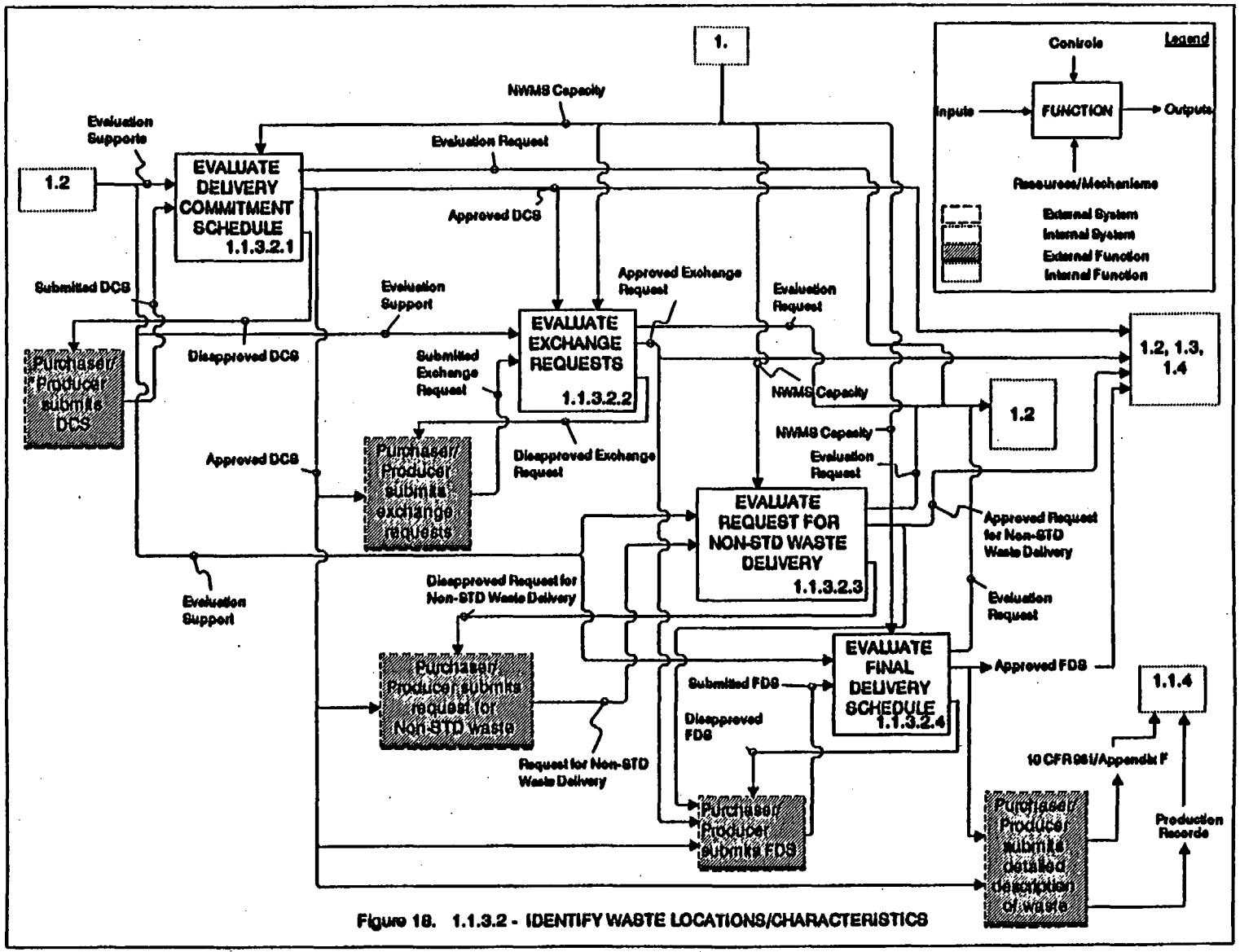

Figure 18. 1.1.3.2 - IDENTIFY WASTE LOCATIONS/CHARACTERISTICS

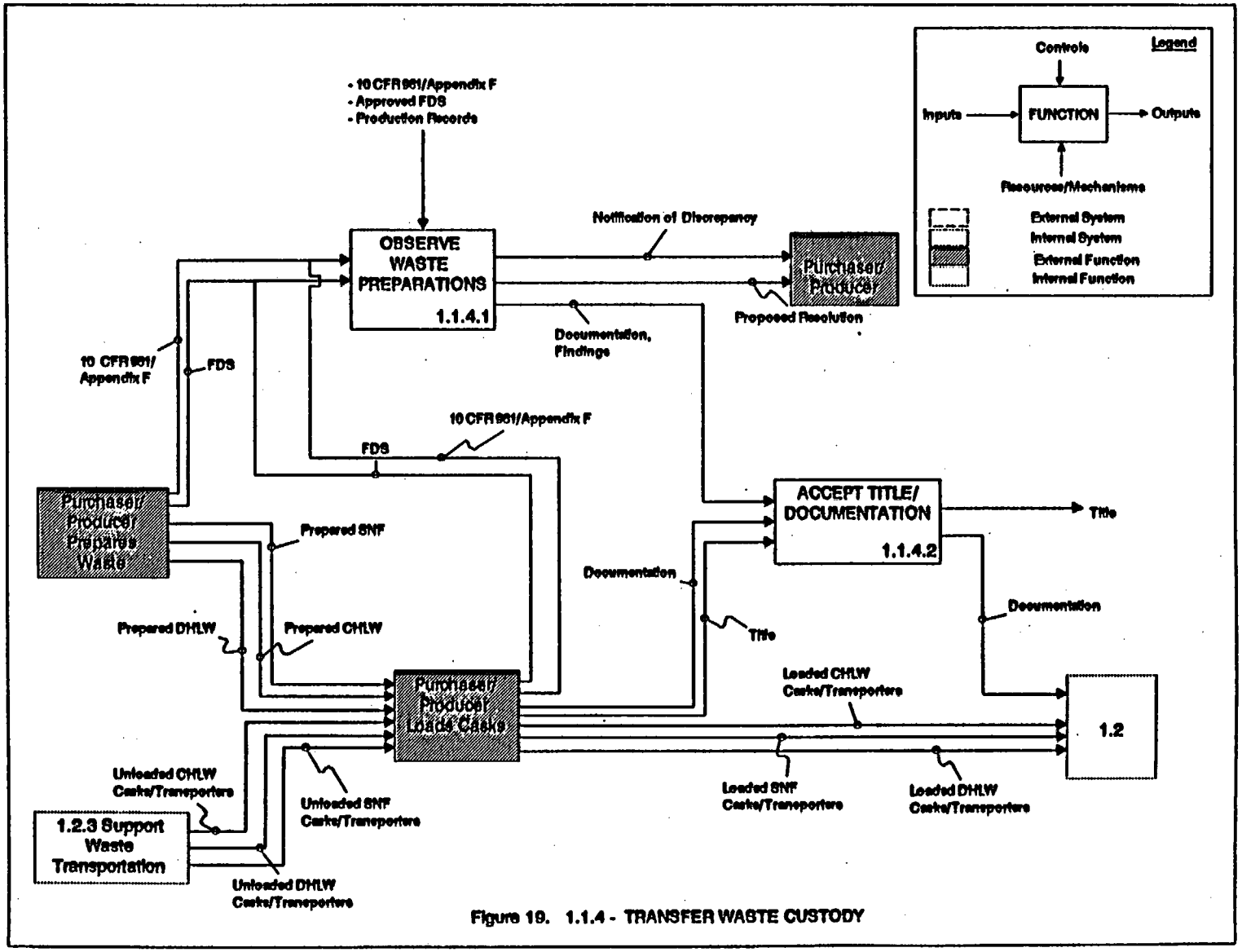

Figure 19. 1.1.4 - TRANSFER WASTE CUSTODY

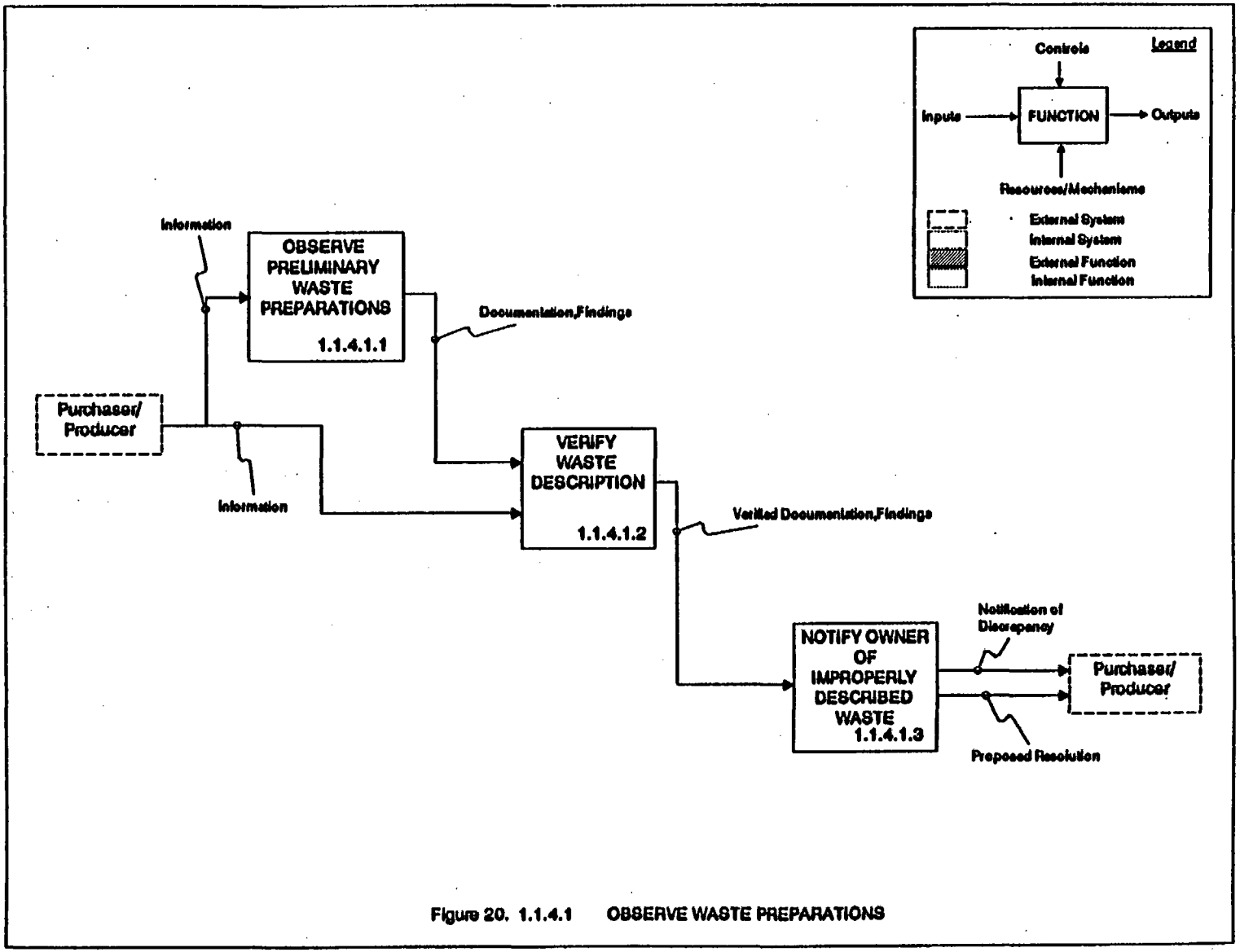

Figure 20. 1.1.4.1 OBSERVE WASTE PREPARATIONS

APPENDICES

APPENDIX A

GLOSSARY

This glossary contains definitions for the various terms used throughout this report and references for those terms that have been previously defined in one or more source documents.

Accessible Environment - (1) The atmosphere, (2) the land surface, (3) surface water, (4) oceans, and (5) the portion of the lithosphere that is outside the controlled area. [10 CFR 60.2]

Act - The Nuclear Waste Policy Act of 1982, Public Law 97-425, 96 Stat. 2201 et seq., 42 USC 10101 et seq. [10 CFR 961.3]

As Low As Reasonably Achievable (ALARA) - As low as is reasonably achievable taking into account the state of technology, and the economics of improvement in relation to-

(1) Benefits to the public health and safety,
(2) Other societal and socioeconomic considerations, and
(3) The utilization of atomic energy in the public interest. [10 CFR 72.3]

Architecture - That part of the physical system actually built, found, or selected to perform a function subject to its stated requirements.

Atomic energy defense activity - 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.

Cask - See package.

Carrier - A person engaged in the transportation of passengers or property by land or water as a common, contract, or private carrier, or by civil aircraft. [10 CFR 71.4]

Certificate of Compliance (CoC) - A certificate issued by DOE or the Nuclear Regulatory Commission, as appropriate, approving for use, with identified limitations, a specific packaging for quantities of radioactive materials exceeding A1/A2 quantities as defined in 49 CFR 173 and 10 CFR 71. [DOE Order 1540.3, Section 4.a]

Commercial High-Level Radioactive Waste (CHLW) - The high-level radioactive waste, as defined by NWPA Sec. 2(12), resulting from atomic energy civilian activities.

Commission - The Nuclear Regulatory Commission or its duly authorized representatives. [10 CFR 60.2]

Consolidation - 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 tubes are collected and formed into a closely packed bundle 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]

Constraint - A requirement imposed by the external environment (e.g., NRC).

Container - The component of the waste package that is placed around the waste form or the canistered waste form.

Contract - The agreement set forth in 10 CFR 961.11 and any duly executed amendment or modification thereto.

Control - Rules, regulations, laws, facts, etc., that constrain the performance of a function.

Defense High-Level Radioactive Waste (DHLW) - The high-level radioactive waste, as defined by NWPA Sec. 2(12), resulting from atomic energy defense activities.

Department - The Department of Energy.

Disposal Package or Waste Package - The primary container that holds, and is in contact with, solidified high-level radioactive waste, spent nuclear fuel, or other radioactive materials, and any overpacks that are emplaced at a repository. [NWPA Sect. 2(10)]

Function - A primary statement of purpose; definition of what a system or subsystem must accomplish to meet the system mission.

Functional Analysis - The first step in the Systems Engineering process that defines a baseline of functions and function performance requirements which must be met in order to adequately accomplish the operation, support, test, and production requirements of a system. [DSMC 6.1]

Functional Interface - The interaction between functions, as in the flow of material or information between a sequence of activities.

Generator - Any person who is licensed by the Nuclear Regulatory Commission to use a utilization or production facility under the authority of section 103 or 104 of the Atomic Energy Act of 1954 (42 U.S.C. 2133, 2134). [10 CFR 961.3]

Geologic Repository - A system which is intended to be used for, or may be used for, the disposal of radioactive wastes in excavated geologic media. A geologic repository includes: (1) the geologic repository operations area, and (2) the portion of the geologic setting that provides isolation of the radioactive waste. [10 CFR 60.2]

- A system, requiring licensing by the NRC, that is intended to be used, or may be used, for the disposal of radioactive waste in excavated geologic media. A geologic repository includes (1) the geologic repository-operations area and (2) the portion of the geologic setting that provides isolation of the radioactive waste and is located within the controlled area. [10 CFR 960.2]

- The Term "repository" means any system licensed by the Commission that is intended to be used for, or may be used for, the permanent deep geologic disposal of high-level radioactive waste and spent nuclear fuel, whether or not such system is designed to permit the recovery, for a limited period during initial operation, of any materials placed in such system. Such term includes both surface and subsurface areas at which high-level radioactive waste and spent nuclear fuel handling activities are conducted. "Disposal System" means any combination of engineered and natural barriers that isolate spent nuclear fuel or radioactive waste after disposal.

High-level Radioactive Waste - (A) 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 (B) other highly radioactive material that the Commission, consistent with existing law, determines by rule requires permanent isolation. [NWPA Sect. 2(12)]

- (1) Irradiated reactor fuel, (2) liquid wastes resulting from the operation of the first cycle solvent extraction system, or equivalent, and the concentrated wastes from subsequent extraction cycles, or equivalent, in a facility for reprocessing irradiated reactor fuel, and (3) solids into which such liquid wastes have been converted. [10 CFR 60.2]

HLW Facility - A facility subject to the licensing and related regulatory authority of the Commission pursuant to Section 202(3) and 202(4) of the Energy Reorganization Act of 1974 (88 Stat. 1244). [10 CFR 60.2]

Important to Safety - With reference to structures, systems, and components means 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 at any time until the completion of permanent closure. [10 CFR 60.2]

- Those features of the ISFSI or MRS whose function is:

(1) To maintain the conditions required to store spent fuel or high-level radioactive waste safely,

(2) To prevent damage to the spent fuel or the high-level radioactive waste container during handling and storage, or
(3) To provide reasonable assurance that spent fuel or high-level radioactive waste can be received, handled, packaged, stored, and retrieved without undue risk to the health and safety of the public. [10 CFR 72.3]

Input - Anything that is acted upon by a function to produce desired outputs. Inputs can be classified as either internal or external. Inputs that originate from outside a particular system are considered to be external. Inputs that are outputs from functions within a particular system are considered to be internal.

Interface Requirements - A requirement which applies to the inputs to, or outputs from, the function and may be imposed either by external sources or by OCRWM.

Licensee - A person who is authorized to conduct activities under a license or construction permit issued by the Commission. [10 CFR 2.4]
NOTE: In 10 CFR 71 two separate activities are addressed. The first activity is the delivery to a carrier for transport or the transport of radioactive material. 10 CFR 71.3 specifically requires these activities to be covered either by a specific or general license issued by the commission. The second activity is the NRC certification of a package design for use. These activities are covered by a Certificate of Compliance (license) which is issued to a specific person who is identified in section 3 of the C of C. In some instances these two activities are conducted by the same person (licensee). In other instances a licensee (licensee-user) will deliver to a carrier for transport in a package which is owned by another licensee. In this instance the NRC holds the licensee-user responsible to insure that all of its transportation activities meet the requirements of 10 CFR 71, even those normally associated with cask ownership. See IE Information Notice No. 83-10: "Clarification of Several Aspects Relating to Use of NRC-Certified Transport Packages" for additional information.

Management - Any activity, operation, or process (except for transportation) conducted to prepare spent nuclear fuel or radioactive waste for storage or disposal, or the activities associated with placing such fuel or waste in a disposal system. [40 CFR 191.01(m)]

Monitored Retrievable Storage facility (MRS) - The storage facility described in section 141(b)(1). [NWPA Section 2(34)]

Nuclear Waste Management System - (NWMS) - Consists of the composite of the sites, and all facilities, systems, equipment, materials, information, activities, and the personnel required to perform those activities necessary to manage waste disposal.

Output - Anything that leaves the system or function after it has been acted upon by that function.

Owner - Any person who has title to spent nuclear fuel or high-level radioactive waste. [10 CFR 961.3]

Package - The packaging together with its radioactive contents as presented for transport. [10 CFR 71.4]

Packaging - The assembly of components necessary to ensure compliance with the packaging requirements of this part. It may consist of one or more receptacles, absorbent materials, spacing structures, thermal insulation, radiation shielding, and devices for cooling or absorbing mechanical shocks. The vehicle, tie-down system, and auxiliary equipment may be designated as part of the packaging. [10 CFR 71.4]

Physical Interface - The boundary at which physical systems interact, as in a necessary fit between architectures.

Physical System - The Nuclear Waste Management System (NWMS) consisting of the composite of the sites, and all facilities, systems, equipment, materials, information, activities, and the personnel required to perform those activities necessary to manage waste disposal.

Producer - Any generator of high-level radioactive waste resulting from atomic energy activities.

Production Records - Waste producer documents which contain information specified in Waste Compliance Plans to demonstrate compliance with Waste Acceptance Specifications, including identification of any nonconformances and documentation of accomplishment of any approved resolutions.

Purchaser - 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 (42 USC 2133, 2134) or who has title to spent nuclear fuel or high level radioactive waste and who has executed a contract with DOE. [10 CFR 961.3]

Repository - See Geologic Repository.

Requirement - A qualitative or quantitative statement of how well a function must be performed. Requirements may be of three types: Performance Requirements, Constraints, and Interface Requirements.

Requirements Allocation - The further decomposition of system level requirements until a level is reached at which a specific hardware item or software routine can fulfill the needed functional/performance requirements. [DSMC 6.4]

Resource - The people, material, or funds available to support the satisfaction of a function.

RW-859 Data - Data from Nuclear Fuel Data Form RW-859, submitted annually by Purchaser which lists the site-specific total SNF inventory to include actual projected discharge.

Secretary - The Secretary of Energy. [10 CFR 961.3]

Shipment - The movement of the properly packaged cask from the generating facility to the receiving site and all associated regulatory activities.

Shipper - The person (or his or her agent) who tenders a shipment for transportation. The term includes persons who prepare packages for shipment, and offer packages to a carrier for transportation by signature on the shipping papers. [DOE Order 1540.1, Section 5.q]

Shipping Cask - A container for shipping spent nuclear fuel and/or high-level radioactive waste which meets all applicable regulatory requirements.

Spent Nuclear Fuel - (SNF) - Fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing. [NWPA Sect. 2(23); 10 CFR 961.11, I.18]

System - The geologic setting at the site, the waste package, and the repository, all acting together to contain and isolate the waste. [10 CFR 960.2]

System Performance - The complete behavior of a repository system in response to the conditions, processes, and events that may affect it. [10 CFR 960.2]

Systems Engineering - The management function which controls the total system development effort for the purpose of achieving an optimum balance of all system elements. It is a process which transforms an operational need into a description of system parameters and integrates those parameters to optimize the overall system effectiveness. [DSMC 1.3]. Systems engineering is a sequence of activities and decisions that transforms an identified mission need into a description of system performance parameters and a preferred system configuration [DOE Order 4700.1]

Systems Engineering Process - An iterative process applied throughout the acquisition life cycle. The process itself leads to a well defined, completely documented, and optimally balanced system. It does not produce the actual system itself, but rather, it produces the complete set of documentation, tailored to the needs of a specific program, which fully describes the system to be developed and produced. [DSMC 5.1]

Transporter or Transport Vehicle - A cargo-carrying vehicle such as ... semitrailer, ... or rail car used for the transportation of cargo by any mode. Each cargo-carrying body (trailer, rail car, barge) is a separate transport vehicle. [49 CFR 171.8]

Waste Acceptance Specifications - A compilation of quantitative detailed standards which ensure that each conforming waste form produced will be acceptable for the waste management system.

Waste Form - The radioactive waste materials and any encapsulating or stabilizing matrix. [10 CFR 60.2, 10 CFR 960.2]

- The materials comprising the radioactive components of waste and any encapsulating or stabilizing matrix. [40 CFR 191.12(c)]

Waste Form Compliance Plan - Document prepared by a waste producer for RW approval 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 - Documentation prepared by waste producer for RW approval which describes results of analyses, tests and engineering development work actually performed to demonstrate waste form compliance with waste acceptance specifications.

Waste Owner - Same as Owner.

Waste Package - The waste form and any containers, shielding, packing and other absorbent materials immediately surrounding an individual waste container. [10 CFR 60.2]

APPENDIX B

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APPENDIX C

DECISION DOCUMENTATION

Specifications of many performance and interface requirements and the selection of particular architectural concepts are the results of DOE decisions. As additional decisions are made and documented, they will be included in the technical baseline and documented in this section.

1. ... the Secretary is announcing ... an initiative for establishing integrated monitored retrievable storage (MRS) with a target for spent-fuel acceptance in 1998.

   [DOE/RW-0247, page vii]

2. Neither the NWPA nor the Standard Contract imposes an unconditional obligation on the Department to accept SNF by January 31, 1998. The NWPA and the Standard Contract condition waste acceptance by the Department upon the commencement of operation of a repository or an MRS facility. In this connection, Section 302(a)(5)B) of the NWPA directs that contracts entered into in accordance with Section 302(a) of the NWPA are to provide that the Department will take title to SNF following commencement of operation of a repository.

   In response to this statutory requirement, the Standard Contract provides in Article II that "[t]he services to be provided by DOE under this contract shall begin, after commencement of facility operations, not later than January 31, 1998." Of further importance is Section 142 of the NWPA that authorizes the Department to accept SNF for temporary storage at an MRS facility prior to disposal in a repository. By these provisions, the triggering event for the Department's waste acceptance obligation is the commence of either repository or MRS operation on or after January 31, 1998.

   The Department intends to initiate the waste acceptance process, consistent with its obligation under both the NWPA and the Standard Contract, as soon as a facility commences operation. The Department fully expects this process to begin at an MRS by January 31, 1998. Until the SNF is accepted by the Department, Section 111(a)(5) of the NWPA assigns the waste owners the primary responsibility to provide for, and pay the costs of, interim storage.

   [Bartlett Letter to Sanda, dated 2/14/92]

APPENDIX D

ACRONYMS

ACR	Annual Capacity Report
AE	Accessible Environment
ALARA	As Low as Reasonably Achievable
APR	Acceptance Priority Ranking
CFR	Code of Federal Regulations
CHLW	Commercial High-Level Radioactive Waste
CRWM	Civilian Radioactive Waste Management
CMF	Cask Maintenance Facility
CoC	Certificate of Compliance
DCS	Delivery Commitment Schedule
DHLW	Defense High-Level Radioactive Waste
DOE	Department of Energy
DP	Office of Defense Programs, Department of Energy
DSMC	Defense Systems Management College
DWPF	Defense Waste Processing Facility
EM	Office of Environmental Restoration and Waste Management
EPA	Environmental Protection Agency
FDS	Final Delivery Schedule
FEMA	Federal Emergency Management Agency
f.o.b.	Freight on Board
F-R-A	Functions-Requirements-Architecture
HLW	High-Level Radioactive Waste
IAEA	International Atomic Energy Agency
kWh	Kilowatt-hour
MOA	Memorandum of Agreement
MRS	Monitored Retrievable Storage
MSIS	Management System Improvement Strategy
MTHM	Metric Tons of Heavy Metal
MTU	Metric Tons of Uranium
MWd	Megawatt Days
NEPA	National Environmental Policy Act
NRC	Nuclear Regulatory Commission
NWMS	Nuclear Waste Management System
NWPA	Nuclear Waste Policy Act
OCC	Operations Control Center
OCRWM	Office of Civilian Radioactive Waste Management
PP	Purchaser and/or Producer
QA	Quality Assurance
RW	Office of Civilian Radioactive Waste Management
SNF	Spent Nuclear Fuel
TBD	To Be Determined
TRU	Transuranic
USC	United States Code
WVDP	West Valley Demonstration Project

APPENDIX E

ACCEPT WASTE INTERFACES

INTERFACE CONTROL #	FROM	TO	OUTPUT/INPUT TITLE	OUTPUT/INPUT ID#
PP/1.1	Purchaser/Producer	Accept Waste	SNF CHLW DHLW	1.111 1.112 1.113
1.1/1.2	Accept Waste	Transport Waste	Loaded SNF Casks/Transporters Loaded CHLW Casks/Transporters Loaded DHLW Casks/Transporters	1.101/1.211 1.102/1.212 1.103/1.213
1.2/1.1	Transport Waste	Accept Waste	Unloaded Casks/Transporters	1.204/1.114

APPENDIX F

WASTE ACCEPTANCE SCHEDULE

Year	Annual Waste Acceptance Rate			Annual Waste Transportation Rate				
				Accept-Store		Accept-Dispose		Store-Dispose
	SNF	CHLW	DHLW	SNF	SNF	CHLW	DHLW	SNF
1998								
1999								
2000								
2001								
2002								
2003								
2004								
2005								
2006								
2007								
2008								
2009								
2010								
.								
.								
.								

TBD

APPENDIX G

INDENTURED LIST OF ACCEPT WASTE FUNCTIONS

(1. Manage Waste Disposal)

1.1 Accept Waste

1.1.1 Define Waste Acceptance Criteria

1.1.2 Establish Contracts/Agreements

1.1.3 Plan for Waste Acceptance

1.1.3.1 Allocate Waste System Capacity

1.1.3.1.1 Collect Waste Data

1.1.3.1.2 Rank/Order Waste

1.1.3.1.3 Allocate Annual Capacity to Owners

1.1.3.2 Identify Waste Locations/Characteristics

1.1.3.2.1 Evaluate Delivery Commitment Schedule

1.1.3.2.2 Evaluate Exchange Requests

1.1.3.2.3 Evaluate Request for Non-Standard Waste Delivery

1.1.3.2.4 Evaluate Final Delivery Schedule

1.1.3.3 Define Site Interface Capabilities

1.1.4 Accept Waste Custody

1.1.4.1 Observe Waste Preparations

1.1.4.1.1 Observe Preliminary Waste Preparations

1.1.4.1.2 Verify Waste Description

1.1.4.1.3 Notify Owner of Improperly Described Waste

1.1.4.2 Accept Title/Documentation

1.1.5 Resolve Improperly Described Waste

1.1.6 Support Fee Collection

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RW-30