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Office of Civilian Radioactive Waste Management



Physical System Requirements – Store Waste

January 1992

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

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Office of Civilian Radioactive Waste Management



Physical System Requirements – Store Waste

January 1992

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

100.2
ENCLOSURE #4

**PROGRAM CHANGE CONTROL BOARD
DIRECTIVE**

(1) DCP NUMBER: 44 (2) DCP TITLE: Initial Issuance of Physical System Requirements - Overall System

(3) DOCUMENT NUMBER: N/A (4) COGNIZANT ORGANIZATION:
REVISION: 0
DOCUMENT TITLE: Physical System Requirements - Overall System

(5) DCP DISPOSITION:

<input checked="" type="checkbox"/> APPROVE	<input type="checkbox"/> DISAPPROVE
<input type="checkbox"/> APPROVE WITH CONDITIONS	<input type="checkbox"/> ACTION DEFERRED
	<input type="checkbox"/> CANCELLED/WITHDRAWN

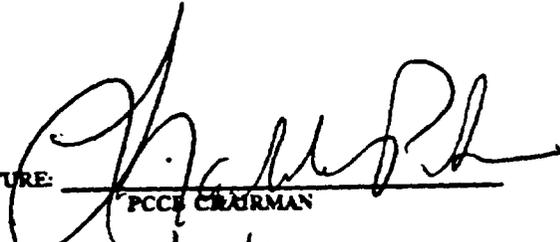
(6) CONDITIONS/RATIONALE:
None

(7) IMPLEMENTATION DIRECTION:

The Physical System Requirements - Overall System document, in accordance with Document Change Proposal 56 - Interim Approach for the Technical Document Hierarchy, replaces DOE/RW-0264, Waste Management System Requirements (WMSR) document, Vol. I, Revision 1, and DOE/RW-0270P, Waste Management System Description (WMSD), Revision 0, as the highest level technical baseline document for the Waste Acceptance, Store Waste and Transport Waste functions only. Those sections of the Overall System document that apply to MGDS and ESF are nonbinding requirements. WMSR, Volume IV, and applicable portions of the WMSR, Volume I and the WMSD are retained for MGDS and ESF requirements. The Physical System Requirements-Store Waste (DOE/RW-0319) will be effective upon approval of the Physical System Requirements - Overall System", and will replace the Waste Management System Requirements (WMSR), Volume III (DOE/RW-0272P).

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

DATE: _____

(9) SIGNATURE: 
PCCB CHAIRMAN
DATE: 1/17/92

(10) IMPLEMENTATION COMPLETE:

VERIFICATION: _____
(IF REQUIRED) DIRECTOR, OQA

DATE: _____

SIGNATURE: _____
PCCB EXECUTIVE SECRETARY

DATE: _____

**OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
PROGRAM CHANGE CONTROL BOARD
DIRECTIVE**

(1) DCP NUMBER: 46 (2) DCP TITLE: Initial Issuance of "Physical System Requirements - Store Waste"

(3) DOCUMENT NUMBER: **** (4) COGNIZANT ORGANIZATION: RW-30
REVISION: 0
DOCUMENT TITLE: Physical System Requirements - Store Waste

(5) DCP DISPOSITION:

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(6) CONDITIONS/RATIONALE:

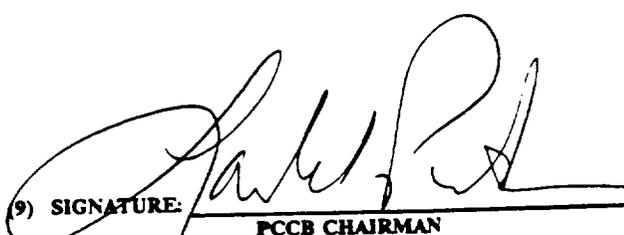
None

(7) IMPLEMENTATION DIRECTION:

This document is hereby approved and shall be effective upon replacement of the WMSR III and related documents.

(8) CONCURRENCE: N/A
(IF REQUIRED) DIRECTOR, OQA

DATE: _____

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DATE: 11/1/91

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VERIFICATION: _____
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1.0 INTRODUCTION

1.1 Background

The Nuclear Waste Policy Act (NWPA) of 1982 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 three new initiatives for 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 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, two separate but coordinated systems engineering efforts have been undertaken: (1) a functional analysis of the operating phase of the waste management system and; (2) a functional analysis of the program. The physical system functional analysis is intended to:

- Identify the functions that must be performed by the physical system and each of its elements to fulfill the waste disposal mission; and
- Identify the corresponding requirements leading to the updating of the technical requirements baseline.
- 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 physical system functional analysis effort for the Store Waste mission. The starting point for this functional analysis was the further decomposition of the Store 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 Store Waste mission by performing a functional analysis of the operating phase, including decommissioning, of a MRS Installation. This document will be baselined and the technical requirements contained herein will be the basis for all stages of design (i.e. conceptual, Title I, Title II, etc.) of a Monitored Retrievable Storage (MRS) Installation.

1.3 Approach

A comprehensive functional analysis of the physical system 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 physical 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 physical system 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

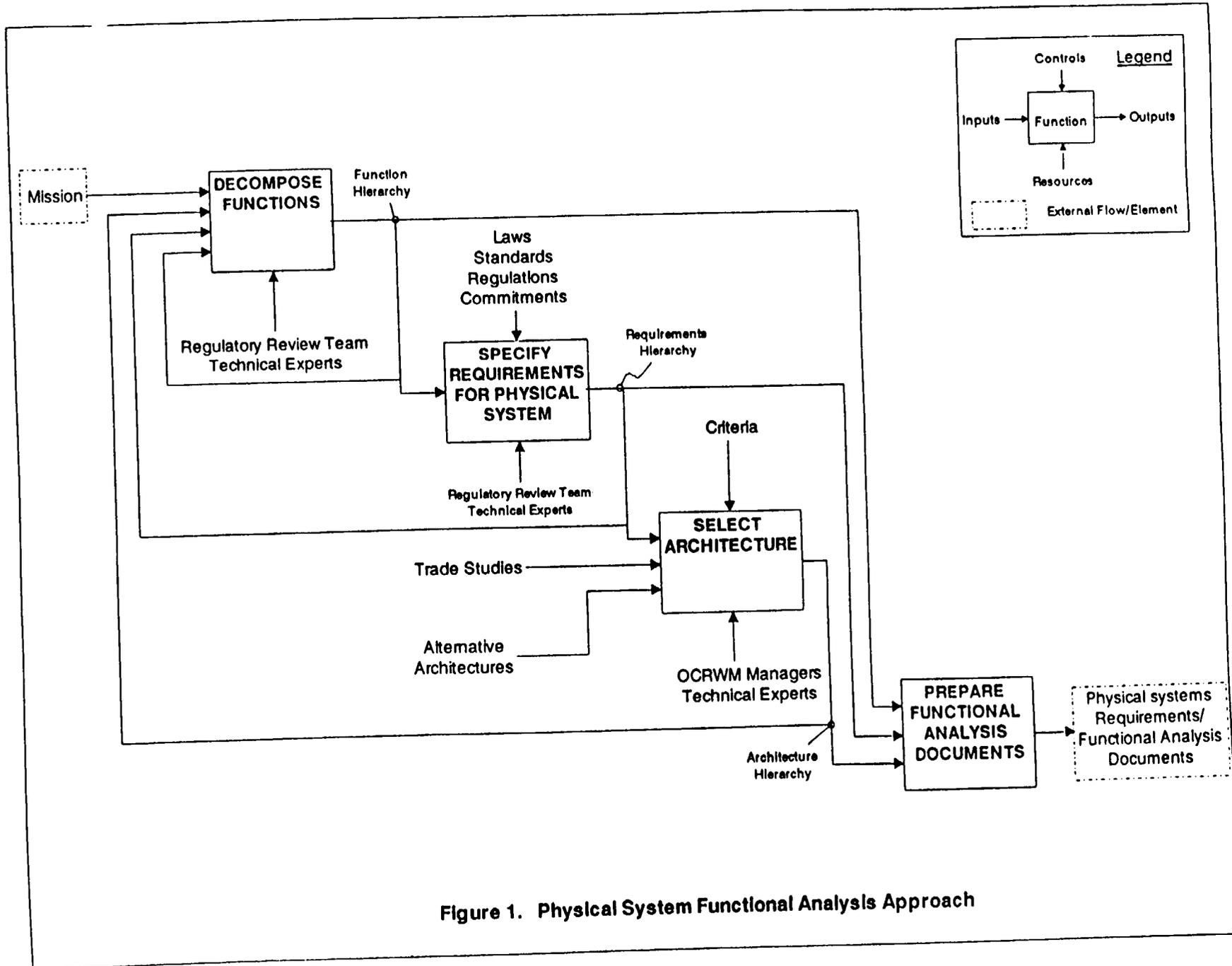


Figure 1. Physical System Functional Analysis Approach

parent function which the technical experts decomposed into a set of functions that are both necessary and sufficient to satisfy the parent. Physical system 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, until a MRS design is prepared. This can lead to some differences in the level of detail for functions, requirements, and architecture contained within this document.

Table 1. Source Documents Containing Requirements in this Store Waste document

<u>Document Identifier</u>	<u>Document Description</u>
29 USC 651 et.seq.	Occupational Safety and Health Act
42 USC 300f et.seq.	Safe Drinking Water Act ¹
NWPA-42 USC 10101 et.seq.	Nuclear Waste Policy Act of 1982
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 73	Physical Protection of Plants and Materials ¹
10 CFR 961	Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste
40 CFR 191	Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes
DOE/RW-0239	The DOE Position on the MRS Facility
DOE/RW-0247	Report to Congress on Reassessment of the CRWM Program
DOE ORDER 3790.1A	Federal Employee Occupational Safety and Health Program
DOE ORDER 5480.11	Radiation Protection for Occupational Workers ¹
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

¹. Document review for requirements not complete.

1.4 Mission

Based upon the Nuclear Waste Policy Act, the mission of the operating waste management system is to manage and dispose of the nation's spent fuel and high-level radioactive waste in a geologic repository in a manner that protects the health and safety of the public and of workers and the quality of the environment. Based

upon the overall program mission, the Store Waste function is to **store spent nuclear fuel resulting from civilian nuclear activities, in a timely manner that protects the health and safety of the public and maintains the quality of the environment, with the intent to recover such fuel for subsequent disposal.**

1.5 Scope

1.5.1 Scope of Functional Analysis

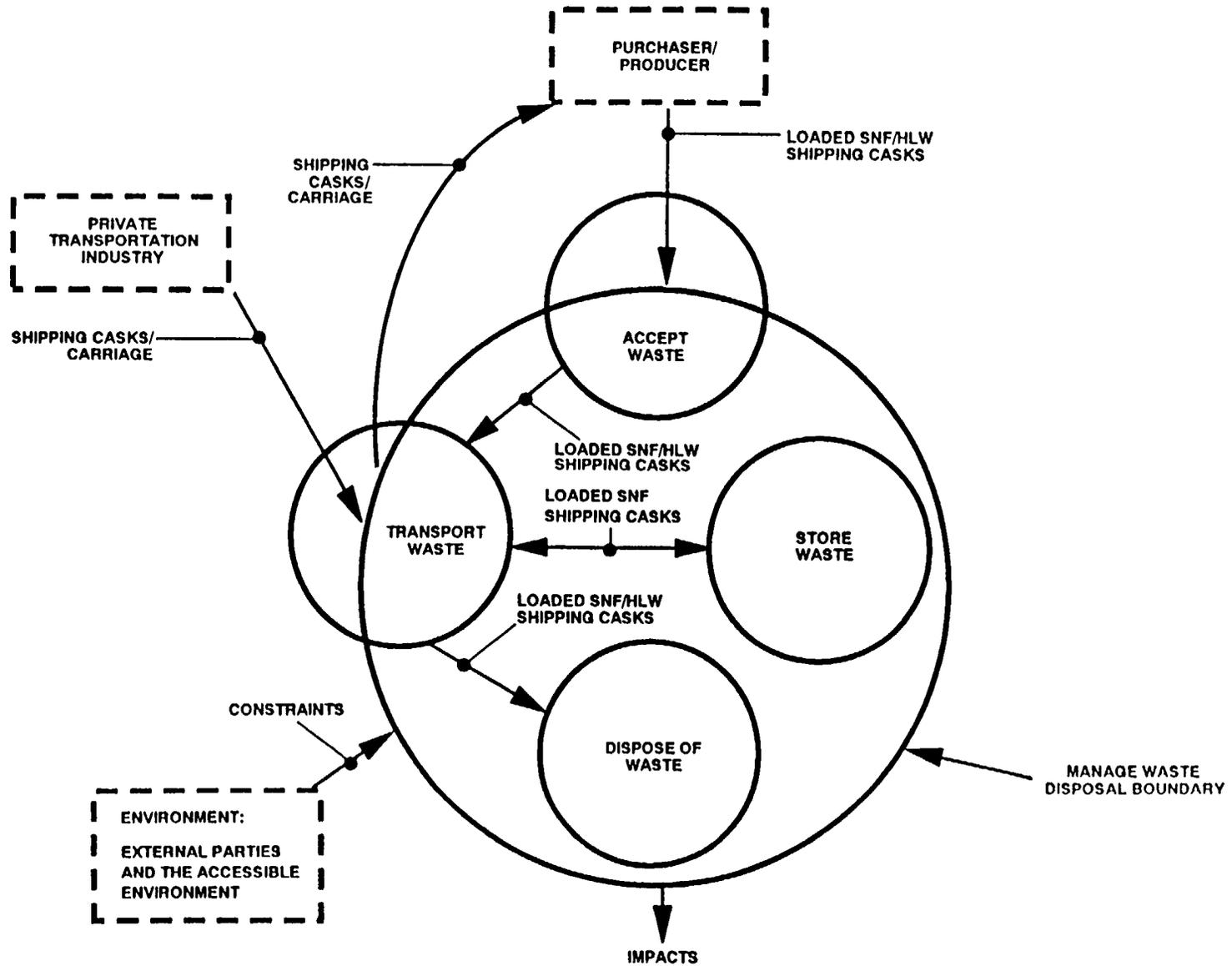
The functional analysis process must eventually consider all phases of a system's life cycle. However, it should begin with an analysis of that phase having the greatest impact on satisfaction of the mission. For the Store Waste mission, that phase was determined to be the operating phase, including decommissioning of a MRS Installation. Thus, the time period covered by this functional analysis is from the initial acceptance of spent fuel at an MRS through its permanent decommissioning.

Figure 2 illustrates the boundaries between the Manage Waste Disposal function and its environment. The Store Waste function is contained entirely within the overall system boundary. There are potential impacts across the boundary from each of the four functions. The environment identified on Figure 2 is intended to mean anything and everything outside the direct control of the DOE/OCRWM program. The boundaries for the Store Waste function are shown in Figure 3. The extent of the controlled area as specified by 10 CFR 72.106(b) is "*The minimum distance from the spent fuel ... handling and storage facilities to the nearest boundary of the controlled area shall be at least 100 meters.*" The controlled area boundary demarcates the controlled area from the general environment.

1.5.2 Organization of Document

Section 2.0 of this document contains an explicit description for each of the Store Waste functions plus the higher level Manage Waste Disposal functions; 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 MRS Installation 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.



SNF: Spent Nuclear Fuel
HLW: High Level Waste

FIGURE 2. MANAGE WASTE DISPOSAL BOUNDARIES
[Reference: Physical System Requirements - Overall System]

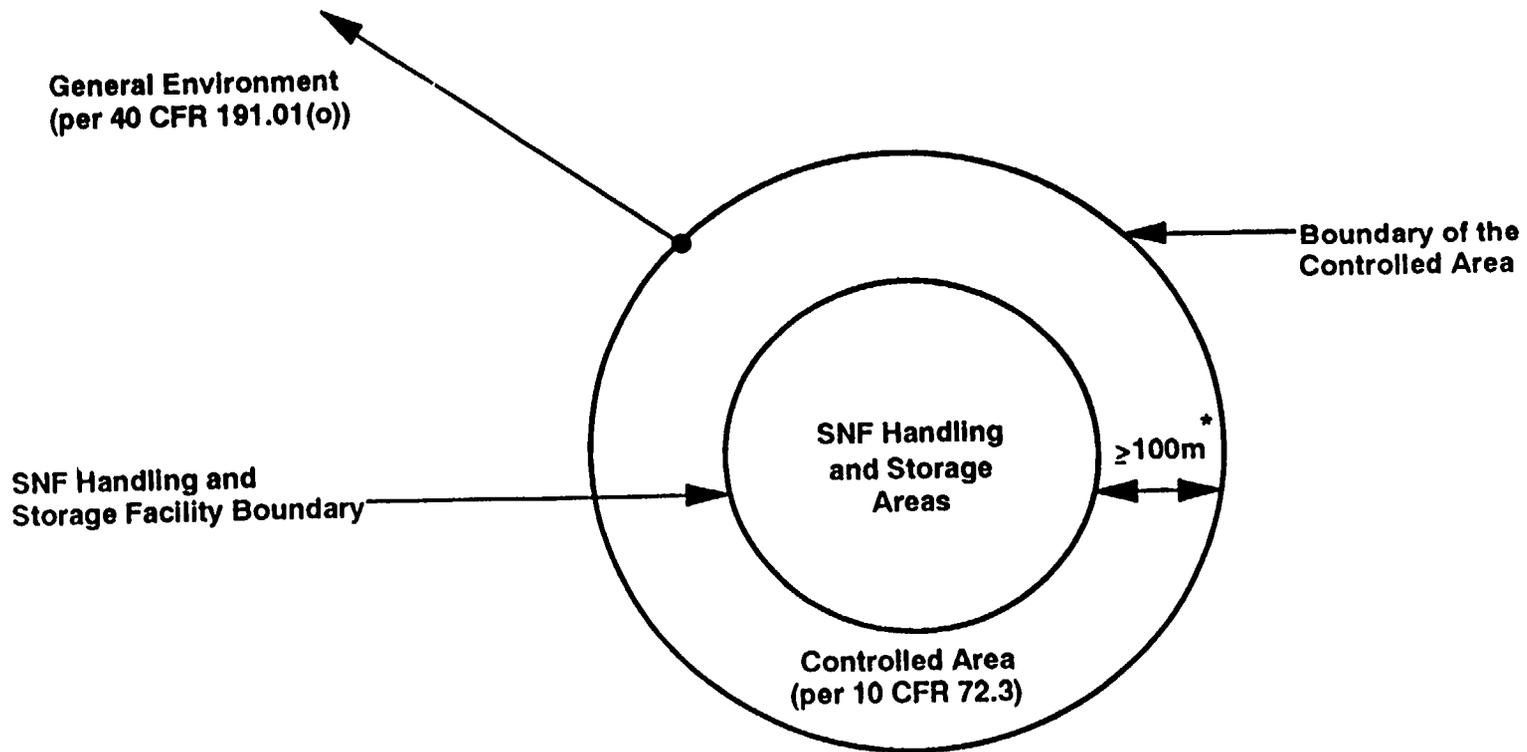


Figure 3. Store Waste Boundaries

* per 10 CFR 72.106(b)

Section 4.0 contains a more illustrative description of the important interfaces that have been identified within the Store 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 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, Store Waste Interfaces, contains a list of the important inputs and outputs from the Store Waste function; Appendix F, a reserved section for the Waste Acceptance Schedule, including the transportation modal split and SNF characteristics; and Appendix G, an indented list of Store Waste functions. In addition, Supplemental Appendices, which are not intended to be approved and controlled, are included as separate attachments for completeness.

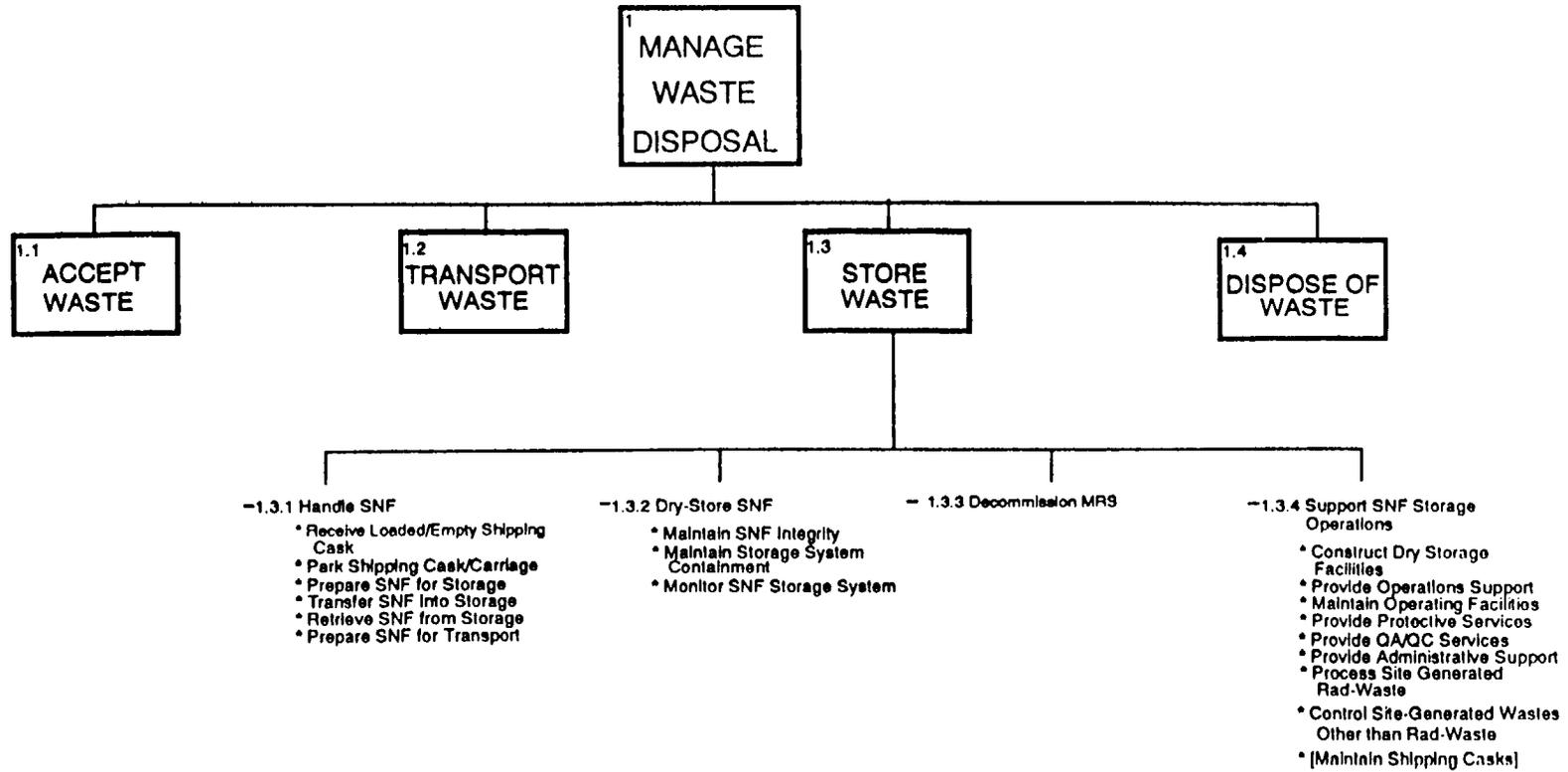
2.0 FUNCTIONS AND REQUIREMENTS

Figures 4, 5, and 6 display the functions, at successively increasing levels of detail, deemed necessary to fulfill the Store Waste mission. As indicated, the numbering scheme which uniquely identifies function titles is based on using a 1. at the first level, a 1.3 at the second level, a 1.3.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 Store 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. This list is not intended to be complete. It will be expanded as more applicable documents are identified.

Tables F1. through F1.3.4.9 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 indented list of all Store Waste functions is provided in Appendix G. Tables F1. through F1.3.4.9 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; 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 numbering convention used for the identification of requirements in these tables is as follows: for example, 1.3C1: the first constraint (C) assigned to Function 1.3; 1.3P1: the first performance requirement (P) assigned to Function 1.3; and 1.3O3a: the first (a) requirement assigned to output (O) 3 from Function 1.3. 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 "TBD" below the requirement or "Requirements at this level to be specified". Some



[] If Required

Figure 4. Store Waste Function Hierarchy (Fourth Level)

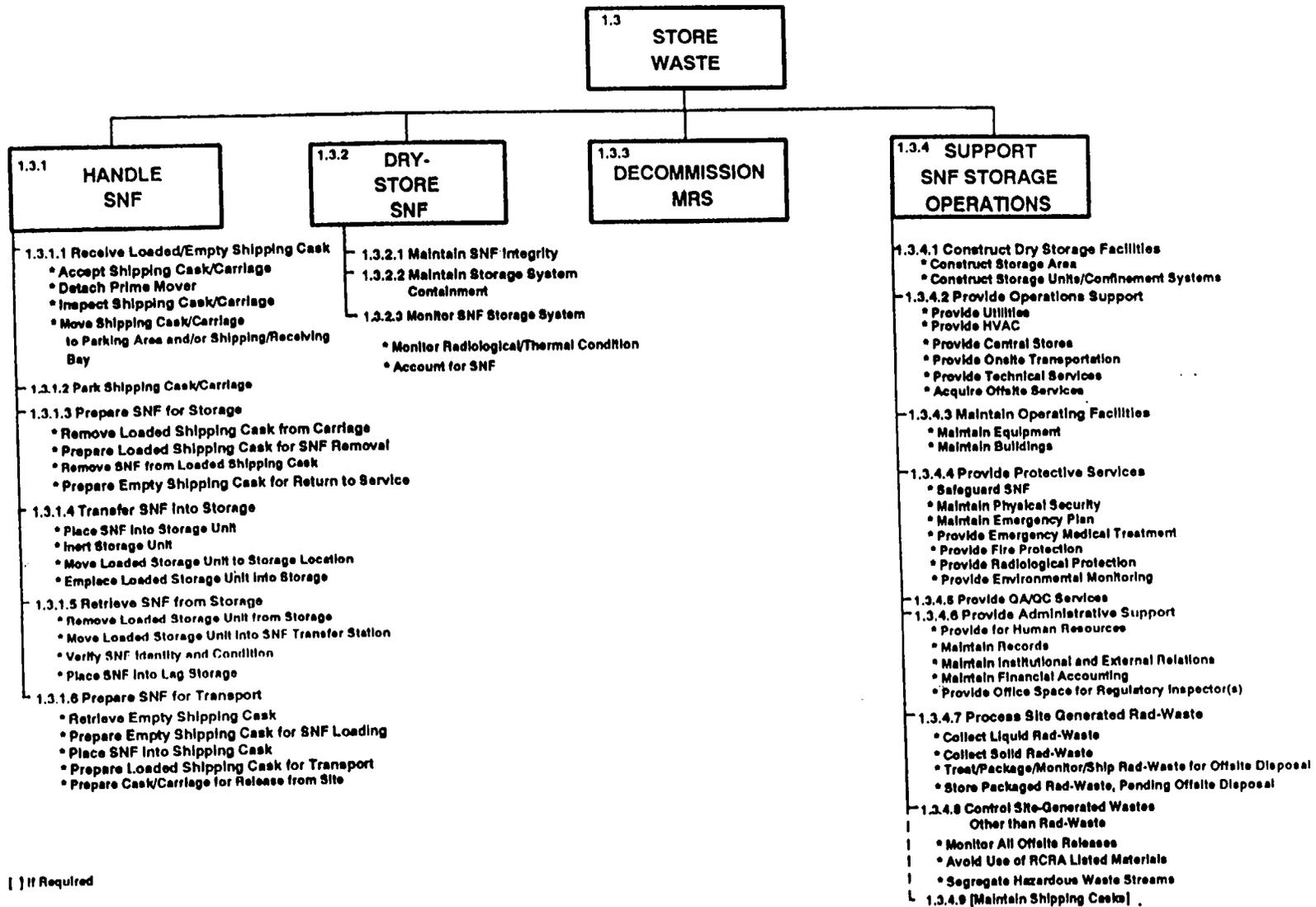


Figure 5. Store Waste Function Hierarchy (Fifth Level)

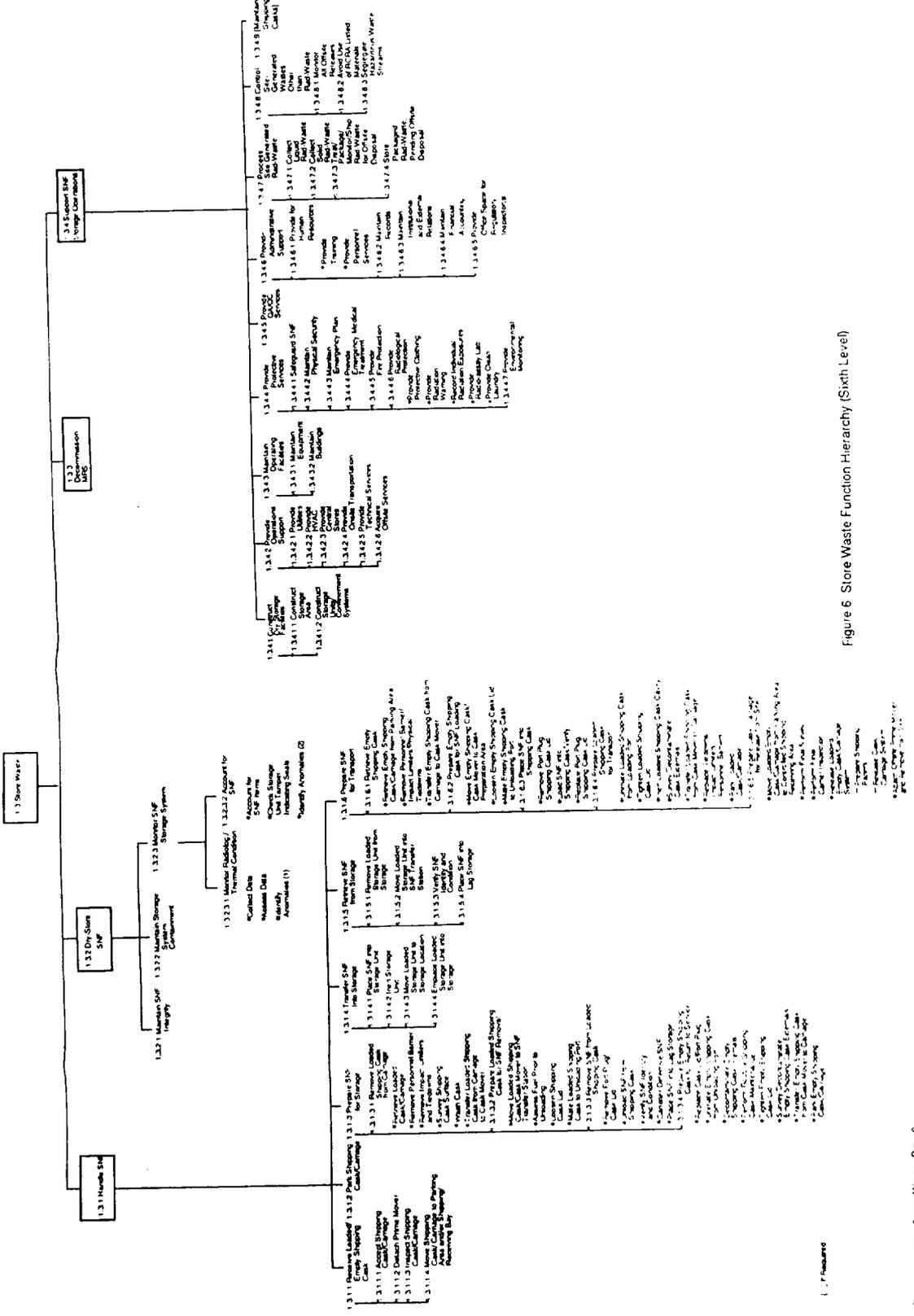


Figure 6 Store Waste Function Hierarchy (Sixth Level)

requirements specified are administrative in nature which support the operating phase. Note that any reference to an appendix, a different section number or paragraph number within a particular requirement refers to the appendix, section or paragraph in the source document itself.

OCRWM recognizes that this initial version of the Store Waste requirements document contains a limited number of performance requirements and no State and local regulatory requirements. Furthermore, many of the interfaces currently have no requirements specified, 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 10 CFR 50 Appendix B and NQA-1 and documented under an acceptable decision record format.

Table F1. Function Description: Manage Waste Disposal¹

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 permanently isolate spent nuclear fuel and high-level radioactive waste in a geologic repository in a timely manner that protects the health and safety of the public and maintains 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:

1.11	SNF	From:	Purchaser
1.12	CHLW	From:	Producer
1.13	DHLW	From:	Producer

B. Outputs:

1.01	Federally-Permitted Radiation Exposure	To:	Accessible Environment
1.02	Federally-Permitted Release of Radionuclides	To:	Accessible Environment

V. Function Requirements:

A. Constraints:

1.C1 This requirement intentionally left blank.

¹ Reference: Physical System Requirements - Overall System.

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

1.C3 This requirement intentionally left blank.

1.C4 The design objectives for personnel exposure from external sources of radiation in continuously occupied controlled areas are ALARA and not exceeding 0.5 mrem (5 microsieverts) per hour on average. The design objectives for exposure rates for potential exposure to a radiation worker where occupancy is generally not continuous are ALARA and not exceeding 20 percent of the applicable standard in paragraphs 9b(1) and (2).
[DOE ORDER 5480.11(9)(j)(1)(b)]

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.,(654 (a)(b))]

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, IV B.1.]

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

1.12 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)]

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

[Presidential Memo, 1985]

1.01 ... 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)]

1.02 ... 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)]

Table F1.3 Function Description: Store Waste²

- I. Function ID Number:** 1.3
- II. Function Title:** Store Waste
- III. Function Definition:**

"To store spent nuclear fuel, in a manner that protects the health and safety of the public and maintains the quality of the environment, with the intent to recover such fuel for subsequent disposal."

² Reference: Physical System Requirements - Overall System.

The term storage means retention of ... spent nuclear fuel ... with the intent to recover such waste or fuel for subsequent use, processing or disposal. [NWPA Sec. 2.(25)]

... including meeting needs for packaging and handling of spent nuclear fuel, improving the flexibility of the repository development schedule, and providing temporary storage of spent nuclear fuel accepted for disposal. [NWPA Sec. 143(a)(1)(C)(iv)]

IV. Interfaces:

A. Inputs:

1.311 Loaded SNF Cask/Carriage From: Function 1.2
1.312 Empty Cask/Carriage From: Function 1.2

B. Outputs:

1.301 Loaded SNF Cask/Carriage To: Function 1.2
1.302 Empty Cask/Carriage To: Function 1.2
1.303 Federally-Permitted Radiation Exposure To: Accessible Environment
1.304 Federally-Permitted Release of Radionuclides To: Accessible Environment

V. Function Requirements:

A. Constraints:

1.3C1 ... the construction of one or more monitored retrievable storage facilities for ... spent nuclear fuel ...

(A) to accommodate spent nuclear fuel ... resulting from civilian nuclear activities;

(B) to permit continuous monitoring, management, and maintenance of such spent fuel ... for the foreseeable future;

(C) to provide for the ready retrieval of such spent fuel ... for further processing or disposal; and

(D) to safely store such spent fuel and waste as long as may be necessary by maintaining such facility through appropriate means, including any required replacement of such facility. [NWPA Sec. 141(b)(1)]

1.3C2 The Secretary is authorized to site, construct, and operate one monitored retrievable storage facility subject to the conditions described in sections 143 through 149. [NWPA Sec. 142(b)]

1.3C3 the quantity of spent nuclear fuel ... at the site of such facility at any one time may not exceed 10,000 metric tons of heavy metal until a repository under this Act first accepts spent nuclear fuel or solidified high-level radioactive waste; ...

[NWPA Sec. 148(d)(3)]

1.3C4 the quantity of spent nuclear fuel ... at the site of such facility at any one time may not exceed 15,000 metric tons of heavy metal.

[NWPA Sec. 148(d)(4)]

1.3C5 ... The license term for an MRS must not exceed 40 years from the date of issuance ...

[10 CFR 72.42(a)]

1.3C6 The quantity of spent nuclear fuel ... at the site of the MRS at any one time may not exceed 10,000 metric tons of heavy metal until a repository authorized under NWPA and Part 60 of this chapter first accepts spent nuclear fuel or solidified high-level radioactive waste; ...

[10 CFR 72.44(g)(3)]

1.3C7 The quantity of spent nuclear fuel ... at the site of the MRS at any one time may not exceed 15,000 metric tons of heavy metal.

[10 CFR 72.44(g)(4)]

1.3C8 (c) If an MRS is located, or is planned to be located, within 50 miles of the first HLW repository, any Commission decision approving the first HLW repository application must limit the quantity of spent fuel or high-level radioactive waste that may be stored. This limitation shall prohibit the storage of a quantity of spent fuel containing in excess of 70,000 metric tons of heavy metal, or a quantity of solidified high-level radioactive waste resulting from the reprocessing of such a quantity of spent fuel, in both the repository and the MRS until such time as a second repository is in operation.

(d) An MRS authorized by section 142(b) of NWPA (101 Stat. 1330-232, 42 U.S.C. 10162 (b)) may not be constructed in the State of Nevada. The quantity of spent nuclear fuel or high-level radioactive waste that may be stored at an MRS authorized by section 142(b) of NWPA shall be subject to the limitations in Section 72.44(g) of this part instead of the limitations in paragraph (c) of this section.

[10 CFR 72.96]

1.3C9 (a) For each ... MRS site, a controlled area must be established.

(b) ... The minimum distance from the spent fuel ... handling and storage facilities to the nearest boundary of the controlled area shall be at least 100 meters.

(c) The controlled area may be traversed by a highway, railroad or waterway, so long as appropriate and effective arrangements are made to control traffic and to protect public health and safety.

[10 CFR 72.106]

1.3C10 The MRS must be designed to store ... spent fuel 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(b)]

1.3C11 (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.

(b) Methods of criticality control. When practicable the design of an ... MRS must be based on favorable geometry, permanently fixed neutron absorbing materials (poisons), or both. Where solid neutron absorbing materials are used, the design shall provide for positive means to verify their continued efficacy.

[10 CFR 72.124]

1.3C12 Each licensee² shall establish, maintain, and execute a quality assurance program satisfying each of the applicable criteria of this subpart, and satisfying any specific provisions which are applicable to the licensee's activities. The licensee shall execute the applicable criteria in a graded approach to an extent that is commensurate with the importance to safety. The quality assurance program must cover the activities identified in Sec. 72.24(n) throughout the life of the licensed activity, from the site selection through decommissioning, prior to termination of the license.

² While the term "licensee" is used in these criteria, the requirements are applicable to whatever design, construction, fabrication, assembly, and testing is accomplished with respect to structures, systems, and components prior to the time a license is issued.

[10 CFR 72.140(b)]

1.3C13 No monitored retrievable storage facility developed pursuant to this section may be constructed in any State in which there is located any site approved for site characterization under section 112 [42 U.S.C. 10132]. The restriction in the preceding sentence shall only apply until such time as the Secretary decides that such candidate site no longer a candidate site under consideration for development as a repository. Such restriction shall continue to apply to any site selected for construction as a repository.

[NWSA Sec. 141 (g)]

1.3C14 construction of such facility may not begin until the Commission has issued a license for the construction of a repository under section 115(d) [42 U.S.C. 10135(d)]; ...
[NWPA Sec. 148 (d)(1)]

1.3C15 construction of such facility or acceptance of spent nuclear fuel ... shall be prohibited during such time as the repository license is revoked by the Commission or construction of the repository ceases; ...
[NWPA Sec. 148 (d)(2)]

1.3C16 Construction of the MRS may not begin until the Commission has authorized the construction of a repository under section 114(d) of NWPA (96 Stat. 2215, as amended by 101 Stat. 1330-230, 42 U.S.C 10134(d)) and Part 60 of this chapter; ...
[10 CFR 72.44 (g)(1)]

1.3C17 Construction of the MRS or acceptance of spent nuclear fuel ... at the MRS is prohibited during such time as the repository license is revoked by the Commission or construction of the repository ceases; ...
[10 CFR 72.44 (g)(2)]

B. Performance:

1.3P1 This requirement intentionally left blank.

1.3P2 ... and an initiative for establishing integrated monitored retrievable storage (MRS) with a target for spent-fuel acceptance in 1998.
[DOE/RW-0247]

1.3P3 Accept only spent-fuel at the MRS facility.
[DOE/RW-0239]

1.3P4 This requirement intentionally left blank.

1.3P5 Use dry storage as the preferred method of storage at an MRS.
[DOE/RW-0035, DOE/RW-0235]

C. Interface:

1.311 The SNF acceptance rate, characteristics and transportation mode to the MRS installation will be in accordance with Appendix F of this document. *[TBD]*

1.312 Requirements at this level to be specified.

1.301 Requirements at this level to be specified.

1.302 Requirements at this level to be specified.

1.303a Management and storage of spent nuclear fuel ... at all facilities regulated by the Commission or by Agreement States shall be conducted in such a manner as to provide reasonable assurance that the combined annual dose equivalent to any member of the public in the general environment resulting from: (1) Discharges of radioactive material and direct radiation from such management and storage and (2) all operations covered by Part 190; shall not exceed 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other critical organ. *[40 CFR 191.03(a)]*

1.303b (a) During normal operations and anticipated occurrences, the annual dose equivalent to any real individual who is located beyond the controlled area must not exceed 25 mrem to the whole body, 75 mrem to the thyroid and 25 mrem to any other organ as a result of exposure to:

(1) Planned discharges of radioactive materials, radon and its decay products excepted, to the general environment,

(2) Direct radiation from ... MRS operations, and

(3) Any other radiation from uranium fuel cycle operations within the region.

(b) Operational restrictions must be established to meet as low as is reasonably achievable objectives for radioactive materials in effluents and direct radiation levels associated with ... MRS operations.

(c) Operational limits must be established for radioactive materials in effluents and direct radiation levels associated with ... MRS operations to meet the limits given in paragraph (a) of this section. *[10 CFR 72.104]*

1.303c Any individual located on or beyond the nearest boundary of the controlled area shall not receive a dose greater than 5 rem to the whole body or any organ from any design basis accident ...

[10 CFR 72.106 (b)]

1.304a Management and storage of spent nuclear fuel ... at all facilities regulated by the Commission or by Agreement States shall be conducted in such a manner as to provide reasonable assurance that the combined annual dose equivalent to any member of the public in the general environment resulting from: (1) Discharges of radioactive material and direct radiation from such management and storage and (2) all operations covered by Part 190; shall not exceed 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other critical organ.

[40 CFR 191.03(a)]

1.304b Each license authorizing the receipt, handling, and storage of spent fuel ... under this part must include technical specifications that, in addition to stating the limits on the release of radioactive materials for compliance with limits of Part 20 of this chapter and the "as low as is reasonably achievable" objectives for effluents, require that:

(1) Operating procedures for control of effluents be established and followed, and equipment in the radioactive waste treatment systems be maintained and used, to meet the requirements of 72.104;

(2) An environmental monitoring program be established to ensure compliance with the technical specifications for effluents;

[10 CFR 72.44(d)]

1.304c (a) During normal operations and anticipated occurrences, the annual dose equivalent to any real individual who is located beyond the controlled area must not exceed 25 mrem to the whole body, 75 mrem to the thyroid and 25 mrem to any other organ as a result of exposure to:

(1) Planned discharges of radioactive materials, radon and its decay products excepted, to the general environment,

(2) Direct radiation from ... MRS operations, and

(3) Any other radiation from uranium fuel cycle operations within the region.

(b) Operational restrictions must be established to meet as low as is reasonably achievable objectives for radioactive materials in effluents and direct radiation levels associated with ... MRS operations.

(c) Operational limits must be established for radioactive materials in effluents and direct radiation levels associated with ... MRS operations to meet the limits given in paragraph (a) of this section.

[10 CFR 72.104]

1.304d Any individual located on or beyond the nearest boundary of the controlled area shall not receive a dose greater than 5 rem to the whole body or any organ from any design basis accident.

[10 CFR 72.106 (b)]

1.304e ... MRS must be designed to provide means to limit to levels as low as is reasonably achievable the release of radioactive materials in effluents during normal operations; and control the release of radioactive materials under accident conditions. Analyses must be made to show that releases to the general environment during normal operations and anticipated occurrences will be within the exposure limit given in section 72.104. Analyses of design basis accidents must be made to show that releases to the general environment will be within the exposure limits given in section 72.106. Systems designed to monitor the release of radioactive materials must have means for calibration and testing their operability.

[10 CFR 72.126(d)]

Table F1.3.1 Function Description: Handle SNF

I. Function ID Number: 1.3.1

II. Function Title: Handle SNF

III. Function Definition:

The facility will be capable of handling both truck and rail shipments of spent nuclear fuel. Provisions will be included to detach incoming vehicles and substitute with site handling vehicles and to wash and inspect the external surfaces of the casks and associated vehicles. Provisions will also be included for onsite lag storage. This function also includes preparing the SNF for storage, transferring the SNF to its interim storage location, retrieving the SNF from interim storage, and preparing the SNF for transport for further use, processing, or permanent disposal. Provisions for handling abnormal conditions, if encountered, during these processes will also be included in this function.

IV. Interfaces:

A. Inputs:

1.3.111	Loaded SNF Cask/Carriage (Rail)	From: Function 1.2
1.3.112	Loaded SNF Cask/Carriage (Truck)	From: Function 1.2
1.3.113	Empty SNF Cask/Carriage (Rail)	From: Function 1.2
1.3.114	Empty Storage Units	From: Function 1.3.4
1.3.115	Loaded Storage Units	From: Function 1.3.2

B. Outputs:

1.3.1O1	Loaded SNF Cask/Carriage (Rail)	To: Function 1.2
1.3.1O2	Empty SNF Cask/Carriage (Rail)	To: Function 1.2
1.3.1O3	Empty SNF Cask/Carriage (Truck)	To: Function 1.2
1.3.1O4	Loaded Storage Units	To: Function 1.3.2
1.3.1O5	This output intentionally left blank	
1.3.1O6	Site-Generated Waste	To: Function 1.3.4
1.3.1O7	Federally-Permitted Radiation Exposure	To: Accessible Environment
1.3.1O8	Federally-Permitted Release of Radionuclides	To: Accessible Environment
1.3.1O9	Heat	To: Accessible Environment
1.3.1O10	Manifest	To: Function 1.2

V. Function Requirements:

A. Constraints:

1.3.1C1 (a) Quality Standards. Structures, systems, and components important to safety must be designed, fabricated, erected, and tested to quality standards commensurate with the importance to safety of the function to be performed.

(b) Protection against environmental conditions and natural phenomena. (1) Structures, systems, and components important to safety must be designed to accommodate the effects of, and to be compatible with, site characteristics and environmental conditions associated with normal operation, maintenance, and testing of the ... MRS and to withstand postulated accidents.

(2) Structures, systems, and components important to safety must be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, lighting, hurricanes, floods, tsunami, and seiches, without impairing their capability to perform safety functions. The design bases for these structures, systems, and components must reflect:

(i) Appropriate consideration of the most severe of the natural phenomena reported for the site and surrounding area, with appropriate margins to take into account the limitations of the data and the period of time in which the data have accumulated, and

(ii) Appropriate combinations of the effects of normal and accident conditions and the effects of natural phenomena.

The ... MRS should also be designed to prevent massive collapse of building structures or the dropping of heavy objects as a result of building structural failure on the spent fuel ... or on to structures, systems, and components important to safety.

(3) Capability must be provided for determining the intensity of natural phenomena that may occur for comparison with design bases of structures, systems, and components important to safety.

(4) If the ... MRS is located over an aquifer which is a major water resource, measures must be taken to preclude the transport of radioactive materials to the environment through this potential pathway.

(c) Protection against fires and explosions. Structures, systems, and components important to safety must be designed and located so that they can continue to perform their safety functions effectively under credible fire and explosion exposure conditions. Noncombustible and heat-resistant materials must be used wherever practical throughout the ... MRS, particularly in locations vital to the control of radioactive materials and to the maintenance of safety control functions. Explosion and fire detection, alarm, and suppression systems shall be designed and provided with sufficient capacity and capability to minimize the adverse effects of fires and explosions on structures, systems, and components important to safety. The design of the ... MRS must include provisions to protect against adverse effects that might result from either the operation or the failure of the fire suppression system.

(d) Sharing of structures, systems, and components. Structures, systems, and components important to safety must not be shared between an ... MRS and other facilities unless it is shown that such sharing will not impair the capability of either facility to perform its safety functions, including the ability to return to a safe condition in the event of an accident.

(e) Proximity of sites. An ... MRS located near other nuclear facilities must be designed and operated to ensure that the cumulative effects of their combined operations will not constitute an unreasonable risk to the health and safety of the public.

(f) Testing and maintenance of systems and components. Systems and components that are important to safety must be designed to permit inspection, maintenance, and testing.

(g) Emergency capability. Structures, systems, and components important to safety must be designed for emergencies. The design must provide for accessibility to the equipment of onsite and available offsite emergency facilities and services such as hospitals, fire and police departments, ambulance service, and other emergency agencies

(i) Instrumentation and control systems. Instrumentation and control systems must be provided to monitor systems that are important to safety over anticipated ranges for normal operation and off-normal operation. Those instruments and control systems that must remain operational under accident conditions must be identified in the Safety Analysis Report.

(j) Control room or control area. A control room or control area, if appropriate for the ... MRS design, must be designed to permit occupancy and actions to be taken to monitor the ... MRS safely under normal conditions, and to provide safe control of the ... MRS under off-normal or accident conditions.

[10 CFR 72.122]

1.3.1C2 (c) Criticality Monitoring. A criticality monitoring system shall be maintained in each area where special nuclear material is handled, used, or stored which will energize clearly audible alarm signals if accidental criticality occurs. Underwater monitoring is not required when special nuclear material is handled or stored beneath water shielding. Monitoring of dry storage areas where special nuclear material is packaged in its stored configuration under a license issued under this subpart is not required.

[10 CFR 72.124]

1.3.1C3 (a) Spent fuel ... storage and handling systems. Spent fuel storage, ... and other systems that might contain or handle radioactive materials associated with spent fuel ... must be designed to ensure adequate safety under normal and accident conditions. These systems must be designed with --

- (1) A capability to test and monitor components important to safety,
- (2) Suitable shielding for radioactive protection under normal and accident conditions,
- (3) Confinement structures and systems,
- (4) A heat-removal capability having testability and reliability consistent with its importance to safety, and

(5) means to minimize the quantity of radioactive wastes generated.

[10 CFR 72.128]

1.3.1C4 Operation of equipment and controls that have been identified as important to safety in the Safety Analysis Report and in the license must be limited to trained and certified personnel or be under the direct visual supervision of an individual with training and certification in the operation. Supervisory personnel who personally direct the operation of equipment and controls that are important to safety must also be certified in such operations.

[10 CFR 72.190]

1.3.1C5 The physical condition and the general health of personnel certified for the operation of equipment and controls that are important to safety must not be such as might cause operational errors that could endanger other in-plant personnel or the public health and safety. Any condition that might cause impaired judgment or motor coordination must be considered in the selection of personnel for activities that are important to safety. These conditions need not categorically disqualify a person, if appropriate provisions are made to accommodate such defect.

[10 CFR 72.194]

1.3.1C6 Each application for a license under this part must include a Safety Analysis Report describing the proposed ... MRS for the receipt, handling, packaging, and storage of spent fuel ..., including how the ... MRS will be operated. The minimum information to be included in this report must consist of the following:

(i) If the proposed ... MRS incorporates structures, systems, or components important to safety whose functional adequacy or reliability have not been demonstrated by prior use for that purpose or cannot be demonstrated by reference to performance data in related applications or to widely accepted engineering principles, an identification of these structures, systems, or components along with a schedule showing how safety questions will be resolved prior to the initial receipt of spent fuel ... for storage at the ... MRS.

[10 CFR 72.24]

1.3.1C7 (h) Confinement barriers and systems. (1) The spent fuel cladding must be protected during storage against degradation that leads to gross ruptures or the fuel must be otherwise confined such that degradation of the fuel during storage will not pose operational safety problems with respect to its removal from storage. This may be accomplished by canning of consolidated fuel rods or unconsolidated assemblies or other means as appropriate.

(2) For underwater storage of spent fuel ... in which the pool water serves as a shield and a confinement medium for radioactive materials, systems for maintaining water purity and the pool water level must be designed so that any abnormal operations or failure in those systems from any cause will not cause the water level to fall below safe limits. The design must preclude installations of drains, permanently connected systems, and other features that could, by abnormal operations or failure, cause a significant loss

of water. Pool water level equipment must be provided to alarm in a continuously manned location if the water level in the storage pools falls below a predetermined level.

(3) Ventilation systems and off-gas systems must be provided where necessary to ensure the confinement of airborne radioactive particulate materials during normal or off-normal conditions.

(4) Storage confinement systems must have the capability for continuous monitoring in a manner such that the licensee will be able to determine when corrective action needs to be taken to maintain safe storage conditions.

(5) The high-level radioactive waste must be packaged in a manner that allows handling and retrievability without the release of radioactive materials to the environment or radiation exposures in excess of Part 20 limits. The package must be designed to confine the high-level radioactive waste for the duration of the license.

[10 CFR 72.122]

B. Performance:

1.3.1P1 All shipments from the MRS facility to the repository would be made exclusively by rail in dedicated trains, which would minimize the number of shipments to the repository.

[DOE/RW-0239]

C. Interface:

1.3.1I1 The SNF acceptance rate (by rail) at the MRS installation will be in accordance with Appendix F of this document.

[TBD]

1.3.1I2 The SNF acceptance rate (by truck) at the MRS installation will be in accordance with Appendix F-3 of this document.

[TBD]

1.3.1I3 Requirements at this level to be specified

1.3.1I4 Requirements at this level to be specified

1.3.1I5 Requirements at this level to be specified

1.3.101 The SNF transportation rate (by rail) from the MRS installation to the geologic repository will be in accordance with Appendix F of this document.

[TBD]

1.3.102 Requirements at this level to be specified

1.3.103 Requirements at this level to be specified

1.3.104 Requirements at this level to be specified

1.3.105 Requirements at this level to be specified

1.3.106 Requirements at this level to be specified

1.3.107 The combined radiation dose from output 1.3.107 and output 1.3.204 will not exceed the dose requirements specified for 1.303.

1.3.108 The combined dose due to radionuclide release from output 1.3.108 and output 1.3.205 will not exceed the dose requirements specified for 1.304.

Table F1.3.1.1 Function Description: Receive Loaded/Empty Shipping Cask

I. Function ID Number: 1.3.1.1

II. Function Title: Receive Loaded/Empty Shipping Cask

III. Function Definition:

Upon arrival of a loaded SNF shipping cask/carriage or empty cask/carriage in the shipping/receiving area at the boundary of the MRS, the cask is accepted by the MRS and the accompanying shipping records (including the records relating to the cask contents for the loaded casks) are transferred to MRS personnel.

IV. Interfaces:

A. Inputs:

1.3.1.1I1 Loaded SNF Cask/Carriage (Rail) From: Function 1.2
1.3.1.1I2 Loaded SNF Cask/Carriage (Truck) From: Function 1.2
1.3.1.1I3 Empty SNF Cask/Carriage (Rail) From: Function 1.2

B. Outputs:

1.3.1.1O1 Loaded SNF Cask/Carriage (Rail) To: Function 1.3.1.2/1.3.1.3
1.3.1.1O2 Loaded SNF Cask/Carriage (Truck) To: Function 1.3.1.2/1.3.1.3
1.3.1.1O3 Empty SNF Cask/Carriage (Rail) To: Function 1.2/1.3.1.2/1.3.1.6

V. Function Requirements:

A. Constraints: Requirements at this level to be specified

B. Performance: Requirements at this level to be specified

C. Interface:

1.3.1.1I1 Same requirements as specified for 1.3.1I1

1.3.1.1I2 Same requirements as specified for 1.3.1I2

1.3.1.1I3 Same requirements as specified for 1.3.1I3

1.3.1.1O1 Requirements at this level to be specified

1.3.1.1O2 Requirements at this level to be specified

1.3.1.1O3 Requirements at this level to be specified

Table F1.3.1.1.1 Function Description: Accept Shipping Cask/Carriage

I. Function ID Number: 1.3.1.1.1

II. Function Title: Accept Shipping Cask/Carriage

III. Function Definition:

Upon satisfactory verification of records, custody of the SNF is transferred to the MRS facility.

IV. Interfaces:

A. Inputs:

1.3.1.1.111	Loaded SNF Cask/Carriage (Rail)	From: Function 1.2
1.3.1.1.112	Loaded SNF Cask/Carriage (Truck)	From: Function 1.2
1.3.1.1.113	Empty SNF Cask/Carriage (Rail)	From: Function 1.2
1.3.1.1.114	Manifest	From: Function 1.2

B. Outputs:

1.3.1.1O1	Loaded SNF Cask/Carriage (Rail)	To: Function 1.3.1.1.2
1.3.1.1O2	Loaded SNF Cask/Carriage (Truck)	To: Function 1.3.1.1.2
1.3.1.1O3	Empty SNF Cask/Carriage (Rail)	To: Function 1.3.1.1.2
1.3.1.1O4	Manifest	To: Function 1.3.1.1.3

V. Function Requirements:

A. Constraints:

1.3.1.1.1C1 (a) Except as provided in paragraph (b) of this section, whenever the licensee transfers or receives spent fuel, the licensee shall complete and distribute a Nuclear Material Transaction Report on DOE/NRC Form-741 in accordance with printed instructions for completing the form...

(b) Any licensee who is required to submit inventory change reports on DOE/NRC Form-741 pursuant to 75.34 of this chapter (pertaining to implementation of the US/IAEA Safeguards Agreement) shall prepare and submit such reports only as provided in that section instead of as provided in paragraph (a) of this section.

[10 CFR 72.78]

B. Performance: Requirements at this level to be specified

C. Interface:

1.3.1.1.1I1 Same requirements as specified for 1.3.1.1.1

1.3.1.1.1I2 Same requirements as specified for 1.3.1I2

1.3.1.1.1I3 Same requirements as specified for 1.3.1I3

1.3.1.1.1I4 Requirements at this level to be specified

1.3.1.1.1O1 Requirements at this level to be specified

1.3.1.1.1O2 Requirements at this level to be specified

1.3.1.1.1O3 Requirements at this level to be specified

1.3.1.1.1O4 Requirements at this level to be specified

Table F1.3.1.1.2 Function Description: Detach Prime Mover

I. Function ID Number: 1.3.1.1.2

II. Function Title: Detach Prime Mover

III. Function Definition:

Upon arrival of the shipping cask/carriage in the shipping/receiving area at the facility, the prime mover is detached from the shipping cask/carriage, as soon as possible, and removed from the site.

IV. Interfaces:

A. Inputs:

1.3.1.1.2I1	Loaded SNF Cask/Carriage (Rail)	From: Function 1.3.1.1.1
1.3.1.1.2I2	Loaded SNF Cask/Carriage (Truck)	From: Function 1.3.1.1.1
1.3.1.1.2I3	Empty SNF Cask/Carriage (Rail)	From: Function 1.3.1.1.1

B. Outputs:

1.3.1.1.2O1	Loaded SNF Cask/Carriage (Rail)	To:	Function 1.3.1.1.3
1.3.1.1.2O2	Loaded SNF Cask/Carriage (Truck)	To:	Function 1.3.1.1.3
1.3.1.1.2O3	Empty SNF Cask/Carriage (Rail)	To:	Function 1.3.1.1.3

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.1.3 Function Description: Inspect Shipping Cask/Carriage

I. Function ID Number: 1.3.1.1.3

II. Function Title: Inspect Shipping Cask/Carriage

III. Function Definition:

Arriving shipments are inspected for the presence of explosives or other unauthorized material. The cask and carriage is also inspected to see if it is mechanically intact, that no damage exists, and that there is nothing out of order regarding the appearance of the incoming shipment. This activity takes place within the controlled area, but outside the secured area.

IV. Interfaces:

A. Inputs:

1.3.1.1.3I1	Loaded SNF Cask/Carriage (Rail)	From:	Function 1.3.1.1.2
1.3.1.1.3I2	Loaded SNF Cask/Carriage (Truck)	From:	Function 1.3.1.1.2
1.3.1.1.3I3	Empty SNF Cask/Carriage (Rail)	From:	Function 1.3.1.1.2
1.3.1.1.3I4	Manifest	From:	Function 1.3.1.1.1

B. Outputs:

1.3.1.1.3O1	Loaded SNF Cask/Carriage (Rail)	To:	Function 1.3.1.1.4
1.3.1.1.3O2	Loaded SNF Cask/Carriage (Truck)	To:	Function 1.3.1.1.4
1.3.1.1.3O3	Empty SNF Cask/Carriage (Rail)	To:	Function 1.3.1.1.4
1.3.1.1.3O4	Records	To:	Function 1.3.4.4.1.1

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.1.4 Function Description: Move Shipping Cask/Carriage to Parking Area and/or Shipping/Receiving Bay

I. **Function ID Number:** 1.3.1.1.4

II. **Function Title:** Move Shipping Cask/Carriage to Parking Area and/or Shipping/Receiving Bay

III. **Function Definition:**

Loaded and Empty Shipping Casks/Carriages are moved by an onsite vehicle from the Shipping/Receiving Area to either the Parking Area or the Shipping/Receiving Bay.

IV. **Interfaces:**

A. Inputs:

1.3.1.1.4I1	Loaded SNF Cask/Carriage (Rail)	From: Function 1.3.1.1.3
1.3.1.1.4I2	Loaded SNF Cask/Carriage (Truck)	From: Function 1.3.1.1.3
1.3.1.1.4I3	Empty SNF Cask/Carriage (Rail)	From: Function 1.3.1.1.3

B. Outputs:

1.3.1.1.4O1	Loaded SNF Cask/Carriage (Rail)	To: Function 1.3.1.2/1.3.1.3
1.3.1.1.4O2	Loaded SNF Cask/Carriage (Truck)	To: Function 1.3.1.2/1.3.1.3
1.3.1.1.4O3	Empty SNF Cask/Carriage (Rail)	To: Function 1.2/1.3.1.2/ 1.3.1.6

V. **Function Requirements:** Requirements at this level to be specified

Table F1.3.1.2 Function Description: Park Shipping Cask/Carriage

I. **Function ID Number:** 1.3.1.2

II. **Function Title:** Park Shipping Cask/Carriage

III. **Function Definition:**

A parking capability (area) is provided for storage of empty and loaded truck and rail shipping cask/carriage which have either just arrived at the facility or are awaiting transport offsite.

IV. **Interfaces:**

A. Inputs:

1.3.1.2I1	Loaded SNF Cask/Carriage (Rail)	From:	Function 1.3.1.1
1.3.1.2I2	Loaded SNF Cask/Carriage (Truck)	From:	Function 1.3.1.1
1.3.1.2I3	Empty SNF Cask/Carriage (Rail)	From:	Function 1.3.1.1/1.3.1.3
1.3.1.2I4	Empty SNF Cask/Carriage (Truck)	From:	Function 1.3.1.3

B. Outputs:

1.3.1.2O1	Loaded SNF Cask/Carriage (Rail)	To:	Function 1.3.1.3
1.3.1.2O2	Loaded SNF Cask/Carriage (Truck)	To:	Function 1.3.1.3
1.3.1.2O3	Empty SNF Cask/Carriage (Rail)	To:	Function 1.3.1.6/1.2
1.3.1.2O4	Empty SNF Cask/Carriage (Truck)	To:	Function 1.2

V. **Function Requirements:** Requirements at this level to be specified

Table F1.3.1.3 Function Description: Prepare SNF For Storage

I. **Function ID Number:** 1.3.1.3

II. **Function Title:** Prepare SNF For Storage

III. **Function Definition:**

SNF is unloaded from the shipping casks and prepared for transfer into the MRS storage location.

IV. **Interfaces:**

A. Inputs:

1.3.1.3I1	Loaded SNF Cask/Carriage (Rail)	From:	Function 1.3.1.1/1.3.1.2
1.3.1.3I2	Loaded SNF Cask/Carriage (Truck)	From:	Function 1.3.1.1/1.3.1.2

B. Outputs:

1.3.1.3O1	SNF	To:	Function 1.3.1.4
1.3.1.3O2	Empty SNF Cask/Carriage (Rail)	To:	Function 1.2/1.3.1.2/1.3.1.6
1.3.1.3O3	Empty SNF Cask/Carriage (Truck)	To:	Function 1.2/1.3.1.2
1.3.1.3O4	Site-Generated Waste	To:	Function 1.3.4

V. **Function Requirements:** Requirements at this level to be specified.

Table F1.3.1.3.1 Function Description: Remove Loaded Shipping Cask From Carriage

I. **Function ID Number:** 1.3.1.3.1

II. **Function Title:** Remove Loaded Shipping Cask From Carriage

III. **Function Definition:**

The shipping cask is removed from the carriage in preparation of cask opening and transferring the SNF.

IV. **Interfaces:**

A. **Inputs:**

1.3.1.3.1I1 Loaded SNF Cask/Carriage (Rail) **From:** Function 1.3.1.1/1.3.1.2

1.3.1.3.1I2 Loaded SNF Cask/Carriage (Truck) **From:** Function 1.3.1.1/1.3.1.2

B. **Outputs:**

1.3.1.3.1O1 Carriage (Rail) **To:** Function 1.3.1.3.4

1.3.1.3.1O2 Carriage (Truck) **To:** Function 1.3.1.3.4

1.3.1.3.1O3 Loaded Cask Mover **To:** Function 1.3.1.3.2

1.3.1.3.1O4 Wastewater **To:** Function 1.3.4

V. **Function Requirements:** Requirements at this level to be specified

Table F1.3.1.3.1.1 Function Description: Retrieve Loaded Cask/Carriage

I. **Function ID Number:** 1.3.1.3.1.1

II. **Function Title:** Retrieve Loaded Cask/Carriage

III. Function Definition:

The shipping cask/carriage is moved from the storage/parking area to the transfer station receiving bay using an onsite tractor, to prepare the cask for unloading from its carriage.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.1.2 Function Description: Remove Personnel Barrier

I. Function ID Number: 1.3.1.3.1.2

II. Function Title: Remove Personnel Barrier

III. Function Definition:

The personnel barrier is removed to provide access to the shipping cask in preparation for SNF transfer.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.1.3 Function Description: Remove Impact Limiters And Tiedowns

I. Function ID Number: 1.3.1.3.1.3

II. Function Title: Remove Impact Limiters And Tiedowns

III. Function Definition:

The impact limiters and tiedowns are removed to permit removal of the cask from the carriage.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.1.4 Function Description: Survey Shipping Cask Surface

I. Function ID Number: 1.3.1.3.1.4

II. Function Title: Survey Shipping Cask Surface

III. Function Definition:

The shipping cask surface is surveyed to examine the cask for any abnormalities (e.g., excessive radiation, surface contamination and physical damage).

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.1.5 Function Description: Wash Cask

I. Function ID Number: 1.3.1.3.1.5

II. Function Title: Wash Cask

III. Function Definition:

The shipping cask is cleaned of the road dirt accumulated during transportation to the MRS.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.1.6 Function Description: Transfer Loaded Shipping Cask From Carriage To Cask Mover

I. Function ID Number: 1.3.1.3.1.6

II. Function Title: Transfer Loaded Shipping Cask From Carriage To Cask Mover

III. Function Definition:

The shipping cask is transferred from the carriage to the cask mover which is used to move the cask around at the MRS.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.2 Function Description: Prepare Loaded Shipping Cask For SNF Removal

I. Function ID Number: 1.3.1.3.2

II. Function Title: Prepare Loaded Shipping Cask For SNF Removal

III. Function Definition:

The actions by which the shipping cask is prepared for unloading of the SNF.

IV. Interfaces:

A. Inputs:

1.3.1.3.2I1 Loaded Cask Mover **From:** Function 1.3.1.3.1

B. Outputs:

1.3.1.3.2O1 Loaded Cask Mover **To:** Function 1.3.1.3.3
1.3.1.3.2O2 Vented Gas **To:** Function 1.3.4

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.2.1 Function Description: Move Loaded Shipping Cask/Cask Mover To SNF Transfer Station

I. Function ID Number: 1.3.1.3.2.1

II. Function Title: Move Loaded Shipping Cask/Cask Mover To SNF Transfer Station

III. Function Definition:

The shipping cask is moved from the receiving bay to the cask preparation area within the SNF transfer station area by use of the cask mover.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.2.2 Function Description: Assess Fuel Prior to Unloading

I. Function ID Number: 1.3.1.3.2.2

II. Function Title: Assess Fuel Prior to Unloading

III. Function Definition:

After venting the valve box cover, or outer lid, the gas in the shipping cask is monitored to determine if any degradation of the SNF has occurred during shipment and the cask is vented to equalize any pressure differential between the atmosphere and the cask interior prior to opening the cask.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.2.3 Function Description: Loosen Shipping Cask Lid

I. Function ID Number: 1.3.1.3.2.3

II. Function Title: Loosen Shipping Cask Lid

III. Function Definition:

The shipping cask lid fasteners are loosened to facilitate the removal of the lid in the SNF transfer station and to provide access to the interior of the shipping cask.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.2.4 Function Description: Mate Loaded Shipping Cask To Unloading Port

I. Function ID Number: 1.3.1.3.2.4

II. Function Title: Mate Loaded Shipping Cask To Unloading Port

III. Function Definition:

The shipping cask is connected to the unloading port of the SNF transfer station for the removal of the cask lid and the unloading of the SNF.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.3 Function Description: Remove SNF From Loaded Shipping Cask

I. Function ID Number: 1.3.1.3.3

II. Function Title: Remove SNF From Loaded Shipping Cask

III. Function Definition:

The SNF is removed from the shipping cask for placement into either the MRS storage unit or internal lag storage.

IV. Interfaces:

A. Inputs:

1.3.1.3.3I1 Loaded Cask Mover **From:** Function 1.3.1.3.2

B. Outputs:

1.3.1.3.3O1 SNF **To:** Function 1.3.1.4
1.3.1.3.3O2 Empty Cask Mover **To:** Function 1.3.1.3.4

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.3.1 Function Description: Remove Port Plug/Cask Lid

I. Function ID Number: 1.3.1.3.3.1

II. Function Title: Remove Port Plug/Cask Lid

III. Function Definition:

The port plug is removed from the unloading port to provide access to the cask lid.
The cask lid is removed through the unloading port to provide access to the cask interior.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.3.2 Function Description: Unload SNF From Shipping Cask

I. Function ID Number: 1.3.1.3.3.2

II. Function Title: Unload SNF From Shipping Cask

III. Function Definition:

The SNF is unloaded from the shipping cask by use of a grapple which grips the fuel assembly and removes it from the cask.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.3.3 Function Description: Verify SNF Identity And Condition

I. Function ID Number: 1.3.1.3.3.3

II. Function Title: Verify SNF Identity And Condition

III. Function Definition:

The identity of the SNF which is shipped is verified against the manifest.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.3.4 Function Description: Canister Defective SNF

I. Function ID Number: 1.3.1.3.3.4

II. Function Title: Canister Defective SNF

III. Function Definition:

If required, defective or off-normal SNF is canistered.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.3.5 Function Description: Place SNF Into Lag Storage

I. Function ID Number: 1.3.1.3.3.5

II. Function Title: Place SNF Into Lag Storage

III. Function Definition:

If required, SNF is placed in lag storage to provide for short term storage of the SNF in order to balance MRS throughput operations.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.4 Function Description: Prepare Empty Shipping Cask For Return To Service

I. Function ID Number: 1.3.1.3.4

II. Function Title: Prepare Empty Shipping Cask For Return To Service

III. Function Definition:

The shipping cask is made ready for additional shipments.

IV. Interfaces:

A. Inputs:

1.3.1.3.4I1	Carriage (Rail)	From: Function 1.3.1.3.1
1.3.1.3.4I2	Carriage (Truck)	From: Function 1.3.1.3.1
1.3.1.3.4I3	Empty Cask Mover	From: Function 1.3.1.3.3

B. Outputs:

1.3.1.3.4O1	Empty SNF Cask/Carriage (Rail)	To: Function 1.2/1.3.1.2
1.3.1.3.4O2	Empty SNF Cask/Carriage (Truck)	To: Function 1.2/1.3.1.2
1.3.1.3.4O3	Waste Water	To: Function 1.3.4

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.4.1 Function Description: Replace Cask Lid/Port Plug

I. Function ID Number: 1.3.1.3.4.1

II. Function Title: Replace Cask Lid/Port Plug

III. Function Definition:

The cask lid is replaced on the cask and the port plug is replaced in the unloading port in preparation for cask removal.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.4.2 Function Description: Unmate Empty Shipping Cask From Unloading Port

I. Function ID Number: 1.3.1.3.4.2

II. Function Title: Unmate Empty Shipping Cask From Unloading Port

III. Function Definition:

The empty shipping cask is disconnected from the unloading port.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.4.3 Function Description: Decontaminate Empty Shipping Cask Internals

I. Function ID Number: 1.3.1.3.4.3

II. Function Title: Decontaminate Empty Shipping Cask Internals

III. Function Definition:

If required, the interior of the shipping cask is cleaned to facilitate any routine maintenance and to minimize contamination in reactor pools.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.4.4 Function Description: Perform Routine Shipping Cask Maintenance

I. Function ID Number: 1.3.1.3.4.4

II. Function Title: Perform Routine Shipping Cask Maintenance

III. Function Definition:

If required, the cask is maintained by repairing and replacing parts and by verifying its integrity.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.4.5 Function Description: Tighten Empty Shipping Cask Lid

I. Function ID Number: 1.3.1.3.4.5

II. Function Title: Tighten Empty Shipping Cask Lid

III. Function Definition:

After disconnection from the unloading port [and routine maintenance and decontamination, if required] the cask lid fasteners are tightened, the cask is sealed, and the seal is verified.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.4.6 Function Description: Survey/Decontaminate Empty Shipping Cask Externals

I. Function ID Number: 1.3.1.3.4.6

II. Function Title: Survey/Decontaminate Empty Shipping Cask Externals

III. Function Definition:

The exterior of the shipping cask is surveyed [and decontaminated, as required].

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.4.7 Function Description: Transfer Empty Shipping Cask From Cask Mover To Carriage

I. Function ID Number: 1.3.1.3.4.7

II. Function Title: Transfer Empty Shipping Cask From Cask Mover To Carriage

III. Function Definition:

The empty shipping cask is helium leak checked, placed on the carriage, with tiedowns, impact limiters, and personnel barriers installed, in preparation for transportation or on-site temporary storage.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.3.4.8 Function Description: Park Empty Shipping Cask/Carriage

I. Function ID Number: 1.3.1.3.4.8

II. Function Title: Park Empty Shipping Cask/Carriage

III. Function Definition:

The shipping cask/carriage is moved to the storage/parking area, using an onsite tractor, pending shipment offsite.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.4 Function Description: Transfer SNF Into Storage

I. Function ID Number: 1.3.1.4

II. Function Title: Transfer SNF Into Storage

III. Function Definition:

The SNF is transferred from either internal lag storage or from the shipping cask to the transfer device used to move the spent fuel to the MRS storage location. (Since the specific mode of storage has not yet been selected, additional functions specific to the selected mode may be required.)

IV. Interfaces:

A. Inputs:

1.3.1.4I1	SNF	From: Function 1.3.1.3
1.3.1.4I2	Empty Storage Units	From: Function 1.3.4/1.3.1.5

B. Outputs:

1.3.1.4O1	Loaded Storage Units	To: Function 1.3.2
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V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.4.1 Function Description: Place SNF Into Storage Unit

I. Function ID Number: 1.3.1.4.1

II. Function Title: Place SNF Into Storage Unit

III. Function Definition:

The SNF is placed into the MRS storage unit and the storage unit is sealed.

IV. Interfaces:

A. Inputs:

1.3.1.4.I11	SNF	From: Function 1.3.1.3
1.3.1.4.I12	Empty Storage Units	From: Function 1.3.4/1.3.1.5

B. Outputs:

1.3.1.4.1O1 Loaded Storage Units To: Function 1.3.1.4.2

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.4.2 Function Description: Inert Storage Unit

I. Function ID Number: 1.3.1.4.2

II. Function Title: Inert Storage Unit

III. Function Definition:

The storage unit cavity atmosphere is evacuated and backfilled with inert gas to prevent oxidation of the SNF, and the seal integrity is verified.

IV. Interfaces:

A. Inputs:

1.3.1.4.2I1 Loaded Storage Units **From:** Function 1.3.1.4.1
1.3.1.4.2I2 Inert Gas **From:** Function 1.3.4

B. Outputs:

1.3.1.4.2O1 Loaded Storage Units (Sealed) To: Function 1.3.1.4.3

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.4.3 Function Description: Move Loaded Storage Unit to Storage Location

I. Function ID Number: 1.3.1.4.3

II. Function Title: Move Loaded Storage Unit To Storage Location

III. Function Definition:

If required, the storage unit containing SNF is moved from the transfer station to the MRS storage location.

IV. Interfaces:

A. Inputs:

1.3.1.4.3I1 [Loaded Storage Units (Sealed)] From: Function 1.3.1.4.2

B. Outputs:

1.3.1.4.3O1 [Loaded Storage Units (Sealed)] To: Function 1.3.1.4.4/1.3.2

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.4.4 Function Description: Emplace Loaded Storage Unit Into Storage

I. Function ID Number: 1.3.1.4.4

II. Function Title: Emplace Loaded Storage Unit Into Storage

III. Function Definition:

If required, the storage unit containing SNF is placed in the MRS storage location.

IV. Interfaces:

A. Inputs:

1.3.1.4.4I1 [Loaded Storage Units (Sealed)] From: Function 1.3.1.4.3

B. Outputs:

1.3.1.4.4O1 [Emplaced Loaded Storage Units (Sealed)] To: Function 1.3.2

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.5 Function Description: Retrieve SNF From Storage

I. Function ID Number: 1.3.1.5

II. Function Title: Retrieve SNF From Storage

III. Function Definition:

Stored SNF is retrieved from the MRS storage location.

IV. Interfaces:

A. Inputs:

1.3.1.5I1 Loaded Storage Units From: Function 1.3.2

B. Outputs:

1.3.1.5O1 SNF To: Function 1.3.1.6

1.3.1.5O2 Empty Storage Units To: Function 1.3.1.4

V. Function Requirements:

A. Constraints:

1.3.1.5C1 (l) Storage systems must be designed to allow ready retrieval of spent fuel ...
for further processing or disposal.

[10 CFR 72.122]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.1.5.1 Function Description: Remove Loaded Storage Unit From Storage

I. Function ID Number: 1.3.1.5.1

II. Function Title: Remove Loaded Storage Unit From Storage

III. Function Definition:

The storage unit containing SNF is moved from the storage location to the transfer station for further handling.

IV. Interfaces:

A. Inputs:

1.3.1.5.1I1 Loaded Storage Units **From:** Function 1.3.2

B. Outputs:

1.3.1.5.1O1 Loaded Storage Units **To:** Function 1.3.1.5.2

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.5.2 Function Description: Move Loaded Storage Unit Into SNF Transfer Station

I. Function ID Number: 1.3.1.5.2

II. Function Title: Move Loaded Storage Unit Into SNF Transfer Station

III. Function Definition:

The SNF is unloaded from the MRS storage unit into the MRS transfer station.

IV. Interfaces:

A. Inputs:

1.3.1.5.2I1 Loaded Storage Units **From:** Function 1.3.1.5.1

B. Outputs:

1.3.1.5.2O1 SNF **To:** Function 1.3.1.5.3
1.3.1.5.2O2 Empty Storage Units **To:** Function 1.3.1.4

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.5.3 Function Description: Verify SNF Identity And Condition

I. Function ID Number: 1.3.1.5.3

II. Function Title: Verify SNF Identity And Condition

III. Function Definition:

The SNF is inspected to verify its integrity and its identity; and any defective SNF is canisterized prior to offsite shipment.

IV. Interfaces:

A. Inputs:

1.3.1.5.3I1 SNF **From:** Function 1.3.1.5.2/1.3.1.5.4

B. Outputs:

1.3.1.5.3O1 SNF (Verified) **To:** Function 1.3.1.5.4/1.3.1.6

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.5.4 Function Description: Place SNF Into Lag Storage

I. Function ID Number: 1.3.1.5.4

II. Function Title: Place SNF Into Lag Storage

III. Function Definition:

If required, SNF is placed in lag storage to provide for short term storage of the SNF in order to balance MRS throughput operations.

IV. Interfaces:

A. Inputs:

1.3.1.5.4I1 [SNF (Verified)] **From:** Function 1.3.1.5.3

B. Outputs:

1.3.1.5.4O1 SNF **To:** Function 1.3.1.5.3

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.6 Function Description: Prepare SNF For Transport

I. Function ID Number: 1.3.1.6

II. Function Title: Prepare SNF For Transport

III. Function Definition:

The SNF is prepared for transport offsite to the permanent disposal location.

IV. Interfaces:

A. Inputs:

1.3.1.6I1 SNF **From:** Function 1.3.1.5
1.3.1.6I2 Empty SNF Cask/Carriage (Rail) **From:** Function 1.3.1.1/1.3.1.2/
1.3.1.3

B. Outputs:

1.3.1.6O1 Loaded SNF Cask/Carriage (Rail) **To:** Function 1.2
1.3.1.6O2 Empty SNF Cask/Carriage (Rail) **To:** Function 1.2
1.3.1.6O3 Manifest **To:** Function 1.2
1.3.1.6O4 Site-Generated Waste **To:** Function 1.3.4

V. Function Requirements: Requirements at this level to be specified

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.6.1.2 Function Description: Remove Personnel Barrier/Impact Limiters/Physical Tiedowns

I. Function ID Number: 1.3.1.6.1.2

II. Function Title: Remove Personnel Barrier/Impact Limiters/Physical Tiedowns

III. Function Definition:

The personnel barrier, impact limiters, and physical tiedowns are removed from the cask/carriage.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.6.1.3 Function Description: Transfer Empty Shipping Cask From Carriage To Cask Mover

I. Function ID Number: 1.3.1.6.1.3

II. Function Title: Transfer Empty Shipping Cask From Carriage To Cask Mover

III. Function Definition:

The empty shipping cask is transferred from the carriage to the cask mover which is used to move the empty cask around at the MRS.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.6.2 Function Description: Prepare Empty Shipping Cask For SNF Loading

I. Function ID Number: 1.3.1.6.2

II. Function Title: Prepare Empty Shipping Cask For SNF Loading

III. Function Definition:

The appropriate shipping cask is prepared, prior to being loaded with SNF, for shipment to the geologic repository.

IV. Interfaces:

A. Inputs:

1.3.1.6.2I1 Empty SNF Cask/Carriage (Rail) **From:** Function 1.3.1.6.1 / 1.3.1.1 / 1.3.1.2 / 1.3.1.3

B. Outputs:

1.3.1.6.2O1 Empty SNF Cask/Carriage (Rail) **To:** Function 1.3.1.6.3
1.3.1.6.2O2 Site-Generated Waste **To:** Function 1.3.4

V. Function Requirements:

A. Constraints:

1.3.1.6.2C1 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; ...

[10 CFR 71.87]

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- B. Performance: Requirements at this level to be specified
 - C. Interface: Requirements at this level to be specified
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Table F1.3.1.6.2.1 Function Description: Move Empty Shipping Cask/Cask Mover To Cask Preparation Area

- I. Function ID Number: 1.3.1.6.2.1
 - II. Function Title: Move Empty Shipping Cask/Cask Mover To Cask Preparation Area
 - III. Function Definition:
The shipping cask is moved to the cask preparation area by the cask mover, in preparation for SNF loading.
 - IV. Interfaces:
 - A. Inputs: None identified at this time
 - B. Outputs: None identified at this time
 - V. Function Requirements: Requirements at this level to be specified
-
-

Table F1.3.1.6.2.2 Function Description: Loosen Empty Shipping Cask Lid

- I. Function ID Number: 1.3.1.6.2.2
 - II. Function Title: Loosen Empty Shipping Cask Lid
 - III. Function Definition:
The shipping cask lid fasteners are loosened to facilitate removal through the unloading port to provide access to the cask interior.
-

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.6.2.3 Function Description: Mate Empty Shipping Cask To Unloading Port

I. Function ID Number: 1.3.1.6.2.3

II. Function Title: Mate Empty Shipping Cask To Unloading Port

III. Function Definition:

The shipping cask/cask mover is moved to the unloading port and the cask mated to the port.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.6.3 Function Description: Place SNF Into Shipping Cask

I. Function ID Number: 1.3.1.6.3

II. Function Title: Place SNF Into Shipping Cask

III. Function Definition:

The SNF is loaded into the shipping cask at the SNF transfer station.

IV. Interfaces:

A. Inputs:

1.3.1.6.3I1	SNF	From: Function 1.3.1.5
1.3.1.6.3I2	Empty SNF Cask/Carriage (Rail)	From: Function 1.3.1.6.2 / 1.3.1.1 / 1.3.1.2 / 1.3.1.3

B. Outputs:

1.3.1.6.3O1	Loaded SNF Cask/Carriage (Rail)	To: Function 1.3.1.6.4
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V. Function Requirements:

A. Constraints:

1.3.1.6.3C1 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:

(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;

[10 CFR 71.87]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.1.6.3.1 Function Description: Remove Port Plug/Shipping Cask Lid

I. Function ID Number: 1.3.1.6.3.1

II. Function Title: Remove Port Plug/Shipping Cask Lid

III. Function Definition:

The port plug and shipping cask lid are removed in order to provide access to the cask interior for SNF loading.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.6.3.2 Function Description: Load SNF Into Shipping Cask/Verify

I. Function ID Number: 1.3.1.6.3.2

II. Function Title: Load SNF Into Shipping Cask/Verify

III. Function Definition:

The SNF is handled using a grapple, inspected for integrity, and its identity verified and canistered if necessary prior to being placed in the shipping cask.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.6.3.3 Function Description: Replace Port Plug/Shipping Cask Lid

I. Function ID Number: 1.3.1.6.3.3

II. Function Title: Replace Port Plug/Shipping Cask Lid

III. Function Definition:

The shipping cask lid is replaced on the cask and the port plug is placed in the unloading port and sealed.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.6.4 Function Description: Prepare Loaded Shipping Cask For Transport

I. Function ID Number: 1.3.1.6.4

II. Function Title: Prepare Loaded Shipping Cask For Transport

III. Function Definition:

The shipping cask is prepared for offsite shipment to the geologic repository.

IV. Interfaces:

A. Inputs:

1.3.1.6.4I1 Loaded SNF Cask/Carriage (Rail) **From:** Function 1.3.1.6.3

B. Outputs:

1.3.1.6.4O1 Loaded SNF Cask/Carriage (Rail,Sealed) **To:** Function 1.3.1.6.5

V. Function Requirements:

A. Constraints:

1.3.1.6.4C1 (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.

(c) Each package must include a containment system securely closed by a positive fastening device which cannot be opened unintentionally

(e) A package valve or other device, the failure of which would allow radioactive contents to escape, must be protected against unauthorized operation and, except for a pressure relief device, must be provided with an enclosure to retain any leakage.

(f) A package must be designed, constructed, and prepared for shipment so that under the tests specified in Section 71.71 (Normal Conditions of Transport) there would be no loss or dispersal of radioactive contents, no significant increase in external radiation levels, and no substantial reduction in the effectiveness of the packaging.

(g) A package must be designed, constructed, and prepared for transport so that in still air at 38°C (100°F) and in the shade, no accessible surface of a package would have a temperature exceeding 50°C (122°F) in a non-exclusive use shipment or 82°C (180°F) in an exclusive use shipment.

[10 CFR 71.43]

1.3.1.6.4C2 A package must be designed and prepared for shipment so that the radiation level does not exceed 200 millirem per hour at any point on the external surface of the package and the transport index does not exceed 10 (See Section 71.4 "Definitions"). For a package transported as exclusive use by rail, highway, or water, radiation levels external to the package may exceed those limits, but must not exceed any of the following:

(a) 200 millirem/hour on the accessible external surface of the package unless the following conditions are met, in which case the limit is 1000 millirem per hour:

- (1) The shipment is made in a closed transport vehicle;
- (2) Provisions are made to secure the package so that its position within the vehicle remains fixed during transportation; and
- (3) There are no loading or unloading operations between the beginning and end of the transportation;

(b) 200 millirem/hour at any point on the outer surface of the vehicle, including the upper and lower surfaces, or, in the case of an open vehicle, at any point on the vertical planes projected from the outer edges of the vehicle, on the upper surface of the load, and on the lower external surface of the vehicle;

(c) 10 millirem/hour at any point two meters from the vertical planes represented by the outer lateral surfaces of the vehicle, or, in the case of an open vehicle, at any point two meters from the vertical planes projected from the outer edges of the conveyance; and

(d) Two millirem/hour in any normally occupied positions of the vehicle, except that this provision does not apply to private motor carriers when persons occupying these positions are provided with special health supervision, personnel radiation exposure monitoring devices, and training in accordance with Section 19.12 of this chapter.

[10 CFR 71.47]

1.3.1.6.4C3 (a) A Type B package, in addition to satisfying the requirements of Section 71.41 through 71.47 must be designed, constructed, and prepared for shipment so that under the tests specified in:

(1) Section 71.71 (Normal Conditions of Transport), there would be no loss or dispersal of radioactive contents, as demonstrated to a sensitivity of 10^{-6} A₂ per hour, no significant increase in external radiation levels, and no substantial reduction in the effectiveness of the packaging; and

(2) Section 71.73 (Hypothetical Accident Conditions), there would be no escape of krypton-85 exceeding 10,000 curies in one week, no escape of other radioactive material exceeding a total amount A₂ in one week, and no external radiation dose rate exceeding one rem per hour at one meter from the external surface of the package.

(b) Compliance with the permitted activity release limits of paragraph (a) of this section must not depend upon filters or upon a mechanical cooling system.

[10 CFR 71.51]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.1.6.4.1 Function Description: Unmate Loaded Shipping Cask From Loading Port

I. Function ID Number: 1.3.1.6.4.1

II. Function Title: Unmate Loaded Shipping Cask From Loading Port

III. Function Definition:

The shipping cask is disconnected from the unloading port after the replacement of the cask lid and the port plug.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.6.4.2 Function Description: Tighten Loaded Shipping Cask Lid

I. **Function ID Number:** 1.3.1.6.4.2

II. **Function Title:** Tighten Loaded Shipping Cask Lid

III. **Function Definition:**

The cask lid fasteners are tightened to seal the shipping cask in preparation for shipment.

IV. **Interfaces:**

A. **Inputs:** None identified at this time

B. **Outputs:** None identified at this time

V. **Function Requirements:**

A. **Constraints:**

1.3.1.6.4.2C1 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: ...

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

[10 CFR 71.87]

B. **Performance:** Requirements at this level to be specified

C. **Interface:** Requirements at this level to be specified

Table F1.3.1.6.4.3 Function Description: Inert Loaded Shipping Cask Cavity

I. **Function ID Number:** 1.3.1.6.4.3

II. **Function Title:** Inert Loaded Shipping Cask Cavity

III. Function Definition:

The cask cavity atmosphere is evacuated and backfilled with an inert gas to prevent SNF degradation, and the seal integrity is verified.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements:

A. Constraints:

1.3.1.6.4.3C1 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: ...

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

[10 CFR 71.87]

1.3.1.6.4.3C2 (d) After each test, leak-tightness or indispersibility of the specimen must be determined by a method no less sensitive than the following leaching assessment procedure. For a capsule resistant to corrosion by water, and which has an internal void volume greater than 0.1 milliliters, an alternative to the leaching assessment is a demonstration of leak-tightness of 10^{-4} torr-l/s (1.3×10^{-4} atm cm^3/s) (based on air at 25°C and one atmosphere differential pressure) for solid radioactive content, or 10 torr⁻⁶l/s (1.3×10^{-6} atm cm^3/s) for liquid or gaseous radioactive content.

(1) The specimen must be immersed for seven days in water at ambient temperature. The water must have a pH of 6 - 8 and a maximum conductivity of 10 [mu]mho/cm at 20°C (68°F). Encapsulated material is not subject to the seven-day requirement.

(2) The water with specimen must then be heated to a temperature of 50° +/- 5°C (122° +/- 9°F) and maintained at this temperature for four hours.

(3) The activity of the water must be determined at that time.

(4) The specimen must then be stored for at least seven days in still air of humidity not less than 90% and a temperature not less than 30°C (86°F).

(5) The specimen must then be immersed in water having a pH of 6 - 8 and a maximum conductivity of 10 [mu]mho/cm at 20°C, and the water with specimen heated to 50° +/- 5°C (122° +/- 9°F) and maintained at this temperature for four hours.

(6) The activity of the water must be determined at that time.

(7) The activities determined in paragraphs (c)(3) and (6) of this section must not exceed 0.05 [μ]Ci.

[10 CFR 71.75]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.1.6.4.4 Function Description: Survey/Decontaminate Cask Externals

I. Function ID Number: 1.3.1.6.4.4

II. Function Title: Survey/Decontaminate Cask Externals

III. Function Definition:

The shipping cask exterior is surveyed and, if required, cleaned of radioactive contamination.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements:

A. Constraints:

1.3.1.6.4.4C1 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: ...

(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	
	$\mu\text{Ci}/\text{cm}^2$	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;

[10 CFR 71.87(i)]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.1.6.4.5 Function Description: Transfer Shipping Cask From Cask Mover To Carriage

I. Function ID Number: 1.3.1.6.4.5

II. Function Title: Transfer Shipping Cask From Cask Mover To Carriage

III. Function Definition:

The shipping cask is moved from the cask mover to the carriage.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.6.4.6 Function Description: Replace Tiedowns/Impact Limiters/Personnel Barriers

I. Function ID Number: 1.3.1.6.4.6

II. Function Title: Replace Tiedowns/Impact Limiters/Personnel Barriers

III. Function Definition:

The tiedowns, impact limiters and the personnel barriers are replaced on the shipping cask/carriage.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements:

A. Constraints:

1.3.1.6.4.6C1 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: ...

(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 Section 71.45;

[10 CFR 71.87]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.1.6.4.7 Function Description: Park Loaded Cask/Carriage

I. Function ID Number: 1.3.1.6.4.7

II. Function Title: Park Loaded Cask/Carriage

III. Function Definition:

The loaded shipping cask/carriage is moved to the cask/carriage parking area using an onsite tractor and parked, pending shipment to the geologic repository.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.6.5 Function Description: Prepare Cask/Carriage For Release From Site

I. Function ID Number: 1.3.1.6.5

II. Function Title: Prepare Cask/Carriage For Release From Site

III. Function Definition:

A loaded shipping cask/carriage is released for shipment to the geologic repository; an empty shipping cask/carriage is released for shipment to a waste producer to pick up SNF.

IV. Interfaces:

A. Inputs:

1.3.1.6.5I1	Loaded SNF Cask/Carriage (Rail, Sealed)	From: Function 1.3.1.6.4
1.3.1.6.5I2	Empty SNF Cask/Carriage (Rail)	From: Function 1.3.1.1 /1.3.1.2 / 1.3.1.3

B. Outputs:

1.3.1.6.5O1	Loaded SNF Cask/Carriage (Rail)	To: Function 1.2
1.3.1.6.5O2	Empty Cask/Carriage (Rail)	To: Function 1.2
1.3.1.6.5O3	Manifests	To: Function 1.2

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.6.5.1 Function Description: Move Loaded/Empty Cask/Carriage From Parking Area To Controlled Shipping/Receiving Area

I. Function ID Number: 1.3.1.6.5.1

II. Function Title: Move Loaded/Empty Cask/Carriage From Parking Area To Controlled Shipping/Receiving Area

III. Function Definition:

Loaded and empty shipping cask/carriages are moved by an onsite tractor from the parking area to the shipping/receiving area.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.6.5.2 Function Description: Perform Final Survey

I. Function ID Number: 1.3.1.6.5.2

II. Function Title: Perform Final Survey

III. Function Definition:

The shipping cask is inspected to verify the absence of smearable contamination and its integrity, prior to final release from the MRS.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.6.5.3 Function Description: Perform Final Carrier Inspection

I. Function ID Number: 1.3.1.6.5.3

II. Function Title: Perform Final Carrier Inspection

III. Function Definition:

The carrier is inspected to verify its condition is satisfactory, prior to final release from the MRS.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.6.5.4 Function Description: Release Loaded/Empty Cask/Carriage System

I. Function ID Number: 1.3.1.6.5.4

II. Function Title: Release Loaded/Empty Cask/Carriage System

III. Function Definition:

The shipping cask/carriage is certified to be released from the MRS, to either pick up SNF from a waste producer or to deliver a shipment of SNF to the geologic repository.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.6.5.4.1 Function Description: Prepare Shipping Papers

I. Function ID Number: 1.3.1.6.5.4.1

II. Function Title: Prepare Shipping Papers

III. Function Definition:

The shipping papers, or manifest, are prepared with the appropriate documentation to describe the shipment of SNF.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

(7) Keys, locks, combinations, and related equipment shall be controlled to minimize the possibility of compromise and promptly changed whenever there is evidence that they have been compromised. Upon termination of employment of any employee, keys, locks, combinations, and related equipment to which that employee had access shall be changed.

[10 CFR 73.50]

1.3.4.4.2C5 (d) Detection aids. (1) All alarms required pursuant to this part shall annunciate in a continuously manned central alarm station located within the protected area and in at least one other continuously manned station, not necessarily within the protected area, such that a single act cannot remove the capability of calling for assistance or otherwise responding to an alarm. All alarms shall be self-checking and tamper indicating. The annunciation of an alarm at the onsite central alarm station shall indicate the type of alarm (e.g., intrusion alarm, emergency exit alarm, etc.) and location. All intrusion alarms, emergency exit alarms, alarm systems, and line supervisory systems shall at minimum meet the performance and reliability levels indicated by GSA Interim Federal Specification W-A-00450 B (GSA-FSS).

(2) All emergency exits in each protected area and each vital area shall be alarmed.

[10 CFR 73.50]

1.3.4.4.2C6 (e) Communication requirements. (1) Each guard or watchman on duty shall be capable of maintaining continuous communication with an individual in a continuously manned central alarm station within the protected area, who shall be capable of calling for assistance from other guards and watchmen and from local law enforcement authorities.

(2) The alarm stations required by paragraph (d)(1) of this section shall have conventional telephone service for communication with the law enforcement authorities as described in paragraph (e)(1) of this section.

(3) To provide the capability of continuous communication, two-way radio voice communication shall be established in addition to conventional telephone service between local law enforcement authorities and the facility and shall terminate at the facility in a continuously manned central alarm station within the protected area.

(4) All communications equipment, including offsite equipment, shall remain operable from independent power sources in the event of loss of primary power.

[10 CFR 73.50]

1.3.4.4.2C7 (f) Testing and maintenance. Each licensee shall test and maintain intrusion alarms, emergency alarms, communications equipment, physical barriers, and other security related devices or equipment utilized pursuant to this section as follows:

organization to be initiated at the time of penetration of the protected area. Parking facilities, both for employees and visitors, shall be located outside the isolation zone.

(5) Isolation zones and clear areas between barriers shall be provided with illumination sufficient for the monitoring required by paragraphs (b) (3) and (4) of this section, but not less than 0.2 foot candles.

[10 CFR 73.50]

1.3.4.4.2C4 (c) Access requirements. The licensee shall control all points of personnel and vehicle access into a protected area, including shipping or receiving areas, and into each vital area. Identification of personnel and vehicles shall be made and authorization shall be checked at such points.

(2) All packages being delivered into the protected area shall be checked for proper identification and authorization. Packages other than hand-carried packages shall be searched at random intervals.

(3) A picture badge identification system shall be used for all individuals who are authorized access to protected areas without escort.

(4) Access to vital areas and material access areas shall be limited to individuals who are authorized access to vital equipment or special nuclear material and who require such access to perform their duties. Authorization for such individuals shall be provided by the issuance of specially coded numbered badges indicating vital areas and material access areas to which access is authorized. Unoccupied vital areas and material access areas shall be protected by an active intrusion alarm system.

(5) Individuals not employed by the licensee must be escorted by a watchman, or other individual designated by the licensee, while in a protected area and must be badged to indicate that an escort is required. In addition, the licensee shall require that each individual not employed by the licensee register his or her name, date, time, purpose of visit, employment affiliation, citizenship, name and badge number of the escort, and name of the individual to be visited. The licensee shall retain the register of information for three years after the last entry is made in the register. Except for a driver of a delivery or service vehicle, an individual not employed by the licensee who requires frequent and extended access to a protected area or a vital area need not be escorted if the individual is provided with a picture badge, which the individual must receive upon entrance into the protected area and return each time he or she leaves the protected area, that indicates--

(i) Nonemployee - no escort required,

(ii) Areas to which access is authorized, and

(iii) The period for which access has been authorized.

(6) No vehicles used primarily for the conveyance of individuals shall be permitted within a protected area except under emergency conditions.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements:

A. Constraints:

1.3.4.4.2C1 ... must demonstrate how the applicant plans to comply with the applicable requirements of Part 73 of this chapter ... and must include the design for physical protection ...

[10 CFR 72.180]

1.3.4.4.2C2 (a) Each licensee shall provide physical protection against radiological sabotage and against theft of special nuclear material at the fixed sites where licensed activities are conducted. Physical security systems shall be established and maintained by the licensee in accordance with security plans approved by the Nuclear Regulatory Commission.

[10 CFR 73.40]

1.3.4.4.2C3 Each licensee who possesses, uses, or stores formula quantities of strategic special nuclear material which is not readily separable from other radioactive material and which has a total external radiation dose rate in excess of 100 rems per hour at a distance of 3 feet from any accessible surface without intervening shielding other than at a nuclear reactor facility licensed pursuant to Part 50 of this chapter shall comply with the following:

(b) Physical barriers. (1) The licensee shall locate vital equipment only within a vital area, which, in turn, shall be located within a protected area such that access to vital equipment requires passage through at least two physical barriers. More than one vital area may be within a single protected area.

(2) The licensee shall locate material access areas only within protected areas such that access to the material access area requires passage through at least two physical barriers. More than one material access area may be within a single protected area.

(3) The physical barrier at the perimeter of the protected area shall be separated from any other barrier designated as a physical barrier within the protected area, and the intervening space monitored or periodically checked to detect the presence of persons or vehicles so that the facility security organization can respond to suspicious activity or to the breaching of any physical barrier.

(4) An isolation zone shall be maintained around the physical barrier at the perimeter of the protected area and any part of a building used as part of that physical barrier. The isolation zone shall be monitored to detect the presence of individuals or vehicles within the zone so as to allow response by armed members of the license security

licensee shall retain a copy of the current inventory as a record until the Commission terminates the license.

(c) Each licensee shall establish, maintain, and follow written material control and accounting procedures that are sufficient to enable the licensee to account for material in storage. The licensee shall retain a copy of the current material control and accounting procedures until the Commission terminates the license.

(d) Records of spent fuel ... in storage must be kept in duplicate. The duplicate set of records must be kept at a separate location sufficiently remote from the original records that a single event would not destroy both sets of records. Records of spent fuel transferred out of an ... MRS must be preserved for a period of five years after the date of transfer.

[10 CFR 72.72]

1.3.4.4.1.C2 (c) Records that are required by the regulations in this part or by the license conditions must be maintained for the period specified by the appropriate regulation or license condition. If a retention period is not otherwise specified, the above records must be maintained until the Commission terminates the license.

[10 CFR 72.80]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.4.4.2 Function Description: Maintain Physical Security

I. Function ID Number: 1.3.4.4.2

II. Function Title: Maintain Physical Security

III. Function Definition:

Physical security is maintained to protect the SNF from sabotage, diversion, incidental damage, or tampering.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.4.1 Function Description: Safeguard SNF

I. Function ID Number: 1.3.4.4.1

II. Function Title: Safeguard SNF

III. Function Definition:

Material control and accountability of SNF is maintained to fulfill national security and IAEA objectives during all phases of operation.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements:

A. Constraints:

1.3.4.4.1.C1 (a) Each licensee shall keep records showing the receipt, inventory (including location), disposal, acquisition, and transfer of all spent fuel ... in storage. The records must include as a minimum the name of shipper of the material to the ... MRS, the estimated quantity of radioactive material per item (including special nuclear material in spent fuel), item identification and seal number, storage location, onsite movements of each fuel assembly or storage canister, and ultimate disposal. These records for spent fuel at an ... MRS must be retained for as long as the material is stored and for a period of five years after the material is disposed of or transferred out of the ... MRS.

(b) Each licensee shall conduct a physical inventory of all spent fuel ... in storage at intervals not to exceed 12 months unless otherwise directed by the Commission. The

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.3.2 Function Description: Maintain Buildings

I. Function ID Number: 1.3.4.3.2

II. Function Title: Maintain Buildings

III. Function Definition:

All onsite buildings are maintained so that the desired level of operations is achieved.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.4 Function Description: Provide Protective Services

I. Function ID Number: 1.3.4.4

II. Function Title: Provide Protective Services

III. Function Definition:

Protective services are provided to protect the health and safety of the public and onsite MRS personnel, national security and IAEA objectives, and the environment.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.3 Function Description: Maintain Operating Facilities

I. Function ID Number: 1.3.4.3

II. Function Title: Maintain Operating Facilities

III. Function Definition:

The operating facilities are maintained in good operating condition so that the MRS throughput schedule is achieved.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.3.1 Function Description: Maintain Equipment

I. Function ID Number: 1.3.4.3.1

II. Function Title: Maintain Equipment

III. Function Definition:

All onsite equipment and shops are maintained to support the desired level of operations.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.2.5 Function Description: Provide Technical Services

I. Function ID Number: 1.3.4.2.5

II. Function Title: Provide Technical Services

III. Function Definition:

Technical services, including data analysis, inspections, tests and evaluations, are provided to support SNF storage operations.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.2.6 Function Description: Acquire Offsite Services

I. Function ID Number: 1.3.4.2.6

II. Function Title: Acquire Offsite Services

III. Function Definition:

Additional offsite services are acquired, as necessary, to support operations.

C. Interface: Requirements at this level to be specified

Table F1.3.4.2.3 Function Description: Provide Central Stores

I. Function ID Number: 1.3.4.2.3

II. Function Title: Provide Central Stores

III. Function Definition:

Central storage facilities are provided for warehousing, and inventory management of materials needed to operate and maintain SNF transfer and storage facilities and operations.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.2.4 Function Description: Provide Onsite Transportation

I. Function ID Number: 1.3.4.2.4

II. Function Title: Provide Onsite Transportation

III. Function Definition:

Onsite transportation (e.g. maintenance, security vehicles) is provided to move personnel and material around the site.

(i) Increase the probability or consequences of an accident or malfunction of components, structures, or systems that are important to safety; or

(ii) Reduce the margin of safety as defined in the basis for any technical specifications of either facility.

[10 CFR 72.122]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.4.2.2 Function Description: Provide HVAC

I. Function ID Number: 1.3.4.2.2

II. Function Title: Provide HVAC

III. Function Definition:

Heating, ventilation, and air conditioning (HVAC) are provided in those areas that require it to protect the health and safety of the public, MRS personnel, and to maintain the integrity of the SNF.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements:

A. Constraints:

1.3.4.2.2C1 (h)(3) Ventilation systems and off-gas systems must be provided where necessary to ensure the confinement of airborne radioactive particulate materials during normal or off-normal conditions.

[10 CFR 72.122]

B. Performance: Requirements at this level to be specified

V. Function Requirements:

A. Constraints:

1.3.4.2.1C1 (a) In General. -- (1) Prohibition. -- Any pipe, solder, or flux, which is used after the enactment of the Safe Drinking Water Act Amendments of 1986, in the installation or repair of-

(A) any public water system, or

(B) any plumbing in a residential or nonresidential facility providing water for human consumption which is connected to a public water system.

shall be lead free (within the meaning of subsection (d)). This paragraph shall not apply to leaded joints necessary for the repair of cast iron pipes ...

(d) Definition of Lead Free. -- For purposes of this section, the term "lead free" -

(1) when used with respect to solders and flux refers to solders and flux containing not more than 0.2 percent lead, and

(2) when used with respect to pipes and pipe fittings refers to pipes and pipe fitting containing not more than 8.0 percent lead.

[42 USC 300f et.seq, Section 300g-6]

1.3.4.2.1C2 This requirement intentionally left blank.

1.3.4.2.1C3 (k) Utility or other services. (1) Each utility service system must be designed to meet emergency conditions. The design of utility services and distribution systems that are important to safety must include redundant systems to the extent necessary to maintain, with adequate capacity, the ability to perform safety functions assuming a single failure.

(2) Emergency utility services must be designed to permit testing of the functional operability and capacity, including the full operational sequence, of each system for transfer between normal and emergency supply sources; and to permit the operation of associated safety systems.

(3) Provisions must be made so that, in the event of a loss of the primary electric power source or circuit, reliable and timely emergency power will be provided to instruments, utility service systems, the central security alarm station, and operating systems, in amounts sufficient to allow safe storage conditions to be maintained and to permit continued functioning of all systems essential to safe storage.

(4) An ... MRS which is located on the site of another facility may share common utilities and services with such a facility and be physically connected with the other facility; however, the sharing of utilities and services or the physical connection must not significantly:

Table F1.3.4.2 Function Description: Provide Operations Support

I. Function ID Number: 1.3.4.2

II. Function Title: Provide Operations Support

III. Function Definition:

All services needed to support operations are provided.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.2.1 Function Description: Provide Utilities

I. Function ID Number: 1.3.4.2.1

II. Function Title: Provide Utilities

III. Function Definition:

Utilities (e.g., electricity, water, sewer, communications, fuel, gas) are provided by both onsite and offsite means, with backup sources for utilities serving systems important to safety.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

Table F1.3.4.1.1 Function Description: Construct Storage Area

I. Function ID Number: 1.3.4.1.1

II. Function Title: Construct Storage Area

III. Function Definition:

A storage area is constructed in which to place modular storage units.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.1.2 Function Description: Construct Storage Units/Confinement Systems

I. Function ID Number: 1.3.4.1.2

II. Function Title: Construct Storage Units/Confinement Systems

III. Function Definition:

The modular storage units necessary to provide confinement for the SNF during storage are constructed or fabricated.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

IV. Interfaces:

A. Inputs:

1.3.4I1	Site-Generated Waste	From:	Function 1.3.1 / 1.3.3
1.3.4I2	Data	From:	Function 1.3.2

B. Outputs:

1.3.4O1	Site-Generated Waste	To:	Outside System Boundary
1.3.4O2	Records	To:	Outside System Boundary
1.3.4O3	Storage Confinement Systems	To:	1.3.2
1.3.4O4	Empty Storage Units	To:	1.3.1

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.1 Function Description: Construct Dry Storage Facilities

I. Function ID Number: 1.3.4.1

II. Function Title: Construct Dry Storage Facilities

III. Function Definition:

Storage facilities will continue to be constructed during the operation of the MRS.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

V. Function Requirements:

A. Constraints

1.3.3C1 The choice of the alternative for decommissioning with a description of activities involved. An alternative is acceptable if it provides for completion of decommissioning without significant delay.

[10 CFR 72.54 (b)(1)]

1.3.3C2 ... the decommissioning will be performed in accordance with the regulations in this chapter and will not be inimical to the common defense and security or to the health and safety of the public

[10 CFR 72.54(d)]

1.3.3C3 ... MRS and site are suitable for release for unrestricted use.

[10 CFR 72.54 (e)(2)]

1.3.3C4 ... MRS must be designed for decommissioning. Provisions must be made to facilitate decontamination of structures and equipment, minimize the quantity of radioactive wastes and contaminated equipment, and facilitate the removal of radioactive wastes and contaminated materials at the time the ... MRS is permanently decommissioned.

[10 CFR 72.130]

B. Performance Requirements at this level to be specified

C. Interface Requirements at this level to be specified

Table F1.3.4 Function Description: Support SNF Storage Operations

I. Function ID Number: 1.3.4

II. Function Title: Support SNF Storage Operations

III. Function Definition:

All functions necessary to support the operation and maintenance of an MRS facility.

III. Function Definition:

If required, any anomalies in the storage unit seal integrity are identified so that corrective actions can be taken to prevent SNF diversion.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.3 Function Description: Decommission MRS

I. Function ID Number: 1.3.3

II. Function Title: Decommission MRS

III. Function Definition:

"Decommission" means to remove (as a facility) safely from service and reduce residual radioactivity to a level that permits release of the property for unrestricted use and termination of license. [10 CFR 72.3]

Decommission MRS consists of removing SNF, low level radioactive waste, decontamination and dismantling of the facility, restoring the site for unrestricted use, verification of non-contaminated status and release of the property for unrestricted use.

IV. Interfaces:

A. Inputs:

1.3.311 Dry Storage Facilities	From: MRS
1.3.312 Waste Handling Facilities	From: MRS

B. Outputs:

1.3.301 Site-Generated Waste	To: Function 1.3.4
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(c) Each licensee shall establish, maintain, and follow written material control and accounting procedures that are sufficient to enable the licensee to account for material in storage. The licensee shall retain a copy of the current material control and accounting procedures until the Commission terminates the license.

[10 CFR 72.72]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.2.3.2.2 Function Description: Check Storage Unit Tamper Indicating Seals

I. Function ID Number: 1.3.2.3.2.2

II. Function Title: Check Storage Unit Tamper Indicating Seals

III. Function Definition:

The seal on each storage unit is checked periodically to verify its integrity.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.2.3.2.3 Function Description: Identify Anomalies (2)

I. Function ID Number: 1.3.2.3.2.3

II. Function Title: Identify Anomalies (2)

movements of each fuel assembly or storage canister, and ultimate disposal. These records for spent fuel at an ... MRS must be retained for as long as the material is stored and for a period of five years after the material is disposed of or transferred out of the ... MRS.

(d) Records of spent fuel ... in storage must be kept in duplicate. The duplicate set of records must be kept at a separate location sufficiently remote from the original records that a single event would not destroy both sets of records. Records of spent fuel transferred out of an ... MRS must be preserved for a period of five years after the date of transfer.

[10 CFR 72.72]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.2.3.2.1 Function Description: Account For SNF Items

I. Function ID Number: 1.3.2.3.2.1

II. Function Title: Account for SNF Items

III. Function Definition:

The accountability for each SNF assembly, can of SNF, storage unit, and contents thereof, is maintained.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements:

A. Constraints:

1.3.2.3.2.1C1 (b) Each licensee shall conduct a physical inventory of all spent fuel ... in storage at intervals not to exceed 12 months unless otherwise directed by the Commission. The licensee shall retain a copy of the current inventory as a record until the Commission terminates the license.

III. Function Definition:

If required, any anomalies in radiological or thermal output are identified so that corrective actions can be taken to minimize adverse impacts on the SNF integrity.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.2.3.2 Function Description: Account For SNF

I. Function ID Number: 1.3.2.3.2

II. Function Title: Account For SNF

III. Function Definition:

The condition and location of all SNF received at, stored in, and shipped from the MRS is recorded and maintained.

IV. Interfaces:

A. Inputs:

1.3.2.3.2I1 Inventory Data From: Function 1.3.2.2

B. Outputs:

1.3.2.3.2O1 Data To: Function 1.3.4

V. Function Requirements:

A. Constraints

1.3.2.3.2C1 (a) Each licensee shall keep records showing the receipt, inventory (including location), disposal, acquisition, and transfer of all spent fuel ... in storage. The records must include as a minimum the name of shipper of the material to the ... MRS, the estimated quantity of radioactive material per item (including special nuclear material in spent fuel), item identification and seal number, storage location, onsite

III. Function Definition:

Radiological and thermal data indicating the condition of the SNF storage system are collected.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.2.3.1.2 Function Description: Assess Data

I. Function ID Number: 1.3.2.3.1.2

II. Function Title: Assess Data

III. Function Definition:

The radiological and thermal data collected is assessed to evaluate the condition of the SNF storage system.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.2.3.1.3 Function Description: Identify Anomalies (1)

I. Function ID Number: 1.3.2.3.1.3

II. Function Title: Identify Anomalies (1)

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.2.3.1 Function Description: Monitor Radiological/Thermal Condition

I. Function ID Number: 1.3.2.3.1

II. Function Title: Monitor Radiological/Thermal Condition

III. Function Definition:

The radiological and thermal conditions of the storage system are monitored and maintained to assure that safe storage conditions are maintained.

IV. Interfaces:

A. Inputs:

1.3.2.3.111	Federally-Permitted Radiation Exposure	From: Function 1.3.2.2
1.3.2.3.112	Decay Heat	From: Function 1.3.2.2

B. Outputs:

1.3.2.3.101	Data	To: Function 1.3.4
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V. Function Requirements: Requirements at this level to be specified

Table F1.3.2.3.1.1 Function Description: Collect Data

I. Function ID Number: 1.3.2.3.1.1

II. Function Title: Collect Data

I. Function ID Number: 1.3.2.3

II. Function Title: Monitor SNF Storage System

III. Function Definition:

The SNF storage system is monitored to detect any abnormal SNF storage conditions.

IV. Interfaces:

A. Inputs:

1.3.2.3I1	Inventory Data	From: Function 1.3.2.2
1.3.2.3I2	Decay Heat	From: Function 1.3.2.2
1.3.2.3I3	Federally-Permitted Radiation Exposure	From: Function 1.3.2.2

B. Outputs:

1.3.2.3O1	Data	To: Function 1.3.4
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V. Function Requirements:

A. Constraints:

1.3.2.3C1 (c)(3) Surveillance requirements. Surveillance requirements include:

(i) Inspection and monitoring of spent fuel ... in storage;

(ii) inspection, test and calibration activities to ensure that the necessary integrity of required systems and components is maintained;

(iii) confirmation that operation of the ... MRS is within the required functional and operating limits; and

(iv) confirmation that the limiting conditions required for safe storage are met.
[10 CFR 72.44]

1.3.2.3C2 (h)(4) Storage confinement systems must have the capability for continuous monitoring in a manner such that the licensee will be able to determine when corrective action needs to be taken to maintain safe storage conditions.
[10 CFR 72.122]

1.3.2.1P2 Requirements at this level to be specified

Table F1.3.2.2 Function Description: Maintain Storage System Containment

I. Function ID Number: 1.3.2.2

II. Function Title: Maintain Storage System Containment

III. Function Definition:

SNF containment within the storage system is maintained under all credible accidents and natural phenomena.

IV. Interfaces:

A. Inputs:

1.3.2.2I1	Loaded Storage Units	From: Function 1.3.2.1
1.3.2.2I2	Decay Heat	From: Function 1.3.2.1
1.3.2.2I3	Storage Confinement Systems	From: Function 1.3.2.1

B. Outputs:

1.3.2.2O1	Loaded Storage Units	To: Function 1.3.1
1.3.2.2O2	Storage Confinement Systems	To: Function 1.3.3/1.3.4
1.3.2.2O3	Inventory Data	To: Function 1.3.2.3
1.3.2.2O4	Federally-Permitted Radiation Exposure	To: Function 1.3.2.3/Accessible Environment
1.3.2.2O5	Decay Heat	To: Function 1.3.2.3/Accessible Environment

V. Function Requirements: Requirements at this level to be specified

Table F1.3.2.1 Function Description: Maintain SNF Integrity

I. Function ID Number: 1.3.2.1

II. Function Title: Maintain SNF Integrity

III. Function Definition:

The SNF integrity is maintained by preventing oxidation, corrosion and removing decay heat.

IV. Interfaces:

A. Inputs:

1.3.2.1I1	Loaded Storage Units	From: Function 1.3.1
1.3.2.1I2	Storage Confinement Systems	From: Function 1.3.4

B. Outputs:

1.3.2.1O1	Loaded Storage Units	To: Function 1.3.2.2
1.3.2.1O2	Decay Heat	To: Function 1.3.2.2
1.3.2.1O3	Storage Confinement Systems	To: Function 1.3.2.2

V. Function Requirements:

A. Constraints:

1.3.2.1C1 (h) Confinement barriers and systems. (1) The spent fuel cladding must be protected during storage against degradation that leads to gross ruptures or the fuel must be otherwise confined such that degradation of the fuel during storage will not pose operational safety problems with respect to its removal from storage. This may be accomplished by canning of consolidated fuel rods or unconsolidated assemblies or other means as appropriate.

[10 CFR 72.122]

B. Performance:

1.3.2.1P1 The SNF clad temperature shall be maintained equal to or less than 375 degrees Celsius in an inert or non reactive atmosphere.

[TBD]

important to safety. These conditions need not categorically disqualify a person, if appropriate provisions are made to accommodate such defect.

[10 CFR 72.194]

1.3.2C5 Each application for a license under this part must include a Safety Analysis Report describing the proposed ... MRS for the receipt, handling, packaging, and storage of spent fuel or high-level radioactive waste, including how the ... MRS will be operated. The minimum information to be included in this report must consist of the following:

(i) If the proposed ... MRS incorporates structures, systems, or components important to safety whose functional adequacy or reliability have not been demonstrated by prior use for that purpose or cannot be demonstrated by reference to performance data in related applications or to widely accepted engineering principles, an identification of these structures, systems, or components along with a schedule showing how safety questions will be resolved prior to the initial receipt of spent fuel or high-level radioactive waste for storage at the ... MRS.

[10 CFR 72.24]

B. Performance: Requirements at this level to be specified

C. Interface:

1.3.2I1 Requirements at this level to be specified

1.3.2I2 Requirements at this level to be specified

1.3.2O1 Requirements at this level to be specified

1.3.2O2 Requirements at this level to be specified

1.3.2O3 Requirements at this level to be specified

1.3.2O4 The combined radiation dose from output 1.3.1O7 and output 1.3.2O4 will not exceed the dose requirements specified for 1.3O3.

1.3.2O5 The combined dose due to radionuclide release from output 1.3.1O8 and output 1.3.2O5 will not exceed the dose requirements specified for 1.3O4.

(i) Instrumentation and control systems. Instrumentation and control systems must be provided to monitor systems that are important to safety over anticipated ranges for normal operation and off-normal operation. Those instruments and control systems that must remain operational under accident conditions must be identified in the Safety Analysis Report.

(j) Control room or control area. A control room or control area, if appropriate for the ... MRS design, must be designed to permit occupancy and actions to be taken to monitor the ... MRS safely under normal conditions, and to provide safe control of the ... MRS under off-normal or accident conditions.

(l) Retrievability. Storage systems must be designed to allow ready retrieval of spent fuel ... for further processing or disposal.

[10 CFR 72.122]

1.3.2C2 (a) Spent fuel ... storage and handling systems. Spent fuel storage, ... and other systems that might contain or handle radioactive materials associated with spent fuel ... must be designed to ensure adequate safety under normal and accident conditions. These systems must be designed with -

- (1) A capability to test and monitor components important to safety,
- (2) Suitable shielding for radioactive protection under normal and accident conditions,
- (3) Confinement structures and systems,
- (4) A heat-removal capability having testability and reliability consistent with its importance to safety; and
- (5) means to minimize the quantity of radioactive wastes generated.

[10 CFR 72.128]

1.3.2C3 Operation of equipment and controls that have been identified as important to safety in the Safety Analysis Report and in the license must be limited to trained and certified personnel or be under the direct visual supervision of an individual with training and certification in the operation. Supervisory personnel who personally direct the operation of equipment and controls that are important to safety must also be certified in such operations.

[10 CFR 72.190]

1.3.2C4 The physical condition and the general health of personnel certified for the operation of equipment and controls that are important to safety must not be such as might cause operational errors that could endanger other in-plant personnel or the public health and safety. Any condition that might cause impaired judgment or motor coordination must be considered in the selection of personnel for activities that are

into account the limitations of the data and the period of time in which the data have accumulated, and

(ii) Appropriate combinations of the effects of normal and accident conditions and the effects of natural phenomena.

The ... MRS should also be designed to prevent massive collapse of building structures or the dropping of heavy objects as a result of building structural failure on the spent fuel ... or on to structures, systems, and components important to safety.

(3) Capability must be provided for determining the intensity of natural phenomena that may occur for comparison with design bases of structures, systems, and components important to safety.

(4) If the ... MRS is located over an aquifer which is a major water resource, measures must be taken to preclude the transport of radioactive materials to the environment through this potential pathway.

(c) Protection against fires and explosions. Structures, systems, and components important to safety must be designed and located so that they can continue to perform their safety functions effectively under credible fire and explosion exposure conditions. Noncombustible and heat-resistant materials must be used wherever practical throughout the ... MRS, particularly in locations vital to the control of radioactive materials and to the maintenance of safety control functions. Explosion and fire detection, alarm, and suppression systems shall be designed and provided with sufficient capacity and capability to minimize the adverse effects of fires and explosions on structures, systems, and components important to safety. The design of the ... MRS must include provisions to protect against adverse effects that might result from either the operation or the failure of the fire suppression system.

(d) Sharing of structures, systems, and components. Structures, systems, and components important to safety must not be shared between an ... MRS and other facilities unless it is shown that such sharing will not impair the capability of either facility to perform its safety functions, including the ability to return to a safe condition in the event of an accident.

(e) Proximity of sites. An ... MRS located near other nuclear facilities must be designed and operated to ensure that the cumulative effects of their combined operations will not constitute an unreasonable risk to the health and safety of the public.

(f) Testing and maintenance of systems and components. Systems and components that are important to safety must be designed to permit inspection, maintenance, and testing.

(g) Emergency capability. Structures, systems, and components important to safety must be designed for emergencies. The design must provide for accessibility to the equipment of onsite and available offsite emergency facilities and services such as hospitals, fire and police departments, ambulance service, and other emergency agencies.

Table F1.3.2 Function Description: Dry-Store SNF

I. Function ID Number: 1.3.2

II. Function Title: Dry-Store SNF

III. Function Definition:

The SNF is stored in a dry, inert environment to prevent its degradation.

IV. Interfaces:

A. Inputs:

1.3.2I1	Loaded Storage Units	From: Function 1.3.1
1.3.2I2	Storage Confinement Systems	From: Function 1.3.4

B. Outputs:

1.3.2O1	Loaded Storage Units	To: Function 1.3.1
1.3.2O2	Data	To: Function 1.3.4
1.3.2O3	This output intentionally left blank	To: Accessible Environment
1.3.2O4	Federally-Permitted Radiation Exposure	To: Accessible Environment
1.3.2O5	Federally-Permitted Release of Radionuclides	To: Accessible Environment

V. Function Requirements:

A. Constraints:

1.3.2C1 (a) Quality Standards. Structures, systems, and components important to safety must be designed, fabricated, erected, and tested to quality standards commensurate with the importance to safety of the function to be performed.

(b) Protection against environmental conditions and natural phenomena. (1) Structures, systems, and components important to safety must be designed to accommodate the effects of, and to be compatible with, site characteristics and environmental conditions associated with normal operation, maintenance, and testing of the ... MRS and to withstand postulated accidents.

(2) Structures, systems, and components important to safety must be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, lightning, hurricanes, floods, tsunami, and seiches, without impairing their capability to perform safety functions. The design bases for these structures, systems, and components must reflect:

(i) Appropriate consideration of the most severe of the natural phenomena reported for the site and surrounding area, with appropriate margins to take

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.1.6.5.5 Function Description: Attach Offsite Prime Mover and Remove From Site

I. Function ID Number: 1.3.1.6.5.5

II. Function Title: Attach Offsite Prime Mover And Remove From Site

III. Function Definition:

The offsite prime mover is attached to the shipping cask/carriage or an assembly of shipping casks/carriages to transport it to either a waste producer (if empty) or the geologic repository (if loaded).

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

V. Function Requirements:

A. Constraints:

1.3.1.6.5.4.1C1 This requirement intentionally left blank.

1.3.1.6.5.4.1C2 Prior to delivery of a package to a carrier for transport, the licensee shall ensure that any special instructions needed to safely open the package have been sent to or otherwise made available to the consignee for the consignee's use in accordance with Section 20.205 of this chapter.

[10 CFR 71.89]

1.3.1.6.5.4.1C3 (a) Except as provided in paragraph (b) of this section, whenever the licensee transfers or receives spent fuel, the licensee shall complete and distribute a Nuclear Material Transaction Report on DOE/NRC Form-741 in accordance with printed instructions for completing the form.

(b) Any licensee who is required to submit inventory change reports on DOE/NRC Form-741 pursuant to Section 75.34 of this chapter (pertaining to implementation of the US/IAEA Safeguards Agreement) shall prepare and submit such reports only as provided in that section instead of as provided in paragraph (a) of this section.

[10 CFR 72.78]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.1.6.5.4.2 **Function Description: Release Cask/Carriage System**

I. Function ID Number: 1.3.1.6.5.4.2

II. Function Title: Release Cask/Carriage System

III. Function Definition:

The shipping cask/carriage is released from the MRS to go to either a waste producer (if empty) or the geologic repository (if loaded).

(1) All alarms, communications equipment, physical barriers, and other security related devices or equipment shall be maintained in operable and effective condition.

(2) Each intrusion alarm shall be functionally tested for operability and required performance at the beginning and end of each interval during which it is used for security, but not less frequently than once every seven (7) days.

(3) Communications equipment shall be tested for operability and performance not less frequently than once at the beginning of each security personnel work shift.

[10 CFR 73.50]

1.3.4.4.2C8 (c)(1) At the point of personnel and vehicle access into a protected area, all individuals, except employees who possess a NRC or United States Department of Energy access authorization, and all hand-carried packages shall be searched for devices such as firearms, explosives, and incendiary devices, or other items which could be used for radiological sabotage. The search shall be conducted either by a physical search or by the use of equipment capable of detecting such devices. Employees who possess an NRC or Department of Energy access authorization shall be searched at random intervals. Subsequent to search, drivers of delivery and service vehicles shall be escorted at all times while within the protection area.

[10 CFR 73.50]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.4.4.3 Function Description: Maintain Emergency Plan

I. Function ID Number: 1.3.4.4.3

II. Function Title: Maintain Emergency Plan

III. Function Definition:

An emergency plan is maintained to protect the health and safety of both the public and MRS personnel and to mitigate the consequences of an inadvertent release of radionuclides.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements:

A. Constraints

1.3.4.4.3C1 (a) Each licensee shall notify the NRC Operations Center¹ within one hour of discovery of accidental criticality or any loss of special nuclear material.

¹ (Commercial telephone number of the NRC Operations Center is (301)951 - 0550.)

(b) This notification must be made to the NRC Operations Center via the Emergency Notification System if the licensee is party to that system. If the Emergency Notification System is inoperative or unavailable, the licensee shall make the required notification via commercial telephonic service or any other dedicated telephonic system or any other method that will ensure that a report is received by the NRC Operations Center within one hour. The exemption of Section 73.21(g)(3) of this chapter applies to all telephonic reports required by this section.

[10 CFR 72.74(a)(b)]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.4.4.4 Function Description: Provide Emergency Medical Treatment

I. Function ID Number: 1.3.4.4.4

II. Function Title: Provide Emergency Medical Treatment

III. Function Definition:

Onsite emergency medical treatment is available to mitigate the consequence of any onsite operational accidents.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.4.5 Function Description: Provide Fire Protection

I. Function ID Number: 1.3.4.4.5

II. Function Title: Provide Fire Protection

III. Function Definition:

Onsite fire protection is available to mitigate the consequences of any onsite fires or explosions.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.4.6 Function Description: Provide Radiological Protection

I. Function ID Number: 1.3.4.4.6

II. Function Title: Provide Radiological Protection

III. Function Definition:

Radiological protection is provided to maintain the health and safety of both the public and MRS personnel.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements:

A. Constraints:

1.3.4.4.6C1 (a) Exposure control. Radiation protection systems must be provided for all areas and operations where onsite personnel may be exposed to radiation or airborne radioactive materials. Structures, systems, and components for which operation, maintenance, and required inspections may involve occupational exposure must be designed, fabricated, located, shielded, controlled, and tested so as to control external and internal radiation exposures to personnel. The design must include means to:

- (1) Prevent the accumulation of radioactive material in those systems requiring access;
- (2) Decontaminate those systems to which access is required;
- (3) Control access to areas of potential contamination or high radiation within the ... MRS;
- (4) Measure and control contamination of areas requiring access;
- (5) Minimize the time required to perform work in the vicinity of radioactive components; for example, by providing sufficient space for ease of operation and designing equipment for ease of repair and replacement; and
- (6) Shield personnel from radiation exposure.

[10 CFR 72.126]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.4.4.6.1 Function Description: Provide Protective Clothing

I. Function ID Number: 1.3.4.4.6.1

II. Function Title: Provide Protective Clothing

III. Function Definition:

Specialized protective clothing is made available to MRS personnel when needed for safety during operations.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.4.6.2 Function Description: Provide Radiation Warning

I. Function ID Number: 1.3.4.4.6.2

II. Function Title: Provide Radiation Warning

III. Function Definition:

Early warning of any operational abnormalities resulting in excessive radiation levels is provided to operational personnel.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements:

A. Constraints:

1.3.4.4.6.2C1 (b) Radiological alarm systems. Radiological alarm systems must be provided in accessible work areas as appropriate to warn operating personnel of radiation and airborne radioactive material concentrations above a given setpoint and of

concentrations of radioactive material in effluents above control limits. Radiation alarm systems must be designed with provisions for calibration and testing their operability.

(c) Effluent and direct radiation monitoring.

(2) Areas containing radioactive materials must be provided with systems for measuring the direct radiation levels in and around these areas.

[10 CFR 72.126]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.4.4.6.3 Function Description: Record Individual Radiation Exposures

I. Function ID Number: 1.3.4.4.6.3

II. Function Title: Record Individual Radiation Exposures

III. Function Definition:

Cumulative radiation exposures to all MRS personnel are recorded.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.4.6.4 Function Description: Provide Radio-assay Lab

I. Function ID Number: 1.3.4.4.6.4

II. Function Title: Provide Radio-assay Lab

III. Function Definition:

A Radio-assay lab is provided to support the operations personnel working within radiological areas.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.4.6.5 Function Description: Provide Clean Laundry

I. Function ID Number: 1.3.4.4.6.5

II. Function Title: Provide Clean Laundry

III. Function Definition:

Clean laundry is provided to remove site-generated radioactive waste that collects in the clothing used to work in contaminated areas.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.4.7 Function Description: Provide Environmental Monitoring

I. Function ID Number: 1.3.4.4.7

II. Function Title: Provide Environmental Monitoring

III. Function Definition:

A system is maintained to monitor the environment in and around the MRS installation to detect releases from the installation (e.g., air, water, ground, flora, fauna).

... including the results of environmental monitoring programs. [10 CFR 72.70 (b)(1)]

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.5 Function Description: Provide QA/QC Services

I. Function ID Number: 1.3.4.5

II. Function Title: Provide QA/QC Services

III. Function Definition:

A quality assurance/quality control program is certified and implemented to ensure the quality of all onsite operations.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. **Function Requirements:** Requirements at this level to be specified

Table F1.3.4.6 **Function Description: Provide Administrative Support**

I. **Function ID Number:** 1.3.4.6

II. **Function Title:** Provide Administrative Support

III. **Function Definition:**

Administrative support is provided to control the overall operation of the MRS and to interact with local jurisdictions.

IV. **Interfaces:**

A. **Inputs:** None identified at this time

B. **Outputs:** None identified at this time

V. **Function Requirements:**

A. **Constraints:**

1.3.4.6C1 (c)(5) Administrative controls. Administrative controls include the organization and management procedures, recordkeeping, review and audit, and reporting necessary to assure that the operations involved in the storage of spent fuel in an ... MRS are performed in a safe manner.

[10 CFR 72.44]

1.3.4.6C2 5. REQUIREMENTS. The mandatory components of a Federal Employee Occupational Medical Program are as follows:

a. Health Services Personnel.

(1) Health services shall be provided under the direction of a licensed physician, and nursing services shall be provided by licensed professional nurses. To the maximum extent feasible, such physicians and nurses shall be qualified in occupational medicine and occupational nursing.

(2) As an alternative, Heads of Field Organizations may elect to contract for medical services. When this option is selected, licensed physicians and nurses

shall be qualified in occupational medicine and occupational nursing, if possible, and programs shall comply with the requirements of this chapter.

b. **Preplacement Health Evaluation.** Prior to employment, where a hazard is associated with job performance, each employee shall have a complete health evaluation, with special emphasis placed upon the health and physical factors that relate to the hazards of the position. The purpose of this examination is to determine an employee's health status prior to any exposures associated with a job. In addition, it is to determine the employee's physical capabilities and any required accommodations necessary for safe and healthy job performance. The health evaluation shall be performed by the health services staff at no cost to the employee.

c. **Health Screening Evaluation.** Each employee age 45 and over shall be offered a complete health evaluation annually at no cost to the employee.

d. **Job Change or Transfer Health Evaluation.**

(1) Employees who change or transfer job functions with associated hazards (e.g., electrician to lineman or lineman to crane operator) shall have their health status and physical fitness reviewed with emphasis on the effects of the position vacated and the health and physical factors that relate to the new job tasks and demands. The evaluation shall be at no cost to the employee.

(2) Employees who change or transfer from a job function with associated hazards to a job function with negligible associated hazards or vice versa (e.g., courier to file clerk or draftsman to lineman) shall have their health status and physical fitness reviewed with emphasis on the effects of the position vacated or the health and physical factors that relate to the new job tasks and demands, for whichever involves hazards. The evaluation shall be at no cost to the employee.

e. **Retirement or Separation Health Evaluation.** The health status of an employee who is retiring or separating from a position where there is an associated hazard shall be determined by a health evaluation, with emphasis placed upon the health and physical factors of that position. The evaluation shall be at no cost to the employee.

f. **Return to Work (Fitness-for-Duty) Evaluation.** An employee who occupies a position with an associated hazard, who is absent from work more than 3 consecutive workdays due to either an occupational or a nonoccupational illness or injury, shall submit either a health status report from a personal physician (obtained at the employee's expense) to the employee's supervisor stating that the employee is fit to work, or shall undergo a health evaluation by the health services staff (at no cost to the employee) sufficient to ensure that the employee's return to work will be without undue health hazard or accident risk to the employee or others.

g. **Treatment and Medications.** The health services staff shall at their discretion administer the following at no cost to the employee:

(1) Vaccines or other medications furnished by the employee and prescribed in writing by the employee's personal physician as reasonably necessary to maintain the employee's health and well-being while at work; and

(2) Treatment prescribed by a physician providing medical care in performance-of-duty injury or illness cases under the Federal Employee's Compensation Act.

h. Screening Examinations. Tests and immunizations for specific diseases shall be provided as necessary by health services personnel.

i. Health Education and Counseling, provided at no cost to employees, shall include:

(1) Lectures on health and health education materials to promote and encourage employees to improve and maintain personal health;

(2) Individual counseling on health matters; and

(3) Utilization of available Employee Assistance Program services.

j. Treatment of Injuries or Illnesses.

(1) Occupational Injury or illness. Any employee with an occupationally related injury or illness shall be initially examined and treated to allay pain, discomfort, and anxiety without undue delay and at no cost to the employee. The scope and content of the examination and treatment shall be based upon the nature and extent of the injury or illness, and shall be sufficient to determine whether the employee may return to work without undue health hazard or accident risk to the workforce. If necessary, conveyance of the employee to a local hospital emergency room shall be provided.

(2) Nonoccupational Injury or Illness. On-the-job care is given, at no cost to the employee, as necessary to allay pain, discomfort, and anxiety; to allow completion of the workday, and to provide interim care prior to referral of the employee to his or her physician for private medical attention.

k. Emergency Training. Employees shall have the opportunity to receive training in the basic elements of first aid and cardiopulmonary resuscitation (CPR) and CPR refresher training, at no cost to the employee.

l. Medical Emergency Response. Areas with the potential for emergencies shall be identified and a written emergency planning, preparedness, and response program shall be prepared. The medical emergency response capability must include the following:

(1) The ability to treat the initial consequences of potential medical emergencies which might occur on the site and, if necessary, the ability to process injured or sick personnel for transfer to offsite medical emergency facilities; and

(2) The capacity to treat the number of patients and types of illnesses or injuries which are likely to occur on the site.

m. **Emergency Tests and Exercises.** Medical response capabilities shall be conducted periodically for the identified potential emergencies. When practicable, tests and exercises shall be conducted under simulated emergency conditions.

[DOE ORDER 3790.1A, p. VIII-3]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.4.6.1 Function Description: Provide For Human Resources

I. Function ID Number: 1.3.4.6.1

II. Function Title: Provide For Human Resources

III. Function Definition:

Human resource services are provided to maintain and train adequate staffing levels at the MRS during all phases of operation.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

I. Function ID Number: 1.3.4.6.1.1

II. Function Title: Provide Training

III. Function Definition:

Training is provided for onsite personnel so that they can accomplish their functions at the required level of performance.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements:

A. Constraints:

1.3.4.6.1.1C1 2.b.(1) Training for Top Management. Top management shall be provided orientation training which will enable them to manage their programs in a safe manner. Such orientation training should include coverage under section 19 of the Occupational Safety and Health Act of 1970, Executive Order 12196, 29 CFR part 1960, and the DOE's Federal Employee Occupational Safety and Health Program.

(2) Training for Supervisors. Supervisors shall be trained through introductory and specialized courses and materials to recognize and eliminate occupational safety and health hazards in their work units. Such training should also include the development of requisite skills in managing the safety and health program within their work unit, including the training and motivation of subordinates toward safe and healthful work practices.

(3) Training for Employees. Occupational safety and health training for employees shall include specialized job safety and health training appropriate to the work performed. Such training shall also include informing employees of their rights and responsibilities under section 19 of the Occupational Safety and Health Act of 1970, Executive Order 12196, 29 CFR part 1960, and the DOE's Federal Employee Occupational Safety and Health Program.

(4) Training for Representatives of Employees. Training for employees who are representatives of employee groups, such as labor organizations which are recognized by the Department, shall include introductory and specialized courses and materials which will enable such groups to function appropriately in the interest of ensuring safe and healthful working conditions and practices in the workplace and, in particular, to enable them to effectively assist in the conduct of workplace safety and health inspections. Nothing in this paragraph shall be construed to alter the provisions of the Federal Service Labor-Management Relations Statute, other provisions of law providing for

collective bargaining agreements and procedures, or any agreements entered into pursuant to such provisions.

(5) **Training for Safety and Health Professionals.** Safety and health personnel shall be trained through courses, laboratory experiences, field study, and other learning experiences to perform the necessary technical monitoring, consulting, testing, inspecting, designing, and other tasks which will enable them to determine whether applicable standards are being met in the workplace. Training should be designed so as to develop skills in hazard recognition, obtaining qualified evaluations, recommending corrective action, and functioning as consultants to management.

(6) **Training for Collateral Duty Safety Personnel.** Training should be designed so as to develop skills in hazard recognition, obtaining qualified evaluations, recommending corrective action, and functioning as consultants to management.

[DOE Order 3790.1A, p. V-1]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.4.6.1.2 Function Description: Provide Personnel Services

I. Function ID Number: 1.3.4.6.1.2

II. Function Title: Provide Personnel Services

III. Function Definition:

Personnel services are provided to maintain adequate staffing levels during all phases of the MRS operations.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.6.2 Function Description: Maintain Records

I. Function ID Number: 1.3.4.6.2

II. Function Title: Maintain Records

III. Function Definition:

All records pertaining to the operating MRS installation are maintained and protected.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements:

A. Constraints:

1.3.4.6.2C1 (c)(1) Each employer shall make, keep and preserve, and make available to the Secretary (of Labor) or the Secretary of Health and Human Services, such records regarding his activities relating to this chapter as the Secretary, in cooperation with the Secretary of Health and Human Services, may prescribe by regulation as necessary or appropriate for the enforcement of this chapter or for developing information regarding the causes and prevention of occupational accidents and illnesses. In order to carry out the provisions of this paragraph such regulations may include provisions requiring employers to conduct periodic inspections. The Secretary shall also issue regulations requiring that employers, through posting of notices or other appropriate means, keep their employees informed of their protections and obligations under this chapter, including the provisions of applicable standards.

[29 USC 651 et.seq., Section 657]

1.3.4.6.2C2 (a) Each licensee shall maintain for a period of three years after shipment a record of each shipment of licensed material not exempt under Section 71.10, showing, where applicable:

- (1) Identification of the packaging by model number;
- (2) Verification that there are no significant defects in the packaging, as shipped;
- (3) Volume and identification of coolant;
- (4) Type and quantity of licensed material in each package, and the total quantity of each shipment;
- (5) For each item of irradiated fissile material:
 - (i) Identification by model number and/or serial number;

(ii) Irradiation and decay history to the extent appropriate to demonstrate that its nuclear and thermal characteristics comply with license conditions; and

(iii) Any abnormal or unusual condition relevant to radiation safety.

(6) Date of the shipment;

(7) For Fissile Class III and for Type B packages, any special controls exercised;

(8) Name and address of the transferee;

(9) Address to which the shipment was made; and

(10) Results of the determinations required by Section 71.87 and by the conditions of the package approval.

(b) The licensee shall make available to the Commission for inspection, upon reasonable notice, all records required by this part. Records are valid only if stamped, initialed, or signed and dated by authorized personnel or otherwise authenticated.

(c) Each licensee shall maintain sufficient written records to furnish evidence of the quality of packaging. The records to be maintained include results of the determinations required by Section 71.85; design, fabrication, and assembly records; results of reviews, inspections, tests, and audits; results monitoring work performance and materials analyses; and results of maintenance, modification, and repair activities. Inspection, test, and audit records must identify the inspector or data recorder, the type of observation, the results, the acceptability and the action taken in connection with any deficiencies noted. The records must be retained for three years after the life of the packaging to which they apply.

[10 CFR 71.91]

1.3.4.6.2C3 (d) Any record that must be maintained pursuant to this part may be either the original or a reproduced copy by any state of the art method provided that any reproduced copy is duly authenticated by authorized personnel and is capable of producing a clear and legible copy after storage for the period specified by Commission regulations.

[10 CFR 72.80(d)]

1.3.4.6.2C4 (b) The licensee shall have available documentary evidence that material and equipment conform to the procurement specifications prior to installation or use of the material and equipment. The licensee shall retain or have available this documentary evidence for the life of ... MRS. The licensee shall ensure that the evidence is sufficient to identify the specific requirements met by the purchased material and equipment.

[10 CFR 72.154(b)]

1.3.4.6.2C5 The licensee shall maintain sufficient records to furnish evidence of activities affecting quality. The records must include the following: design records, records of use and the results of reviews, inspections, tests, audits, monitoring of work performance, and materials analyses. The records must include closely related data such as qualifications of personnel, procedures, and equipment. Inspection and test records must, at a minimum, identify the inspector or data recorder, the type of observation, the results, the acceptability, and the action taken in connection with any noted deficiencies. Records must be identifiable and retrievable. Records pertaining to the design, fabrication, erection, testing, maintenance, and use of structures, systems, and components important to safety shall be maintained by or under the control of the licensee until the Commission terminates the license.

[10 CFR 72.174]

1.3.4.6.2C6 Records shall be maintained in accordance with DOE 1324.2, RECORDS DISPOSITION.

[DOE Order 3790.1A]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.4.6.3 Function Description: Maintain Institutional and External Relations

I. Function ID Number: 1.3.4.6.3

II. Function Title: Maintain Institutional and External Relations

III. Function Definition:

Relations on institutional and communications matters with surrounding communities and jurisdictions are maintained.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.6.4 Function Description: Maintain Financial Accounting

I. Function ID Number: 1.3.4.6.4

II. Function Title: **Maintain Financial Accounting**

III. Function Definition:

Financial accounting is maintained to provide a sound and responsible fiscal base for the operation of the MRS.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.6.5 Function Description: Provide Office Space For Regulatory Inspector(s)

I. Function ID Number: 1.3.4.6.5

II. Function Title: **Provide Office Space For Regulatory Inspector(s)**

III. Function Definition:

Onsite office space is provided for the exclusive use of NRC inspector(s).

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements:

A. Constraints:

1.3.4.6.5C1 (c)(1) Each licensee under this part shall upon request by the Director, Office of Nuclear Material Safety and Safeguards or the appropriate NRC Regional Administrator provide rent-free office space for the exclusive use of the Commission inspection personnel. Heat, air conditioning, light, electrical outlets and janitorial services shall be furnished by each licensee. The office shall be convenient to and have full access to the installation and shall provide the inspector both visual and acoustic privacy.

[10 CFR 72.82]

1.3.4.6.5C2 (c)(2) For a site with a single storage installation the space provided shall be adequate to accommodate a full-time inspector, a part-time secretary, and transient NRC personnel and will be generally commensurate with other office facilities at the site. A space of 250 sq. ft., either within the site's office complex or in an office trailer, or other onsite space, is suggested as a guide. For sites containing multiple facilities, additional space may be requested to accommodate additional full-time inspectors. The office space that is provided shall be subject to the approval of the Director, Office of Nuclear Material Safety and Safeguards or the appropriate NRC Regional Administrator. All furniture, supplies and Commission equipment will be furnished by the Commission.

[10 CFR 72.82]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.4.7 Function Description: Process Site-Generated Rad-Waste

I. Function ID Number: 1.3.4.7

II. Function Title: Process Site-Generated Rad-Waste

III. Function Definition:

All site-generated waste is collected and processed in preparation for offsite disposal.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements:

A. Constraints:

1.3.4.7C1 (c) Effluent and direct radiation monitoring.

(1) As appropriate for the handling and storage system, effluent systems must be provided. Means for measuring the amount of radionuclides in effluents during normal operations and under accident conditions must be provided for these systems. A means of measuring the flow of the diluting medium, either air or water, must also be provided.

[10 CFR 72.126]

1.3.4.7C2 (b) Waste treatment. Radioactive waste treatment facilities must be provided. Provisions must be made for the packing of site-generated low-level wastes in a form suitable for storage onsite awaiting transfer to disposal sites.

[10 CFR 72.128]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.4.7.1 Function Description: Collect Liquid Rad-Waste

I. Function ID Number: 1.3.4.7.1

II. Function Title: Collect Liquid Rad-Waste

III. Function Definition:

Site-generated liquid rad-waste is collected from the various operations at the MRS in preparation for disposal.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.7.2 Function Description: Collect Solid Rad-Waste

I. Function ID Number: 1.3.4.7.2

II. Function Title: Collect Solid Rad-Waste

III. Function Definition:

Site-generated solid rad-waste is collected from the various operations at the MRS in preparation for disposal.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.7.3 Function Description: Treat/Package/Monitor/Ship Rad-Waste For Offsite Disposal

I. Function ID Number: 1.3.4.7.3

II. Function Title: Treat/Package/Monitor/Ship Rad-Waste For Offsite Disposal

III. Function Definition:

The site-generated rad-waste is treated, packaged, monitored, and shipped offsite for disposal.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements:

A. Constraints:

1.3.4.7.3C1 A package must be designed and prepared for shipment so that the radiation level does not exceed 200 millirem per hour at any point on the external surface of the package and the transport index does not exceed 10 (See 71.4 "Definitions"). For a package transported as exclusive use by rail, highway, or water, radiation levels external to the package may exceed those limits, but must not exceed any of the following:

(a) 200 millirem/hour on the accessible external surface of the package unless the following conditions are met, in which case the limit is 1000 millirem per hour:

(1) The shipment is made in a closed transport vehicle;

(2) Provisions are made to secure the package so that its position within the vehicle remains fixed during transportation; and

(3) There are no loading or unloading operations between the beginning and end of the transportation;

(b) 200 millirem/hour at any point on the outer surface of the vehicle, including the upper and lower surfaces, or, in the case of an open vehicle, at any point on the vertical planes projected from the outer edges of the vehicle, on the upper surface of the load, and on the lower external surface of the vehicle;

(c) 10 millirem/hour at any point two meters from the vertical planes represented by the outer lateral surfaces of the vehicle, or, in the case of an open vehicle, at any point two meters from the vertical planes projected from the outer edges of the conveyance; and

(d) Two millirem/hour in any normally occupied positions of the vehicle, except that this provision does not apply to private motor carriers when persons occupying these positions are provided with special health supervision, personnel radiation exposure monitoring devices, and training in accordance with 19.12 of this chapter.

[10 CFR 71.47]

B. Performance: Requirements at this level to be specified

C. Interface: Requirements at this level to be specified

Table F1.3.4.7.4 **Function Description: Store Packaged Rad-Waste, Pending Offsite Disposal**

I. Function ID Number: 1.3.4.7.4

II. Function Title: Store Packaged Rad-Waste, Pending Offsite Disposal

III. Function Definition:

If required, the site-generated rad-waste is stored and monitored in preparation for offsite disposal.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.8 **Function Description: Control Site-Generated Wastes Other Than Rad-Waste**

I. Function ID Number: 1.3.4.8

II. Function Title: Control Site-Generated Wastes Other Than Rad-Waste

III. Function Definition:

Site generated waste other than radioactive waste is collected, monitored and segregated prior to disposal or offsite release.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.8.1 Function Description: Monitor All Offsite Releases

I. Function ID Number: 1.3.4.8.1

II. Function Title: Monitor All Offsite Releases

III. Function Definition:

A system is maintained to monitor all offsite releases to the environment (e.g.,air, water, site-generated waste).

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.8.2 Function Description: Avoid Use Of RCRA Listed Materials

I. Function ID Number: 1.3.4.8.2

II. Function Title: Avoid Use Of RCRA Listed Materials

III. Function Definition:

A system is maintained to minimize the use of those materials that fall within the scope of RCRA.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.8.3 Function Description: Segregate Hazardous Waste Streams

I. Function ID Number: 1.3.4.8.3

II. Function Title: Segregate Hazardous Waste Streams

III. Function Definition:

A system is maintained to segregate, monitor and collect hazardous waste prior to disposal or offsite release.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements: Requirements at this level to be specified

Table F1.3.4.9 Function Description: [Maintain Shipping Casks]

I. Function ID Number: 1.3.4.9

II. Function Title: [Maintain Shipping Casks]

III. Function Definition:

If required, a shipping cask maintenance facility is provided to perform all operations necessary to maintain and repair the shipping casks.

Note: Collocating the facility with the capability to carry out this function at the MRS is an issue, pending DOE/OCRWM resolution.

IV. Interfaces:

A. Inputs: None identified at this time

B. Outputs: None identified at this time

V. Function Requirements:

A. Constraints Requirements at this level to be specified

B. Performance

1.3.4.9P1 Adequate onsite facilities and capabilities shall be provided to ensure that shipping casks are maintained to meet daily needs and annual inspection requirements. (as delineated in each certificate of compliance)

[TBD]

C. Interface Requirements at this level to be specified

3.0 ARCHITECTURE DESCRIPTION

Architecture is defined herein to be that part of the physical system actually built, found, or selected to perform a function subject to its stated requirements. Figure 7 portrays the architectural concepts that comprise a MRS Installation based on how DOE/OCRWM plans to satisfy its mission.

Tables A.1 - A.1.3.4.9 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. A complete description of the MRS Installation and its components is not possible until more detailed design efforts are completed. Nevertheless, the concepts identified in Figure 7 should improve understanding of the overall concept.

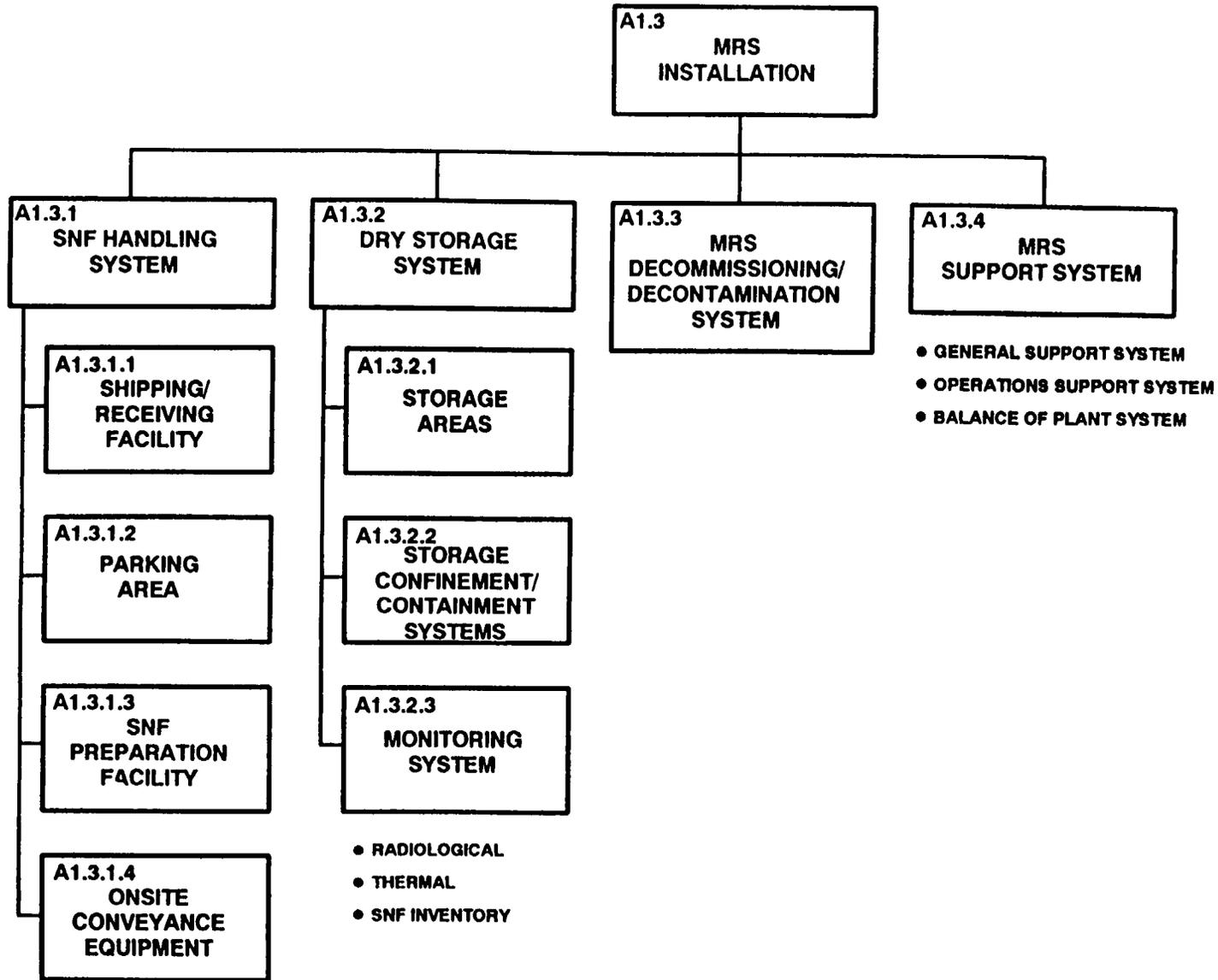


Figure 7. Store Waste Conceptual Architecture Hierarchy.

Table A1. Nuclear Waste Management System

ARCHITECTURE: Nuclear Waste Management System

REQUIREMENTS SATISFIED:

1.C1 - 1.C5; 1.P1; 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 personnel required to perform those activities necessary to manage waste disposal.

Table A1.3 Monitored Retrievable Storage Installation

ARCHITECTURE: Monitored Retrievable Storage Installation

REQUIREMENTS SATISFIED:

1.3C1 - 1.3C17; 1.3P1 - 1.3P5; 1.3I1, 1.3I2; 1.3O1 - 1.3O4

RATIONALE:

- Long-term storage of ... spent nuclear fuel in monitored retrievable storage facilities is an option for providing safe and reliable management of such waste or spent fuel. [NWPA Sec. 141(a)(1)]

- ... waste acceptance at an MRS site could begin, on a limited basis, as early as January 1998; a full-capability MRS facility (i.e., a facility that would store spent fuel as necessary and stage spent-fuel shipments to the repository for final disposal), as recommended in the DOE's May 1989 statement to the MRS Commission, would be available in the year 2000. [DOE/RW-0247 Sec. 2.7.2]

- The DOE ... supports the development of an MRS facility as an integral part of the waste-management system because an integrated MRS facility is critical to achieving the goal of early and timely acceptance of spent fuel and because it would allow the DOE to better meet other strategic objectives, such as timely disposal, schedule confidence, and system flexibility. [DOE/RW-0247, Sec. 4.3]

- The concept preferred by the DOE is an integral MRS facility that is designed to allow development in stages. "Integral" means a facility that is fully integrated into a waste-management system in which all elements and components are optimized as part of a single system. It is an in-line facility that will receive commercial spent fuel, provide a limited amount of storage, provide staging for transportation to the repository, and perform other functions if determined necessary or desirable by future analyses. [DOE/RW-0239, Sec. 3]

DESCRIPTION:

- "Monitored Retrievable Storage Installation" or "MRS" means a complex designed, constructed, and operated by DOE for the receipt, transfer, handling, packaging, possession, safeguarding, and storage of spent nuclear fuel aged for at least one year ... pending shipment to a HLW repository or other disposal.

[10 CFR 72.3]

Table A1.3.1 SNF Handling System

ARCHITECTURE: SNF Handling System

REQUIREMENTS SATISFIED:

1.3.1C1 - 1.3.1C5; 1.3.1P1; 1.3.1I1 - 1.3.1I5; 1.3.1O1 - 1.3.1O8

RATIONALE:

- ... such facility shall be designed -
 - (A) to accommodate spent nuclear fuel ... resulting from civilian nuclear activities;
 - (B) to permit continuous monitoring, management, and maintenance of such spent fuel ... for the foreseeable future;
 - (C) to provide for the ready retrieval of such spent fuel ... for further processing or disposal; and
 - (D) to safely store such spent fuel ... as long as may be necessary by maintaining such facility through appropriate means, including any required replacement of such facility.

[NWPA Sec. 141(b)(1)]

- ... and other systems that might contain or handle radioactive materials associated with spent fuel ... must be designed to ensure adequate safety

[10 CFR 72.128(a)]

DESCRIPTION:

- ... the MRS facility would have a building for receiving and handling the spent fuel. It would receive and inspect spent fuel, store it, and ship it to the repository at a rate and schedule consistent with repository operations. The fuel would be received in transportation casks shipped by truck and rail, unloaded from the shipping cask, inspected, and loaded into storage modules. All shipments from the MRS facility to the repository would be made exclusively by rail in dedicated trains, which would minimize the number of shipments to the repository. During steady-state operation, when the receipt rate is equal to the shipping rate, the MRS facility would serve as a staging facility for transportation: spent fuel received in truck and rail casks would be transferred to large-capacity rail casks for shipment to the repository by dedicated train.

[DOE/RW-0239, Sec. 3]

- "Monitored Retrievable Storage Installation" or "MRS" means a complex designed, constructed, and operated by DOE for the receipt, transfer, handling, packaging, possession, safeguarding, and storage of spent nuclear fuel aged for at least one year ... pending shipment to a HLW repository or other disposal.

[10 CFR 72.3]

-
- A major packaging capability is optional and could be added at a later date. It would consist of any facilities needed for additional functions (e.g., rod consolidation or packaging into disposal-ready containers) that may be determined to be beneficial or required as the system design matures. This optional phase would provide flexibility to further optimize the waste-management system.

[DOE RW-0239, Sec. 3]

Table A1.3.1.1 Shipping/Receiving Facility

ARCHITECTURE: Shipping/Receiving Facility

REQUIREMENTS SATISFIED:

1.3.1.1I1 - 1.3.1.1I3; 1.3.1.1O1 - 1.3.1.1O3; 1.3.1.1IC1; 1.3.1.1I11 - 1.3.1.1I14;
 1.3.1.1O1 - 1.3.1.1O4; 1.3.1.1.3C1; 1.3.1.6.2C1; 1.3.1.6.3C1;
 1.3.1.6.4C1 - 1.3.1.6.4C3; 1.3.1.6.4.2C1; 1.3.1.6.4.3C1; 1.3.1.6.4.4C1; 1.3.1.6.4.6C1;
 1.3.1.6.5.4.1C1 - 1.3.1.6.5.4.1C3

RATIONALE:

- ... is an in-line facility that will receive commercial spent fuel, ... provide staging for transportation to the repository,

[DOE/RW-0239, Sec. 3]

- The MRS facility ... consist of a receiving-and-handling building

After arriving by truck or rail ... the spent fuel would be unloaded into the receiving-and-handling building

[DOE/RW-0187, Sec. 3.2.2]

- ... such facility shall be designed -

(A) to accommodate spent nuclear fuel ... resulting from civilian nuclear activities; ...

(C) to provide for the ready retrieval of such spent fuel ... for further processing or disposal;

[NWPA Sec. 141(b)(1)]

DESCRIPTION:

- ... the MRS facility would have a building for receiving and handling the spent fuel. It would receive and inspect spent fuel, store it, and ship it to the repository at a rate and schedule consistent with repository operations. The fuel would be received in transportation casks shipped by truck and rail, unloaded from the shipping cask, inspected, and loaded into storage modules. All shipments from the MRS facility to the repository would be made exclusively by rail in dedicated trains, which would minimize the number of shipments to the repository. During steady-state operation, when the receipt rate is equal to the shipping rate, the MRS facility would serve as a staging facility for transportation: spent fuel received in truck and rail casks would be transferred to large-capacity rail casks for shipment to the repository by dedicated train.

[DOE/RW-0239, Sec. 3]

-
- "Monitored Retrievable Storage Installation" or "MRS" means a complex designed, constructed, and operated by DOE for the receipt, transfer, handling, packaging, possession, safeguarding, and storage of spent nuclear fuel aged for at least one year ... pending shipment to a HLW repository or other disposal.

[10 CFR 72.3]

Table A1.3.1.2 Parking Area

ARCHITECTURE: Parking Area

REQUIREMENTS SATISFIED:

No requirements specified at this time for function 1.3.1.2 and its subfunctions

RATIONALE:

- ... is an in-line facility that will receive commercial spent fuel, ... provide staging for transportation to the repository,

[DOE/RW-0239, Sec. 3]

DESCRIPTION:

- The MRS facility will have truck parking spaces and rail spurs to provide surge capacity and parking to meet the needs for both normal and off-normal shipments.
-
-

Table A1.3.1.3 SNF Preparation Facility

ARCHITECTURE: SNF Preparation Facility

REQUIREMENTS SATISFIED:

No requirements specified at this time for function 1.3.1.3 and its subfunctions.

RATIONALE:

- ... those features of the ... MRS whose function is: ...
 - (2) To prevent damage to the spent fuel ... during handling ..., or
 - (3) To provide reasonable assurance that spent fuel ... can be received, handled, packaged, stored, and retrieved without undue risk to the health and safety of the public.

[10 CFR 72.3]

- After arriving by truck or rail in a transportation cask ... the spent fuel would be unloaded into the receiving-and-handling building, where it would be prepared

[DOE/RW-0187, Sec. 3.2.2]

DESCRIPTION:

- "Monitored Retrievable Storage Installation" or "MRS" means a complex designed, constructed, and operated by DOE for the receipt, transfer, handling, packaging, possession, safeguarding, and storage of spent nuclear fuel aged for at least one year ... pending shipment to a HLW repository or other disposal. [10 CFR 72.3]

- A major packaging capability is optional and could be added at a later date. It would consist of any facilities needed for additional functions (e.g., rod consolidation or packaging into disposal-ready containers) that may be determined to be beneficial or required as the system design matures. This optional phase would provide flexibility to further optimize the waste-management system. [DOE/RW-0239, Sec. 3]
-
-

Table A1.3.1.4 Onsite Conveyance Equipment

ARCHITECTURE: Onsite Conveyance Equipment

REQUIREMENTS SATISFIED:

No requirements specified at this time for functions 1.3.1.4, 1.3.1.5 and their subfunctions.

RATIONALE:

- Licenses for the receipt, handling, ... and transfer of spent fuel [10 CFR 72.6(a)]
- To provide onsite equipment for transferring/moving spent fuel/loaded casks/carriages in between points in the MRS facility.

DESCRIPTION:

- "Monitored Retrievable Storage Installation" or "MRS" means a complex designed, constructed, and operated by DOE for the receipt, transfer, handling, packaging, possession, safeguarding, and storage of spent nuclear fuel aged for at least one year ... pending shipment to a HLW repository or other disposal. [10 CFR 72.3]
-
-

Table A1.3.2 Dry Storage System

ARCHITECTURE: Dry Storage System

REQUIREMENTS SATISFIED:

1.3.2C1 - 1.3.2C4; 1.3.2I1, 1.3.2I2; 1.3.2O1 - 1.3.2O5

RATIONALE:

- The term "storage" means retention of ... spent nuclear fuel, ... with the intent to recover such ... fuel for subsequent use, processing, or disposal. [NWPA Sec. 2(25)]

- Long-term storage of ... spent nuclear fuel in monitored retrievable storage facilities is an option for providing safe and reliable management of such ... spent fuel. [NWPA Sec. 141(a)(1)]

- ... such facility shall be designed - ...
 - (B) to permit continuous monitoring, management, and maintenance of such spent fuel and waste for the foreseeable future;
 - (C) to provide for the ready retrieval of such spent fuel ... for further processing or disposal; and
 - (D) to safely store such spent fuel ... as long as may be necessary by maintaining such facility through appropriate means, including any required replacement of such facility. [NWPA Sec. 141(b)(1)]

- The requirements of this regulation are applicable, as appropriate, to both wet and dry modes of storage of..... (2) spent fuel ... in a monitored retrievable storage installation (MRS). [10 CFR 72.2 (c)]

DESCRIPTION:

- ... use dry storage as the preferred method of storage at an MRS. [DOE/RW-0035; DOE/RW-0235; RW-1 Memo]
-
-

Table A1.3.2.1 Storage Area

ARCHITECTURE: Storage Area

REQUIREMENTS SATISFIED:

1.3.2.1C1; 1.3.2.1P1

RATIONALE:

- The spent fuel cladding must be protected during storage against degradation that leads to gross ruptures or the fuel must be otherwise confined such that degradation of the fuel during storage will not pose operational safety problems with respect to its removal from storage. This may be accomplished by canning of consolidated fuel rods or unconsolidated assemblies or other means as appropriate. [10 CFR 72.122(h)(1)]

DESCRIPTION:

- The storage area provides space to hold the modular storage units.
-
-

Table A1.3.2.2 Storage Confinement/Containment Systems

ARCHITECTURE: Storage Confinement/Containment Systems

REQUIREMENTS SATISFIED:

No requirements specified at this time for function 1.3.2.2.

RATIONALE:

- Spent fuel storage, ... and other systems that might contain ... radioactive materials associated with spent fuel ... must be designed to ensure adequate safety under normal and accident conditions.

[10 CFR 72.128(a)]

DESCRIPTION:

- "Confinement systems" means those systems, including ventilation that act as barriers between areas containing radioactive substances and the environment.

[10 CFR 72.3]

- ... MRS facility ... will make maximum use of technologies that have been proved ...

[DOE/RW-0247]

Table A1.3.2.3 Monitoring System

ARCHITECTURE: Monitoring System

REQUIREMENTS SATISFIED:

1.3.2.3C1, 1.3.2.3C2; 1.3.2.3.2.1C1

RATIONALE:

- ... such facility shall be designed - ...

(B) to permit continuous monitoring, management, and maintenance of such spent fuel ... for the foreseeable future

[NWSA Sec. 141 (b)(1)]

- Instrumentation and control systems must be provided to monitor systems that are important to safety over anticipated ranges for normal operation and off-normal operation.

[10 CFR 72.122(i)]

- A control room or control area, if appropriate for the ... MRS design, must be designed to permit occupancy and actions to be taken to monitor the ... MRS safely under normal conditions, and to provide safe control of the ... MRS under off-normal or accident conditions.

[10 CFR 72.122 (j)]

- Monitoring of the facility environment would ensure that any significant releases of radioactive material, either from the receiving-and-handling building or from the storage area, are promptly detected and corrected.

[DOE RW-0005, Sec. 3.2.1.3.3]

DESCRIPTION:

- (1)(ii) Monitoring instruments and limiting control settings for an ... MRS are those related to fuel ... handling and storage conditions having significant safety functions ...

(3) Surveillance requirements include:

- (i) Inspection and monitoring of spent fuel ... in storage ... *[10 CFR 72.44(c)(1)]*

- "Structures, systems, and components important to safety" means those features of the ... MRS whose function is:

- (1) To maintain the conditions required to store spent fuel ... safely,
- (2) To prevent damage to the spent fuel ... container during handling and storage, or
- (3) To provide reasonable assurances that spent fuel ... can be received, handled, packaged, stored, and retrieved without undue risk to the health and safety of the public.

[10 CFR 72.3]

- Monitoring of the atmosphere within the storage-unit cavities would detect any leaks in the storage canisters, allowing prompt corrective action without any leakage to the environment.

[DOE RW-0005, Sec. 3.2.1.3.3]

Table A1.3.3 MRS Decommissioning/Decontamination System

ARCHITECTURE: MRS Decommissioning/Decontamination System

REQUIREMENTS SATISFIED:

1.3.3C1 - 1.3.3C5

RATIONALE:

- Each application under this part must include a proposed decommissioning plan that contains sufficient information on proposed practices and procedures for the decontamination of the site and facilities ... in order to provide reasonable assurance that the decontamination and decommissioning of the ... MRS at the end of its useful life will provide adequate protection to the health and safety of the public ...

[10 CFR 72.30(a)]

- The ... MRS must be designed for decommissioning. Provisions must be made to facilitate decontamination of structures and equipment, minimize the quantity of radioactive wastes and contaminated equipment, and facilitate the removal of radioactive wastes and contaminated materials at the time the ... MRS is permanently decommissioned.

[10 CFR 72.130]

DESCRIPTION:

- To remove (as a facility) safely from service and reduce residual radioactivity to a level that permits release of the property for unrestricted use and termination of license. [10 CFR 72.3]
-
-

Table A1.3.4 MRS Support Systems

ARCHITECTURE: MRS Support Systems

REQUIREMENTS SATISFIED:

1.3.4.2.1C1 - 1.3.4.2.1C3; 1.3.4.2.2C1; 1.3.4.2.5C1 - 1.3.4.2.5C3; 1.3.4.4.1C1, 1.3.4.4.1C2;
1.3.4.4.2C1 - 1.3.4.4.2C7; 1.3.4.4.6C1; 1.3.4.4.6.2C1;
1.3.4.5C1 - 1.3.4.5C9; 1.3.4.6C1, 1.3.4.6C2; 1.3.4.6.1.1C1;
1.3.4.6.2C1 - 1.3.4.6.2C6; 1.3.4.6.5C1, 1.3.4.6.5C2; 1.3.4.7C1, 1.3.4.7C2; 1.3.4.7.1P1;
1.3.4.9P1

RATIONALE:

- Administrative controls. Administrative controls include the organization and management procedures, recordkeeping, review and audit, and reporting necessary to assure that the operations involved in the storage of spent fuel in an ... MRS ... [10 CFR 72.44(c)(5)]
- Utility or other services. (1) Each utility service system must be designed to meet emergency conditions. [10 CFR 72.122(k)]
- Effluent Control. The ... MRS must be designed to provide means to limit to levels as low as is reasonably achievable the release of radioactive materials in effluents during normal operations; and control the release of radioactive materials under accident conditions. [10 CFR 72.126(d)]
- Waste Treatment. Radioactive waste treatment facilities must be provided. [10 CFR 72.128(b)]
- The design for physical protection must show the site layout and the design features provided to protect the ... MRS from sabotage. [10 CFR 72.182]

DESCRIPTION:

- "Controlled area" means that area immediately surrounding an ... MRS for which the licensee exercises authority over its use and within which ... MRS operations are performed. [10 CFR 72.3]

-
- The MRS facility ... consist of a receiving-and-handling building (the principal structure); an area for monitored storage; ... and various support facilities, including an administration building, a visitors center, maintenance shops, a warehouse for supplies, a fire station, and a water treatment facility.

[DOE RW-0187, Sec 3.2.2]

4.0 INTERFACES

Interfaces can be either interfaces that indicate a flow between functions as in a sequence of activities, or physical interfaces that indicate a necessary fit between architectures. There 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 8 - 17 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. - F1.3.4.9.

A more visual display of the interfaces is illustrated in the functional flow diagrams (Figures 18 - 28). 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 Store 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 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.

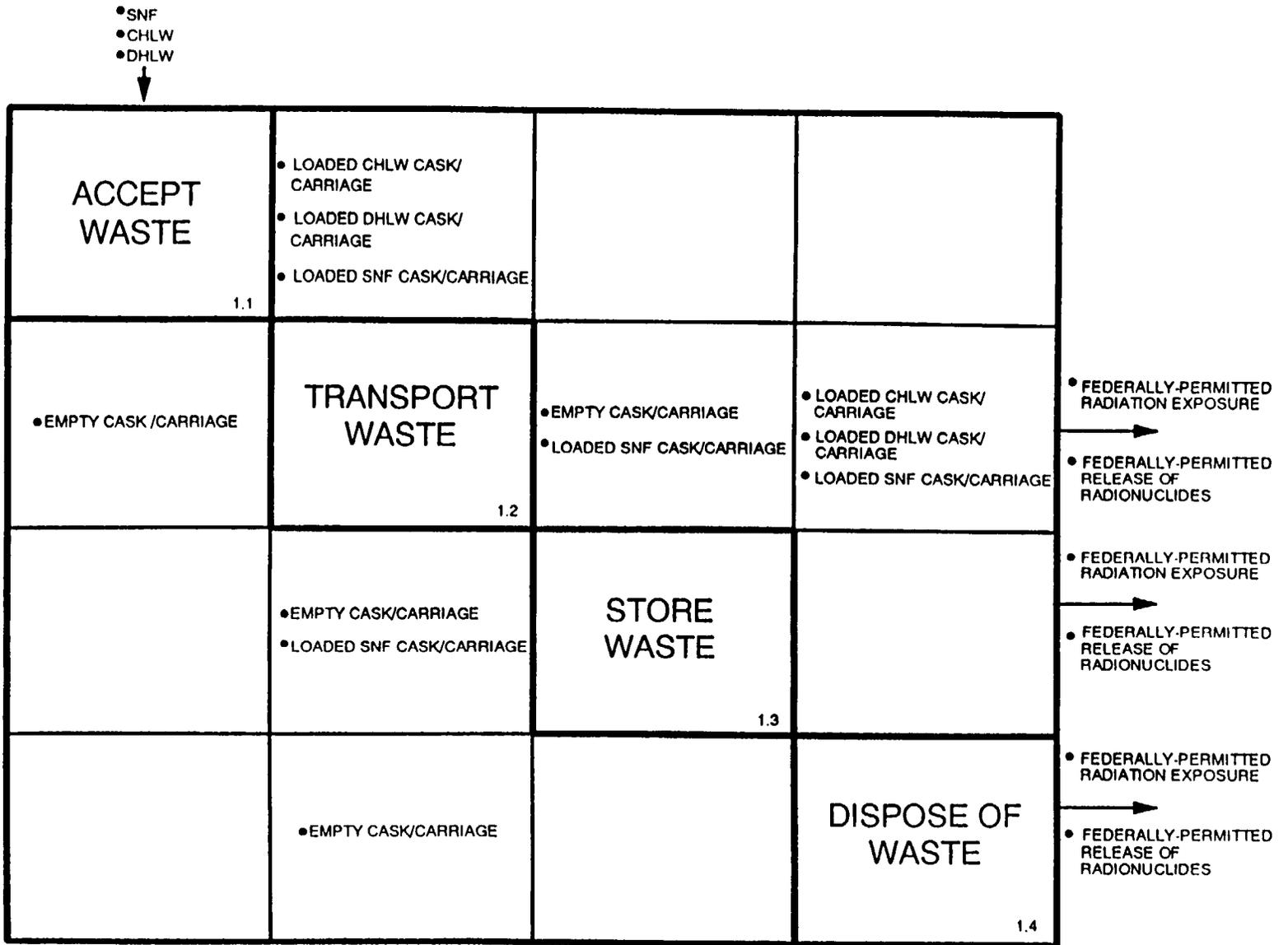


Figure 8. N-Square Chart for 1. - Manage Waste Disposal

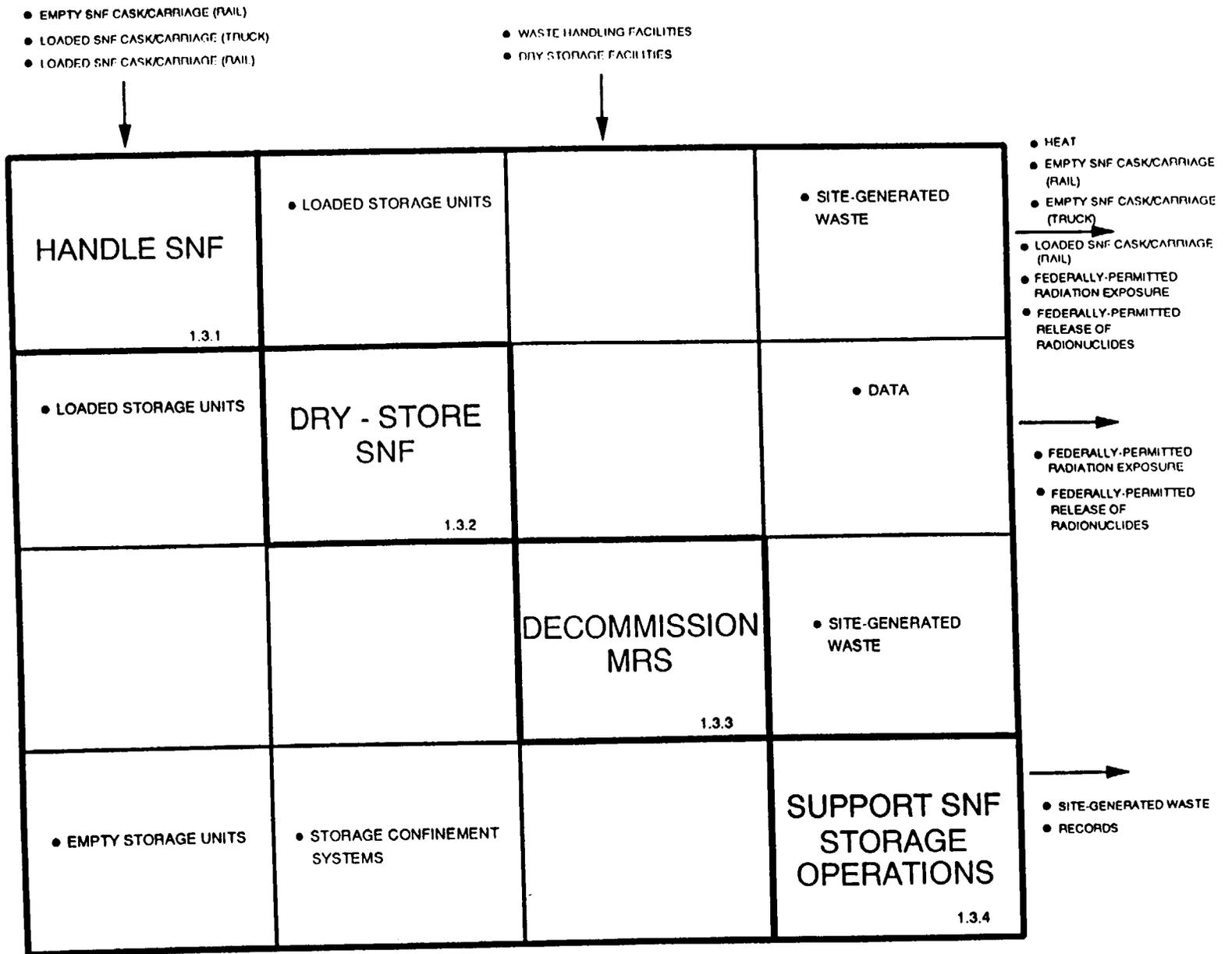


Figure 9. N-Square Chart for 1.3 - Store Waste

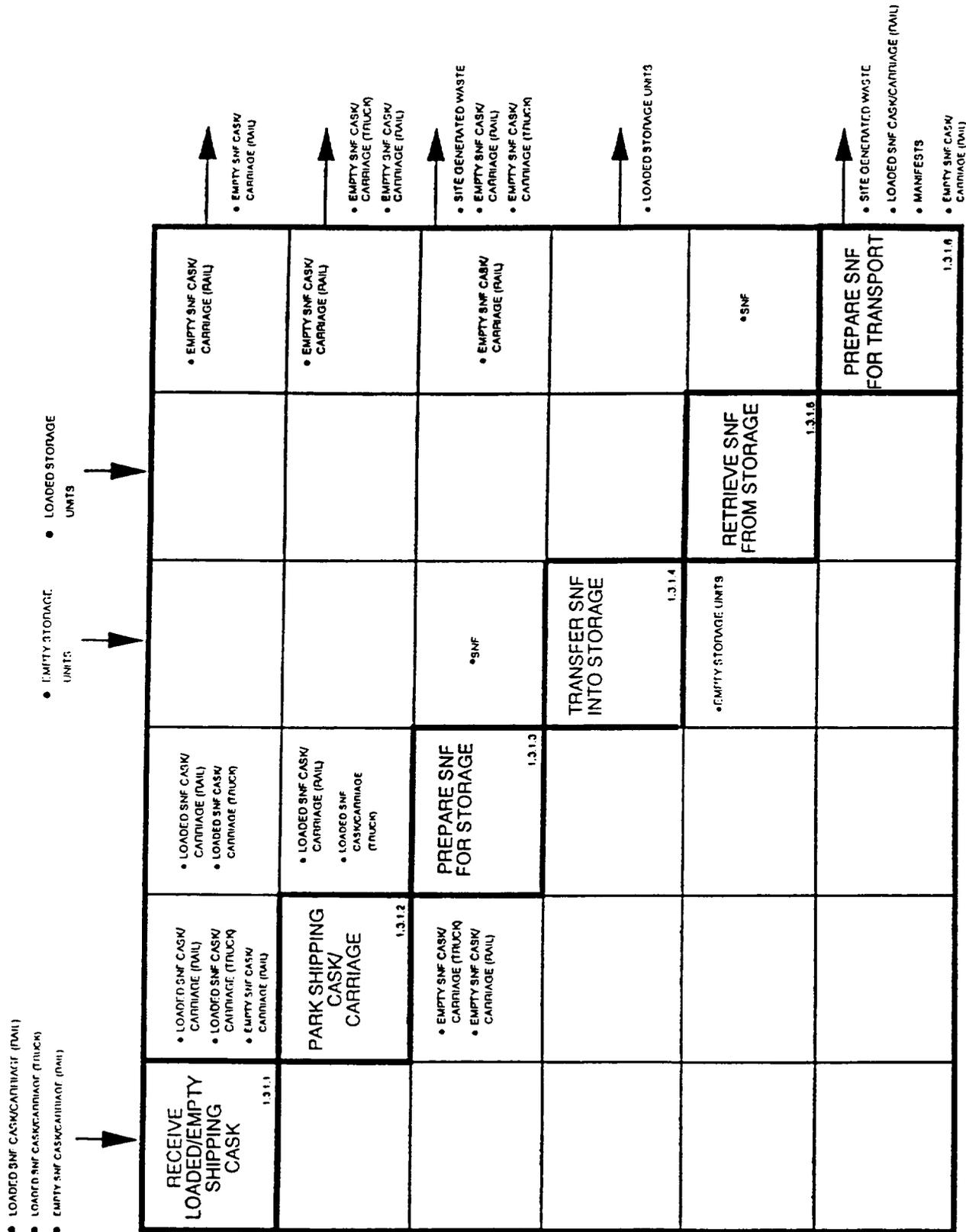


Figure 10. N-Square Chart for 1.3.1 - Handle SNF

PC013 1058.91

- LOADED SNF CASK/CARRIAGE (TRUCK)
- LOADED SNF CASK/CARRIAGE (RAIL)
- MANIFEST
- EMPTY SNF CASK/CARRIAGE (RAIL)

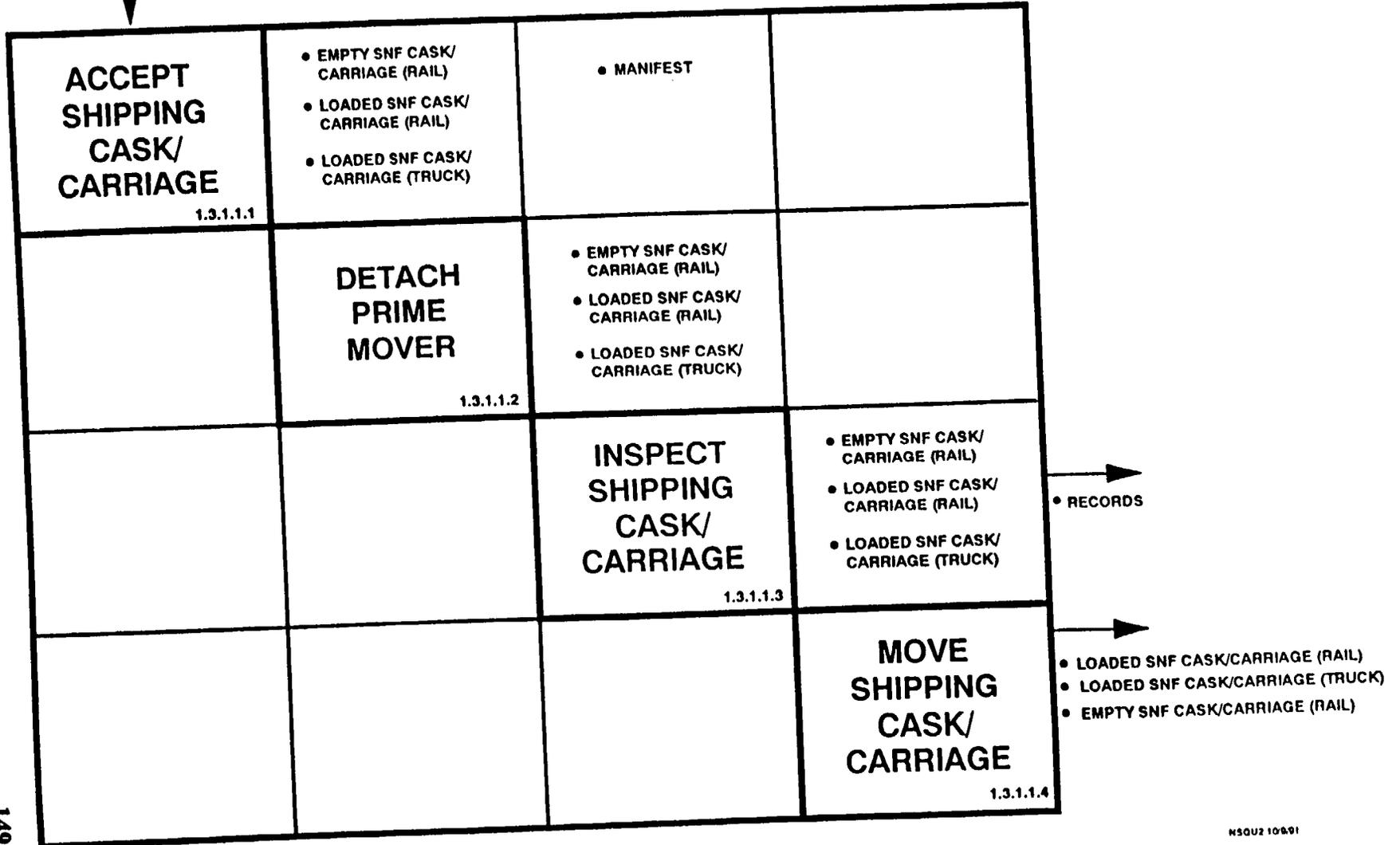


Figure 11. N-Square Chart for 1.3.1.1 - Receive Loaded/Empty Shipping Cask

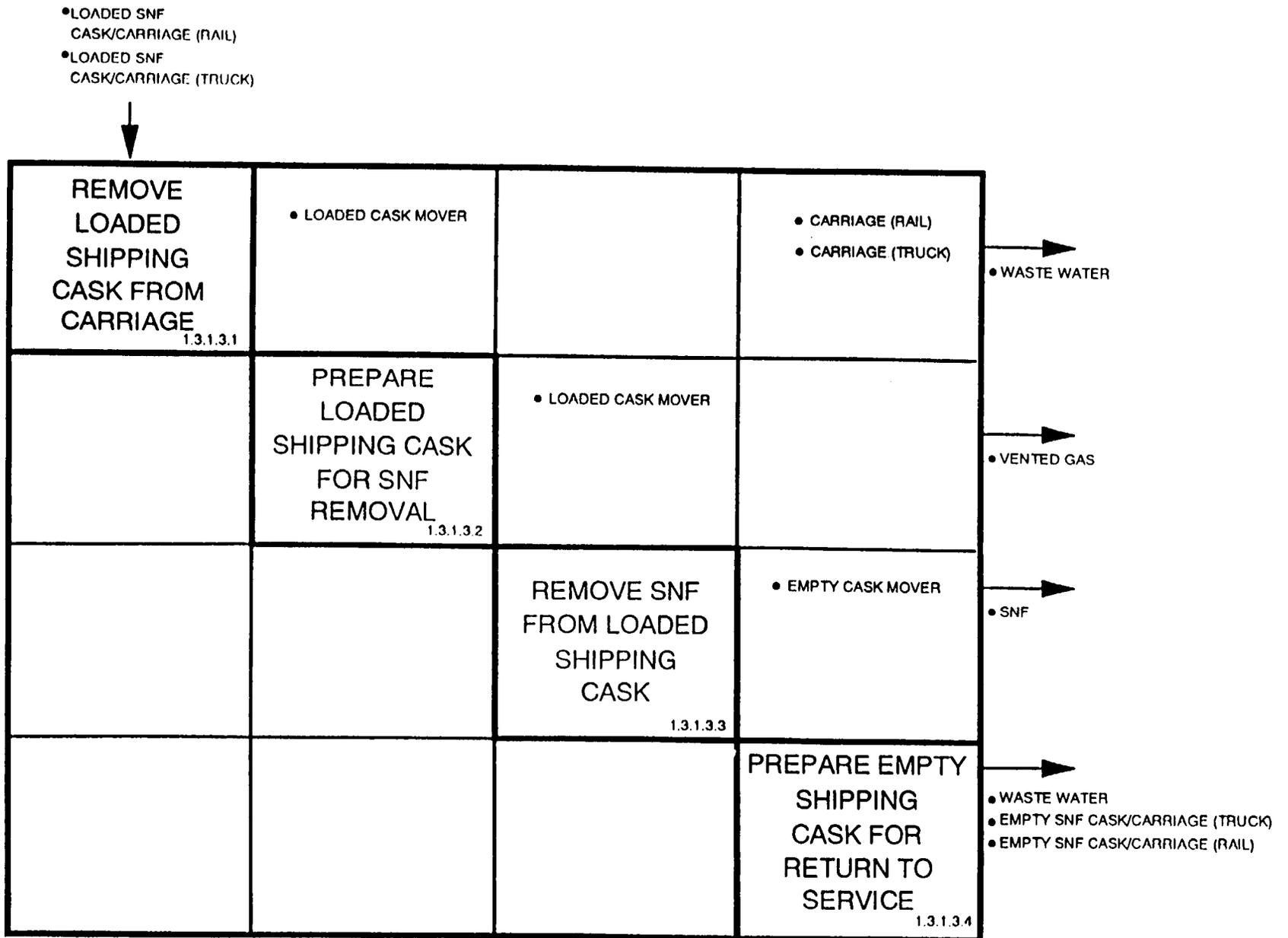
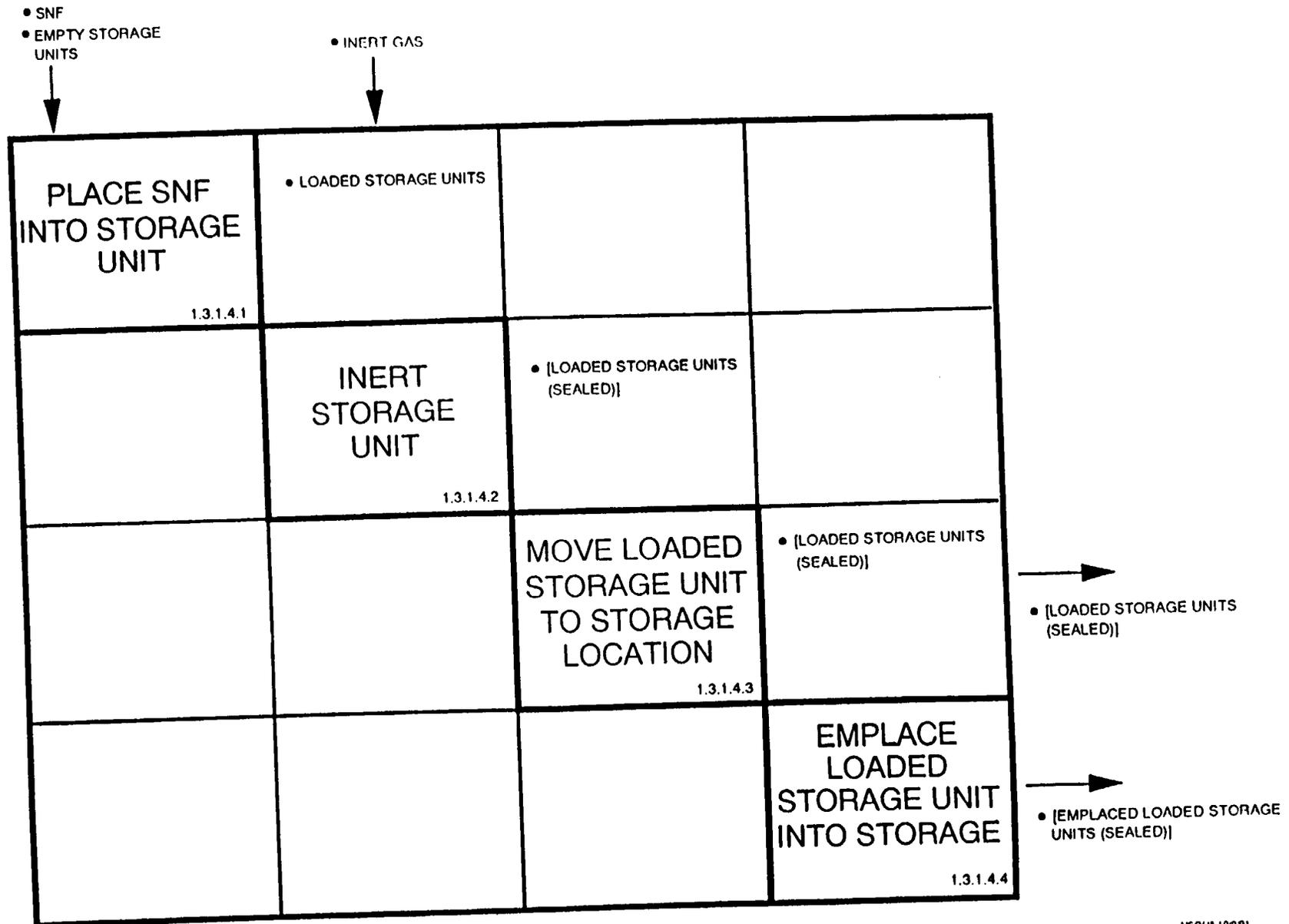
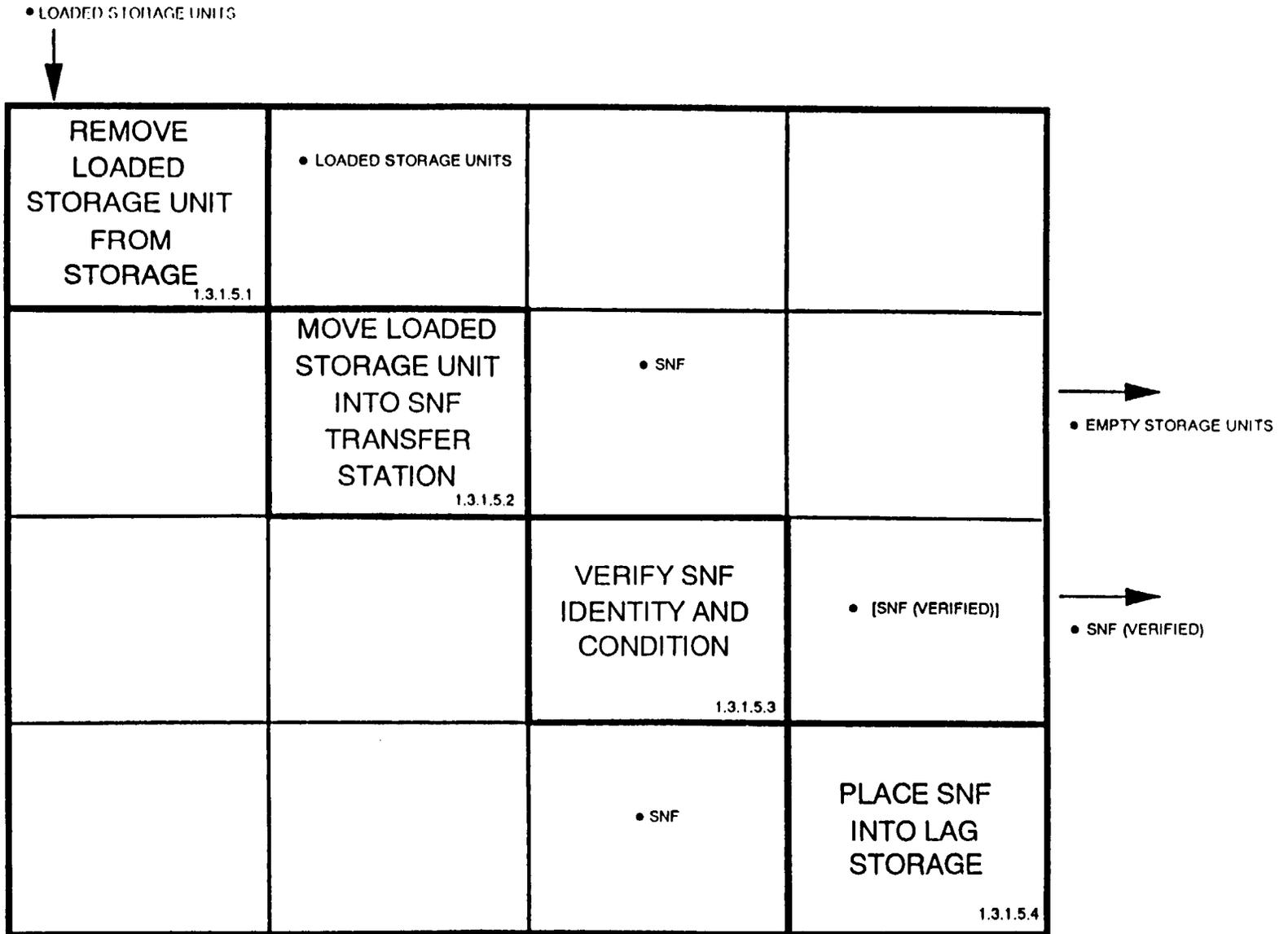


Figure 12. N-Square Chart for 1.3.1.3 - Prepare SNF for Storage



LEGEND
[] = IF REQUIRED

Figure 13. N-Square Chart for 1.3.1.4 - Transfer SNF Into Storage



LEGEND
[] = IF REQUIRED

Figure 14. N-Square Chart for 1.3.1.5 - Retrieve SNF from Storage

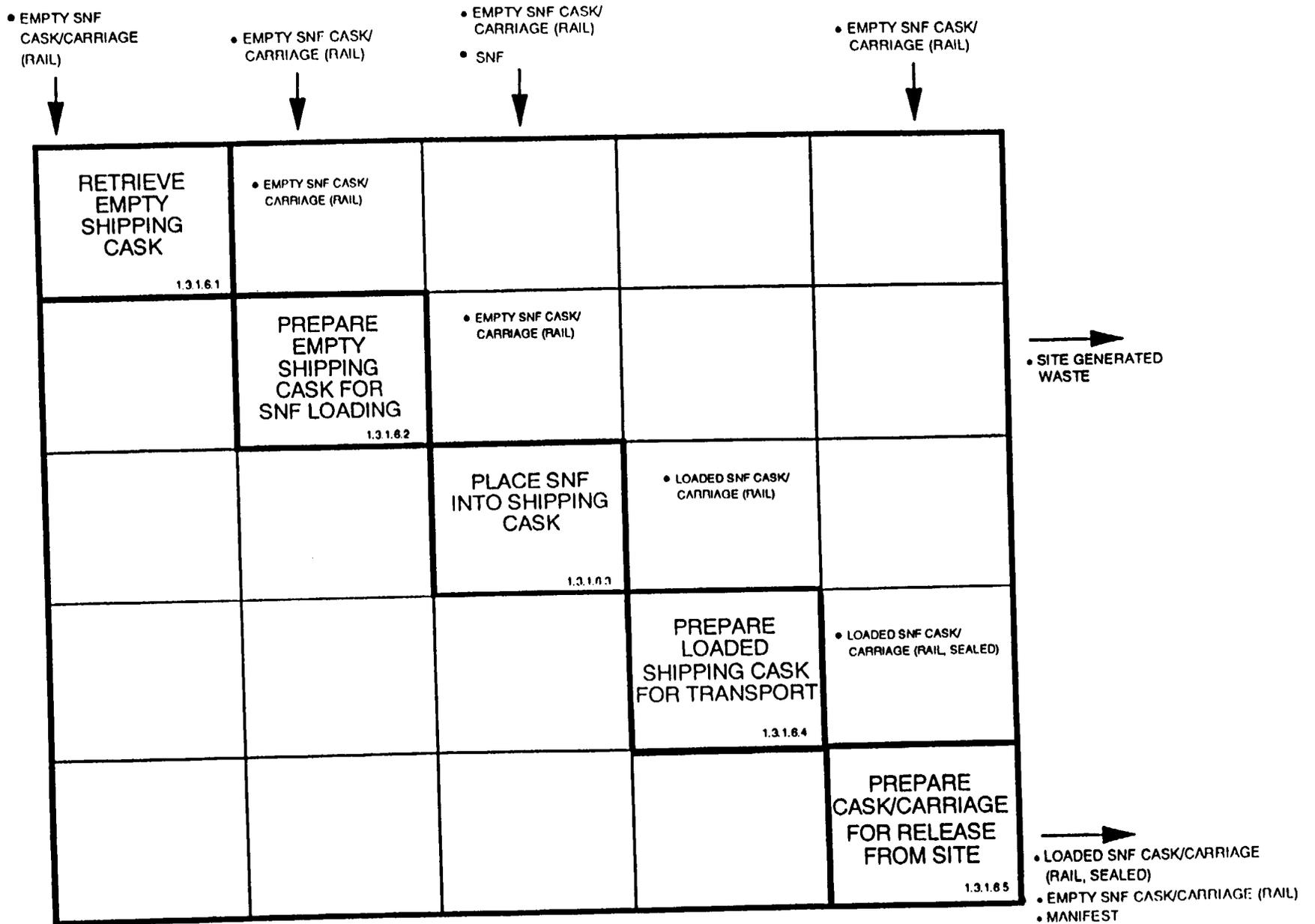


Figure 15. N-Square Chart for 1.3.1.6 - Prepare SNF for Transport

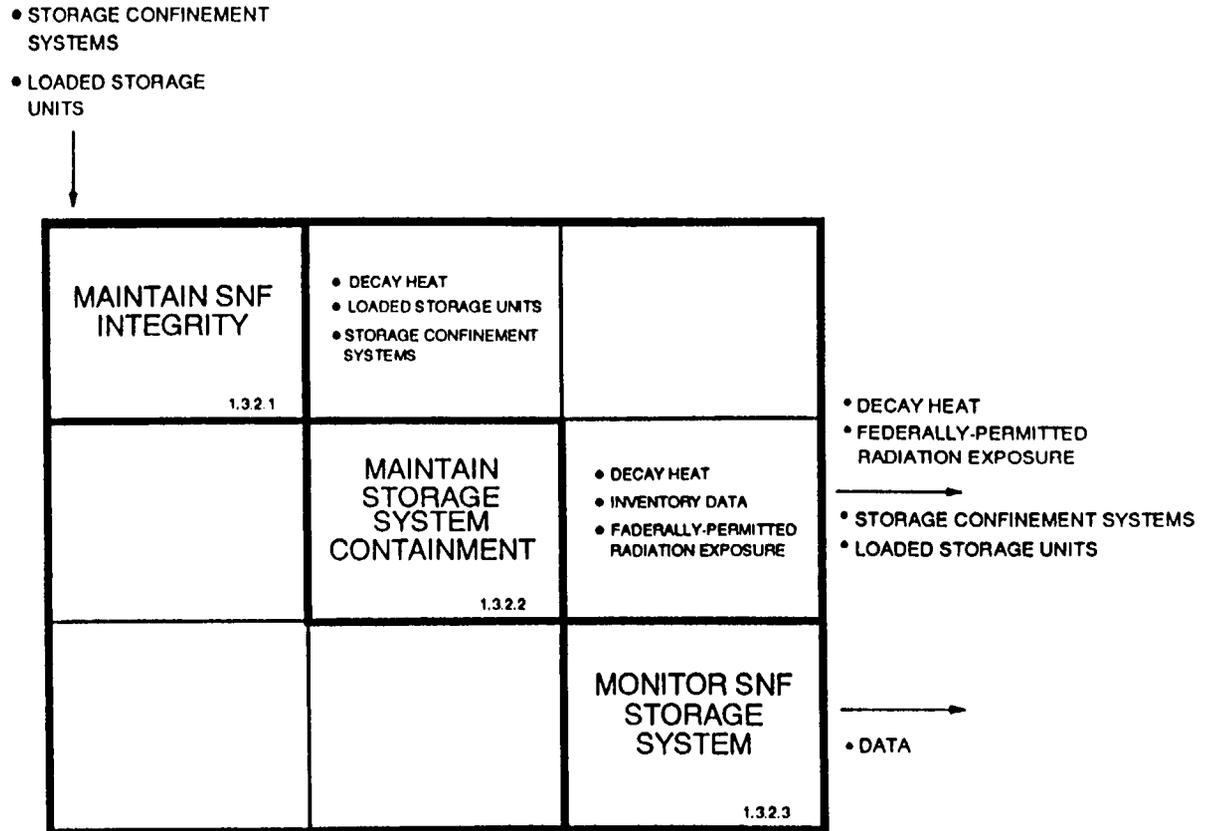


Figure 16. N-Square Chart for 1.3.2 - Dry-Store SNF

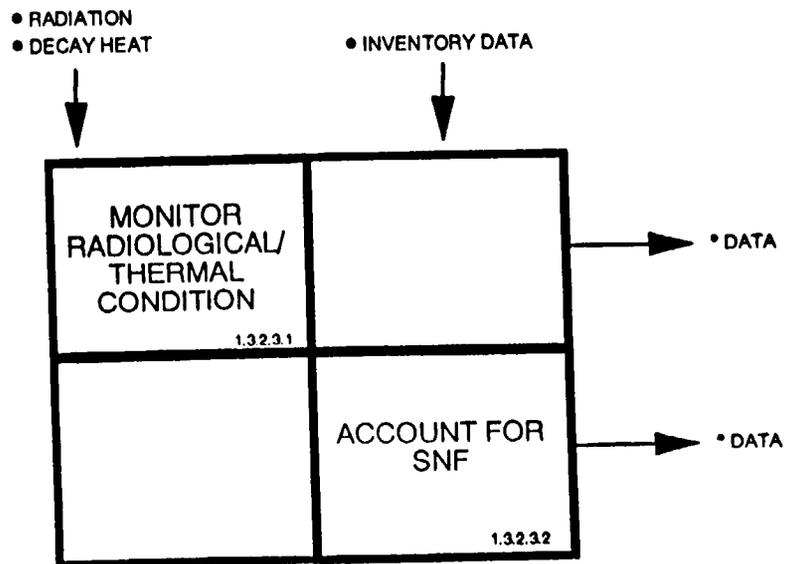


Figure 17. N SQUARE CHART FOR 1.3.2.3 - Monitor SNF Storage System

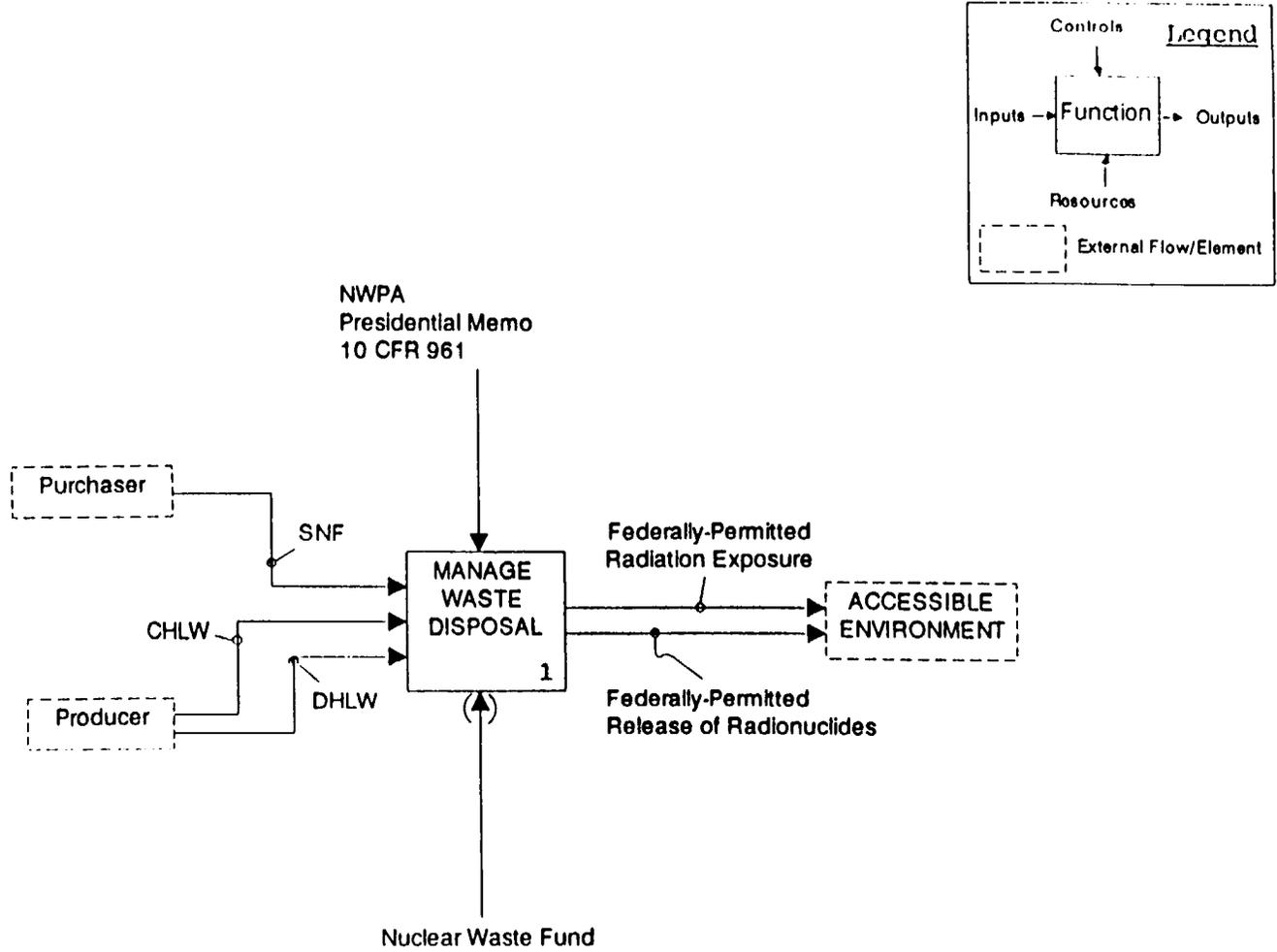


Figure 18. Nuclear Waste Management System Mission

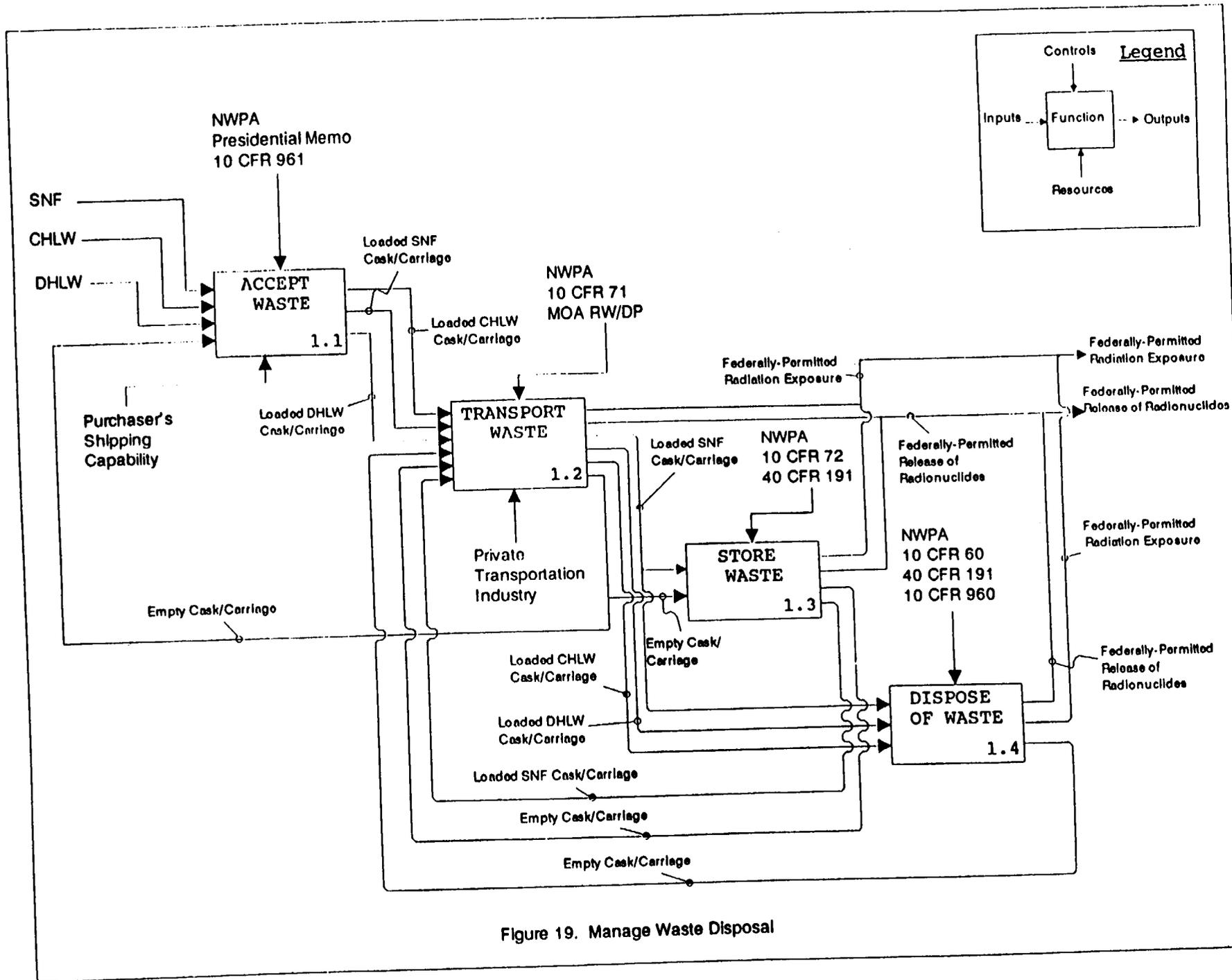


Figure 19. Manage Waste Disposal

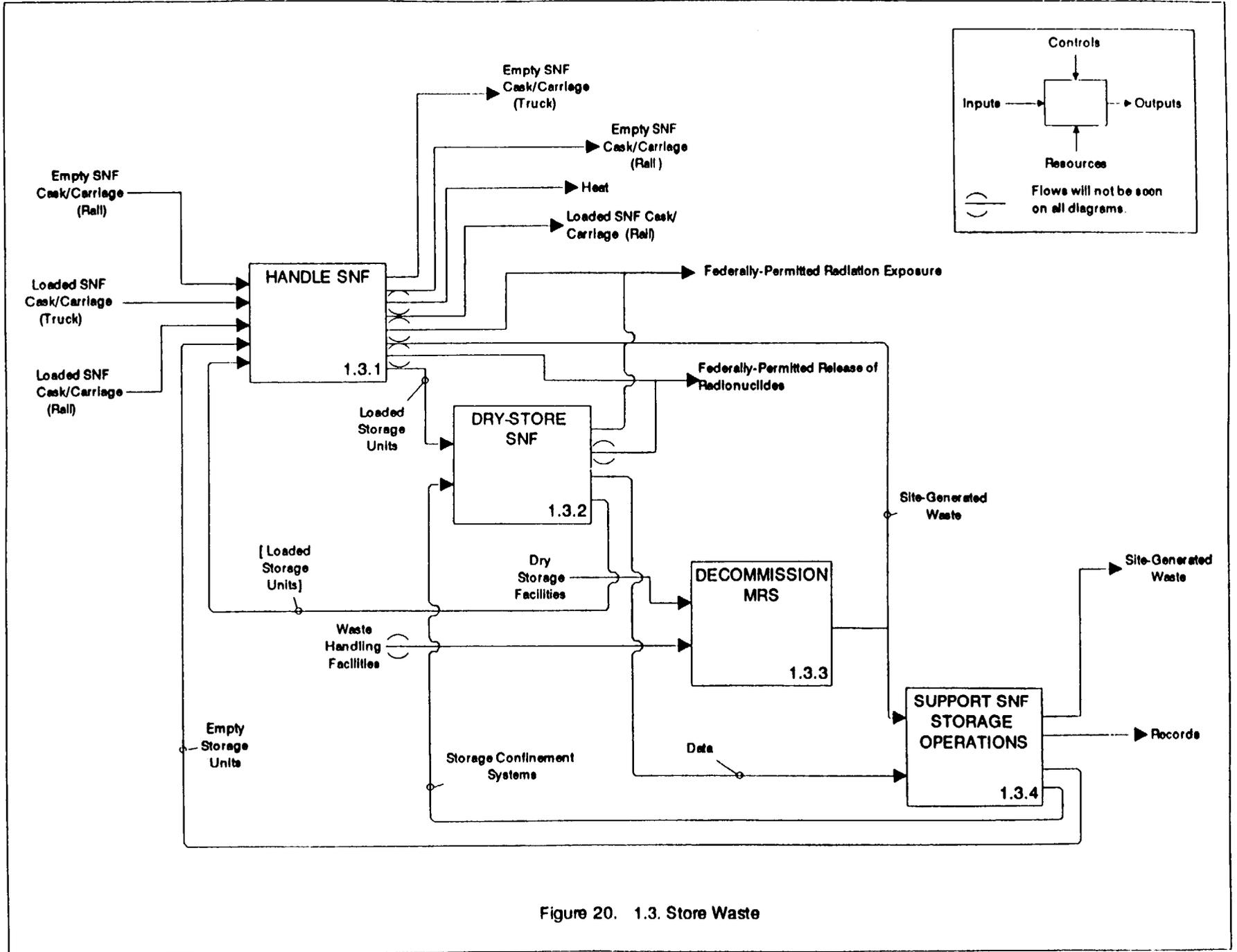


Figure 20. 1.3. Store Waste

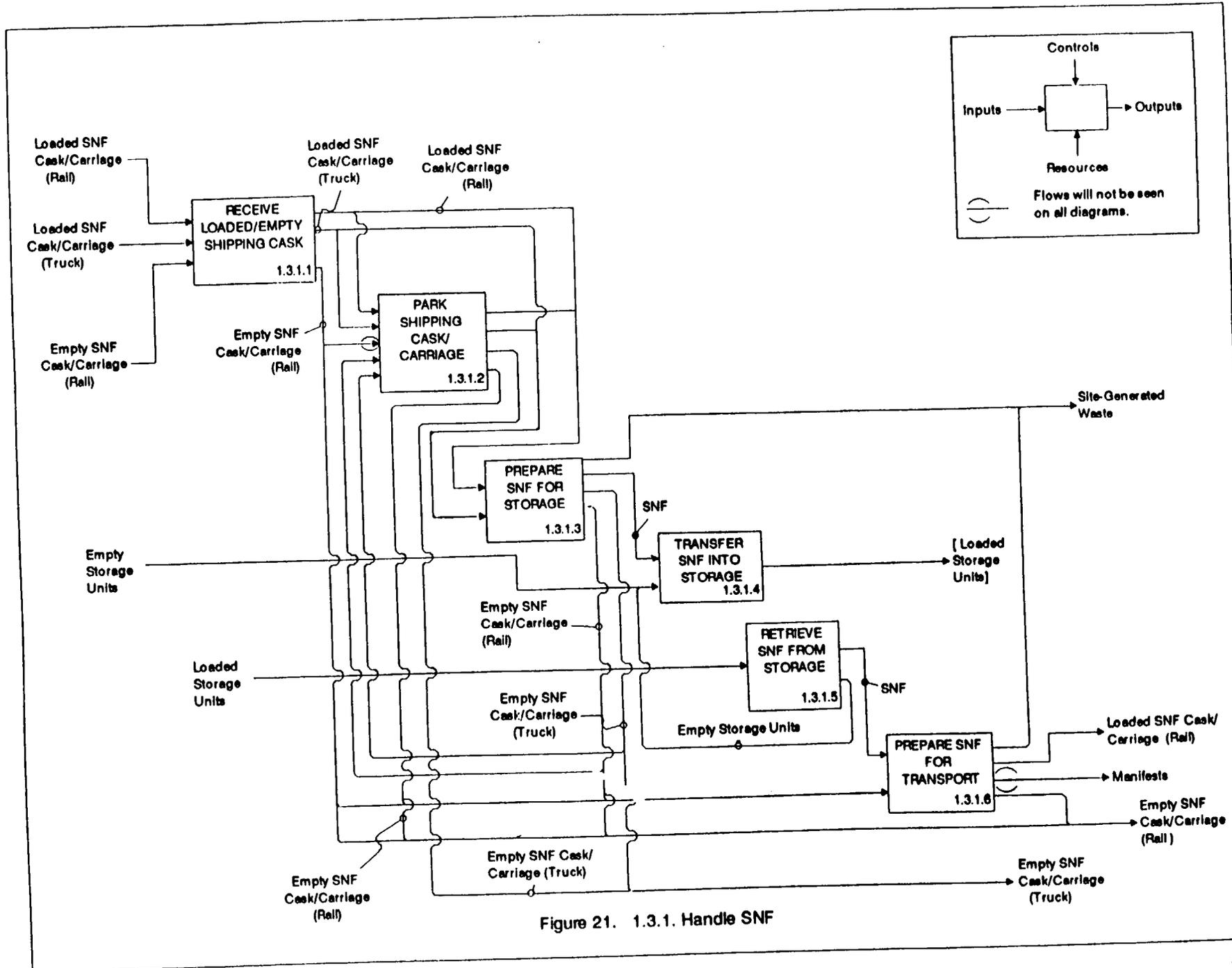


Figure 21. 1.3.1. Handle SNF

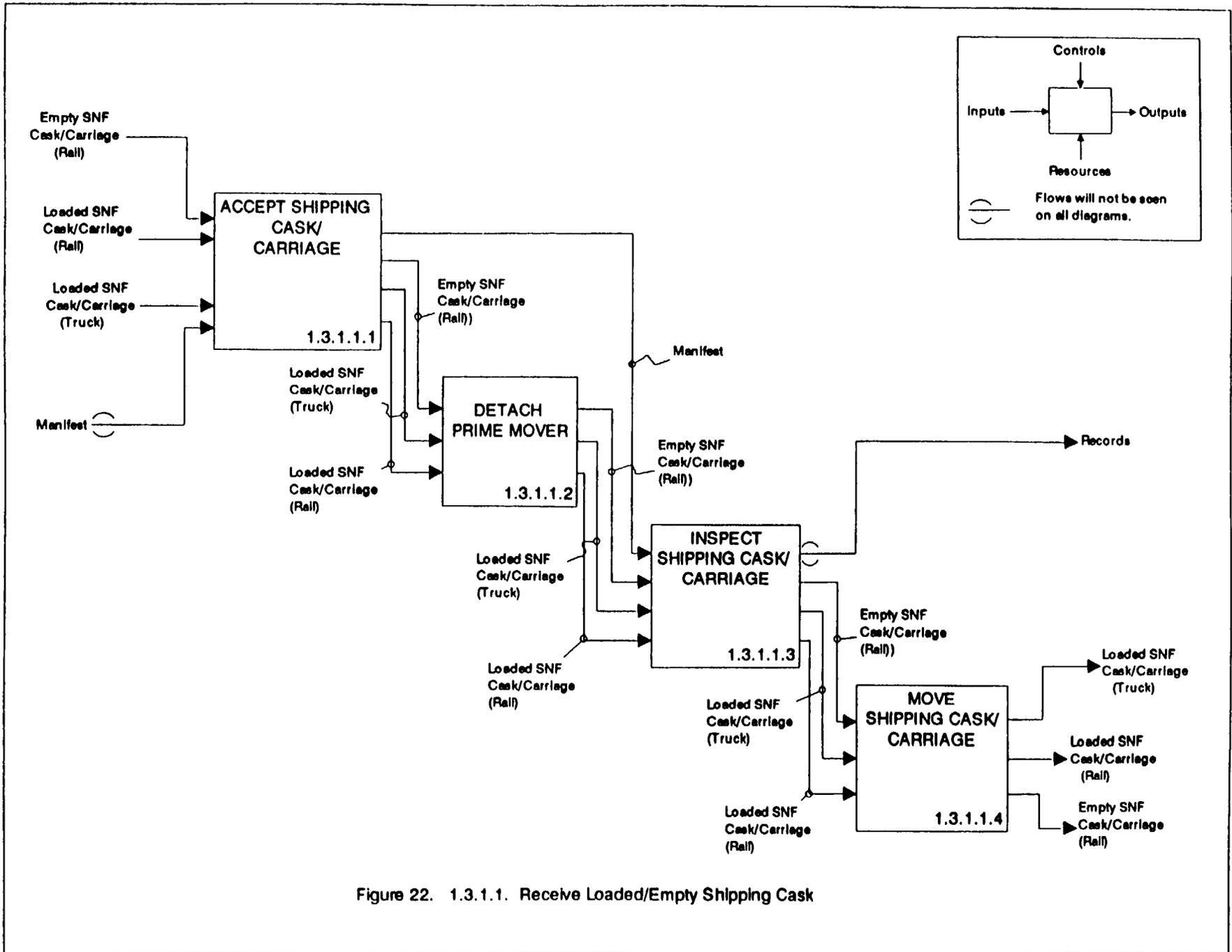


Figure 22. 1.3.1.1. Receive Loaded/Empty Shipping Cask

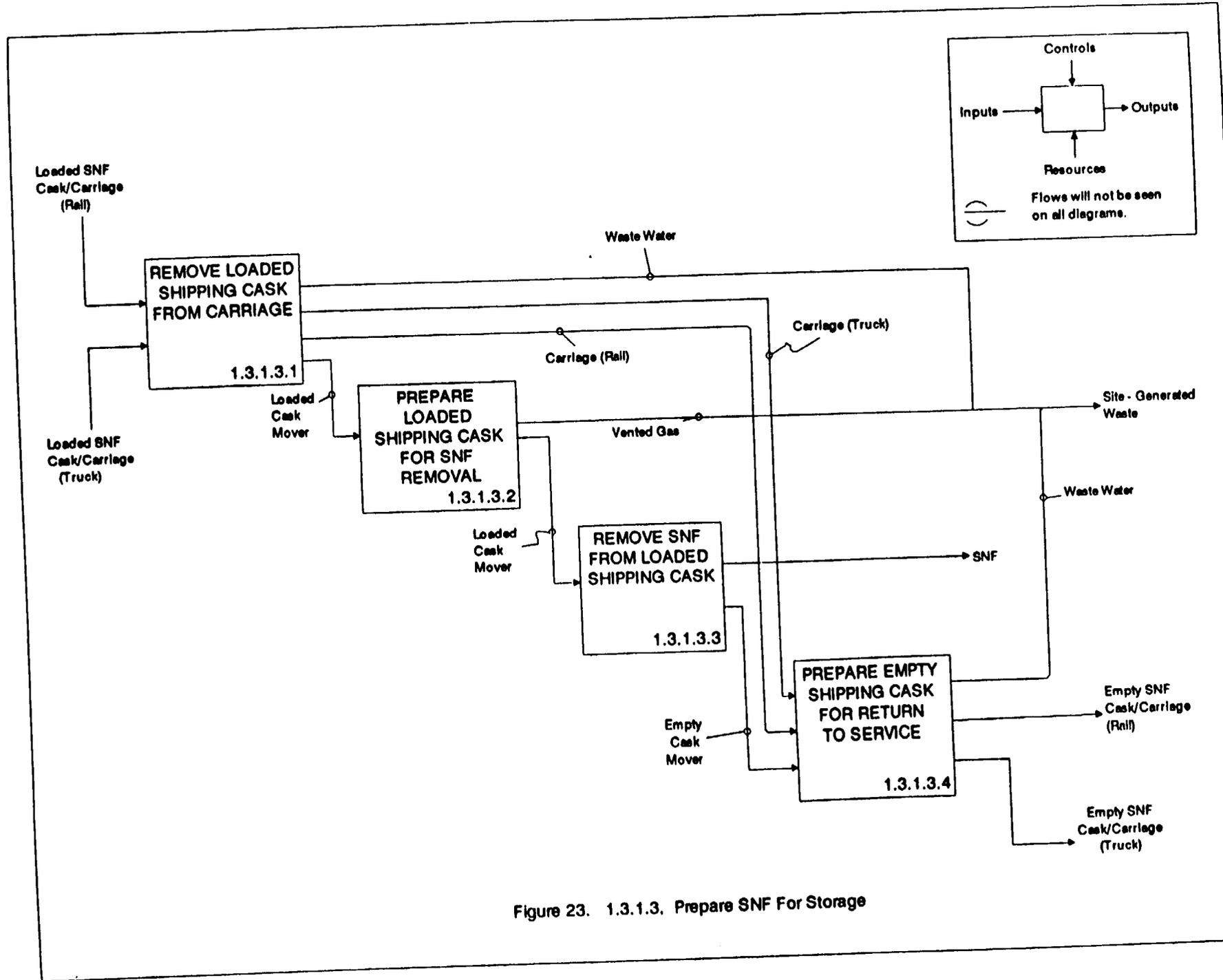


Figure 23. 1.3.1.3. Prepare SNF For Storage

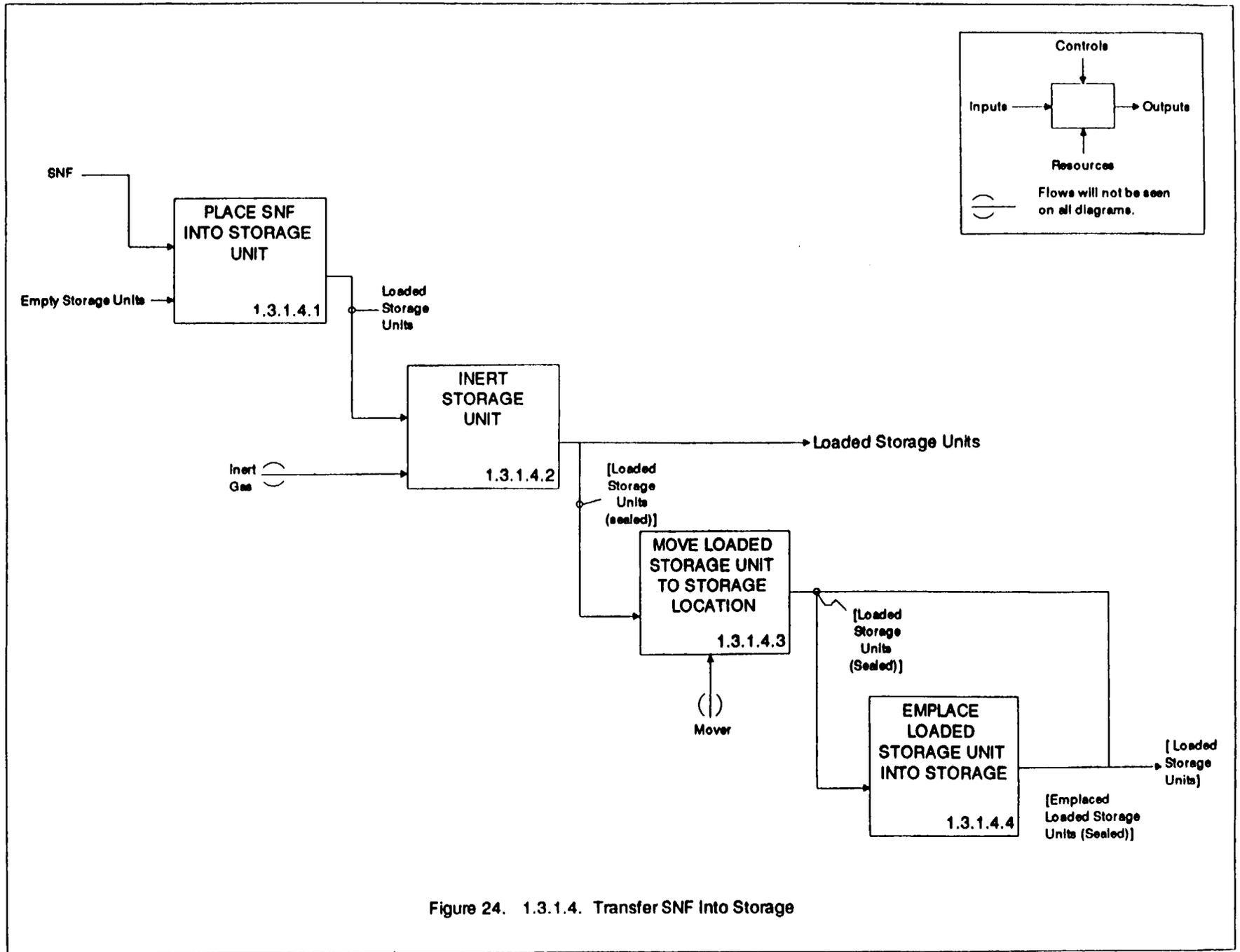


Figure 24. 1.3.1.4. Transfer SNF into Storage

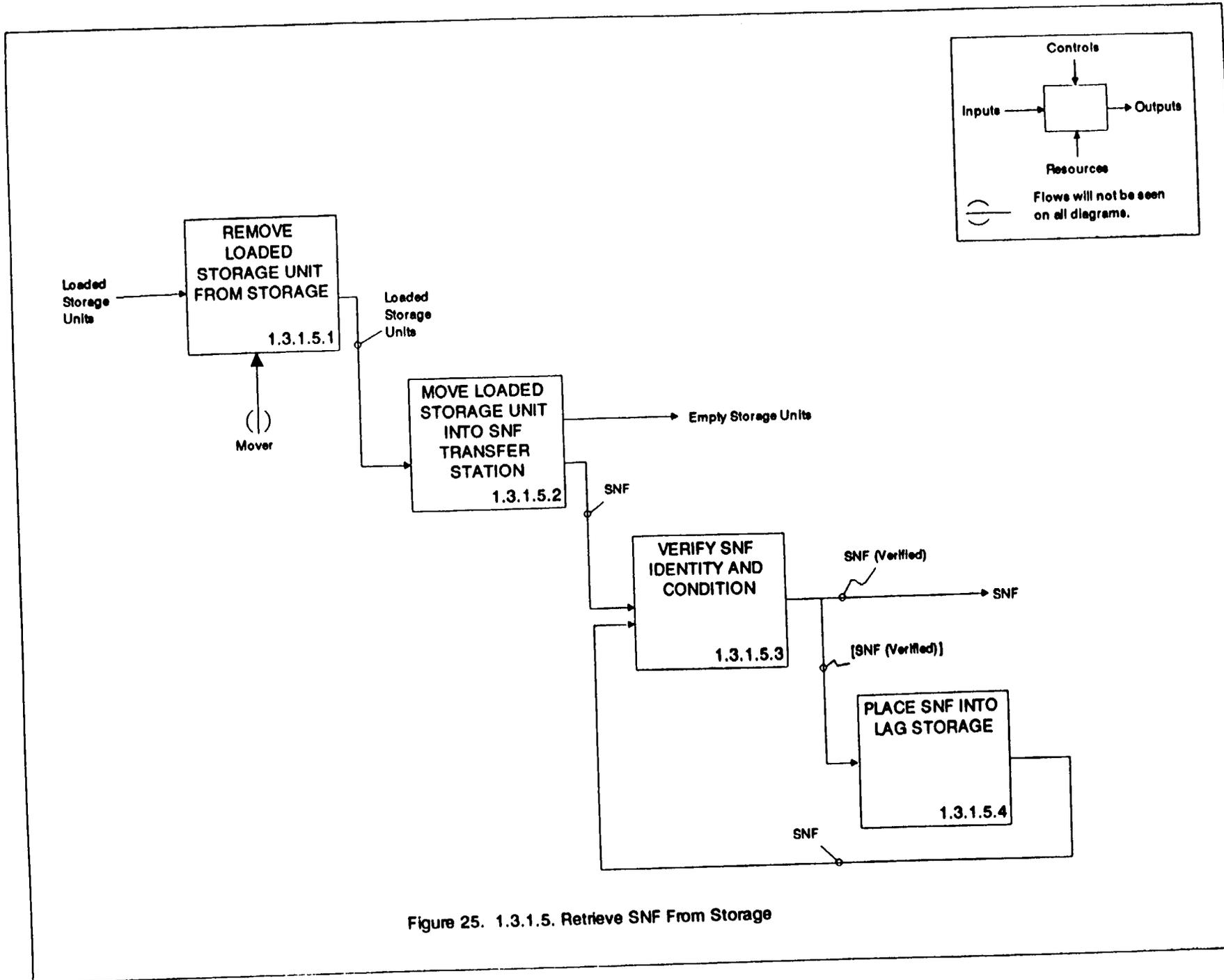


Figure 25. 1.3.1.5. Retrieve SNF From Storage

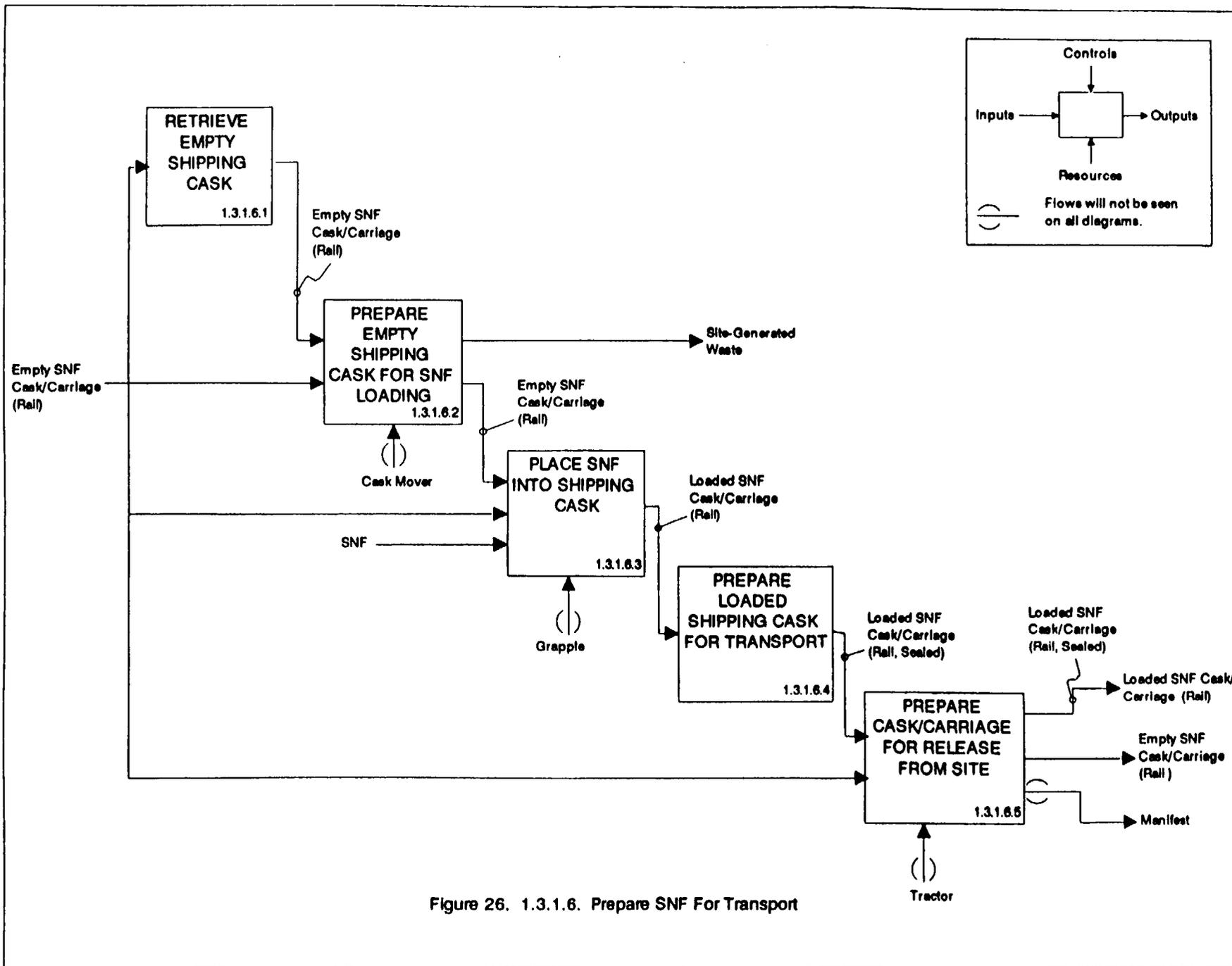


Figure 26. 1.3.1.6. Prepare SNF For Transport

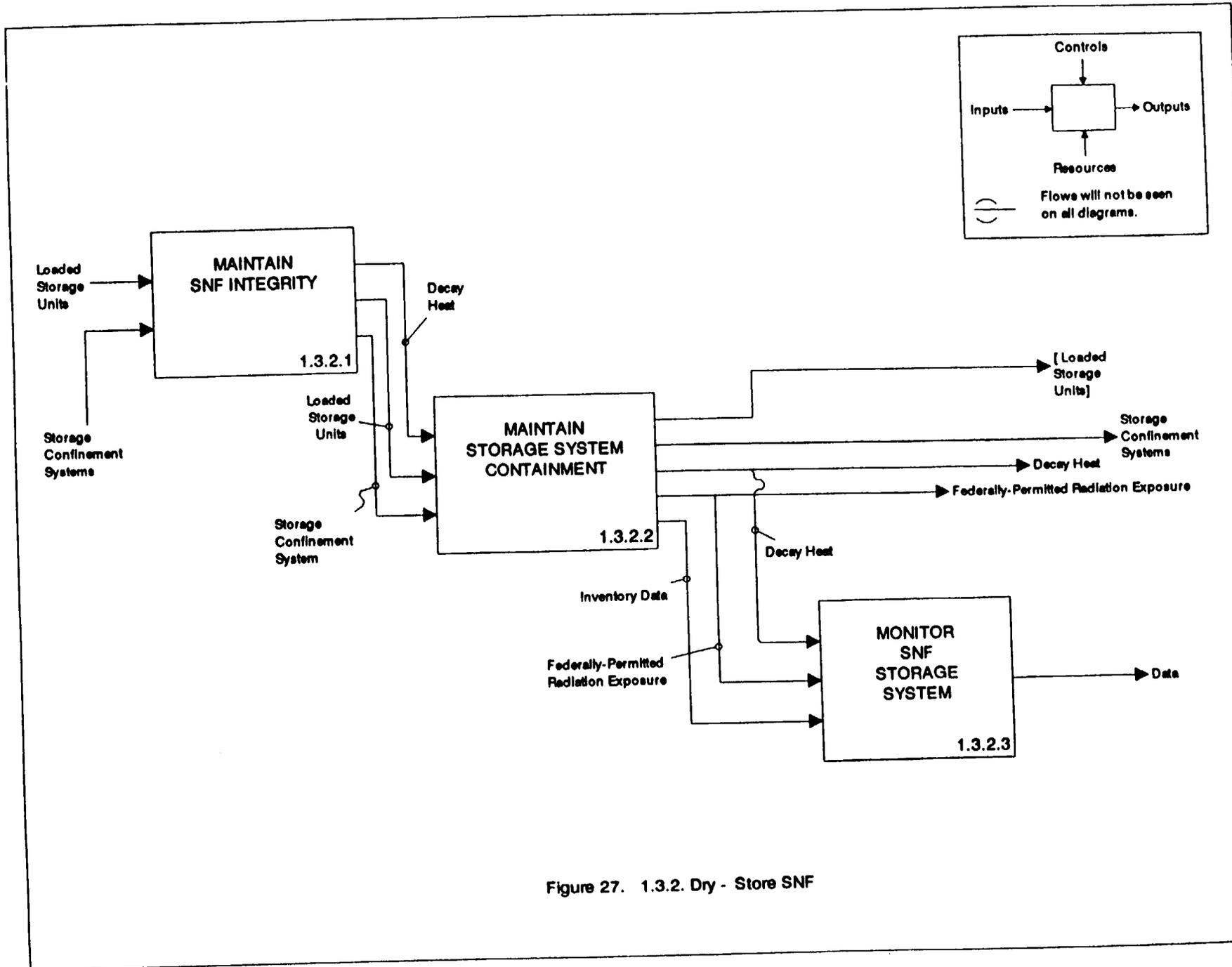


Figure 27. 1.3.2. Dry - Store SNF

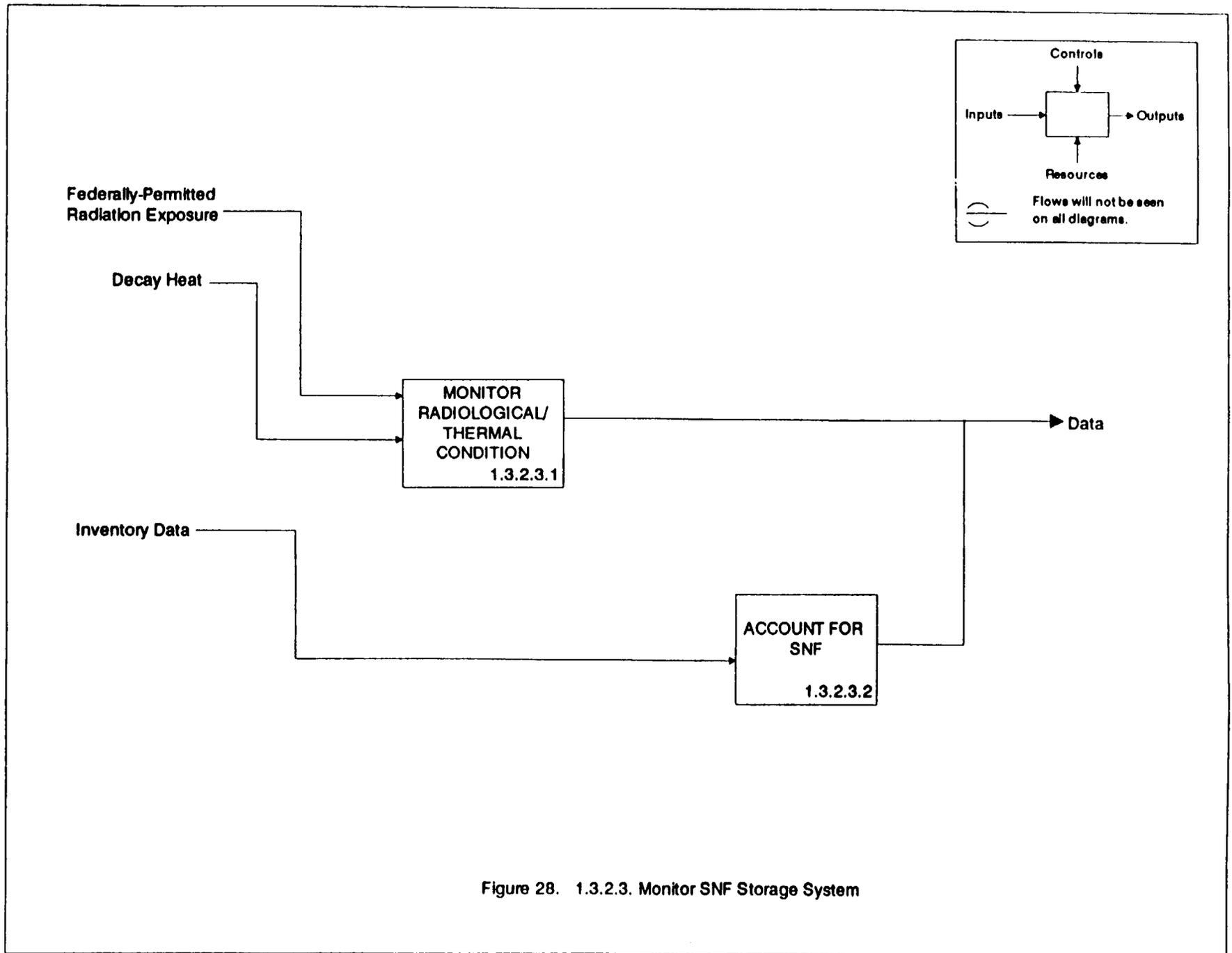


Figure 28. 1.3.2.3. Monitor SNF Storage System

APPENDICES

APPENDIX A

GLOSSARY

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

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 the atomic energy in the public interest. [10 CFR 72.3]

Burnup - A measure of nuclear reactor fuel consumption expressed as the amount of energy produced per unit weight of fuel.

Canister - A sealed container used to contain defective SNF.

Carriage - The vehicle on which the Shipping Cask is transported (i.e., truck trailer, rail, or barge).

Cask Internals - The interior of the Shipping Cask which includes the SNF basket.

Cask Maintenance - Those functions necessary to keep the Shipping Cask in working order (e.g., seal replacement).

Cask Maintenance Facility - A facility to maintain the cask system. The specific mission of the cask maintenance facility is to provide for the servicing, testing, maintenance, repair, modification, storage and configuration control of all cask system elements.

Cask Mover - A vehicle used at the MRS to move the Shipping Cask within the transfer station area.

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

Commission - The Nuclear Regulatory Commission or its duly authorized representatives. [10 CFR 72.3]

Confinement System - Those systems, including ventilation, that act as barriers between areas containing radioactive substances and the environment. [10 CFR 72.3]

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

Control - See constraint.

Controlled Area - That area immediately surrounding an ... MRS for which the licensee exercises authority over its use and within which ... MRS operations are performed. [10 CFR 72.3]

Decommission - To remove (as a facility) safely from service and reduce residual radioactivity to a level that permits release of the property for unrestricted use and termination of license. [10 CFR 72.3]

Decontaminate - The process in which the Internals of the Shipping Cask are cleansed of radioactive particles.

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

Disposal - The isolation of radioactive wastes from the accessible environment. [10 CFR 60.2]

Federally-Permitted Radiation Exposure - The limits on radiation exposure as defined by the Code of Federal Regulations.

Federally-Permitted Release of Radionuclides - The limits on release of radionuclides to the environment as defined by the Code of Federal Regulations.

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

Function Definition - A primary statement of what a function must perform to meet the system mission.

Functional Analysis - As the first step in the Systems Engineering process, 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 the system. [DSMC 6.1]

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

General Environment - The total terrestrial, atmospheric, and aquatic environments outside sites within which any activity, operation, or process associated with the management and storage of spent nuclear fuel or radioactive waste is conducted. [40 CFR 191.02 (o)]

High-level Radioactive Waste (HLW) - (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. [NWSA Sec. 2(12); 10 CFR 72.3]

Impact Limiters - Devices placed on the Shipping cask to provide protection in the event that the Shipping Cask is subject to impact loading during transportation.

Inert - The function by which the atmosphere in the cask is replaced with a non-reactive gas to prevent SNF oxidation.

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.

Integral MRS facility - A facility that is fully integrated into a waste-management system in which all elements and components are optimized as part of a single system. It is an in-line facility that will receive commercial spent fuel, provide a limited amount of storage, provide staging for transportation to the repository, and perform other functions if determined necessary or desirable by future analyses. [DOE/RW-239]

Interface Requirement - A requirement which applies to the inputs to, or outputs from, the function.

Isolation - Inhibiting the transport of radioactive material so that amounts and concentrations of this material entering the accessible environment will be kept within prescribed limits. [10 CFR 60.2]

Lag Storage - The area within the MRS in which SNF is temporarily stored when required due to operational needs.

Monitored Retrievable Storage Installation (MRS) - A complex designed, constructed, and operated by DOE for the receipt, transfer, handling, packaging, possession, safeguarding, and storage of spent nuclear fuel aged for at least one year and solidified high-level radioactive waste resulting from civilian nuclear activities, pending shipment to a HLW repository or other disposal. [10 CFR 72.3]

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 a function or system.

Performance Requirement - A requirement established by OCRWM.

Personnel Barrier - A shield which is placed around the Shipping Cask while it is on the Carriage System to provide protection to personnel and keep personnel at least some minimum distance from the cask.

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.

Port Plug - The portion of the Unloading Port which is removed after the shipping cask is securely in place to provide access to SNF for transfer.

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

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 U.S.C. 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]

Region - The geographical area surrounding and including the site, which is large enough to contain all the features related to a phenomenon or to a particular event that could potentially impact the safe or environmentally sound construction, operation, or decommissioning of an ... monitored retrievable storage installation. [10 CFR 72.3]

Repository - 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. [NWPA Sec. 2(18)]

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.

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

Secured Area - That portion of the controlled area within which access is permitted only to authorized personnel and vehicles.

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

Shipping Cask Lid - The Shipping Cask closure which provides a seal between the environment and the cask interior.

Site - The real property on which the ... MRS is located. [10 CFR 72.3]

SNF Oxidation - The process in which the SNF is degraded by reaction with atmospheric oxygen.

SNF Transfer Station - The location at which the spent fuel is either unloaded from or loaded into the Shipping Cask.

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. [NWSA Sec, 2(23); 10 CFR 961.11, I.18]

- Fuel that has been withdrawn from a nuclear reactor following irradiation, has undergone at least one year's decay since being used as a source of energy in a power reactor, and has not been chemically separated into its constituent elements by reprocessing. Spent fuel includes the special nuclear material, byproduct material, source material, and other radioactive materials associated with fuel assemblies. [10 CFR 72.3]

Storage - Retention of high-level radioactive waste, spent nuclear fuel, or transuranic waste with the intent to recover such waste or fuel for subsequent use, processing, or disposal. [NWSA Sec. 2(25)]

Storage Location - That portion of the MRS where the SNF is stored.

Storage Unit - The container in which the SNF is stored.

Survey - The process of examining the exterior of the Shipping Cask for possible damage and radiation leakage.

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 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 the specific program, which fully describes the system to be developed and produced. [DSMC 5.1]

Tiedowns - Restraints used to secure the Shipping Cask to the Carriage System during transportation.

Tractor - The vehicle which moves the Shipping Cask/Carriage System from the waste producer to the MRS (e.g., a truck, railroad engine or a tug boat).

Trade Study - A quantitative or qualitative parametric analysis of alternatives from which comparisons can be made to support the selection of the "better" alternative.

Unloading Port - The opening into the MRS transfer station at which the Shipping Cask is placed to provide access to the SNF without exposing the SNF to the environment.

Vent/Sample - The process by which the gas in the Shipping Cask is monitored to determine if any degradation of the SNF has occurred during shipment and to relieve any pressure differential between the atmosphere and the cask interior prior to opening the cask.

APPENDIX B

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APPENDIX C

DECISION DOCUMENTATION

1. The decision to use dry storage as the preferred method of storage at an MRS.
[DOE/RW-0035; DOE/RW-0235; RW-1 Memo]

2. The decision to include an MRS as an element of the Nuclear Waste Management System.
[DOE/RW-0239]

3. The decision to accept only spent-nuclear fuel at the MRS facility.
[DOE/RW-0239]

4. All shipments from the MRS facility to the repository would be made exclusively by rail in dedicated trains, which would minimize the number of shipments to the repository.
[DOE/RW-0239]

5. ...and an initiative for establishing integrated monitored retrievable storage (MRS) with a target for spent-fuel acceptance in 1998.
[DOE/RW-0247]

APPENDIX D

ACRONYMS

AE	Accessible Environment
ALARA	As Low as Reasonably Achievable
CFR	Code of Federal Regulations
CHLW	Civilian High-Level Radioactive Waste
CRWM	Civilian Radioactive Waste Management
DE	Design Earthquake
DHLW	Defense High-Level Radioactive Waste
DOE	Department of Energy
DP	Office of Defense Programs, Department of Energy
DSMC	Defense Systems Management College
EPA	Environmental Protection Agency
f.o.b.	Freight on Board
HLW	High-Level Radioactive Waste
IAEA	International Atomic Energy Agency
ISFSI	Independent Spent Fuel Storage Installation
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
OCRWM	Office of Civilian Radioactive Waste Management
PNL	Pacific Northwest Laboratory
PP	Purchaser and/or Producer
QA	Quality Assurance
RCRA	Resource Conservation and Recovery Act of 1976
RW	Office of Civilian Radioactive Waste Management
SNF	Spent Nuclear Fuel
TBD	To Be Determined
USC	United States Code
WMSR	Waste Management System Requirements (Document)
WVDP	West Valley Demonstration Project

APPENDIX E

STORE WASTE INTERFACES*

INTERFACE CONTROL #	FROM	TO	OUTPUT/INPUT TITLE	OUTPUT/INPUT ID#
1.2/1.3.1	Transport Waste	Handle SNF	Loaded SNF Cask/Carriage (R) ¹ Loaded SNF Cask/Carriage (T) ³ Empty SNF Cask/Carriage (R)	1.2O1 ² /1.3.1I1 1.2O1/1.3.1I2 1.2O4 ⁴ /1.3.1I3
1.3.1/1.2	Handle SNF	Transport Waste	Loaded SNF Cask/Carriage (R) Empty SNF Cask/Carriage (R) Empty SNF Cask/Carriage (T)	1.3.1O1/1.2I1 1.3.1O2/1.2I4 1.3.1O3/1.2I4
1.3.1/1.3.2	Handle SNF	Dry-Store SNF	Loaded Storage Units	1.3.1O4/1.3.2I1
1.3.1/1.3.3	Handle SNF	Decommission MRS	Waste Handling Facilities	1.3.1O5/1.3.3I2
1.3.1/1.3.4	Handle SNF	Support SNF Storage Operations	Site Generated Waste	1.3.1O6/1.3.4I1
1.3.1/AE ⁵	Handle SNF	Accessible Environment	Radiation Released Radionuclides	1.3.1O7 1.3.1O8

- * Interfaces for functions below the third level are not shown in this appendix.
- 1. "R" means rail
- 2. 1.2O1: The output "Loaded SNF Cask/Carriage" from function 1.2 - Transport Waste
- 3. "T" means truck
- 4. 1.2O4: The output "Empty Cask/Carriage" from function 1.2 - Transport Waste
- 5. Accessible Environment

STORE WASTE INTERFACES (con't)

INTERFACE CONTROL #	FROM	TO	OUTPUT/INPUT TITLE	OUTPUT/INPUT ID#
1.3.2/1.3.1	Dry-Store SNF	Handle SNF	Loaded Storage Units	1.3.2O1/1.3.1I5
1.3.2/1.3.3	Dry-Store SNF	Decommission MRS	Dry-Storage Facilities	1.3.2O3/1.3.3I1
1.3.2/1.3.4	Dry-Store SNF	Support SNF Storage Operations	Data	1.3.2O2/1.3.4I2
1.3.2/AE	Dry-Store SNF	Accessible Environment	Radiation Released Radionuclides	1.3.2O4 1.3.2O5
1.3.3/1.3.4	Decommission MRS	Support SNF Storage Operations	Site-Generated Waste	1.3.3O1/1.3.4I1
1.3.4/1.3.1	Support SNF Storage Operations	Handle SNF	Empty Storage Units	1.3.4O4/1.3.1I4
1.3.4/1.3.2	Support SNF Storage Operations	Dry-Store SNF	Confinement Systems	1.3.4O3/1.3.2I2
1.3.4/OSB ⁶	Support SNF Storage Operations	Outside System ⁶	Site Generated Waste Records	1.3.4O1 1.3.4O2

⁶. OSB and Outside mean Outside System Boundary

APPENDIX F1 WASTE ACCEPTANCE SCHEDULE

Year	<u>Annual Waste Acceptance Rate</u>			<u>Annual Waste Transportation Rate</u>						<u>Waste Storage Inventory</u>	<u>Waste Disposal Inventory</u>		
	SNF	CHLW	DHLW	<u>Accept-Store</u>		<u>Accept-Dispose</u>			<u>Store-Dispose</u>	SNF	SNF	CHLW	DHLW
				SNF	CHLW	SNF	CHLW	DHLW	SNF				
1998													
1999													
2000													
2001													
2002													
2003													
2004													
2005													
2006													
2007													
2008													
2009													
2010													
.													
.													
.													

TBD

APPENDIX F2 SNF CHARACTERISTICS FOR MRS DESIGN

Year	SNF Transported to MRS				SNF Inventory at MRS				SNF Transported From MRS			
	Age	Burnup	Type	Qty.	Age	Burnup	Type	Qty.	Age	Burnup	Type	Qty.
1998												
1999												
2000												
2001												
2002												
2003												
2004												
2005												
2006												
2007												
2008												
2009												
2010												
.												
.												
.												

TBD

APPENDIX F3 SNF TRANSPORTATION RATES TO/FROM MRS BY MODE

Year	<u>SNF To MRS</u>		<u>SNF From MRS</u>
	Truck	Rail	Rail
1998			-
1999			-
2000			-
2001			-
2002			-
2003			-
2004			-
2005			-
2006			-
2007			-
2008			-
2009			-
2010			-
.			
.			
.			
	TBD		

APPENDIX G

INDENTURED LIST OF STORE WASTE FUNCTIONS

(1. Manage Waste Disposal)

1.3 Store Waste

1.3.1 Handle SNF

1.3.1.1 Receive Loaded/Empty Shipping Cask

1.3.1.1.1 Accept Shipping Cask/Carriage

1.3.1.1.2 Detach Prime Mover

1.3.1.1.3 Inspect Shipping Cask/Carriage

1.3.1.1.4 Move Shipping Cask/Carriage To Parking Area And/Or Shipping/Receiving Bay

1.3.1.2 Park Shipping Cask/Carriage

1.3.1.3 Prepare SNF For Storage

1.3.1.3.1 Remove Loaded Shipping Cask From Carriage

1.3.1.3.1.1 Retrieve Loaded Cask/Carriage

1.3.1.3.1.2 Remove Personnel Barrier

1.3.1.3.1.3 Remove Impact Limiters And Tiedowns

1.3.1.3.1.4 Survey Shipping Cask Surface

1.3.1.3.1.5 Wash Cask

1.3.1.3.1.6 Transfer Loaded Shipping Cask From Carriage To Cask Mover

1.3.1.3.2 Prepare Loaded Shipping Cask For SNF Removal

- 1.3.1.3.2.1 Move Loaded Shipping Cask/Cask Mover To SNF Transfer Station
- 1.3.1.3.2.2 Assess Fuel Prior to Unloading
- 1.3.1.3.2.3 Loosen Shipping Cask Lid
- 1.3.1.3.2.4 Mate Loaded Shipping Cask To Unloading Port
- 1.3.1.3.3 Remove SNF From Loaded Shipping Cask
 - 1.3.1.3.3.1 Remove Port Plug/Cask Lid
 - 1.3.1.3.3.2 Unload SNF From Shipping Cask
 - 1.3.1.3.3.3 Verify SNF Identity And Condition
 - 1.3.1.3.3.4 Canister Defective SNF
 - 1.3.1.3.3.5 Place SNF Into Lag Storage
- 1.3.1.3.4 Prepare Empty Shipping Cask For Return To Service
 - 1.3.1.3.4.1 Replace Cask Lid/Port Plug
 - 1.3.1.3.4.2 Unmate Empty Shipping Cask From Unloading Port
 - 1.3.1.3.4.3 Decontaminate Empty Shipping Cask Internals
 - 1.3.1.3.4.4 Perform Routine Shipping Cask Maintenance
 - 1.3.1.3.4.5 Tighten Empty Shipping Cask Lid
 - 1.3.1.3.4.6 Survey/Decontaminate Empty Shipping Cask Externals
 - 1.3.1.3.4.7 Transfer Empty Shipping Cask From Cask Mover To Carriage
 - 1.3.1.3.4.8 Park Empty Shipping Cask/Carriage

1.3.1.4 Transfer SNF Into Storage

- 1.3.1.4.1 Place SNF Into Storage Unit
- 1.3.1.4.2 Inert Storage Unit
- 1.3.1.4.3 Move Loaded Storage Unit To Storage Location
- 1.3.1.4.4 Emplace Loaded Storage Unit Into Storage
- 1.3.1.5 Retrieve SNF From Storage
 - 1.3.1.5.1 Remove Loaded Storage Unit From Storage
 - 1.3.1.5.2 Move Loaded Storage Unit Into SNF Transfer Station
 - 1.3.1.5.3 Verify SNF Identity And Condition
 - 1.3.1.5.4 Place SNF Into Lag Storage
- 1.3.1.6 Prepare SNF For Transport
 - 1.3.1.6.1 Retrieve Empty Shipping Cask
 - 1.3.1.6.1.1 Retrieve Empty Shipping Cask/Carriage From Parking Area
 - 1.3.1.6.1.2 Remove Personnel Barrier/Impact Limiters/Physical Tiedowns
 - 1.3.1.6.1.3 Transfer Empty Shipping Cask From Carriage To Cask Mover
 - 1.3.1.6.2 Prepare Empty Shipping Cask For SNF Loading
 - 1.3.1.6.2.1 Move Empty Shipping Cask/Cask Mover To Cask Preparation Area
 - 1.3.1.6.2.2 Loosen Empty Shipping Cask Lid
 - 1.3.1.6.2.3 Mate Empty Shipping Cask To Unloading Port
 - 1.3.1.6.3 Place SNF Into Shipping Cask
 - 1.3.1.6.3.1 Remove Port Plug/Shipping Cask Lid

- 1.3.1.6.3.2 Load SNF Into Shipping Cask/Verify
- 1.3.1.6.3.3 Replace Port Plug/Shipping Cask Lid
- 1.3.1.6.4 Prepare Loaded Shipping Cask For Transport
 - 1.3.1.6.4.1 Unmate Loaded Shipping Cask From Loading Port
 - 1.3.1.6.4.2 Tighten Loaded Shipping Cask Lid
 - 1.3.1.6.4.3 Inert Loaded Shipping Cask Cavity
 - 1.3.1.6.4.4 Survey/Decontaminate Cask Externals
 - 1.3.1.6.4.5 Transfer Loaded Shipping Cask From Cask Mover To Carriage
 - 1.3.1.6.4.6 Replace Tiedowns/Impact Limiters/Personnel Barriers
 - 1.3.1.6.4.7 Park Loaded Cask/Carriage
- 1.3.1.6.5 Prepare Cask/Carriage For Release From Site
 - 1.3.1.6.5.1 Move Loaded/Empty Cask/Carriage From Parking Area To Controlled Shipping/Receiving Area
 - 1.3.1.6.5.2 Perform Final Survey
 - 1.3.1.6.5.3 Perform Final Carrier Inspection
 - 1.3.1.6.5.4 Release Loaded/Empty Cask/Carriage System
 - 1.3.1.6.5.4.1 Prepare Shipping Papers
 - 1.3.1.6.5.4.2 Release Cask/Carriage System
 - 1.3.1.6.5.5 Attach Offsite Prime Mover And Remove From Site
- 1.3.2 Dry-Store SNF
 - 1.3.2.1 Maintain SNF Integrity

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Accession No: HQO•910808•0001

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**UNITED STATES
DEPARTMENT OF ENERGY
WASHINGTON, D.C. 20585
RW-30**

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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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ENCLOSURE 5

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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
Washington, D.C. 20585

ENCLOSURE #5

1022

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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.

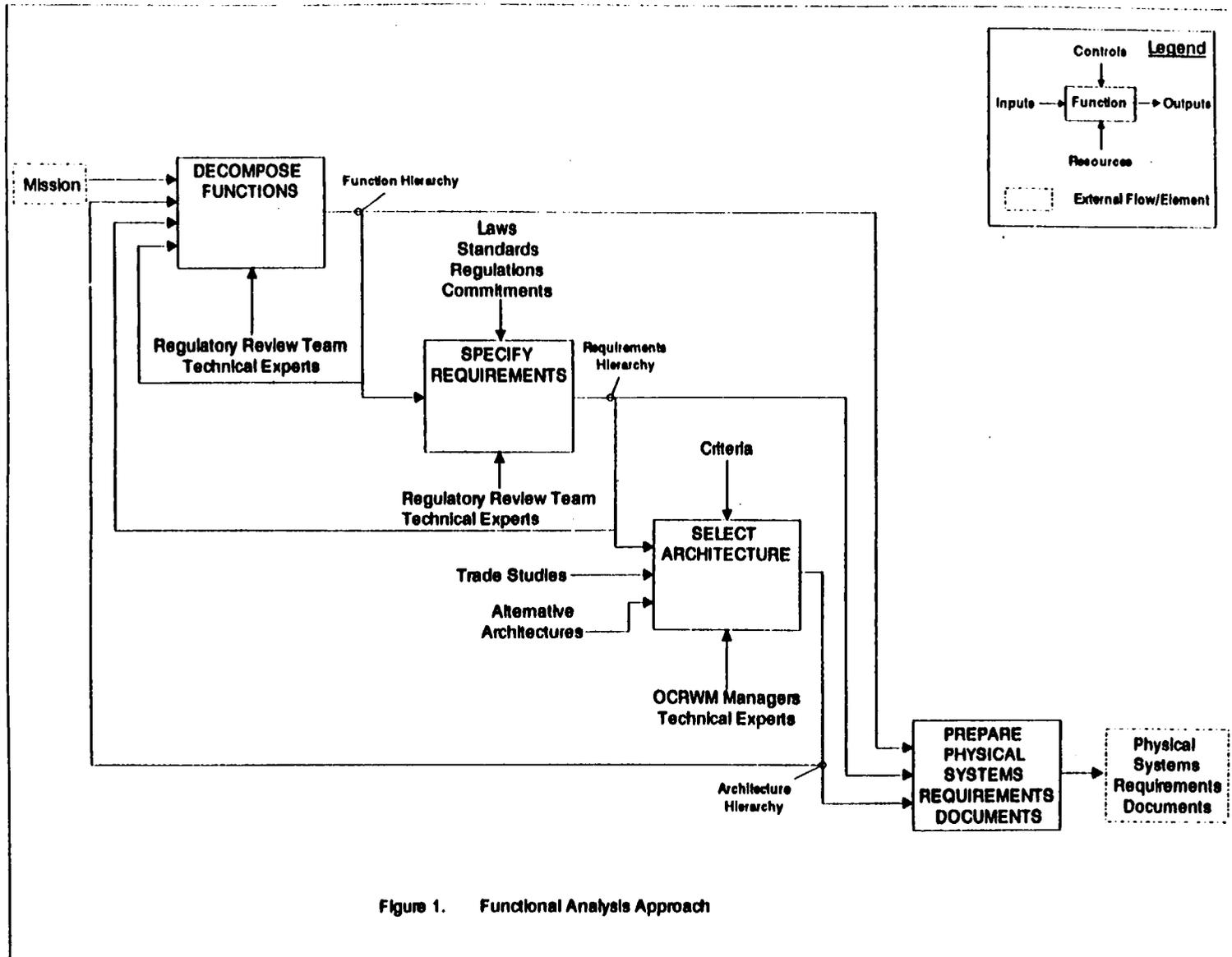


Figure 1. Functional Analysis Approach

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

<u>Document Identifier</u>	<u>Document Description</u>
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 indented 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.

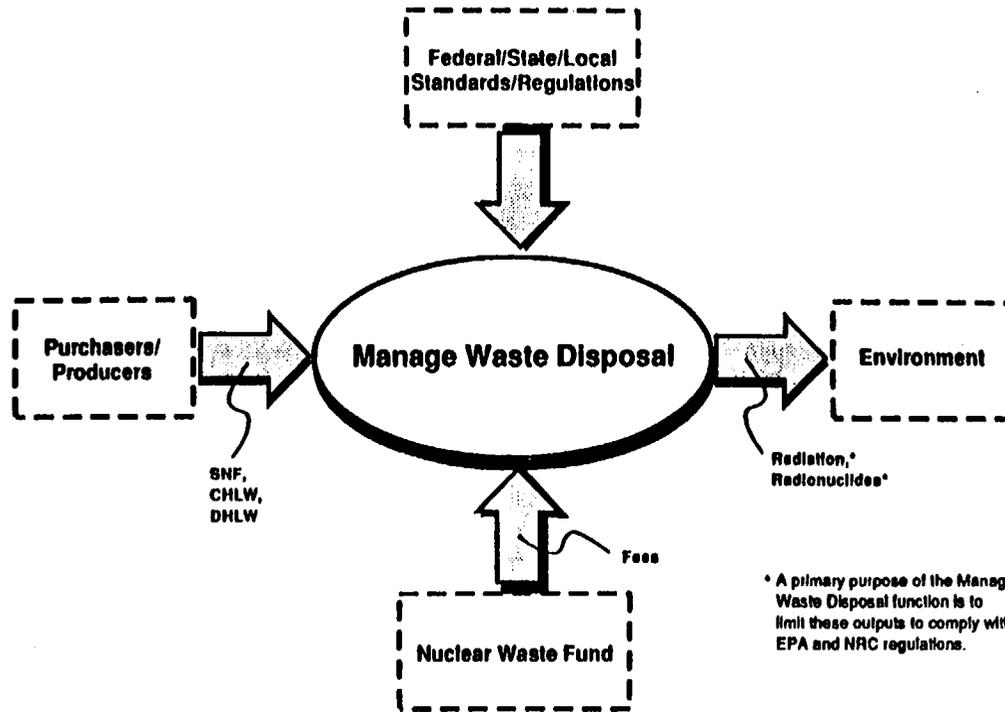


Figure 2. Manage Waste Disposal Boundaries

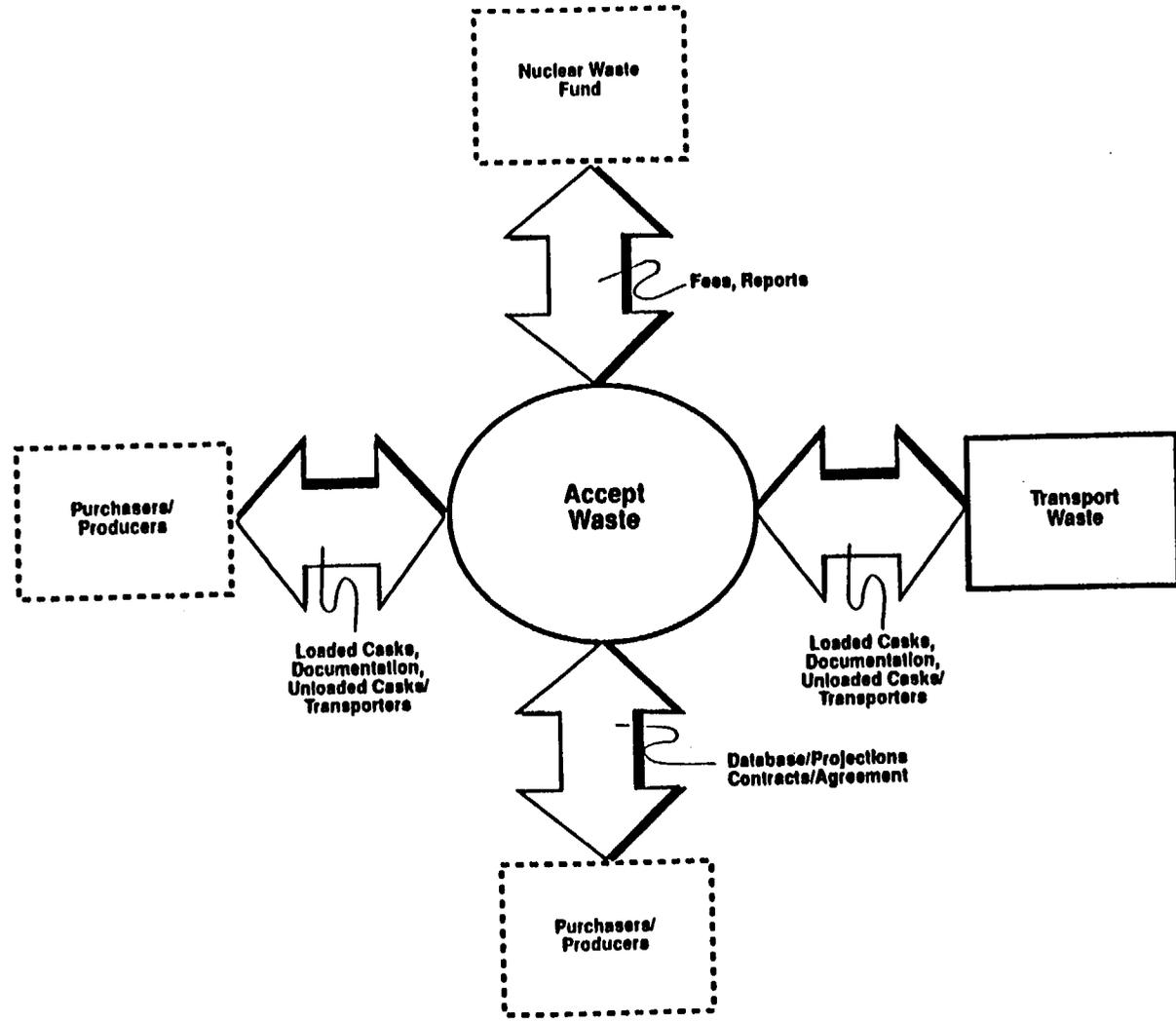


Figure 3. Accept Waste Boundaries

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 indented 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.

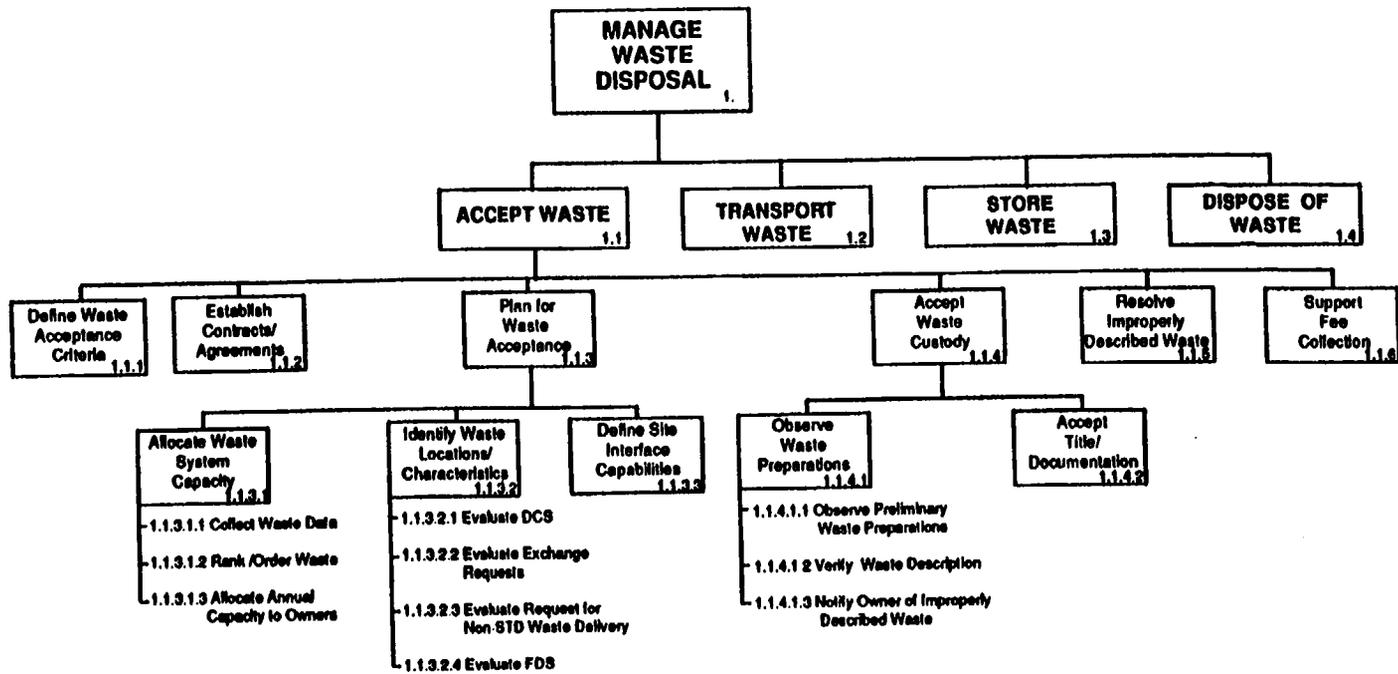


Figure 4. Accept Waste Function Hierarchy

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:

1.11	SNF	From: Purchaser
1.12	CHLW	From: Producer
1.13	DHLW	From: Producer

B. Outputs:

1.01	Federally-Limited Radiation Exposure	To: Accessible Environment
1.02	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]

1.01 -- 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, ...
[NFWPA Sec. 111(a)(4)]

1.02 Same as 1.01 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:

1.111	SNF	From: Purchaser
1.112	CHLW	From: Producer
1.113	DHLW	From: Producer
1.114	Unloaded Casks/Transporters	From: Function 1.2
1.115	Shipping Documents	From: Function 1.2
1.116	Ancillary Equipment	From: Function 1.2

B. Outputs:

1.101	Loaded SNF Casks/Transporters	To: Function 1.2
1.102	Loaded CHLW Casks/Transporters	To: Function 1.2
1.103	Loaded DHLW Casks/Transporters	To: Function 1.2
1.104	Documentation	To: Function 1.2
1.105	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 ...
[NFWPA, 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:

1.111a This requirement intentionally left blank.

1.111b The Purchaser shall deliver to DOE and DOE shall, as provided in this contract, accept the SNF ... which is described in accordance with Article VLA of this contract, for disposal thereof.

[10 CFR 961.11, Article V, A]

1.111c (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]

1.111d (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]

1.111e The SNF acceptance rate will be in accordance with Appendix F of this document.
[TBD, pending DOE/OCRWM decision]

1.111f (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)]

1.112a This requirement intentionally left blank.

1.112b The Purchaser shall deliver to DOE and DOE shall, as provided in this contract, accept the ... HLW which is described in accordance with Article VLA of this contract, for disposal thereof.

[10 CFR 961.11, Article V, A]

1.112c (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]

1.112d The CHLW acceptance rate will be in accordance with Appendix F of this document.
[TBD, pending DOE/OCRWM decision]

1.112e The acceptance agreement for HLW from WVDP is TBD.
[TBD, pending DOE/OCRWM decision]

1.112f (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)]

1.113a The DHLW acceptance rate will be in accordance with Appendix F of this document.
[TBD, pending DOE/OCRWM decision]

1.113b (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)]

1.113c The acceptance agreement for the DOE's SNF and HLW is TBD.
[TBD, pending DOE/OCRWM decision]

1.114 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]

L.1I5 None specified at this time

L.1I6 None specified at this time

L.101a This requirement intentionally left blank.

L.101b ... 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]

L.102a This requirement intentionally left blank.

L.102b ... 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]

L.103 This requirement intentionally left blank.

L.104 ... 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]

L.105 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.IIIa 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	
	$\mu\text{Ci}/\text{cm}^2$	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.IIIb 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:

1.1.311	RW 859 Data	From: Purchaser
1.1.312	Waste Form Compliance Plan	From: Producer
1.1.313	Waste Form Qualification Report	From: Producer
1.1.314	10 CFR 961, Appendix F	From: Purchaser
1.1.315	Schedules, Plans	From: Function 1.2
1.1.316	10 CFR 961/Appendix B	From: Purchaser
1.1.317	DCS	From: Purchaser
1.1.318	FDS	From: Purchaser

B. Outputs:

1.1.301	Approved DCS	To: Purchaser / Function 1.1.4 (Control) / 1.2 / 1.3 / 1.4
1.1.302	Approved FDS	To: Function 1.1.4 (Control) / 1.2 / 1.3 / 1.4
1.1.303	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:

1.1.311a (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
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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]

1.1.3.1.1I1 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:

1.1.3.201	Approved DCS	To:	Purchaser / Function 1.2 / 1.3 / 1.4
1.1.3.202	Approved FDS	To:	Purchaser / Function 1.1.4 (Control) / 1.2 / 1.3 / 1.4
1.1.3.203	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 contract 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	From: Purchaser/Producer
	Approval/Comments	
1.1.3.3I3	Draft Site-Specific Servicing Plans	From: Function 1.2
1.1.3.3I4	Site-Specific Servicing Plans	From: Purchaser/Producer
	Approval/Comments	

B. Outputs:

1.1.3.301	Draft Servicing Planning Documents for Review/Approval	To:	Purchaser/Producer
1.1.3.302	Servicing Planning Documents Approval/Comments	To:	Function 1.2
1.1.3.303	Draft Site-Specific Servicing Plans for Review/Approval	To:	Purchaser/Producer
1.1.3.304	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:

1.1.411	SNF	From:	Purchaser
1.1.412	CHLW	From:	Producer
1.1.413	DHLW	From:	Producer
1.1.414	Title/Documentation	From:	Purchaser/ Producer
1.1.415	Unloaded Casks/Transporters	From:	Function 1.2

B. Outputs:

1.1.401	Loaded SNF Casks/Transporters	To:	Function 1.2
1.1.402	Loaded CHLW Casks/Transporters	To:	Function 1.2
1.1.403	Loaded DHLW Casks/Transporters	To:	Function 1.2
1.1.404	Title	To:	DOE/OCRWM
1.1.405	Documentation	To:	Function 1.2 / DOE/OCRWM
1.1.406	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.

[NWSA 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.II1	Information	From: Purchaser
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B. Outputs:

1.1.4.1O1	Verified Documentation, Findings	To: Function 1.1.4.1.2
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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
1.1.4.1.2I2 Information

From: Function 1.1.4.1.1
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.

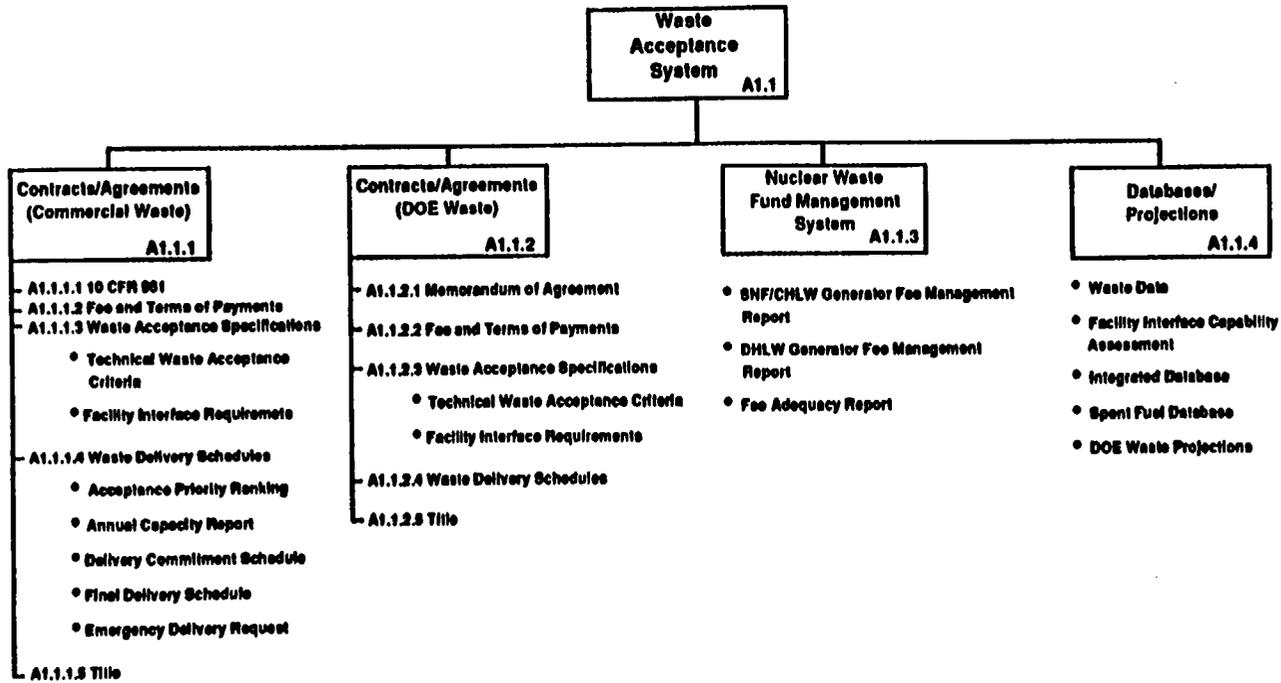


Figure 5. Accept Waste Conceptual Architecture Hierarchy

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.
[NWP, 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.
[NWP, 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

1.1CS; 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 MWD/MTU	\$80.00
5,000 to 10,000 MWD/MTU	142.00
10,000 to 20,000 MWD/MTU	162.00
Over 20,000 MWD/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 A1.1.1.5 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

1.1CS; 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

1.112e; 1.113c

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

1.11C5, 1.11C6; 1.113b

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; 1.1.1H1a, 1.1.1H1b

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

1.1.4.13P1; 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.IP1; 1.1.3.1.III; 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. *[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.

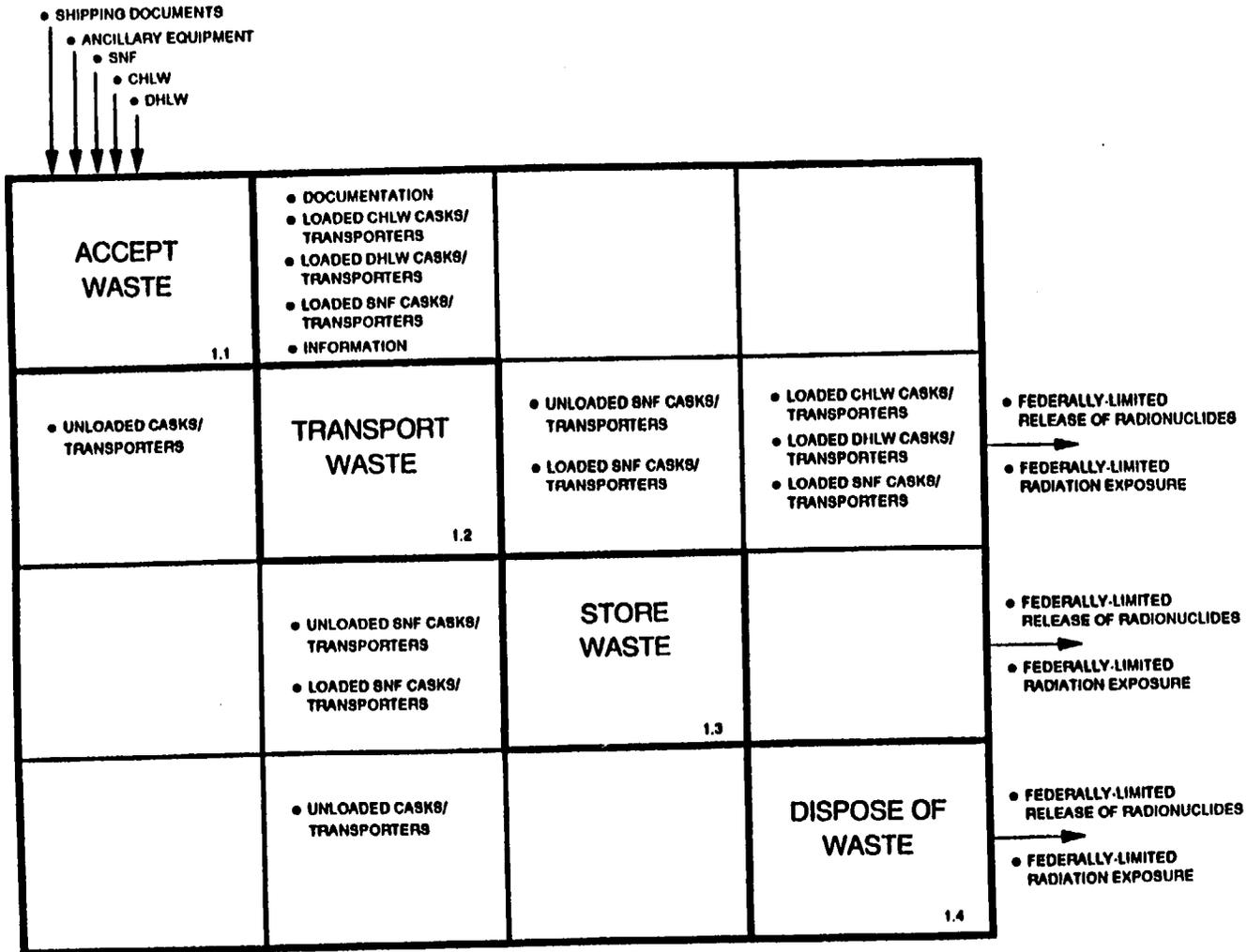


Figure 6. N-Square Chart for 1. - Manage Waste Disposal

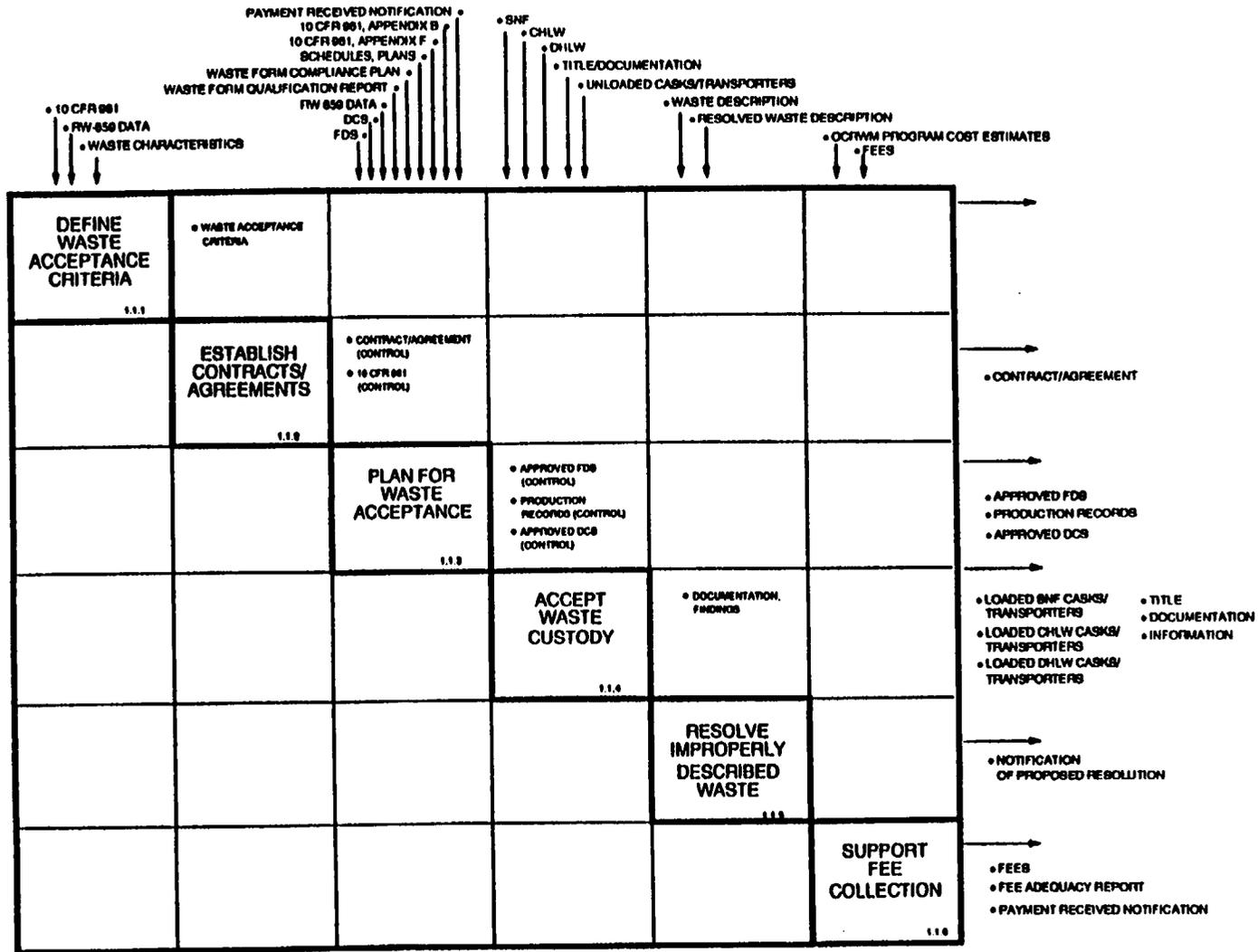


Figure 7. N-Square Chart for 1.1 - Accept Waste

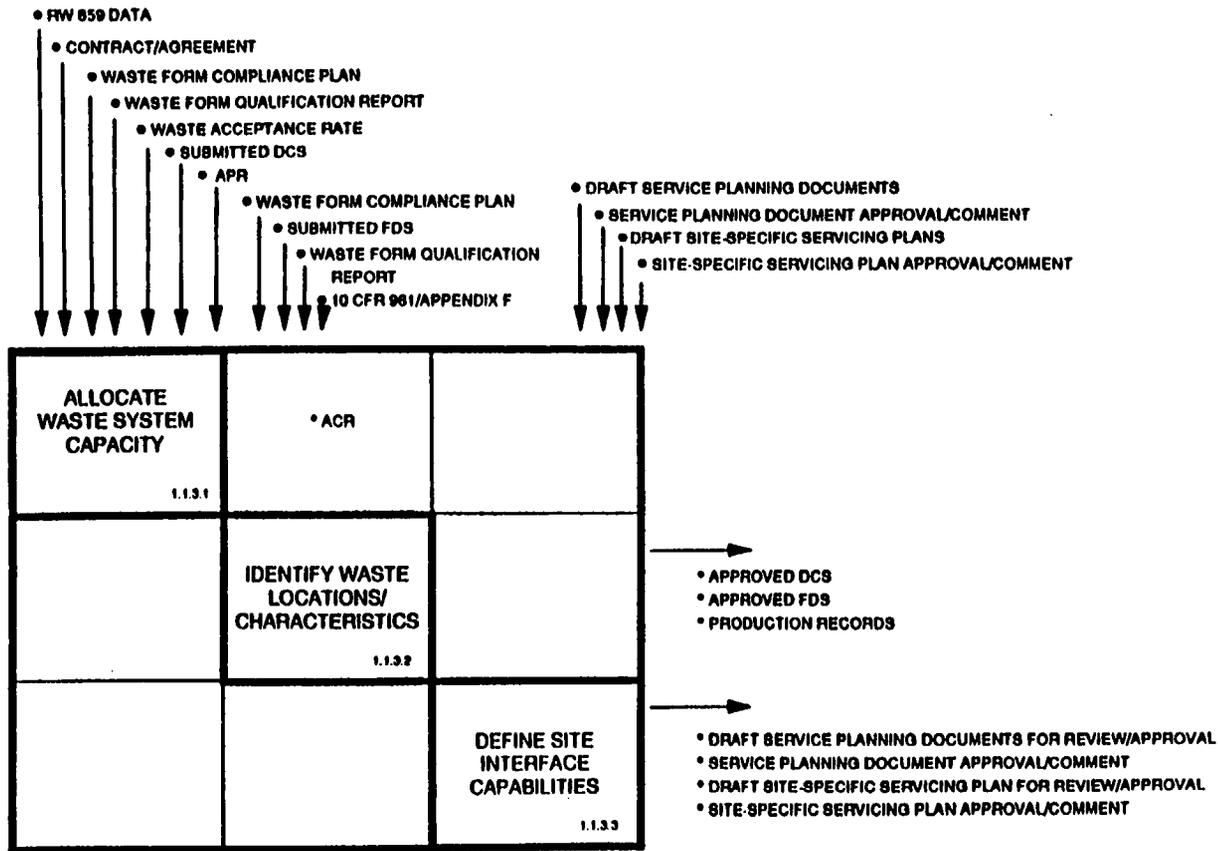


Figure 8. N-Square Chart for 1.1.3 - Plan for Waste Acceptance

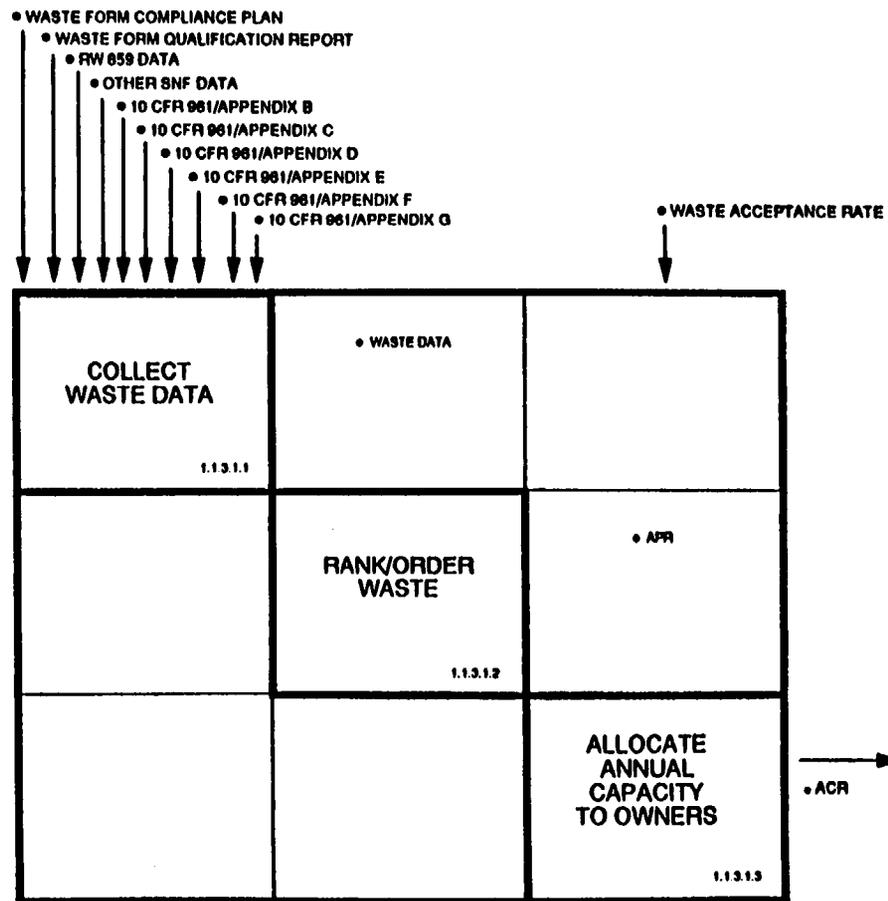


Figure 9. N-Square Chart for 1.1.3.1 - Allocate Waste System Capacity

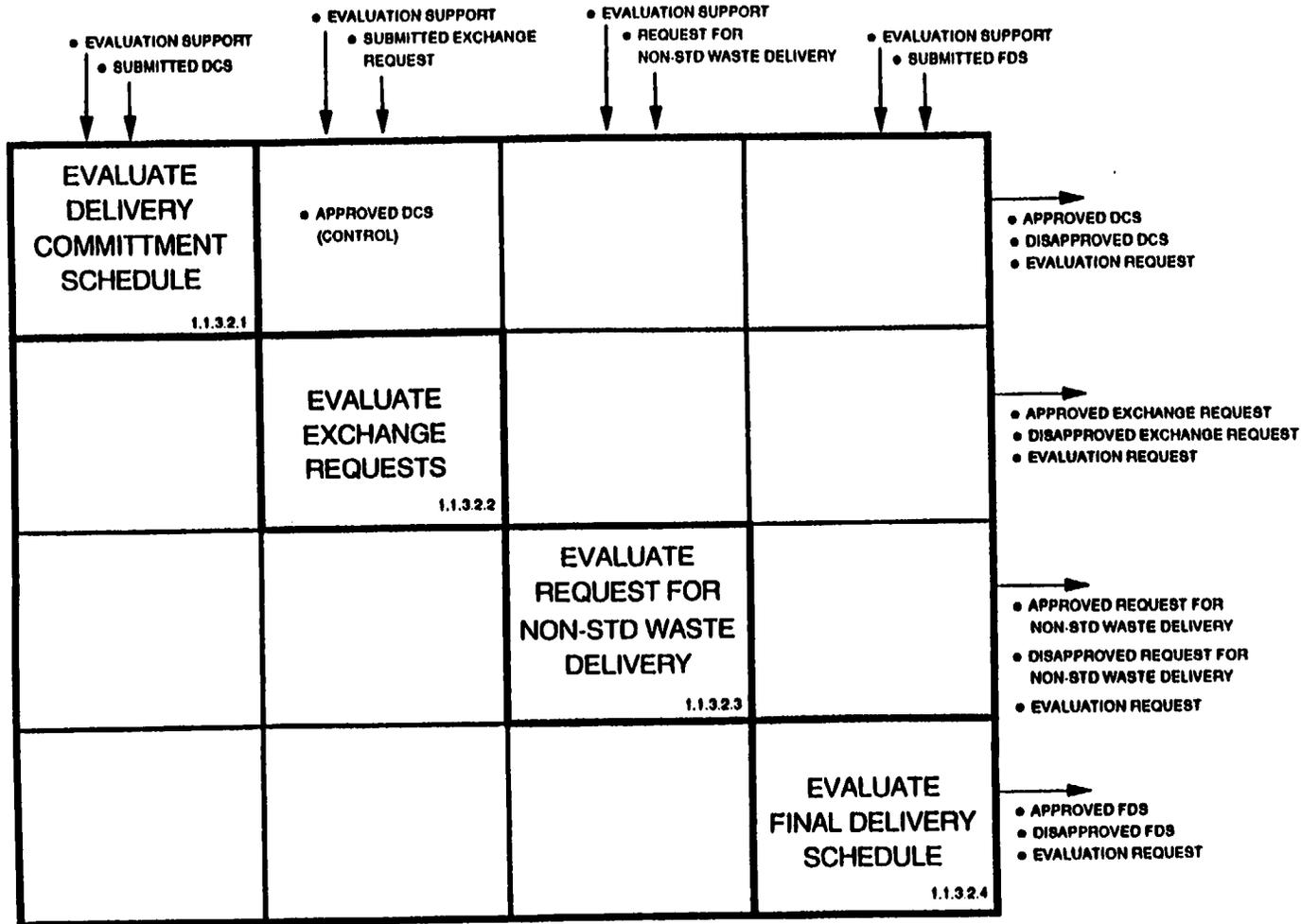


Figure 10. N-Square Chart for 1.1.3.2 - Identify Waste Locations/Characteristics

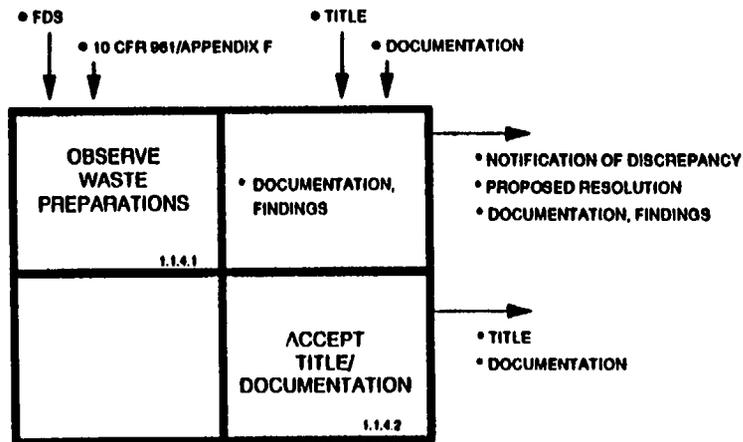


Figure 11. N-Square Chart for 1.1.4 - Transfer Waste Custody

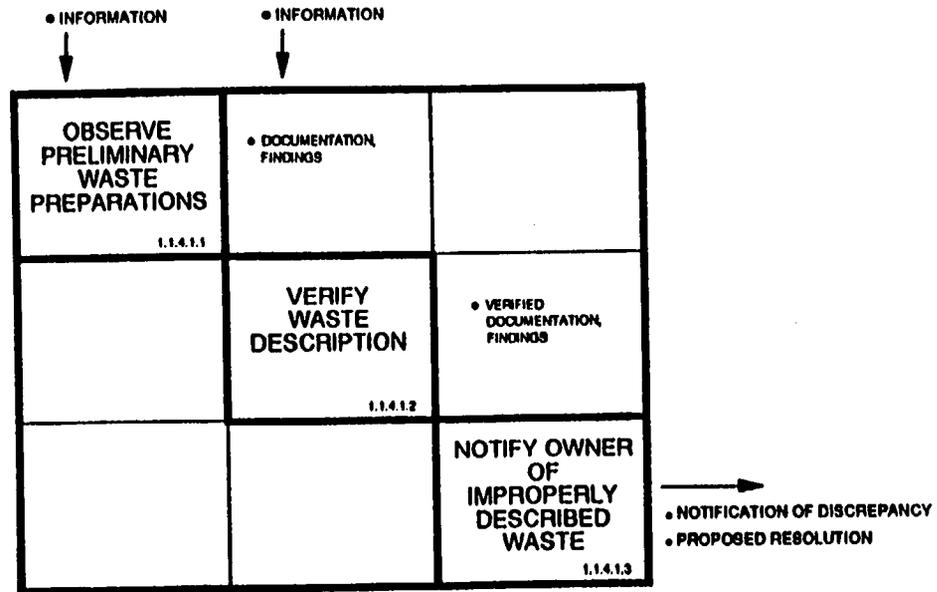


Figure 12. N-Square Chart for 1.1.4.1 - Observe Waste Preparations

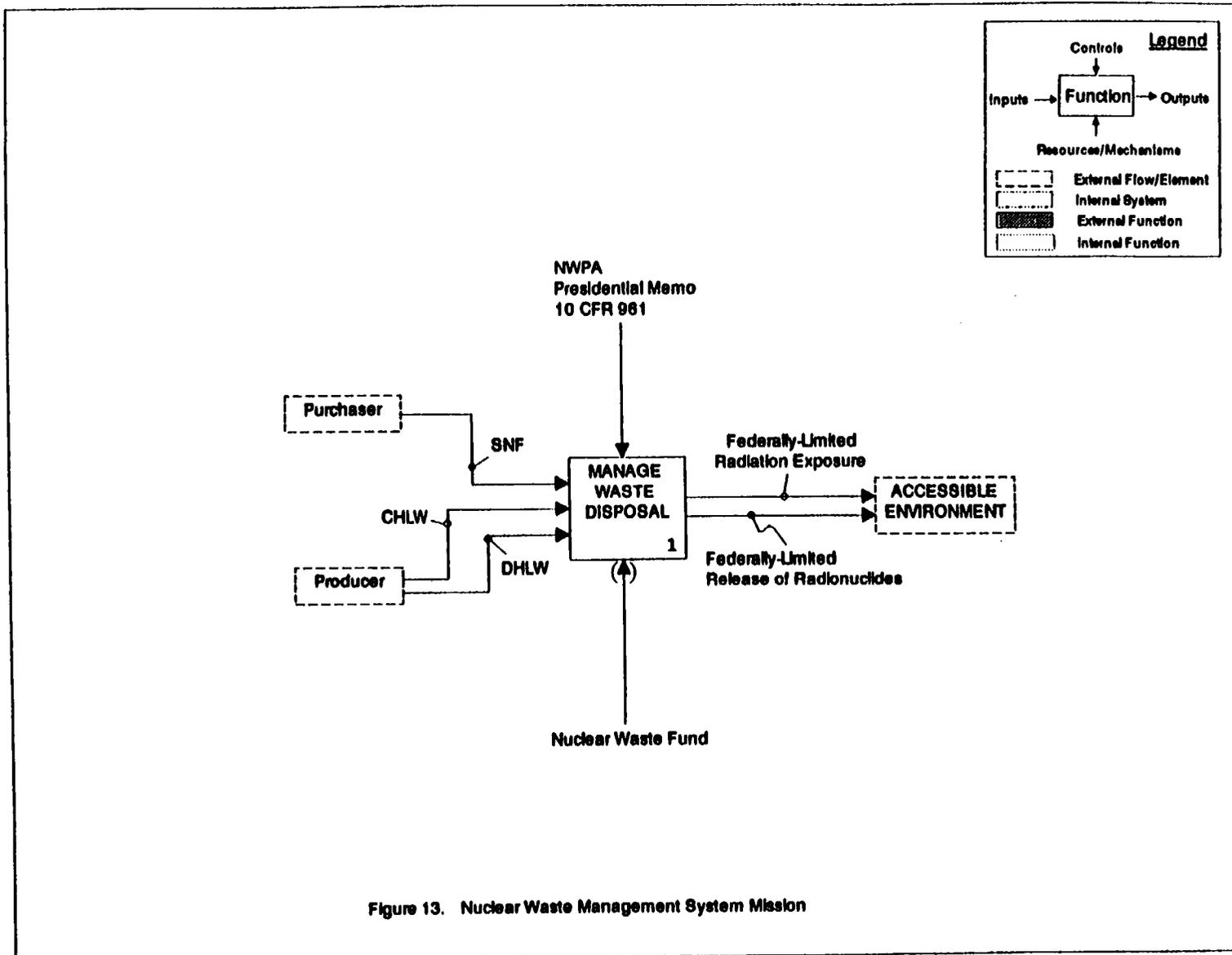


Figure 13. Nuclear Waste Management System Mission

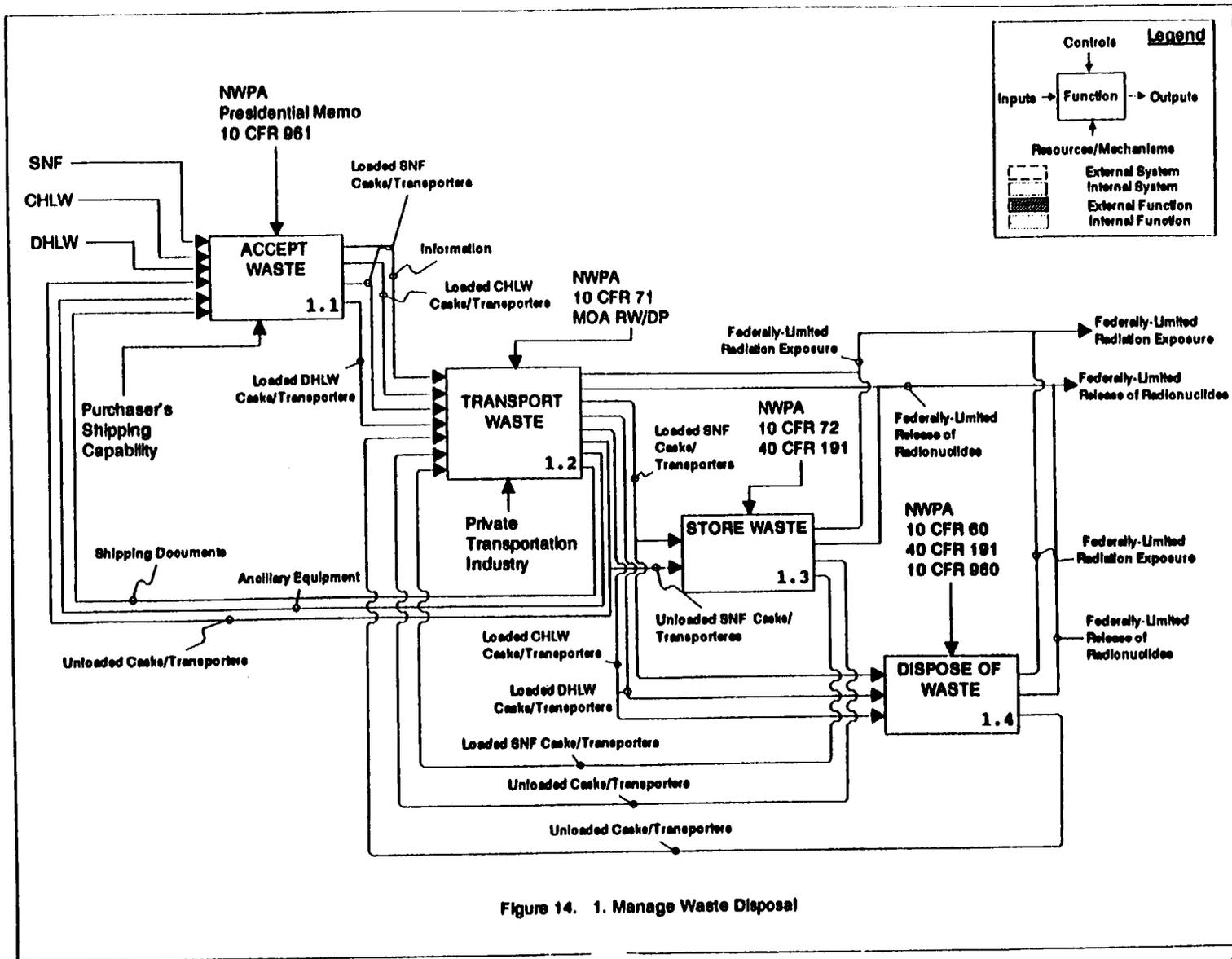
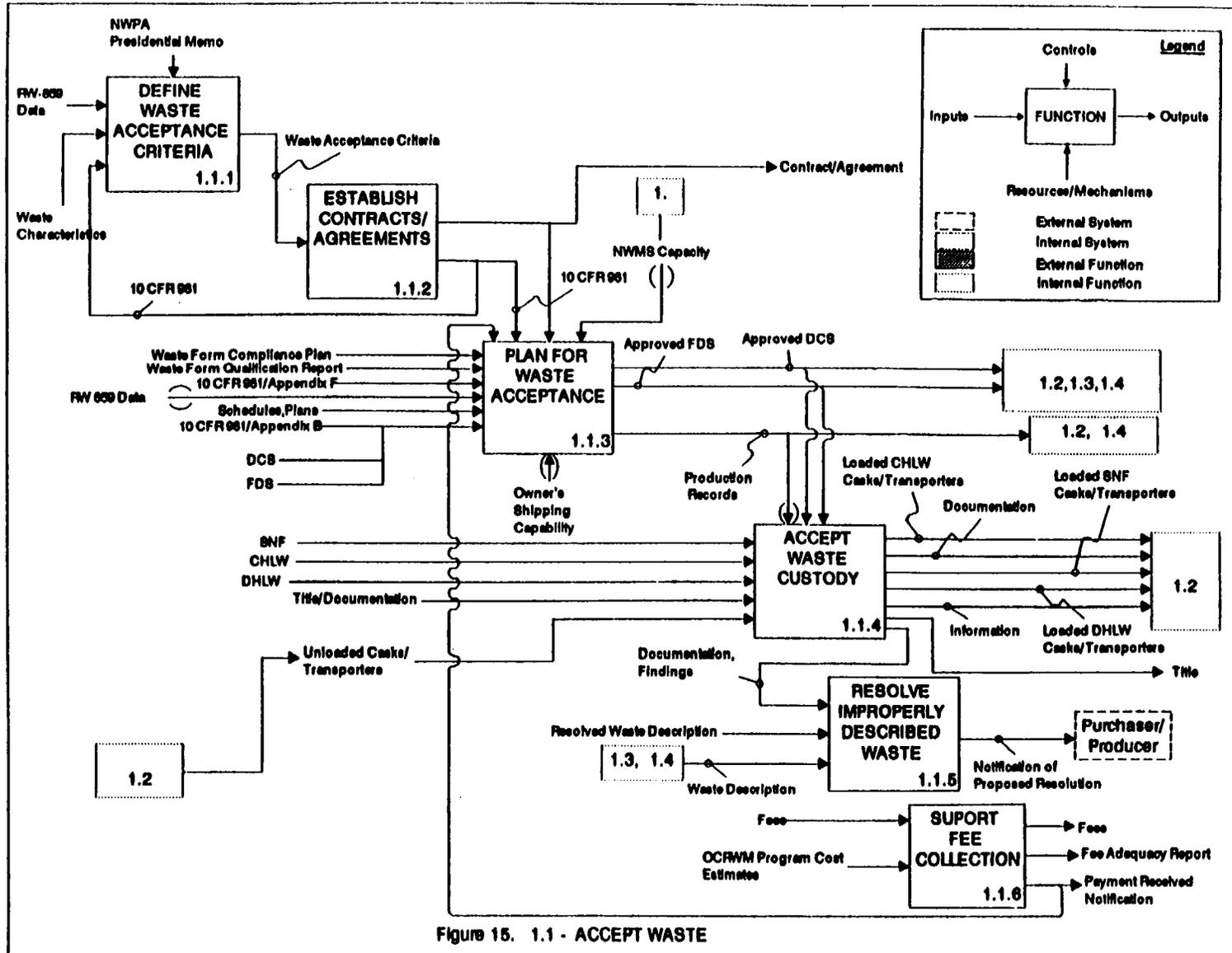


Figure 14. 1. Manage Waste Disposal



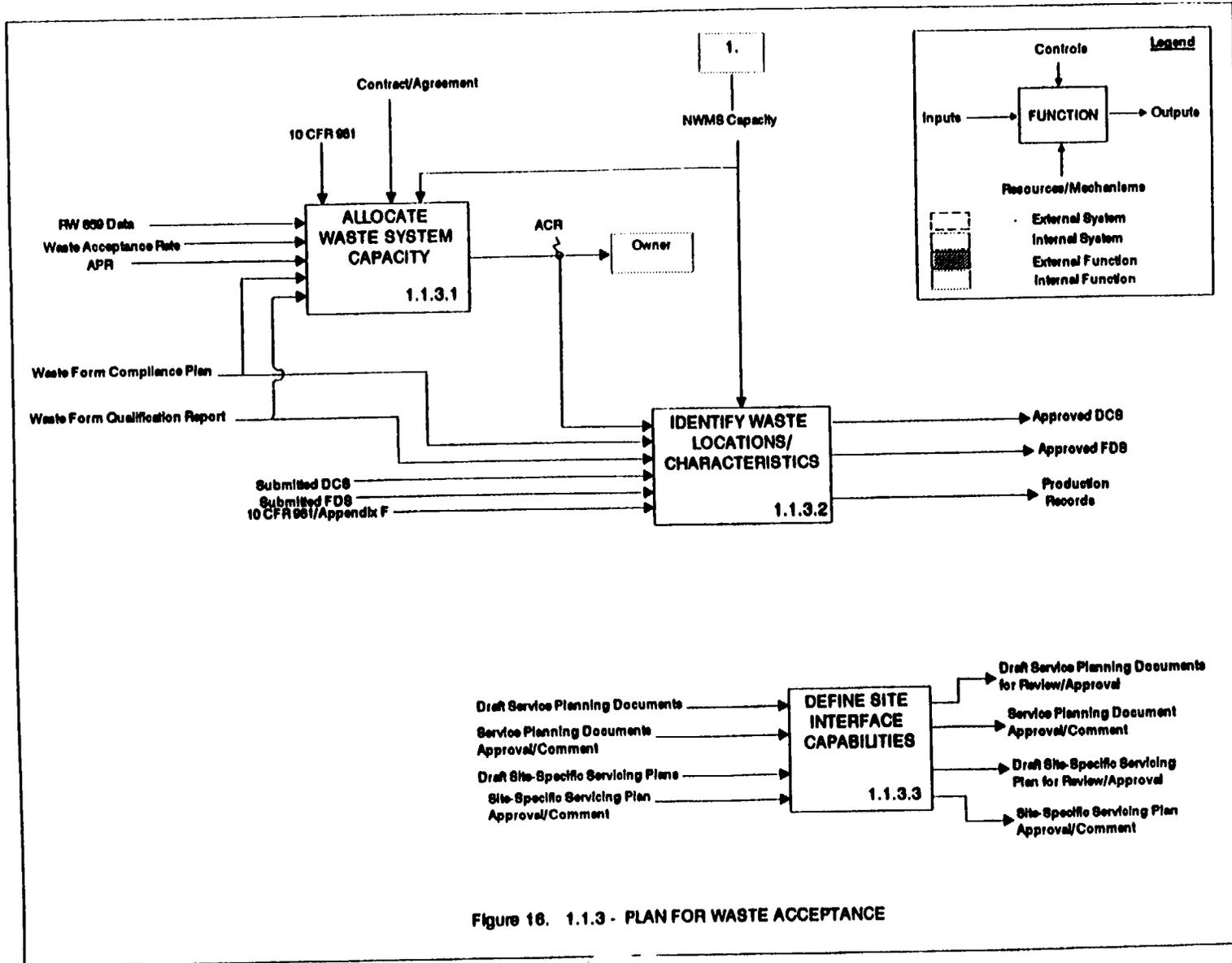


Figure 16. 1.1.3 - PLAN FOR WASTE ACCEPTANCE

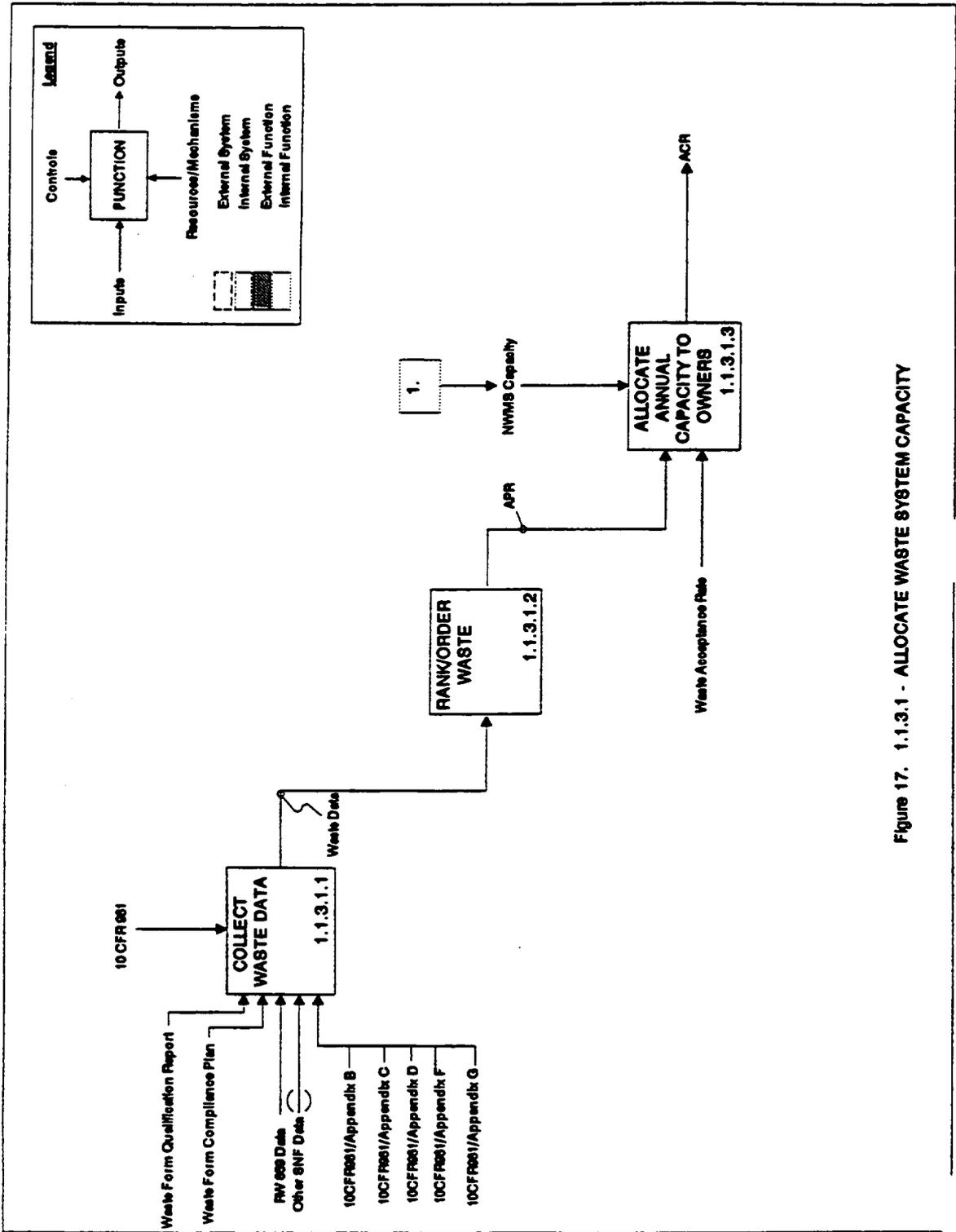


Figure 17. 1.1.3.1 - ALLOCATE WASTE SYSTEM CAPACITY

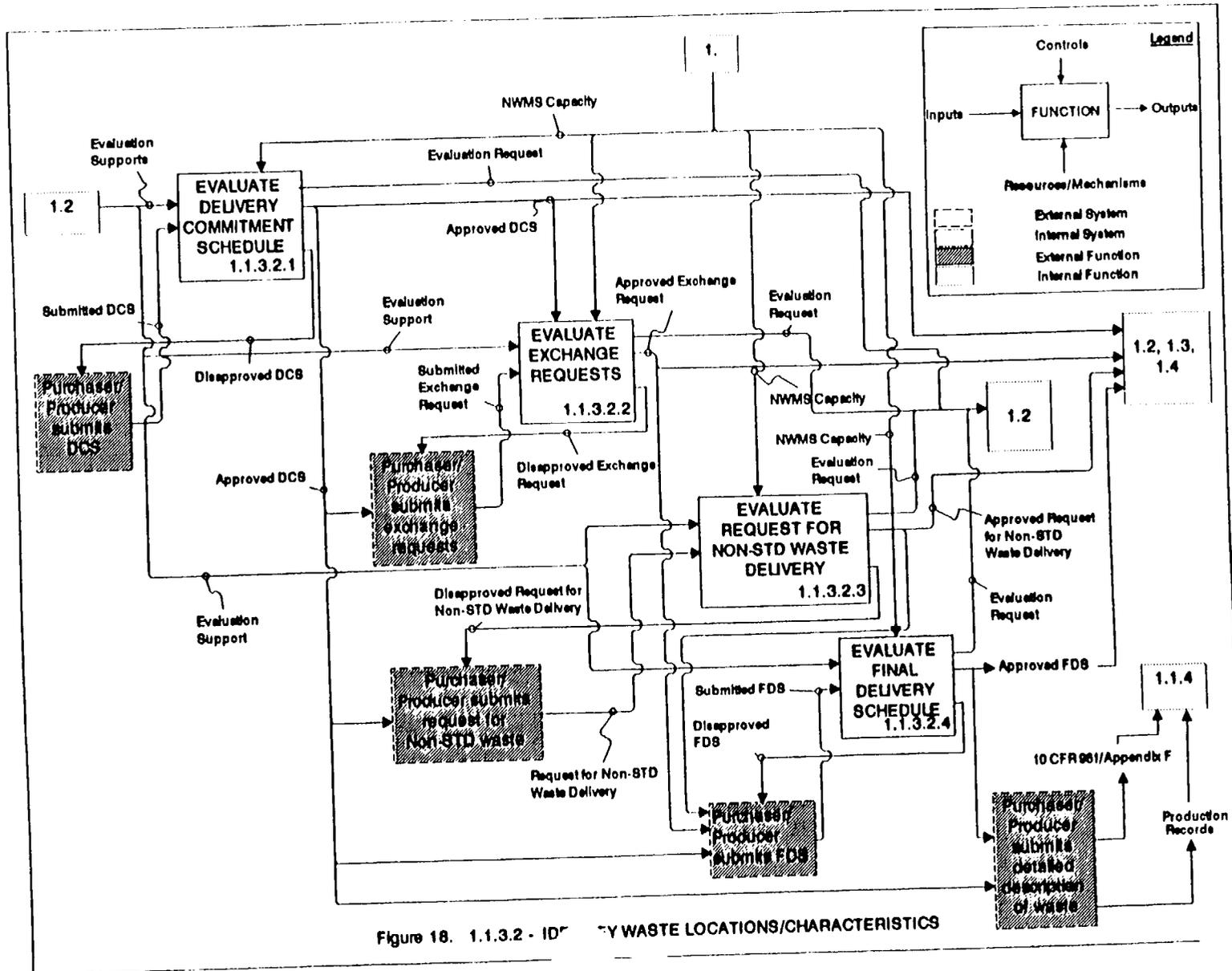


Figure 18. 1.1.3.2 - IDENTITY WASTE LOCATIONS/CHARACTERISTICS

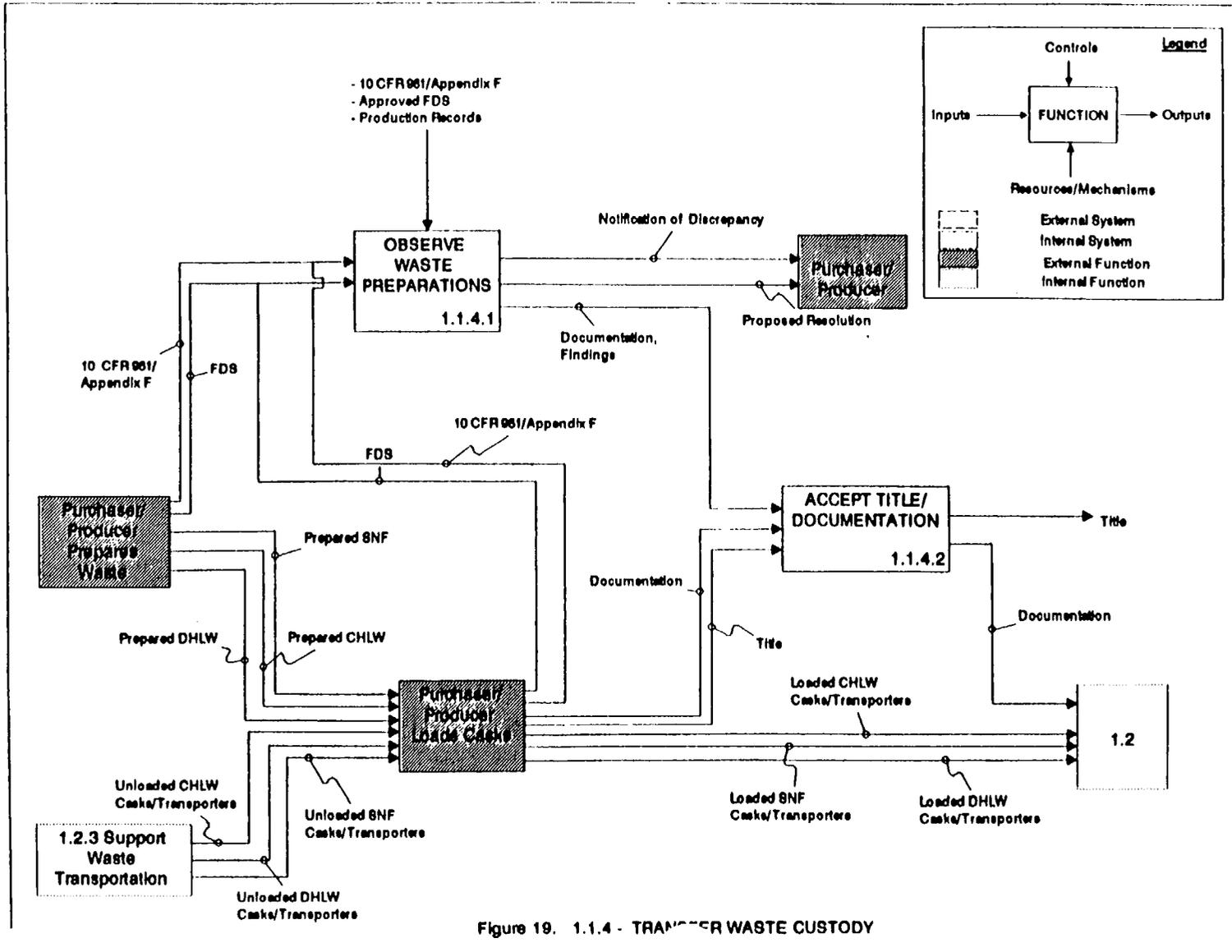
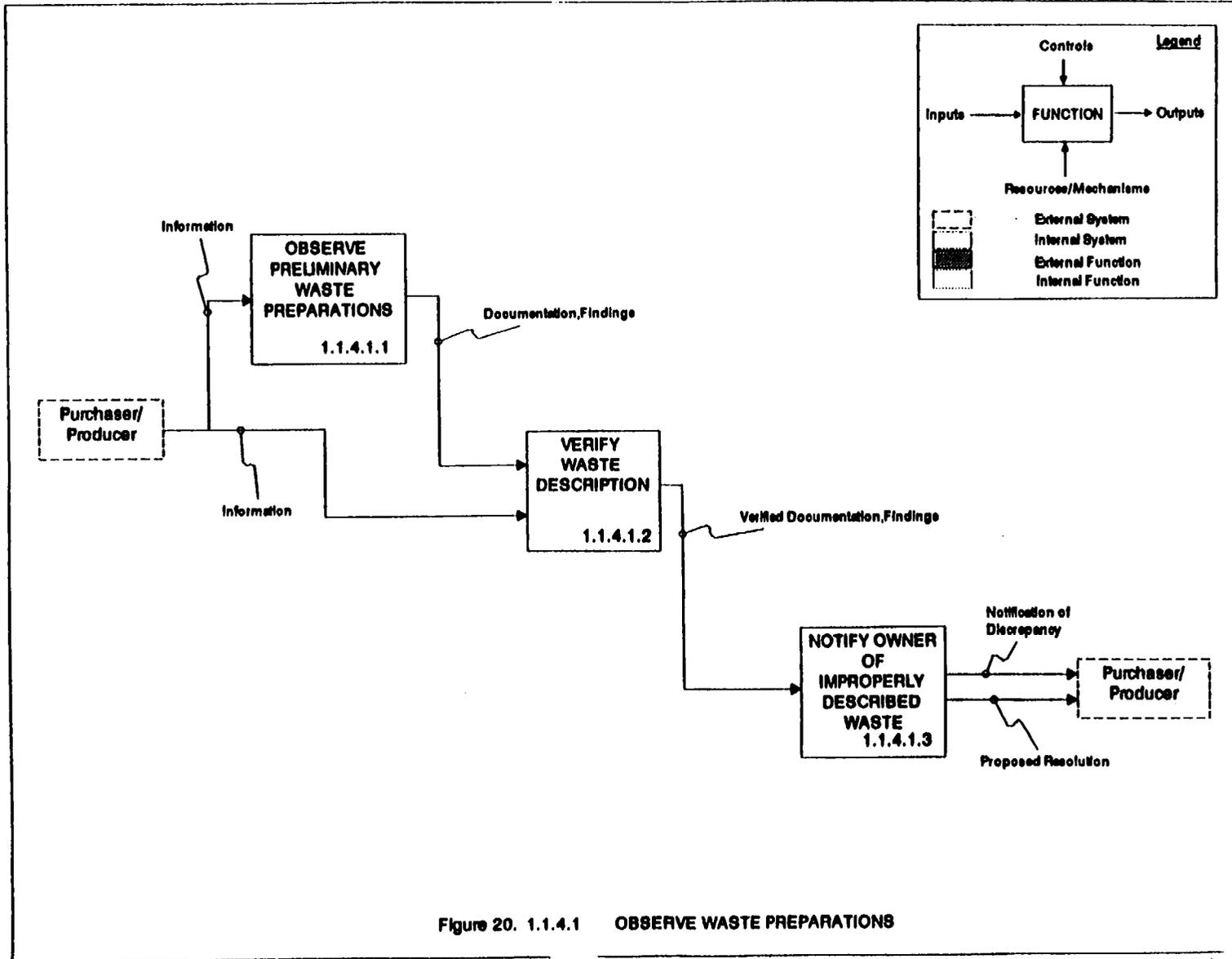


Figure 19. 1.1.4 - TRANSFER WASTE CUSTODY



APPENDICES

1

APPENDIX A

2

GLOSSARY

3

4

5

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.

6

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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]

9

10

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]

11

12

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-

13

14

15

- (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]

16

17

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

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19

Atomic energy defense activity - Any activity of the Secretary performed in whole or in part in carrying out any of the following functions:

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- (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.

28

Cask - See package.

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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]

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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]

- 1 Commercial High-Level Radioactive Waste (CHLW) - The high-level radioactive waste,
2 as defined by NWPA Sec. 2(12), resulting from atomic energy civilian activities.
- 3 Commission - The Nuclear Regulatory Commission or its duly authorized representatives.
4 [10 CFR 60.2]
- 5 Consolidation - The operation performed on spent fuel assemblies during which the
6 upper and lower fuel-assembly tie plates are removed, the assembly spacer grids and any
7 other assembly structural members are removed, and the fuel tubes are collected and
8 formed into a closely packed bundle in a canister or container. The nonfuel structural
9 members of the fuel assemblies are reduced in volume and placed in canisters or
10 containers for shipment and disposal. [DOE/RW-0199, Vol. VIII, Part B, page G-18]
- 11 Constraint - A requirement imposed by the external environment (e.g., NRC).
- 12 Container - The component of the waste package that is placed around the waste form
13 or the canistered waste form.
- 14 Contract - The agreement set forth in 10 CFR 961.11 and any duly executed amendment
15 or modification thereto.
- 16 Control - Rules, regulations, laws, facts, etc., that constrain the performance of a
17 function.
- 18 Defense High-Level Radioactive Waste (DHLW) - The high-level radioactive waste, as
19 defined by NWPA Sec. 2(12), resulting from atomic energy defense activities.
- 20 Department - The Department of Energy.
- 21 Disposal Package or Waste Package - The primary container that holds, and is in contact
22 with, solidified high-level radioactive waste, spent nuclear fuel, or other radioactive
23 materials, and any overpacks that are emplaced at a repository. [NWPA Sect. 2(10)]
- 24 Function - A primary statement of purpose; definition of what a system or subsystem
25 must accomplish to meet the system mission.
- 26 Functional Analysis - The first step in the Systems Engineering process that defines a
27 baseline of functions and function performance requirements which must be met in order
28 to adequately accomplish the operation, support, test, and production requirements of a
29 system. [DSMC 6.1]
- 30 Functional Interface - The interaction between functions, as in the flow of material or
31 information between a sequence of activities.
- 32 Generator - Any person who is licensed by the Nuclear Regulatory Commission to use a
33 utilization or production facility under the authority of section 103 or 104 of the Atomic
34 Energy Act of 1954 (42 U.S.C. 2133, 2134). [10 CFR 961.3]

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

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

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

18 High-level Radioactive Waste - (A) the highly radioactive material resulting from the
19 reprocessing of spent nuclear fuel, including liquid waste produced directly in
20 reprocessing and any solid material derived from such liquid waste that contains fission
21 products in sufficient concentrations; and (B) other highly radioactive material that the
22 Commission, consistent with existing law, determines by rule requires permanent
23 isolation. [NWSA Sect. 2(12)]

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

28 HLW Facility - A facility subject to the licensing and related regulatory authority of the
29 Commission pursuant to Section 202(3) and 202(4) of the Energy Reorganization Act of
30 1974 (88 Stat. 1244). [10 CFR 60.2]

31 Important to Safety - With reference to structures, systems, and components means those
32 engineered structures, systems, and components essential to the prevention or mitigation
33 of an accident that could result in a radiation dose to the whole body, or any organ, of
34 0.5 rem or greater at or beyond the nearest boundary of the unrestricted area at any
35 time until the completion of permanent closure. [10 CFR 60.2]

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

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

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

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

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

12 Licensee - A person who is authorized to conduct activities under a license or
13 construction permit issued by the Commission. [10 CFR 2.4]

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

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

30 Monitored Retrievable Storage facility (MRS) - The storage facility described in section
31 141(b)(1). [NWPA Section 2(34)]

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

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

37 Owner - Any person who has title to spent nuclear fuel or high-level radioactive waste.
38 [10 CFR 961.3]

1 Package - The packaging together with its radioactive contents as presented for transport.
2 [10 CFR 71.4]

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

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

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

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

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

20 Purchaser - Any person, other than a Federal agency, who is licensed by the Nuclear
21 Regulatory Commission to use a utilization or production facility under the authority of
22 sections 103 or 104 of the Atomic Energy Act of 1954 (42 USC 2133, 2134) or who has
23 title to spent nuclear fuel or high level radioactive waste and who has executed a contract
24 with DOE. [10 CFR 961.3]

25 Repository - See Geologic Repository.

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

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

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

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

- 1 Secretary - The Secretary of Energy. [10 CFR 961.3]
- 2 Shipment - The movement of the properly packaged cask from the generating facility to
3 the receiving site and all associated regulatory activities.
- 4 Shipper - The person (or his or her agent) who tenders a shipment for transportation.
5 The term includes persons who prepare packages for shipment, and offer packages to a
6 carrier for transportation by signature on the shipping papers. [DOE Order 1540.1,
7 Section 5.q]
- 8 Shipping Cask - A container for shipping spent nuclear fuel and/or high-level radioactive
9 waste which meets all applicable regulatory requirements.
- 10 Spent Nuclear Fuel - (SNF) - Fuel that has been withdrawn from a nuclear reactor
11 following irradiation, the constituent elements of which have not been separated by
12 reprocessing. [NWP A Sect. 2(23); 10 CFR 961.11, I.18]
- 13 System - The geologic setting at the site, the waste package, and the repository, all acting
14 together to contain and isolate the waste. [10 CFR 960.2]
- 15 System Performance - The complete behavior of a repository system in response to the
16 conditions, processes, and events that may affect it. [10 CFR 960.2]
- 17 Systems Engineering - The management function which controls the total system
18 development effort for the purpose of achieving an optimum balance of all system
19 elements. It is a process which transforms an operational need into a description of
20 system parameters and integrates those parameters to optimize the overall system
21 effectiveness. [DSMC 1.3]. Systems engineering is a sequence of activities and decisions
22 that transforms an identified mission need into a description of system performance
23 parameters and a preferred system configuration [DOE Order 4700.1]
- 24 Systems Engineering Process - An iterative process applied throughout the acquisition life
25 cycle. The process itself leads to a well defined, completely documented, and optimally
26 balanced system. It does not produce the actual system itself, but rather, it produces the
27 complete set of documentation, tailored to the needs of a specific program, which fully
28 describes the system to be developed and produced. [DSMC 5.1]
- 29 Transporter or Transport Vehicle - A cargo-carrying vehicle such as ... semitrailer, ... or
30 rail car used for the transportation of cargo by any mode. Each cargo-carrying body
31 (trailer, rail car, barge) is a separate transport vehicle. [49 CFR 171.8]
- 32 Waste Acceptance Specifications - A compilation of quantitative detailed standards which
33 ensure that each conforming waste form produced will be acceptable for the waste
34 management system.
- 35 Waste Form - The radioactive waste materials and any encapsulating or stabilizing
36 matrix. [10 CFR 60.2, 10 CFR 960.2]

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

3 Waste Form Compliance Plan - Document prepared by a waste producer for RW
4 approval describing planned analyses, tests, and engineering development work to be
5 undertaken and information to be included in individual waste form production records
6 to demonstrate compliance of a proposed waste form with Waste Acceptance
7 Specifications.

8 Waste Form Qualification Report - Documentation prepared by waste producer for RW
9 approval which describes results of analyses, tests and engineering development work
10 actually performed to demonstrate waste form compliance with waste acceptance
11 specifications.

12 Waste Owner - Same as Owner.

13 Waste Package - The waste form and any containers, shielding, packing and other
14 absorbent materials immediately surrounding an individual waste container.
15 [10 CFR 60.2]

APPENDIX B

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¹ The waste management activities of DP are now EM's responsibility.

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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 Sarda, 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	SNF	CHLW	DHLW	SNF	SNF	SNF	SNF	SNF	SNF
	Annual Waste Acceptance Rate			Annual Waste Incineration Rate					
				Accept-Slots	Accept-DHLW	Accept-DHLW	Accept-DHLW	Accept-DHLW	Accept-DHLW

TBD

1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010

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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